EPC PROPOSAL FORM

Originating Academic Unit:	Departments of Mathematics and Computer Science
Date Proposal Submitted:	11-1-2023

INSTRUCTIONS: Upon completing the form, submit the document with all appropriate signatures to the Office of the Provost *via* the Faculty Governance Manager at facgov@plu.edu.

DEADLINES: Type 1 proposals, being non-substantive, are generally considered on a rolling basis. Type 2 proposals – December 1. Type 3 proposals - November 1.

For specifics on the processing of each type of proposal, read the Educational Policies Committee Manual in the PLU Faculty Handbook (Section III, Part VI), and the Preparing EPC Proposals checklist, located on the documents and forms section of the Faculty Governance website.

PROPOSAL SUMMARY

Provide a summary of the proposal.

Adding a Data Science BS major

TYPE OF PROPOSAL

Check all the appropriate boxes.

[ ] TYPE 1: NON-SUBSTANTIVE CHANGES ***[complete shaded sections and provide signatures]***

Check boxes in this section for any changes that do not alter curricular components or requirements. Also complete Proposal Summary (above), a brief Statement of Rationale (below), Catalog/Curriculum Changes section (ahead), and provide chair/dean signatures on the final page.

[ ] Change course number
[ ] Change course title
[ ] Delete course with no GenEd element, which is not part of by any other major/minor/concentration
[ ] Add GenEd Element to existing course**

[ ] Prerequisite change within the academic unit only
[ ] Catalog editorial change

[ ] TYPE 2: SUBSTANTIVE CHANGES ***[complete all sections, including signatures]***

Submit completed form, including signatures. Be sure to check all boxes that apply.

[ ] Change course description++
[ ] Add permanent GenEd course++
[ ] Add permanent non-GenEd course++
[ ] Change major requirement**
[ ] Change grading type (e.g. P/F, letter grade)
[ ] Change prerequisite involving another unit's course
[ ] Other: _____

[ ] Change a course's credit hours
[ ] Delete GenEd course
[ ] Revise curriculum**
[ ] Change minor requirement**
[ ] Change concentration requirement**

[ ] TYPE 3: CHANGES REQUIRING FACULTY ASSEMBLY APPROVAL ***[complete all sections, including signatures]***

Note: These proposals require the approval of the Board of Regents in addition to the Faculty Assembly.

[ ] New Degree** [X] New Major** [ ] New Minor** [ ] New Concentration**
[ ] Eliminate Degree [ ] Eliminate Major [ ] Eliminate Minor [ ] Eliminate Concentration
[ ] Add Certificate (non-Continuing Education)** [ ] Other: _____

** These changes/proposals require completion of the EPC Curriculum Change Template and a two-year course cycle. The noted Type 3 proposals also require attachment of an Institutional Impact Evaluation Form.
++ A course syllabus must be submitted with these course proposals.

STATEMENT OF RATIONALE

Provide a statement of rationale and/or other clarifications. Include information on student learning and outcomes and any General Education Program rationale.

In this era of data deluge, graduates with a data science major who can work with data and draw data-based conclusions are in high demand. Data science is a new, popular discipline, and there is immense power in its tools which historically have recklessly caused unintended, tragic discrimination and social injustice. There is a need for data science programs which do more than just give students tools to generate high-performance models for conducting analyses; we need data scientists who recognize complexities and think about how their reports may have a broader impact beyond what they have on their immediate clients.

Our major program will prepare ethical and competent stewards of data and data models. We will facilitate learning through activities, projects, and discussions of course readings highlighting ethical tensions within the discipline. Graduates will serve, lead, and care for society as they create models to answer questions; communicate results responsibly to an audience; and grapple with issues and implications for their work.

Student Learning outcomes:

1. Design: Be able to critically analyze a problem and to design, implement, and evaluate a solution that meets requirements.
2. Communication: Be able to effectively communicate technical concepts in oral and written form.
3. Application: Be able to apply mathematical or statistical concepts to concrete situations.
4. Disciplinary Citizenship: Develop collaborative skills and independence; have experience with open-ended inquiry.

CATALOG/CURRICULUM CHANGES

Current Catalog Language:

Our society increasingly values decisions that are supported by data. PLU graduates who can enter their vocations and their communities with experience collecting, managing and analyzing data will be empowered to lead and serve thoughtfully, skillfully, and rationally.

Data science is emerging as a field that is revolutionizing science and industries alike. Work across nearly all domains is becoming more data driven, affecting both the jobs that are available and the skills that are required. As more data and ways of analyzing them become available, more aspects of the economy, society, and daily life will become dependent on data... Data science spans a broader

array of activities that involve applying principles for data collection, storage, integration, analysis, inference, communication, and ethics. — National Academy of Sciences (NAS), 2018

The Data Science Minor is ideal for students who would benefit from in-depth experiences managing, analyzing, and visualizing data. The minor is designed for students from virtually any major, although quantitative literacy at or exceeding the level of PLU MATH 140 (Precalculus) is required.

Minor in Data Science

20 semester hours

Data science minors must complete a minimum of 20 credit hours in the following areas:

- Computational and Data Science Foundations (8)
- Statistical Foundations (8)
- Domain-Specific Elective (4)

Students may complete requirements for the minor in any order that meets course prerequisites.
A maximum of eight (8) credits may be double-counted for other major and minor requirements, although students minoring in statistics may not use any of their "8 additional semester hours of statistics" toward the Data Science minor.
Students may transfer a maximum of 8 semester hours toward the Data Science minor, unless they have permission from the chair.
All courses counted toward the minor must be completed with grades of C or higher.

Computational and Data Science Foundations

8 semester hours

- DATA 133: Introduction to Data Science I or CSCI 144: Introduction to Computer Science (4)
- DATA 233: Introduction to Data Science II (4)

Statistical Foundations

8 semester hours

- Any of MATH/STAT 145, STAT 231, 232, 233, or MATH/STAT 242 (4)
- MATH/STAT 348: Statistical Computing and Consulting (4)

Domain-Specific Elective

4 semester hours

Select at least one course from the list of electives below that applies data science principles in a disciplinary context or provides deeper study of data science topics. The course must go beyond introductory topics and techniques to develop advanced statistical expertise for the respective field where at least one of the following are met:

1. Data are not easily collected (e.g., makes use of intricate study design; requires in-depth survey design), OR
2. Data are not easily managed (e.g., data are messy; data set is excessively large; data are not easily synthesized), OR
3. Data are not easily analyzed by selecting routine analyses from a series of menu items (e.g., arguments must be made for
   appropriate covariates), OR
4. Data are not easily presented (e.g., requires sophisticated visualization techniques)

Approved courses include:

- BUSA 310: Information Systems and Database Management (4)
- BUSA 467: Marketing Research (4)
- COMA 342: Applied Research (4)
- CSCI 330: Artificial Intelligence (4)

- CSCI 367: Databases and Web Programming (4)
- ECON 344: Econometrics (4)
- GEOS 331: Maps: Computer-Aided Mapping and Analysis (4)
- NURS 360: Nursing Research and Informatics (4)
- POLS 301: Political Science Methods (4)
- PSYC 242: Advanced Statistics and Research Design (4)
- SOCI 232: Research Methods (4)

Data Science (DATA) - Undergraduate Courses

DATA 133 : Introduction to Data Science I

Introduction to computer programming and problem-solving using real datasets from a variety of domains such as science, business, and the humanities. Introduces the basics of data science concepts through computational thinking, modeling and simulation and data visualization using the Python programming language and R statistical software. Intended for students without prior programming experience. Prerequisite: completion of PLU MATH 140 or an equivalent college-level course with a grade of C or better; or PLU mathematics placement into PLU MATH 151 or a higher numbered PLU mathematics course. (4)

DATA 233 : Introduction to Data Science II

Continuation of DATA 133, topics may include data manipulation, cleaning and visualization techniques, machine learning techniques, natural language processing, databases, text mining, data science ethics/privacy, etc. Students will collaborate with help of version control systems like GitHub. Python is the main programming language used. Prerequisite: DATA 133 or CSCI 144. Recommended: One of MATH/STAT 145, STAT 231, 232, 233, or MATH/STAT 242. (4)

Proposed Catalog Language: (note changes in **Blue Bold** and ~~Blue Strikeout~~)

Our society increasingly values decisions that are supported by data. The Data Science Program at Pacific Lutheran University equips students with the knowledge, skills, and habits of mind (e.g., curiosity, skepticism, holding results with intellectual humility) needed to ethically and responsibly harness the power of data.

Data science is a dynamic field that has been reshaping the landscape of science, industry, and daily life. The ubiquity of data in our lives necessitates professionals who can convert this data into actionable insights, communicate those insights to a variety of audiences, and ethically anticipate and respond to potential consequences of the harnessed information—whether the consequences be intended or not. This field is reshaping professions, offering unprecedented opportunities for innovation, and demanding a higher standard of accountability and responsibility for the producer of data grounded insights.

The Data Science Major at Pacific Lutheran University offers students a deep and comprehensive understanding of data acquisition, curation, and analysis. This program is structured to serve students from diverse educational backgrounds. The interdisciplinary nature of our program gives students the opportunity to apply their quantitative competencies and critical thinking to a variety of fields, helping students prepare to tackle challenges in a variety of industries, fields of research, or public services.

Major in Data Science (64 credits)

PLU offers a Bachelor of Science degree in Data Science. This program helps students develop as responsible stewards and critical thinkers about data, analysis, and their impact on society, while also equipping students with tools to process, visualize, and interpret large datasets. The curriculum combines foundational knowledge, advanced techniques, and critical inquiry to prepare graduates for both immediate employment and further academic pursuits.

28-32 semester hours of mathematics/statistics, 24-28 semester hours of computer science/data science, plus 4-8 semester hours of supporting courses

- **20 semester hours of required mathematics/statistics courses: MATH 152, 331, MATH/STAT 242*, MATH/STAT 348, MATH/STAT 442****
- **12 semester hours of mathematics/statistics electives from: MATH 253, 318, 422, or MATH/STAT 342.**
- **20 semester hours of required computer science/data science courses: CSCI 144, 270, 330, DATA 233, DATA 499A, DATA 499B**
- **8 semester hours of electives from: CSCI 367, CSCI 371, CSCI 390**
- **4 semester hours of supporting courses from a Domain-Specific Elective. Select at least one option from the list of Domain-Specific Electives that applies data science principles in a disciplinary context or provides deeper study of data science topics. (See details below.)**

*** MATH/STAT 145, STAT 231, STAT 232, or STAT 233 may replace MATH/STAT 242.**

****ECON 344 may substitute MATH/STAT 442 if it is not also used as the domain-specific elective.**

All courses counted toward the major must be completed with grades of C or higher.

A maximum of eight (8) credits at the 300+ level may be double-counted for other major requirements and a maximum of eight (8) credits may be double-counted for other minor requirements. Petitions to substitute courses may be submitted to the department chair to address double-counting constraints. Students minoring in statistics may not use any of their "8 additional semester hours of statistics" toward the Data Science major.

The Data Science Minor

The Data Science Minor is ideal for students who would benefit from in-depth experiences managing, analyzing, and visualizing data. The minor is designed for students from virtually any major, although quantitative literacy at or exceeding the level of PLU MATH 140 (Precalculus) is required.

20 semester hours

Data science minors must complete a minimum of 20 credit hours in the following areas:

- Computational and Data Science Foundations (8)
- Statistical Foundations (8)
- Domain-Specific Elective (4)

~~Students may complete requirements for the minor in any order that meets course prerequisites.~~

A maximum of eight (8) credits may be double-counted for other major and minor requirements, although students minoring in statistics may not use any of their "8 additional semester hours of statistics" toward the Data Science minor.

Students may transfer a maximum of 8 semester hours toward the Data Science minor, unless they have permission from the chair.

All courses counted toward the minor must be completed with grades of C or higher.

Computational and Data Science Foundations
8 semester hours
- DATA 133: Introduction to Data Science I or CSCI 144: Introduction to Computer Science (4)
- DATA 233: Introduction to Data Science II (4)

Statistical Foundations
8 semester hours
- Any of MATH/STAT 145, STAT 231, 232, 233, or MATH/STAT 242 (4)
- MATH/STAT 348: Statistical Computing and Consulting (4)

Domain-Specific Elective
4 semester hours
- Select at least one ~~course~~ **option** from the list of electives below that applies data science principles in a disciplinary context or provides deeper study of data science topics. **Details about Domain-Specific Elective Options are given below.**

Domain-Specific Elective Options for the Major and Minor

~~The~~ Domain-Specific Elective course**s** must go beyond introductory topics and techniques to develop advanced statistical expertise for the respective field where at least one of the following are met:

1. Data are not easily collected (e.g., makes use of intricate study design; requires in-depth survey design), OR
2. Data are not easily managed (e.g., data are messy; data set is excessively large; data are not easily synthesized), OR
3. Data are not easily analyzed by selecting routine analyses from a series of menu items (e.g., arguments must be made for appropriate covariates), OR
4. Data are not easily presented (e.g., requires sophisticated visualization techniques)

Current Approved Options include***:

- BUSA 310: Information Systems and Database Management (4)
- BUSA 467: Marketing Research (4)
- ~~COMA 361: Strategic Communication (4)~~
- **COMA 461: Advertising, PR + Campaigns (4)**
- CSCI 330: Artificial Intelligence (4)
- **Selected CSCI 387/388/389/487/488/489: Special Topics in Computer Science Courses (4)**
- ECON 344: Econometrics (4)
- ~~GEOS~~**ESCI** 331: Maps: Computer-Aided Mapping and Analysis (4)
- ~~NURS 360: Nursing Research and Informatics (4)~~
- **NURS 318: Research Methods (2) *with* NURS 319: Healthcare Technology (2)**
- POLS 301: Political Science Methods (4)
- PSYC 242: Advanced Statistics and Research Design (4)
- SOCI 232: Research Methods (4)

*****Students may petition for a course not on this list to satisfy the Domain-Specific Elective.**

Course Descriptions for DATA Courses:

Data Science (DATA) - Undergraduate Courses
DATA 133 : Introduction to Data Science I
Introduction to computer programming and problem-solving using real datasets from a variety of domains such as science, business, and the humanities. Introduces the basics of data science concepts through computational thinking, modeling and simulation and data visualization using the Python programming language and R statistical software. Intended for students without prior programming experience. Prerequisite: completion of PLU MATH 140 or an equivalent college-level course with a grade of C or better; or PLU mathematics placement into PLU MATH 151 or a higher numbered PLU mathematics course. (4)
DATA 233 : Introduction to Data Science II
Continuation of DATA 133, topics may include data manipulation, cleaning and visualization techniques, machine learning techniques, natural language processing, databases, text mining, data science ethics/privacy, etc. Students will collaborate with **the** help of version control systems like GitHub. Python is the main programming language used. Prerequisite: DATA 133 or CSCI 144. Recommended: One of MATH/STAT 145, STAT 231, 232, 233, or MATH/STAT 242. (4)

DATA 499A: Capstone: Culminating Experience I - SR

Preparation for oral and written presentation of information learned in individual research under the supervision of an assigned faculty member, possibly in a small group of two or three students. Discussion of methods for collaborating and communicating results of analysis with client and teammates. Discussion of ethical implications of data-based inferences. With DATA 499B, meets the culminating experience (SR) requirement. Prerequisites: MATH/STAT 442 or concurrent enrollment; CSCI 330; and senior (or second semester junior) standing, or permission of instructor. (2)
DATA 499B: Capstone: Culminating Experience II - SR
Continuation of DATA 499A with emphasis on oral and written presentation. With DATA 499A, meets the culminating experience (SR) requirement. Prerequisite: DATA 499A. (2)

Additional Course Descriptions of New Courses (to be placed in the MATH and STAT sections of the catalog):

MATH 442: Statistical Modeling
Continuation of MATH/STAT 242. Introduction to multiple linear regression models, indicator variables, interactions. Uses R statistical software to explore applications of course topics. Topics may also include extensions to generalized linear models, multilevel models, Bayesian inference, or other statistical modeling techniques. Cross-listed with STAT 442. Prerequisites: MATH 331 and any of MATH/STAT 145, STAT 231, 232, 233, or MATH/STAT 242. (4)

STAT 442: Statistical Modeling
Continuation of MATH/STAT 242. Introduction to multiple linear regression models, indicator variables, interactions. Uses R statistical software to explore applications of course topics. Topics may also include extensions to generalized linear models, multilevel models, Bayesian inference, or other statistical modeling techniques. Cross-listed with MATH 442. Prerequisites: MATH 331 and any of MATH/STAT 145, STAT 231, 232, 233, or MATH/STAT 242. (4)

Additional information for courses:

Are there courses that can be repeated for credit because of variable content?	[ ]	Yes,	?	Times [If yes, the parameters must be clear in course description]	[X]	No [Default is 'no.' Note that does not exclude a student's option to repeat a course for a better grade to replace the initial one.]
Grade Type:	[X]	Standard Letter			[ ]	Pass/Fail
Anticipated Enrollment:						
Course Syllabus Attached++:	[X]	Yes			[ ]	No

++Required for new courses, and other proposals as indicated above.

Does the proposal include the addition to a course(s) of one or more General Education Program elements (GenEd)?

[ ] Yes (Check the appropriate boxes below)
If more than one course is proposed, make sure the proposal makes clear which GenEd elements, if any, are proposed for each course.

[X] No

[ ] International Honors (100-level) **H1**
[ ] International Honors (200-level) **H2**
[ ] International Honors (300-level) **H3**

[ ] FYEP 101 **FW**
[ ] FYEP 102 **FD**
[ ] Academic Study of Religion **RL**
[ ] Engaging the Natural World **NW**
[ ] Examining Self and Society **ES**
[ ] Quantitative Reasoning **QR**
[ ] Fitness and Wellness **FT**
[ ] Global Engagement **GE**
[ ] Creative Expression **CX**
[ ] Interpreting Text **IT**
[ ] Exploring Values and Worldviews **VW**
[ ] Culminating Experience **SR**

Do you want to apply an attribute from the previous GenEd? (MR, A, C, AR, LT, SO, RC, RG, NS, SM, PH)
[ ] No
[ ] Yes, _____

NOTE: Submissions will be forwarded to the Core Curriculum Committee for its review and recommendation. Diversity courses have specific learning objectives that must be included in the syllabus.

[ ] **If your proposal contains a change in course number and/or title and/or course elimination, by checking the box to the left, you are giving permission to the Registrar's Office to make changes to the catalog sections of academic units affected by the change.**

STAFFING & BUDGETARY IMPLICATIONS

Has this proposal been formally approved by at least 2/3 of the full-time teaching faculty in your academic unit?

[ ] Yes
[ ] No (Indicate why the proposal is being forwarded to EPC)

Does this proposal impact any other academic unit?

[X] Yes (List below and indicate if 2/3 of the full-time faculty in that area support the proposal)
BUSA, COMA, ECON, ESCI, NURS, POLS, PSYC, SOCI, STAT
[ ] No

Does this proposal require the commitment of new or substantially different support services (e.g., Library acquisitions, Information and Technology Services, Wang Center)?

[X] Yes (Explain and indicate if support services have been consulted)
This program will require increased support from I&TS beginning in Year 2, and they have been consulted. This additional support has been included in the program budget.
[ ] No

Explain how the proposed change(s) will be staffed. Please note any impacts to regular general education offerings from your program (e.g., FYEP, IHON, and/or other courses that meet general education requirements). Revised 2-Year Course Cycle must be attached.

From Institutional Impact Form 9c: This program will be jointly run through MATH and CSCI, and many of their faculty will teach in the program. All but 2 courses are already offered in the curriculum, and we have faculty with the expertise to offer the additional 2 courses. The Data Science major will increase enrollments in already existing classes and the 2 new courses, so additional faculty will need to be hired over time to address the increased enrollments.

With respect to teaching the capstone series, we expect the numbers of seniors to be low in Years 1 and 2, so they could be accommodated within the already existing MATH and CSCI 499

A and B courses. However, in later years, a separate capstone series would be offered, and the staffing of which has been accounted for. For staffing DATA 499A and DATA 499B, the instructor will be selected, alternating annually between MATH and CSCI faculty as much as possible, in collaboration among the DATA program director and assistant director, the chairs of MATH and CSCI, and the Dean of the College Natural Sciences.

Are special budgetary arrangements and funding required? If "no", explain how the proposed changes will be integrated without added personnel or budgetary requirements.

[X] Yes(Explain what types of support will be used to meet the budgetary requirements of the proposed change(s). Include the source(s) of funding, percentage of costs covered, and time frame covered.)

From Institutional Impact Form 9d: Additional students in CSCI and MATH courses that support the Data Science major will put additional enrollment stresses on those courses, some of which already have high enrollments. Thus, we anticipate needing the following faculty to staff the courses in support of the program:

	Year 1	Year 2	Year 3	Year 4
CSCI	0.5 FTE cont	0.67 FTE cont	1.0 FTE TT 2 courses (per course rate)	1.0 FTE TT 2 courses (per course rate)
MATH	0.5 FTE cont	0.5 FTE cont	1.0 FTE cont	1.0 FTE cont

Additionally, we are requesting staff as follows to support the program:

Admin	0.0 FTE	0.5 FTE	0.5 FTE	0.5 FTE
I&TS	0.0 FTE	0.5 FTE	0.5 FTE	0.5 FTE

Ultimately, we predict that the increase in new students coming to PLU will ultimately pay for these increased costs, as indicated in the Institutional Impact Form Section 13.

[ ] No

NOTE: Budgetary considerations will be reviewed/approved by Dean and Provost.

REQUIRED SIGNATURES

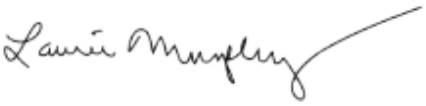
Department Chair/Program Chair/Associate Dean (Date)

Dean (Date)

[ ] Forwarded with Endorsement
[ ] Forwarded with Reservations

Provost (Date)

REQUIRED SIGNATURES



1 1/1/2023

Department Chair/Program Chair/Associate Dean (Date)

11/1/2023

Dean (Date)

[ ] Forwarded with Endorsement
[ ] Forwarded with Reservations

Provost (Date)

Institutional Impact Evaluation Form

1. **Name of Proposed Program: Data Science**

2. **Executive Summary**: In 1-2 paragraphs, describe the proposed program, including a clear statement of how the program meets the mission of the university.

   We propose a new B.S. degree in Data Science.

   The proposed Data Science major aims to expand on our existing minor by providing a rigorous, deep, and comprehensive exploration of data science principles, methodologies, and practical applications. This major will not only provide the technical proficiency required in the field of data science, but it will also cultivate essential skills in critical thinking, problem-solving, and ethical considerations, aligning with the University's mission of preparing students for lives of thoughtful inquiry, service, and leadership.

   In this era of data deluge, graduates with a Data Science major who can work with data and draw data-based conclusions are in high demand. In this new, popular, and relatively uncharted discipline, the tools are immensely powerful. Historically, these tools have been carelessly employed, causing unintended, tragic discrimination and social injustice. There is a need for data science programs that do more than just give students tools for high performance models; we need data scientists that recognize complexities and think about how their reports may have a broader wake beyond the immediate client.

   Our major program will prepare ethical and competent stewards of data and data models. Graduates will serve, lead, and care for society as they create models to answer questions; communicate results responsibly to an audience; and grapple with issues and implications for their work.

3. **Proposed Program Start Date**: Fall 2024

4. **Program Offerings:**

   a. Describe the type of program (new degree, new major, new minor, new concentration).

      1 new major

   b. Identify the delivery format for the program (face-to-face, online, blended, or competency-based) and rationale for this format.

      face-to-face: we already offer these classes in this modality.

   c. Describe the curriculum and program requirements by providing a clear description of the courses required to complete the program and any program-specific policies (e.g., credit hours in residency, GPA requirements). Include course offerings, number of credits, prerequisites, and any general education elements. Clearly distinguish between existing courses and any new courses that will need to be created or deleted. If you are using preexisting catalog language, please highlight changes by using **blue boldface** for changes and ~~blue strikeout~~ for deletions.

      NOTE: New courses are indicated in **GREEN**.

Major in Data Science (64 credits)

28-32 semester hours of mathematics/statistics, 24-28 semester hours of computer science/data science, plus 4-8 semester hours of supporting courses

- **20 semester hours of required mathematics/statistics courses: MATH 152, 331, MATH/STAT 242*, MATH/STAT 348, MATH/STAT 442****
- **12 semester hours of mathematics/statistics electives from: MATH 253, 318, 422, or MATH/STAT 342.**
- **20 semester hours of required computer science/data science courses: CSCI 144, 270, 330, DATA 233, DATA 499A, DATA 499B**
- **8 semester hours of electives from: CSCI 367, CSCI 371, CSCI 390**
- **4 semester hours of supporting courses from a Domain-Specific Elective. Select at least one option from the list of Domain-Specific Electives that applies data science principles in a disciplinary context or provides deeper study of data science topics. (See details below.)**

*** MATH/STAT 145, STAT 231, STAT 232, or STAT 233 may replace MATH/STAT 242.**

****ECON 344 may substitute MATH/STAT 442 if it is not also used as the domain-specific elective.**

All courses counted toward the major must be completed with grades of C or higher.

A maximum of eight (8) credits at the 300+ level may be double-counted for other major requirements and a maximum of eight (8) credits may be double-counted for other minor requirements. Petitions to substitute courses may be submitted to the department chair to address double-counting constraints. Students minoring in statistics may not use any of their "8 additional semester hours of statistics" toward the Data Science major.

The Data Science Minor

The Data Science Minor is ideal for students who would benefit from in-depth experiences managing, analyzing, and visualizing data. The minor is designed for students from virtually any major, although quantitative literacy at or exceeding the level of PLU MATH 140 (Precalculus) is required.

20 semester hours

Data science minors must complete a minimum of 20 credit hours in the following areas:

- Computational and Data Science Foundations (8)
- Statistical Foundations (8)
- Domain-Specific Elective (4)

~~Students may complete requirements for the minor in any order that meets course prerequisites.~~

A maximum of eight (8) credits may be double-counted for other major and minor requirements, although students minoring in statistics may not use any of their "8 additional semester hours of statistics" toward the Data Science minor.

Students may transfer a maximum of 8 semester hours toward the Data Science minor, unless they have permission from the chair.

All courses counted toward the minor must be completed with grades of C or higher.

Computational and Data Science Foundations
8 semester hours
- DATA 133: Introduction to Data Science I or CSCI 144: Introduction to Computer Science (4)
- DATA 233: Introduction to Data Science II (4)

Statistical Foundations
8 semester hours
- Any of MATH/STAT 145, STAT 231, 232, 233**,** or MATH/STAT 242 (4)
- MATH/STAT 348: Statistical Computing and Consulting (4)

Domain-Specific Elective
4 semester hours
- Select at least one ~~course~~ **option** from the list of electives below that applies data science principles in a disciplinary context or provides deeper study of data science topics. **Details about Domain-Specific Elective Options are given below.**

Domain-Specific Elective Options for the Major and Minor

~~The~~ Domain-Specific Elective course**s** must go beyond introductory topics and techniques to develop advanced statistical expertise for the respective field where at least one of the following are met:

1. Data are not easily collected (e.g., makes use of intricate study design; requires in-depth survey design), OR
2. Data are not easily managed (e.g., data are messy; data set is excessively large; data are not easily synthesized), OR
3. Data are not easily analyzed by selecting routine analyses from a series of menu items (e.g., arguments must be made for appropriate covariates), OR
4. Data are not easily presented (e.g., requires sophisticated visualization techniques)

Current Approved Options include*******:

- BUSA 310: Information Systems and Database Management (4)
- BUSA 467: Marketing Research (4)
- ~~COMA 361: Strategic Communication (4)~~
- **COMA 461: Advertising, PR + Campaigns (4)**
- CSCI 330: Artificial Intelligence (4)
- **Selected CSCI 387/388/389/487/488/489: Special Topics in Computer Science Courses (4)**
- ECON 344: Econometrics (4)
- ~~GEOS~~**ESCI** 331: Maps: Computer-Aided Mapping and Analysis (4)
- ~~NURS 360: Nursing Research and Informatics (4)~~

- **NURS 318: Research Methods (2) *with* NURS 319: Healthcare Technology (2)**
- POLS 301: Political Science Methods (4)
- PSYC 242: Advanced Statistics and Research Design (4)
- SOCI 232: Research Methods (4)

*****Students may petition for a course not on this list to satisfy the Domain-Specific Elective.**

Course Descriptions for DATA Courses:

Data Science (DATA) - Undergraduate Courses

DATA 133 : Introduction to Data Science I

Introduction to computer programming and problem-solving using real datasets from a variety of domains such as science, business, and the humanities. Introduces the basics of data science concepts through computational thinking, modeling and simulation and data visualization using the Python programming language and R statistical software. Intended for students without prior programming experience. Prerequisite: completion of PLU MATH 140 or an equivalent college-level course with a grade of C or better; or PLU mathematics placement into PLU MATH 151 or a higher numbered PLU mathematics course. (4)

DATA 233 : Introduction to Data Science II

Continuation of DATA 133, topics may include data manipulation, cleaning and visualization techniques, machine learning techniques, natural language processing, databases, text mining, data science ethics/privacy, etc. Students will collaborate with **the** help of version control systems like GitHub. Python is the main programming language used. Prerequisite: DATA 133 or CSCI 144. Recommended: One of MATH/STAT 145, STAT 231, 232, 233, or MATH/STAT 242. (4)

DATA 499A: Capstone: Culminating Experience I - SR

Preparation for oral and written presentation of information learned in individual research under the supervision of an assigned faculty member, possibly in a small group of two or three students. Discussion of methods for collaborating and communicating results of analysis with client and teammates. Discussion of ethical implications of data-based inferences. With DATA 499B, meets the culminating experience (SR) requirement. Prerequisites: MATH/STAT 442 or concurrent enrollment; CSCI 330; and senior (or second semester junior) standing, or permission of instructor. (2)

DATA 499B: Capstone: Culminating Experience II - SR

Continuation of DATA 499A with emphasis on oral and written presentation. With DATA 499A, meets the culminating experience (SR) requirement. Prerequisite: DATA 499A. (2)

Additional Course Descriptions of New Courses (to be placed in the MATH and STAT sections of the catalog):

MATH 442: Statistical Modeling

Continuation of MATH/STAT 242. Introduction to multiple linear regression models, indicator variables, interactions. Uses R statistical software to explore applications of course topics. Topics may also include extensions to generalized linear models, multilevel models, Bayesian inference, or other statistical modeling techniques. Cross-listed with STAT 442. Prerequisites: MATH 331 and any of MATH/STAT 145, STAT 231, 232, 233, or MATH/STAT 242. (4)

STAT 442: Statistical Modeling

Continuation of MATH/STAT 242. Introduction to multiple linear regression models, indicator variables, interactions. Uses R statistical software to explore applications of course topics. Topics may also include extensions to generalized linear models, multilevel models, Bayesian inference, or other statistical modeling techniques. Cross-listed with MATH 442. Prerequisites: MATH 331 and any of MATH/STAT 145, STAT 231, 232, 233, or MATH/STAT 242. (4)

d. Provide a two-year course cycle for delivering the curriculum.

See attached two year course cycle

e. Provide completion pathways (including two and four-year advising plans for undergraduate programs).

See attached (2 year plan, 4 year plan)

f. Identify the learning outcomes for the program. For undergraduate programs, also describe the connection to the Integrative Learning Objectives.

1. Design: Be able to critically analyze a problem and to design, implement, and evaluate a solution that meets requirements.
2. Communication: Be able to effectively communicate technical concepts in oral and written form.
3. Application: Be able to apply mathematical or statistical concepts to concrete situations.
4. Disciplinary Citizenship: Develop collaborative skills and independence; have experience with open-ended inquiry.

g. Provide a plan for assessing program learning outcomes.

Since 2 of the learning outcomes are also MATH learning outcomes and 2 are also CSCI learning outcomes, the corresponding learning outcomes will be assessed in the MATH and CSCI courses along with those departments' normal assessment plans. Assessment report will be prepared by the director of the Data Science Major, in consultation with the assistant director.

Capstone will be a major point of assessment for Data Science learning outcomes. All learning outcomes will be assessed in DATA 499A and B. If early numbers make offering DATA 499 A and B not feasible, then we can accommodate Data Science student capstones in either MATH499 or CSCI499, and we can assess all outcomes there. The capstone instructor will be selected annually, alternating as much as possible between MATH and CSCI faculty, in collaboration among the DATA program director and assistant director, the chairs of MATH and CSCI, and the Dean of the College Natural Sciences.

h. Identify program entrance requirements, including application processes, if appropriate.

Beginning in the Data Science major assumes successful completion of MATH 151 before starting in the required MATH courses.

5. External Authorization: Will the proposal require authorization from NWCCU, the state of Washington, or an external accreditation body?

NO

6. **Rationale**:

a. Provide evidence of demand for the proposed program, which may include a market analysis or review of trends at other universities. Include reference to relevant competitors' programs and characteristics of the proposed program that will make it attractive to students in light of this competition.

"Data science is emerging as a field that is revolutionizing science and industries alike. Work across nearly all domains is becoming more data driven, affecting both the jobs that are available and the skills that are required. As more data and ways of analyzing them become available, more aspects of the economy, society, and daily life will become dependent on data."
National Academy of Sciences (NAS), 2018

Societal Demands:
Our society increasingly values decisions that are supported by data. PLU graduates who can enter their vocations and their communities with experience of collecting, managing, and analyzing data will be empowered to lead and serve more thoughtfully, skillfully, and rationally.

According to the Bureau of Labor Statistics (BLS):

- The data scientist occupation is projected to be the 6th fastest growing occupation between 2021 and 2031. The BLS expects that there will be a 36% growth in demand for this type of position. This represents an increase from 113,300 (2021) to 153,800 (2031) in the number of jobs in data science.
- The 2021 median pay for Data Scientists is $100,910. The annual average wage of Data Scientists in Washington State is $140,780. This is the second highest in the country behind California ($147,390).
- Based on US News and World report, the Data Scientist occupation is #22 in 100 best jobs rankings.

The data science major would largely improve PLU students' data related skills, helping them to stand out in a competitive job market.

Current Offerings at PLU:
While the current math and computer science majors are each valuable in their own rights, there is a need for a major that will prepare students simultaneously to analyze and manage data. The proposed data science major, housed jointly in the Computer Science and Mathematics Departments, bridges across both disciplines, providing students the opportunity to develop the advanced skills needed to effectively and ethically collect, manage, and analyze data. The major also gives students the option to either use the data-handling skills in a specific area of interest in an applied course.

Offerings at Peer Institutions:
There does not appear to be a data science major offered nearby at any other institution other than UW-Seattle, although statistics and computer science majors are available elsewhere locally. In the Tacoma area, the University of Puget Sound and UW Tacoma do not offer a data science major, although there is a graduate program in business analytics at UW-T. Seattle Pacific University and Seattle University offer graduate degrees in related data fields, but have no offerings for undergraduate data science degrees. Majors in data science are offered by several institutions across the nation, including Luther College (IA), Valparaiso University (IL), and Smith College (MA).

Why Offer a Data Science Major at PLU?
As opposed to UW-Seattle, students pursuing a Data Science major at PLU will encounter small class sizes and do so in the context of Lutheran higher education (a strong liberal arts experience) where ethics will be emphasized. Students will work with peers and faculty to grapple together with the complexities of data–What data is collected and shared? How is it collected? Who has access to data? How is it used? Additionally, unlike UW-Seattle, students will not need to apply for access to the major–those who want

to be Data Science majors will have the opportunity to pursue this degree pathway. And, based upon the success of direct admission to the CSCI program that we encountered in the most recent admission cycle (recruiting first-year students for Fall 2023), we can consider direct admission to the Data Science major as well.

Student Interest:
In 2022, a survey of PLU computer science and Mathematics students showed a high interest in a data science major. Of the 28 students responding to the survey, 57% responded that they would be interested in a data science major. Some of the students comments to the proposed data science major are below:

"I think a data science major could be a very good idea for the students that are not as interested in a full computer science related career in order to get experience without the workload of pure comp sci classes. "

"I think offering a Data Science major would be super cool! "

"I believe this would be a great opportunity for students to get their hands on if they head into research."

"I think that it would be a good major to have for many double majors since it can help in many different fields."

b. Identify the target audience for the program.

The target audience for a data science major would typically be composed of intellectually engaged individuals with a robust interest in the convergence of data, technology, and societal issues. Here are some key attributes these individuals would likely possess:

- **Quantitative aptitude**: These individuals enjoy mathematics and logical problem-solving tasks. They have a strong aptitude for numbers, statistics, and perhaps even some exposure to computer science.
- **Technology enthusiasts:** They are comfortable with or eager to learn about various aspects of technology, such as programming languages, software, and other digital tools, since these are vital elements in data science.
- **Interdisciplinary mindset:** They appreciate how data science can be applied across diverse sectors, not just traditional ones such as business or tech, but also humanities, social sciences, and arts.
- **Curious and creative thinkers:** These individuals enjoy finding patterns and making sense of data. They have a knack for critical thinking and appreciate the power of creative solutions derived from data interpretation.
- **Ethically conscious:** They understand and respect the ethical aspects related to data handling and manipulation. They believe in the responsible use of data and are interested in its ethical implications.
- **Future leaders and innovators:** They envision themselves contributing to positive changes through data science and aim to be at the forefront of new discoveries, technological advancements, and industry best practices.
- **Lifelong learners:** They understand that the data science field is continuously evolving, and they are committed to keeping up with the latest techniques, trends, and theories.
- **Skilled communicators:** They understand the significance of translating intricate data findings into understandable language for various stakeholders, demonstrating effective communication skills.

NOTE: The above text addressing this point (6b) was created with support from ChatGPT.

This group might include recent high school graduates exploring potential college majors, current college students considering a major change, or transfer students.

c. Explain why this is the right time for the university to add this program.

1. **Growing Demand:** The global landscape is becoming increasingly data-centric, and the demand for data science professionals is higher than ever. The U.S. Bureau of Labor Statistics predicts a 31% growth in data science jobs by 2029, significantly outpacing the average for all occupations. By offering a data science program, the university would prepare students for thriving careers in a high-demand field.
2. **Interdisciplinary Nature of Data Science:** Data Science is inherently interdisciplinary. It merges mathematics, statistics, computer science, and domain-specific knowledge, which aligns perfectly with the ethos of a liberal arts education. Our university can take advantage of this to foster a unique approach to data science, infusing it with the liberal arts spirit that values critical thinking, creativity, and ethical understanding.
3. **Technological Advancements:** The recent advancements in technology have made data more accessible than ever, providing an excellent opportunity for practical, hands-on learning. Integrating this program now allows students to directly engage with these advancements and equips them with up-to-date skills.
4. **Attracting Diverse Student Population:** A data science program could attract a wide range of students, both in terms of their backgrounds and their future goals. As the field has applications in virtually every industry, students of various interests will see the value in acquiring data science skills. This could lead to increased enrolment and a more diverse student body.
5. **Educational Leadership:** As a forward-thinking institution, we have the opportunity to be leaders in liberal arts education by integrating a data science program. By doing so, we show our commitment to evolving with the changing educational and professional landscape, setting an example for other institutions.
6. **Equipping Students for the Future:** Regardless of their career paths, all students will benefit from understanding data. From humanities to natural sciences, data-driven decision making is becoming the norm. By introducing this program now, we ensure our students are ready to enter a workforce that values data literacy.

NOTE: The above text addressing this point (6c) was created with support from ChatGPT.

In summary, there has never been a better time to introduce a Data Science program. The demand, technological advancements, and shift towards data-driven decision-making make it clear that data science education is no longer optional – it's necessary. By integrating a Data Science program into our offerings, we can provide our students with the skills they need to succeed in the modern world, while reasserting our position as a leading liberal arts institution.

d. Explain how this program might compete with other programs currently offered at PLU.

It's important to recognize that a Data Science major would indeed share some overlap with the existing MATH and CSCI degrees. However, this overlap doesn't necessarily equate to direct competition. Instead, it can foster enriching cross-disciplinary collaboration and broader academic versatility.

1. **Differentiation in Focus:** While data science incorporates elements of both mathematics and computer science, it applies these principles differently. Data Science is more focused on extracting insights and making informed decisions from large datasets, often using specialized software and tools, while mathematics and computer science have broader scopes.
2. **Cross-disciplinary Appeal:** Data Science may attract students interested in a blend of disciplines – those who are eager to apply mathematical and computational principles in practical, real-world scenarios. This can widen the appeal of our academic programs rather than compete with the

existing ones. For example, students have mentioned that they are comfortable majoring in other disciplines while also completing the minor in Data Science because they believe the latter will help them in the job market. The Data Science major can serve as offering the practical fall-back that allows students to pursue their primary interests.

3. **Shared Resources and Collaboration:** The Data Science program can leverage resources (such as faculty, courses, and research initiatives) already dedicated to Mathematics and Computer Science, leading to a more efficient use of resources and fostering a collaborative academic environment.
4. **Potential for Double Majors and Minors:** For students who are equally interested in mathematics or computer science and data science, the opportunity for double majors or minors could be a compelling option. This could attract high-performing students, enhancing the university's academic profile.
5. **Enrollment Growth:** Rather than cannibalizing existing programs, the Data Science major may boost overall enrollment by appealing to prospective students who might not have otherwise considered our university. As the demand for data science education grows, we have the opportunity to capture this interest and convert it into enrollment growth.

e. Identify which academic units might be affected by this program, and how.

Mathematics: It could increase enrollments in classes that are required for the Data Science program. Due to students' exposure to MATH courses as part of the Data Science major, it could also increase the number of MATH majors (double majors) and minors. Conversely, it could also potentially pull students out of the MATH major into the Data Science major.
Computer Science: It could increase enrollments in classes that are required for the Data Science program. Due to students' exposure to CSCI courses as part of the Data Science major, it could also increase the number of CSCI majors (double majors) and minors. It could also potentially pull students out of the CSCI major into the Data Science major.

Because the Data Science major is an undergraduate degree, we don't anticipate this program negatively impacting the Masters of Marketing Analytics, a graduate degree. The Data Science major, however, does have the potential to feed students into the MSMA Program.

f. Will approval of this program mean the termination of another program? If so, what is the timeline for the proposed elimination?

NO

7. Marketing strategies:

a. Provide a marketing and advertising plan for the initial roll-out of the program, including a timeline.

Based upon research already shared, there is meaningful demand for these programs. Thus, we propose marketing in regular PLU advertisements to prospective students, and expect word-of-mouth interest to be generated by Admission staff.

b. Identify longer-term plans for marketing and advertising.

If the PLU DataFest competition invites high school students to participate, the Data Science major could be marketed in tandem with various activities throughout the competition.

8. External funding sources: Describe any plans for the development of funding sources for this program that are external to the university, including projected amounts of funding for each.

a. Fundraising:

NA

b. Grants:

NA

c. Other:

NA

9. Faculty, Staff and Administration:

a. Describe the qualifications needed by faculty who will teach in the program.

The vast majority of classes making up the data science major are already offered by the MATH and CSCI departments. These departments already have the expertise required to cover the 2 additional classes that need to be added to make the Data Science major.

This program needs MATH or CSCI faculty that are trained to analyze data.

b. Identify the number and type (contingent, tenure-track) of faculty members necessary to deliver the program.

The majority of courses that support this program are already taught as part of the MATH and CSCI curricula as well as the Data Science minor (see 9c) and thus are taught by a mix of current tenured/tenure-track faculty and contingents in the MATH and CSCI departments.

That said, many of the courses are already overflowing. Thus, as the major attracts new students to PLU, new tenure-track faculty in CSCI will be needed nearly immediately, and eventually also new faculty in MATH will be needed to add the sections needed to accommodate more students in these popular courses.

c. Will any current faculty serve in the proposed program? If so, how will this new commitment be accommodated in their teaching load?

This program will be jointly run through MATH and CSCI, and many of their faculty will teach in the program. All but 2 courses are already offered in the curriculum, and we have faculty with the expertise to offer the additional 2 courses. The Data Science major will increase enrollments in already existing classes and the 2 new courses, so additional faculty will need to be hired over time to address the increased enrollments.

With respect to teaching the capstone series, we expect the numbers of seniors to be low in Years 1 and 2, so they could be accommodated within the already existing MATH and CSCI 499 A and B courses. However, in later years, a separate capstone series would be offered, the staffing of which has been accounted for. For staffing DATA 499A and DATA 499B, the instructor will be selected, alternating annually between MATH and CSCI faculty as much as possible, in collaboration among the DATA program director and assistant director, the chairs of MATH and CSCI, and the Dean of the College Natural Sciences.

d. Identify the number and type (contingent, tenure-track) of *new* faculty necessary to deliver the program.

Additional students in CSCI and MATH courses that support the Data Science major will put additional enrollment stresses on those courses, some of which already have high enrollments. Thus, we anticipate needing the following faculty to staff the courses in support of the program:

	Year 1	**Year 2**	**Year 3**	**Year 4**
CSCI	0.5 FTE cont	0.67 FTE cont	1.0 FTE TT 2 courses (per course rate)	1.0 FTE TT 2 courses (per course rate)
MATH	0.5 FTE cont	0.5 FTE cont	1.0 FTE cont	1.0 FTE cont

e. If new faculty are required, provide a recruitment plan and timeline, including comments addressing the challenges of filling positions with small hiring pools or where market premia might be required.

As indicated above, we anticipate needing a 0.5 FTE contingent CSCI faculty member to launch the program in Year 1 (Fall 2024). The CSCI Department will already (independent of this proposal) be conducting a TT search in Fall 2023 to hire a new colleague for Fall 2024. The pool of candidates for this position may be a good pool for the 0.5 FTE contingent position as well. Additionally, because we will be the first non-UW program to offer a Data Science major in western WA, we feel that offering the program will also draw interest from prospective contingent faculty members.

For Year 2, we anticipate needing a 0.67 FTE CSCI contingent colleague as well as a 0.5 FTE MATH contingent colleague. We are hopeful that we could retain our 0.5 FTE CSCI contingent colleague from Year 1 for this position. Fortunately, in recent years, we've had good luck hiring high-quality contingent MATH colleagues.

If enrollments meet or exceed our expectation in Year 1 (Spring 2025) and/or early Year 2 (Fall 2025), we will initiate a tenure-track search for a CSCI colleague to join our faculty beginning in Fall 2026 (Year 3). Again, we feel that this position will be attractive in that we will be the first non-UW program to offer a Data Science major in western WA. At the same time, we will also work to staff the 1.0 FTE contingent MATH position for Fall 2026 (Year 3).

f. Describe plans for providing administrative support for the program. Identify any new administrative positions or organizational rearrangements in staff needed to accommodate the new program.

While the The Data Science minor has been administered by CSCI in collaboration with MATH, the Data Science major will be administered by a program director and an assistant director, with each position alternating between MATH and CSCI. This pair will work in strong collaboration with both the MATH and CSCI departments. The director and assistant director of Data Science will be selected by the respective department chairs from the pool of CSCI and MATH faculty that support the program, and the department represented by each position will alternate annually (for example, MATH colleague serves as director and CSCI colleague serves as assistant director in Year 1, then the same CSCI colleague serves as director and a (possibly new) MATH colleague serves as assistant director in Year 2, etc., with the director receiving a 1.0 course release each year, and the assistant director automatically moving to the director position in the following year. The Data Science director and assistant director will also take on the responsibility of administering the Data Science minor. The director release is already built into the cost model (#13).

Further, we are also requesting 0.5 FTE in administrative staff support for the program beginning in Year 2. Currently, the 7 departments, 1 interdisciplinary program, pre-health sciences advising, and dual-degree engineering are supported by 2.5 FTE in administrative support. We anticipate that the additional

0.5 FTE in administrative staff support would allow us to have appropriate support needed for the MATH, CSCI, and DATA programs.

Lastly, because this program is so dependent on technology, we are also requesting a 0.5 FTE I&TS staff person beginning in Year 2.

10. **Facility and Technology Needs** – Includes but not limited to classroom, office, studio, laboratory, storage, technology, and computer labs.

    a. Describe any new construction or facility renovations necessary to launch or maintain the program and the associated expenses.

       None

    b. Describe any furniture and/or equipment necessary to launch or maintain the program.

       None

    c. Explain any special security considerations associated with the program.

       None

    d. Identify possible health and safety concerns associated with the program.

       None

11. **Library Resources**:

    a. Describe library resources needed to support the program, including print books, electronic materials, and other library resources.

       None

    b. Does the new program require access to library resources not already available? Are these mandated by any program accreditation?

       NO

    c. If program is fully online or blended, describe how library resources will be delivered to students. Include expenses for postage, photocopying, etc.

       NA

12. **Student Services**—Are there any changes in existing student services needed to accommodate the program? Will adding the program result in changes in service provision to the rest of the student body? Where might additional resources be necessary, and what are the projected expenses for those resources?

    a. Financial aid

       NO

    b. Registration

NO

c. Center for Student Success (advising, tutoring)

NO, because the courses are all primarily MATH and CSCI courses, the tutoring already provided for MATH and CSCI will be sufficient.

d. Other

NO

13. Budget. Use information from the questions above to complete the table. Please see footnotes for additional information.

Year	Year Zero	Academic Year 1	Academic Year 2	Academic Year 3	Academic Year 4
# Students in Program[i]	0	15	27	40	55
# Faculty FTE to Deliver Program[ii]	0	0	1	1	2
# *New* Faculty FTE to Deliver Program[iii]	0	1.0	1.167	2.33	2.33
Average Faculty Salary in unit[iv]	0	83,104	83,104	83,104	83,104
# Administrators or Staff[v]	0	0	0	0	0
# *New* Administrators or Staff[vi]	0	0	1.0 (2 X 0.5)	1.0 (2 X 0.5)	1.0 (2 X 0.5)
Average Administrator or Staff Salary[vii]	0	45,000 for admin; 60,000 for I&TS	45,000 for admin; 60,000 for I&TS	45,000 for admin; 60,000 for I&TS	45,000 for admin; 60,000 for I&TS
Services & Purchases[viii]	0	2,000	4,000	6,000	8,000
Facility and Technology[ix]	0	0	0	0	0
Library Resources[x]	0	0	0	0	0
Student Services[xi]	0	0	0	0	0
Net	0	73,931	121,159	188,611	323,091

i. Identify the projected number of students *declared* in the new program for each of the first four years of the program.

ii. Identify projected faculty FTE for each of the first four years of the program.

iii. Identify the number of additional (new) faculty FTE (whether new or contingent) necessary to add in each of the first four years of the program.

iv. Identify average faculty salary in the proposed program in consultation with the Provost's Office.

v. Indicate the projected staff/administrator FTE for each of the first four years of the program.

vi. Identify the number of additional (new) staff/administrator FTE necessary to add in each of the first four years of the program.

vii. Indicate the average staff/administrator salary.

viii. Indicate the annual services and purchases budget required for each of the first four years of the program, including any projected expenditures required for start-up expenses. *Itemize these expenses in an attached narrative*.

S & P NOTE: We are asking for S & P to support Data Sciences-specific initiatives, including but not limited to our annual hosting of Data Fest. We are requesting $2000 in Year 1, increasing by $2000 each year through Year 4, then maxing at $8000 in years afterwards. This assumes that the major meets its enrollment targets, and we feel that this is appropriate for a program having over 50 majors (by Year 4).
ix. Estimate facilities and technology expenses for each of the first four years of the program.

x. Estimate library expenses for each of the first four years of the program.

xi. Estimate student services expenses

14. **Risk management -** Describe the major risk considerations of the plan and the steps that could be taken to mitigate or minimize the risk and still implement a successful plan. For example, if applicable, the plan may encounter problems associated with items such as negotiating a lease contract, obtaining city or government approvals, obtaining accreditation approval, etc.

    Adding a Data Science major to a university's curriculum presents several risks that should be carefully considered and managed. Here are some potential risk considerations, along with strategies to mitigate them:

    - **Faculty Recruitment Risk:** Recruiting faculty with the necessary qualifications and experience can be challenging, particularly given the high demand for data science professionals in the industry. To address this, the university should offer competitive salaries and broaden its application pool to include industry professionals with experience in lieu of a PhD.
    - **Enrollment Risk:** A new program might not attract the anticipated number of students, affecting its viability. A robust marketing and recruitment strategy targeting the right demographics can help to attract students. We currently offer a data science minor and see tremendous demand for a data science major.
    - **Departmental Enrollment Calculations:** For enrollment calculations for purposes such as pro formas, program review, and FJC, Data Science students will be split evenly between Mathematics and Computer Science when considering enrollments for each department.

    By proactively identifying these risks and implementing strategies to address them, the university can increase the likelihood of successfully implementing a data science program.

15. **Accountability and Exit Strategy:**

    a. Outline the steps that will be taken to review whether the program is meeting its enrollment and revenue targets, including the timeline for such review. For new undergraduate programs, provide a 5-year timeline; for new graduate programs, provide a 3-year timeline.

    Year 1: Review enrollment numbers and assess advertising strategies as part of annual report and the completion of any pro formas.

Year 2: Review enrollment numbers and projected enrollment trajectory as part of annual report and the completion of any proformas.

Year 3: Review enrollment numbers and assess advertising strategies as part of annual report and the completion of any pro formas.

Year 4: Review enrollment numbers and projected enrollment trajectory as part of annual report and the completion of any pro formas.

Year 5: Review enrollment numbers and assess advertising strategies. Done as part of annual report and the completion of any pro formas. Comprehensive review of enrollment, FTE, and faculty and staff necessary to continue to support the program. Reassess the leadership model and whether the Data Science program needs to grow into its own department.

Throughout and moving forward, the Computer Science and Mathematics departments will regularly (every 5 years) reevaluate course offerings and FTEs. We will not hire new faculty members until the enrollments justify it. Additionally, if the major does not seem profitable over this time frame, because nearly all of the coursework involved already exists, we can easily sunset the major, teaching out the major for currently declared students and not accepting new majors.

b. Provide an exit strategy, including a general timeline for deciding whether to terminate or continue the program and a plan for teaching out the program.

Because the program can be implemented with less than 1 additional FTE, the exit strategy can be quite simple. If offering the major becomes a burden on CSCI and MATH, it can be terminated by closing enrollment to the program and graduating out the remaining students. Data Science Capstones can be run through the CSCI or MATH capstone classes to reduce FTE and simplify the exit.

c. Identify who will be responsible for providing accountability and oversight for the program meeting its enrollment and revenue targets.

The Data Science program director and assistant director, in collaboration with the chairs of MATH and CSCI, will work together to provide accountability and oversight of the program and make sure it is hitting its enrollment and revenue targets

16. Communications Checklist. The persons/offices listed below should be consulted as the proposal is prepared.

	Signature	**Date**	**<u>Level of Support</u>:** ● **Support** ● **Undecided** ● **Do not support**
Chair			
Dean			
Associate Provost for Undergraduate or Graduate Studies, as appropriate			
Accreditation Liaison Officer			
Director of the Library			
Student Financial Services			

Dean of Admission			
Executive Director Center for Student Success			
Vice President for Administrative Services			
Director of Financial Operations			

March 2023

2024-2025 Academic Year

Course	Course Title	# Fall Sections	# J-Term Sections	# Spring Sections	Total # Sections	Multi-Disciplinary Program courses taught by the department	Comments
CSCI 144	Introduction to Computer Science	3	0	2	5		
CSCI 144L	Introduction to Computer Science	3	0	2	5		
CSCI 270	Data Structures	1	0	2	3		
CSCI 270L	Data Structures	2	0	2	4		
CSCI 330	Artificial Intelligence	1	0	0	1		
CSCI 367	Database and Web Programming	1	0	1	2		
CSCI 371	Design and Analysis of Alogrithms	1	0	0	1		
CSCI 390	Objects and Design	0	0	1	1		
DATA 133	Introduction to Data Science I	1	0	0	1		
DATA 233	Introduction to Data Science II	0	0	1	1		
DATA 499A	Data Science Capstone I	1	0	0	1		
DATA 499B	Data Science Capstone II	0	0	1	1		
MATH 152	Calculus II	1	0	1	2		
MATH/STAT 242	Introduction to Mathematical Statistics	2	0	0	2		
MATH 253	Multivariable Calculus	1	0	1	2		
MATH 331	Linear Algebra (NS)	2	0	1	3		
MATH/STAT 348	Statistical Computing and Consulting	0	0	1	1		
MATH/STAT 442	Statististical Modeling	0	0	0	0		Every other year
MATH 318	Introduction to Proof in Mathematics: Combinatorics	0	1	0	0		Every other year
MATH 422	Mathematical Modeling	1	0	0	0		Every other year
MATH/STAT 342	Probability and Statistical Theory	0	0	0	0		Every other year
BUSA 310	Information Systems and Database Management	1	1	1	3		
BUSA 467	Marketing Research	1	0	0	1		
COMA 461	Advertising, PR + Campaigns	0	0	1	1		
ECON 344	Econometrics	0	0	0	0		Every other year
ESCI 331	Maps: Computer-Aided Mapping and Analysis	0	1	0	1		Every other year
NURS 318	Research Methods	1	0	1	2		
NURS 319	Healthcare Technology	1	0	1	2		
POLS 301	Political Science Methods	?	?	?	?		
PSYC 242	Advanced Statistics and Research Design	2	0	1	3		
SOCI 232	Research Methods	?	?	?	?		

STAT 231	Introductory Statistics		3	1	2	6	
STAT 232	Introduction to Statistics - Psychology		1	0	2	3	
STAT 233	<<name goes here>>	?	?	?	?		

2025-2026 Academic Year

Course	Course Title	# Fall	# J-Term	# Spring	Total #	Multi-Disciplinary	Comments
CSCI 144	Introduction to Computer Science	3	0	2	5		
CSCI 144L	Introduction to Computer Science	3	0	2	5		
CSCI 270	Data Structures	1	0	2	3		
CSCI 270L	Data Structures	2	0	2	4		
CSCI 330	Artificial Intelligence	1	0	0	1		
CSCI 367	Database and Web Programming	1	0	1	2		
CSCI 371	Design and Analysis of Alogrithms	1	0	0	1		
CSCI 390	Objects and Design	0	0	1	1		
DATA 133	introduction to Data Science I	1	0	0	1		
DATA 233	introduction to Data Science II	0	0	1	1		
DATA 499A	Data Science Capstone I	1	0	0	1		
DATA 499B	Data Science Capstone II	0	0	1	1		
MATH 152	Calculus II	1	0	1	2		
MATH/STAT 242	Introduction to Mathematical Statistics	2	0	0	2		
MATH 253	Multivariable Calculus	1	0	1	2		
MATH 331	Linear Algebra (NS)	2	0	1	3		
MATH/STAT 348	Statistical Computing and Consulting	0	0	1	1		
MATH/STAT 442	Statististical Modeling	1	0	0	1		Every other year
MATH 318	Introduction to Proof in Mathematics: Combinatorics	0	0	0	0		Every other year
MATH 422	Mathematical Modeling	0	0	0	0		Every other year
MATH/STAT 342	Probability and Statistical Theory	0	0	1	0		Every other year
BUSA 310	Information Systems and Database Management	1	1	1	3		
BUSA 467	Marketing Research	1	0	0	1		
COMA 461	Advertising, PR + Campaigns	0	0	1	1		
ECON 344	Econometrics	0	0	1	0		Every other year
ESCI 331	Maps: Computer-Aided Mapping and Analysis	0	0	0	0		Every other year
NURS 318	Research Methods	1	0	1	2		
NURS 319	Healthcare Technology	1	0	1	2		

POLS 301	Political Science Methods	?	?	?	?	
PSYC 242	Advanced Statistics and Research Design		2	0	1	3
SOCI 232	Research Methods	?	?	?	?	
STAT 231	Introductory Statistics		3	1	2	6
STAT 232	Introduction to Statistics - Psychology		1	0	2	3
STAT 233	<<name goes here>>	?	?	?	?	

2-year plan

Year

PLU		CC			0
CSCI 144: Intro Computer Sci	4	CIS 121, 122 & 123			
CSCI 270: Data Structures	4	CIS 202			
MATH 152: Calculus II	4	MATH& 151, 152, 153			
MATH 242: Statistics	4	MATH& 146			
TOTAL	16	TOTAL	0	TOTAL	0

1	Fall		J-term		Spring	0
	CSCI 330: Artificial Intelligence	4	MATH 318: Intro to Proofs: Combinato	4	CSCI 367: Databases & Web Pro.	4
	MATH 253: Multivariable Calculus	4			DATA 233: Intro to Data Science II	4
	GEN ED Class	4			STAT 342: Probability and Statistical Theory	4
					GEN ED CLASS	4
	TOTAL	12	TOTAL	4	TOTAL	16

2	Fall	0	J-term		Spring	0
	CSCI 371: Algorithms	4			DATA 499B: Capstone Seminar	2
	DATA 499A: Capstone Seminar	2			STAT 348: Statistical Computing and Consult	4
	MATH 331: Linear Algebra	4			Domain Elective	4
	MATH 442 ** /ECON 344 (4)	4				
	TOTAL	14	TOTAL	0	TOTAL	10

Total Credits: 56

4-year Plan

Year						
1	Fall		J-term		Spring	0
	CSCI 144: Intro Computer Sci	4			CSCI 270: Data Structures	4
	MATH 152: Calculus II	4				
	TOTAL	8	TOTAL	0	TOTAL	4

2	Fall		J-term		Spring	0
	MATH 242: Statistics	4			CSCI 367: Databases & Web Pro.	4
	CSCI 330: Artificial Intelligence	4			DATA 233: Intro to Data Science II	4
	TOTAL	8	TOTAL	0	TOTAL	8

3	Fall		J-term		Spring	0
	CSCI 371: Algorithms	4	MATH 318: Intro to Proofs: Combinato	4	MATH 331: Linear Algebra	4
	MATH 253: Multivariable Calculus	4			STAT 342: Probability and Statistical Theory	4
					Domain Elective	4
	TOTAL	8	TOTAL	4	TOTAL	12

4	Fall	0	J-term		Spring	0
	DATA 499A: Capstone Seminar	2			DATA 499B: Capstone Seminar	2
	MATH 442 ** /ECON 344 (4)	4			STAT 348: Statistical Computing and Consult	4
	TOTAL	6	TOTAL	0	TOTAL	6

Welcome!

If you're in one of my classes, this is the place to start!

First, a little about me...

My name is Nicola Justice (students call me "NJ" or "Dr. Justice"). I dream to one day live in an actual tree house like Swiss Family Robinson (but without the racial stereotypes). When not teaching stats, I love to read children's chapter books. Some of my favorites include *The Phantom Tollbooth*, and *The Voyage of the Dawn Treader*, and *The Princess and the Goblin*. I just finished reading about Hiccup in the first two books of the *How to Train Your Dragon* series, so please *don't* tell me any spoillers!!!

Paradise, my favorite place to hike on Mt. Rainier

Photo credit: Mabel, J. (2014) Dead Horse Creek Trail, subalpine meadow, Paradise, Mount Rainier National Park, Washington state, U.S. Peak in background. Licensed under Creative Commons-SA 3.0. Retrieved from Wikimedia Commons.

Image adapted from: Servin, G. (2017). Person Riding a Bicycle during Rainy Day. Retrieved from Pexels. Licensed by Pexels.

I am passionate about ALL my students learning and being empowered to use their gifts and talents and interests to change the world. Most of my extended family lives in South Africa, and ever since an early age I've been interested in combatting the horrors of apartheid and its aftermath. (Fun fact: my grandmother was threatened by the South African government to be deported because of her efforts to fight apartheid. I am still learning about how I can be an active anti-racist the way that she was.) This blog post about bicycling in Detroit really resonates with me, and it might be a great read for you if you are a white person wanting to learn more about white privilege.

On to info about our course:

The most important thing you should know about me is that I LOVE to help students. Normally, I tell students they can stop by my office any time—even just to chat if you don't have questions about the course. If it is hard for you to be on campus when I am, you can email me any time and/or let's set up a video chat and drink tea and talk about math/stats/dreams/goals/struggles/joys/whatever.

Let's connect! njustice@plu.edu

The 2nd most important thing to know is how to get help. PLU wants you to succeed (and so do I!) so now is a great time to navigate to the "getting help" page where you can learn more about how to succeed in this course. The "Getting Help" Page is page 2 of our "liquid syllabus" (click below).

Next step in the syllabus:

Click Here! Syllabus Part 2: "Getting Help"

(Click on the white button)

Morken Center, PLU

NJ's Office: Morken 255
NJ's Office Phone: 253-535-7446

Interested in Data Science Internships? Check these out!

1. SULI energy internships
2. Search using this app and your interests (click "intern")
3. SIBS biostatistics

Thanks to the following individuals whose ideas I have adapted into this course and syllabus: Tom Read, Donnie Hallstone, Brian Gill, Robbin O'Leary, Caleb Henry, Salah Abed, Liz Fry, Michelle Everson, Laura Le, Laura Ziegler, Andrew Zieffler, Anelise Sabbag, Beth Chance, Kelly Spoon, and Joan Garfield.

A huge thanks to my dear friend Kate for providing much of the artwork used on this website!

Contact me any time: njustice@plu.edu

Getting Help

If you are a student needing help, read on!!! If you are staff or faculty needing help, consider participating in PLU's Lute FASSN program.

Help from Me

It is worth repeating: You are welcome to reach out to me for help any time. I hope that you will connect at least once during the semester – just to chat if you don't have any questions about the course.

One way to connect with me is during student/office hours. I also am happy to set up video meetings outside of regular working hours for students who have commitments that make it difficult to connect during the day.

NJ's Student Hours:

- M, W 3:00-3:30pm;
- T, Th 9:15-10:15am;
- & by appointment! (in person or virtual)

in Morken 255

(link, when decided in advance to be virtual)

What are "student hours" or "Office Hours"?

Student hours are a time I set aside each week to help students with WHATEVER THEY NEED. Some professors call these times "office hours." This time is meant for YOU! You are not "bugging" me if you pop in for those hours, and if you can't make it to my student hours, that's OK! Just reach out to set up another time to meet up with me. I LOVE GETTING TO KNOW STUDENTS, so don't hesitate to reach out!

...via email

Questions via email are great, too! **If you have a question to ask via email, please copy and paste the prompt (question) of the assignment along with your question.** This helps me respond much sooner if I am "out and about" when I receive your email.

(If I am at the grocery store and I read "hey I'm confused about the wording on #7" it will take me a whole heap of time to drive home, look up #7, and respond. If I read "hey I'm confused about the wording on #7, here is what it says: _____" then I can respond right then and there so that you can be on your way.)

Tarazevich, A. (2020) Here To Help Lettering Text on Black Background. Licensed by Pexels: Free to use, Retrieved from Pexels.

Help From other students in our class

If you need help you can also ask other students! You are welcome to complete online quizzes and homework assignments in collaboration with other students!

Help From free PLU tutors

The Center for Student Success hires tutors to give YOU free tutoring! (When I was in college, tutoring cost as much as $50/hour... PLU gives it to you FREE!) Tutoring sessions can be scheduled here. Click the box that says One-on-one tutoring and select a virtual option.

If you can't figure out how to set up an appointment on the Center for Student Success Page, just shoot one or two of them an email and they can help you out.

If you are a student struggling with more complex issues, with multiple or severe learning disabilities, or anything else that is creating a barrier to learning, the director of the tutoring center (Leslie) said you are welcome to reach out to her. You can email foleylj@plu.edu or call her (253-905-6028) to let her know what's happening.

More Help from PLU

I've worked at half-a-dozen institutions, and I've found that there is something different about PLU: they really seem to care about students. Now let me be clear: all institutions care about their students because students graduating and getting good jobs helps their rankings and reported success rates and donations and so on. But PLU is different. They **really** seem to genuinely care about students.

So it is not surprising that they have designed lots of ways to provide support for students who are struggling.

The PLU Center for Academic Success is designed to help you find the support you need to overcome whatever difficulties you may be facing: problems completing coursework, finances, personal life, or anything else. Check out the website at: plu.edu/student-success

Here are some other resources that may help you:

Center for Student Success
This is a good place to start if you need help but don't know where to begin.

Counseling Center

Student Care Network
This is a way to anonymously (or not) report if you have concerns about a friend. A non-judgemental counselor will reach out to check in and see if the student is ok. I submit care forms when students are struggling in class.

Gender-Based Violence Advocate

Bias Incident Response Team (BIRT)
A safe place to start if you don't know how to report a problem

Resources for DACA and undocumented students

Center for Diversity, Justice, and Sustainability

TimelyCare (formerly Lute Telehealth)
TimelyCare has expanded their services for PLU students to include scheduled and on-demand mental health therapy appointments, unlimited health coaching, and self-guided wellness journeys, among other resources tailored to changing student needs. PLU students also have 24/7 access to scheduled psychiatric behavioral health appointments for medication management.

Campus Ministry

Center for Military Support

Resources for Students with Documented Disabilities
Students with medically recognized and documented disabilities and who are in need of accommodation must notify the University Office of Disability Support Services (X7206) of their needs. I am happy to accommodate, and to provide assistance in case of classroom evacuation. Please make an appointment with me as soon as possible if you need either of these. You can also consult with the Office of Accessibility and Accommodation if you don't know where to start.

PLU Pantry
A place to get some food if you need help!

Center for PLU Alumni and Student Connections
This is a great place to find someone to job-shadow or to ask questions about career interests. PLU Alumni LOVE to help out PLU students; take advantage of this awesome opportunity!

If none of these resources seem to apply to your situation, let me know and I'll do some digging to try to help you get the support you need!

A great place to look next is your course's specific page:

Next step for syllabus:

Go to your Course's Page

Courses

(Click on the Courses button)

A huge thanks to my dear friend Kate for providing much of the artwork used on this website!

Contact me any time: njustice@plu.edu

Welcome to MATH/STAT 442!

MWF 11:15-12:20

Class Meets: Morken 137

In case of emergency or if you end up needing to set up a virtual appointment we will use Zoom. If you don't know how to use Zoom, here is a FAQ to get you started:

Zoom Start-Up Guide

Learning Objectives*

The main learning goal of this course is that students will be able to **build, interpret, evaluate, and critique statistical models**

More specifically, students will:*

1. Examine underlying principles of partitioning variance in bivariate and multiple regression models.
2. Relate anova results to variable characteristics (e.g., centered, uncentered, orthogonal, co-linear, etc.).
3. Connect regression output to model features, with particular emphasis on nuances, decisions (whether implied by software or not), and common errors interpreting multiple regression results.
4. Critique and evaluate different measures for selecting models.
5. Develop fluency using R Statistical Software to do all of the above, including data preparation and management, transformations of variables to satisfy conditions for linear regression, model diagnostics, and communication of results using a package that weaves results with exposition (e.g., knitr, etc.)

*More learning outcomes from the mathematics department and PLU's general education are given later.

Stuff you need

Technology

We will submit HW and receive feedback on HW via Google Classroom (GC). You will need to scan your homework and submit as a pdf into GC.

To use your phone to scan homework to a pdf & submit to GC:
Submit with iPhone: https://youtu.be/EIUpRE_xPKc
Submit with Android: https://youtu.be/AbLFIqJq5sc

You may wish to type assignments using LaTeX but I don't especially recommend it unless you're quick with that program.

This course uses R statistical software with R Studio as a graphical interface (both of which are vailable FREE!) Instructions for downloading and getting started are in ModernDive, here.

Why use R?

- It is free
- It is powerful
- It is one of the more commonly used programs for statisticians
- It is open-source (always growing and improving)
- It is great on your resume!

A note on technology:

Some students in this course are computer science majors, but others are not. Regardless of your major, NO COMPUTING KNOWLEDGE is expected or required.

R can be intimidating (and at times frustrating) at first, but remember that ***no computing expertise is expected of students entering this course***. That means you can reach out to me and your peers for help with ANY aspect of the computing. We will strengthen our computing muscles together!

PLU email

To be successful in this course, you will need to activate and use your PLU email (ending with @plu.edu). Your email will contain an invitation to the course website that we will use daily, as well as occasional announcements and notifications about the course.

Although we will use Google Classroom for delivering and submitting assignments and forums, in general we will use this website for communicating course content.

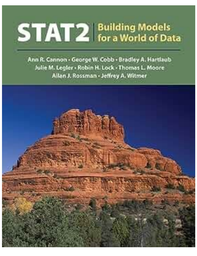
Book

Most of my other courses use open-source materials, but in this class we will make regular use of our primary text: *STAT 2* by Cannon et al (2013).

ISBN: 978-1464148262

I will keep a copy either on reserve in the PLU library.

A newer edition is available, but I prefer the first one.



Prereq Knowledge & Skills

MATH 331 and MATH/STAT 242 or equivalent. Prior experience using R statistical software is strongly recommended.

Katyal, Prateek. (2019) "You Got This Lighted Signage." Licensed under Pexels. Retrieved from Pexels.

Coursework

Labs/Assignments: 75%

These include homework assignments, and in-class assignments (which can become homework if unfinished during class). Some may require or allow you to work together in small groups.

Miscellaneous: 5%

You can expect various online reflections, quizzes, and activities. These are *not* designed to be high-stakes, as the 5% weight indicates.

Final Project 20%

To support our learning goals, you will create, critique, and select from a series of statistical models in a final course project. More details as the time arises.

Grades

Grades of A, A−, B+, B, B−, C+, C, C−, D, and F are assigned at cutoffs of 93%, 90%, 87%, 83%, 80%, 77%, 73%, 70%, 60%, and 0%, respectively.

Please see your PLU Catalog for general policies on grading, incomplete, P/F, and W grades. Online you can also find the PLU policy in case of an academic emergency (e.g., natural disaster, epidemic, etc.).

Learning Objectives (Formally)

This course is aligned with the following **PLU Math Department Learning Objectives:**

- Communication: Be able to read, interpret, write about, and talk about mathematics (or statistics).
- Application: Be able to apply mathematical concepts to concrete situations.
- Disciplinary Citizenship: Develop collaborative skills, independence, perseverance, and experience with open-ended inquiry.

This course is aligned with the following PLU Data Science Major Learning Outcomes:

- Design: Be able to critically analyze a problem and to design, implement, and evaluate a solution that meets requirements.
- Communication: Be able to effectively communicate technical concepts in oral and written form.
- Application: Be able to apply mathematical or statistical concepts to concrete situations.
- Disciplinary Citizenship: Develop collaborative skills and independence; have experience with open-ended inquiry.

This course is aligned with the following **Statistics Minor Objectives:**

- Develop novice-level statistical thinking, particularly with respect to linking appropriate inferences to study design (e.g., correlation does not imply causation).
- Demonstrate the ability to appropriately select and use statistical models (e.g., normal distribution, *t*-distribution, binomial distribution) and statistical methods (e.g., regression, resampling).
- Develop facility with one or more professional statistical software programs.

This course is aligned with the following **General Education Learning Outcomes (NS):**

- Students will understand and apply basic concepts from a particular discipline of the natural sciences.
- Students will identify and explain organizing models of a discipline.
- Students will identify social and ethical issues pertaining to a discipline.

Next step for syllabus: More Syllabus

A huge thanks to my dear friend Kate for providing much of the artwork used on this website!

Contact me any time: njustice@plu.edu

More Syllabus Info

about GROUP WORK

One of the math department's learning outcomes is that you work collaboratively with others. This course will make use of group work.

GROUP WORK DOES NOT MEAN that you divide and conquer, divvying up the work and then trading answers.

Instead, when you work in groups, the entire group should be working simultaneously on each problem, coming to consensus, and then moving on to the next one.

Important Dates.

https://www.plu.edu/registrar/academic-dates-deadlines/

Last day to add a class (without fee): Sept 11
Starting Feb 14 you can add a class with a fee and an instructor permission, but who wants to pay extra?

Last day to drop a class: Sept 18
Before May 6th you can "withdraw", but then a "W" appears on your transcript and you will still pay tuition for the course. Dropping the course is as if you never even signed up for it.

Last day to change to Pass/Fail grading: Sept 27
There are advantages and disadvantages to P/F grading; be sure to talk to your adviser so you know all your options.

Last day to apply for graduation at the end of this term: Oct 2
You're nearly there! You can do it!

Mid-Semester Break: Oct 20
Classes are cancelled.

Advising weeks: Oct 23 - Nov 3
This is a chance to connect with your adviser to figure out your registration plan for the next semester. NJ's hint: consider getting a statistics minor, or a data science minor, or a math major/minor!

Registration weeks for next term: Nov 7 - 17
You will have a pre-specified time (indicated on banner) that tells you when you can snag spots in the classes you'd like to take.

Thanksgiving Holidays: Nov 22 1:30 pm - Nov 24
Classes are cancelled.

Last day to withdraw from a class or from the university: Dec 08
If you opt to withdraw, a "W" appears on your transcript, but the course will not affect your GPA.

Last day of regular class: Dec 09

Finals Week: Dec 11 - Dec 15

Grades Submitted: Dec 22

Policies

Attendance & Your Health

This course is designed so that learning takes place via active participation both in and outside of the class. Although daily attendance is not mandatory, many in-class activities provide irreplaceable learning experiences, and these cannot be made up.

I recognize that some students have other commitments that do not allow them to come to class. You need to do what is best for your life, and for your health. I will try my best to make resources available for students who miss class, but I can't promise all the experiences will be repeatable. Please check in with a peer or two (not just me) to learn about what was covered.

Please do not come to class if you are feeling ill or should be in quarantine. The best place to start with recovering missed course work is the daily content page for your class, and also checking in with a buddy or two for highlights. Should your circumstances change in a way that impacts your ability to continue to succeed in our class, please notify me as soon as possible so that we can work together to connect you to support and make a plan.

About Late Work

Assigned work is not considered late until I have graded all the submitted assignments of your peers. This means that if a deadline is 3pm on Friday, and you don't submit yours until 4pm on Friday, you're probably fine. In fact, I typically take a rest from Friday-Saturday, so usually Sunday I'm starting my grading work.

Once I've graded all the other assignments, I enter 0's in for the missing assignments and return them all. Once you recieve a 0 in Google Classroom, then any submissions thereafter are considered late.

All students have **3 "free" late assignments**. You don't need to tell me when you'd like to use a freebee; the first 3 late assignments will automatically be given grace and will not receive penalty. Once the first 3 freebees have been used up, any late assignments thereafter are penalized by 15% of the grade.

Religious Accommodations

PLU makes every effort to provide reasonable accommodations for all students who, because of religious observances, may have conflicts with scheduled exams, assignments, or required attendance in courses. Students are responsible for reviewing the course schedule at the beginning of the semester to determine any such potential conflicts. Then, students should communicate with their faculty member about the need for a religious accommodation at least three weeks in advance of the date when the conflict occurs. If students would like support in making this request, they can contact PLU's University Pastor Jen Rude (rudejl@plu.edu or 535-7465).

Disruptive Classroom Behavior

I am committed to protecting all my students' opportunities participate in the learning this course has to offer. Repeated disruptive classroom behavior from any student will not be tolerated. Please follow these examples of appropriate (non-disruptive) classroom behaviors:

- Keep questions and comments relevant to the topic at hand
- Act with respect to all students, regardless of their expressed beliefs and ideas
- Arrive with plenty of time to be prepared for active participation in the class
- If you must leave early, do so without disrupting others
- Avoid computing behaviors that are distracting to yourself and other students (e.g., watching videos, checking e-mail, Facebook)

Students who do not follow these guidelines, who make repeated offenses, or who do not respond to instructor correction may be referred to PLU's Student Conduct System (http://www.plu.edu/srr). If someone in the classroom (including your instructor) is obstructing your ability to learn or is not following these guidelines, please tell your instructor as soon as possible.

Academic Dishonesty.

PLU's expectation is that students will not cheat or plagiarize, and that they will not condone these behaviors or assist others who cheat or plagiarize.

Cheating includes, but is not limited to:

- Submitting material that is not yours as part of your course performance, such as copying another person's exam or written assignment, or allowing another student to copy from your exam or assignment
- Using information or devices not allowed (e.g., internet devices during exams, consulting with other groups during group assessments)
- Fabricating information (e.g., making up fake data and presenting it as if it were real)

Plagiarism includes, but is not limited to:

- Directly quoting words of others without using quotations marks or indentation to identify the script as quoted along with credit to the original source
- Using altered wording, materials, or ideas of others without properly identifying the original source
- Offering ideas or strategies as if they are your own when they come from someone else.

Any time you are unclear about whether something is cheating or plagiarism, please see your instructor or your librarian for guidance. More information about academic integrity policies can be found online in the PLU Faculty Handbook.

Use of AI and Proper Attribution

AI tools can assist in providing explanations and suggestions, but they should not be used for direct answers to graded assignments, quizzes, or examinations. You should review and revise any AI-generated responses. Also, you should cite your AI tool (give credit where it is due) any time you use it. Do not submit AI-generated content as your own work; adapt it to make it yours and give credit to the tool as the original draft; otherwise this is plagiarism. You are always invited to meet with me for clarification on course content as a first option, as information provided by the AI can be inaccurate or incomplete.

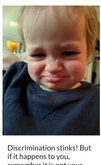
Likewise, if you work with a partner, or get help from anyone on any assignment, you must say so (give proper credit whenever it is due). This is an important ethical practice. Acknowledging such collaborations will not affect your grade, unless otherwise clearly specified in the assignment instructions.

Incomplete Grades.

PLU's policies about incomplete grades can be found in the Undergraduate Academic Policies and Procedures in your course catalog. For this course, Incomplete (I) grades are considered only for students who have completed with a C or higher more than 50% of the course work at the time when a circumstance beyond their control hindered their ability to participate.

Discrimination and Title IX.

The University and I take discrimination very seriously and we are committed to providing equal opportunity for learning to all students ***all*** students, regardless of any aspect of their identity or expression, including race, color, age, gender, ethnicity, national origin, religion, creed, genetic information, disability, veteran's status, or sexual orientation. If you feel that our classroom environment in any way impedes your ability to participate or subjects you to discrimination, or you are experiencing harassment outside of class that disrupts your educational opportunities, please do not hesitate to contact me or our PLU coordinator for Title IX/Equal Opportunity/ADA Office (919-966-3576), which has been designated by the university to handle inquiries regarding the University's non-discrimination policies.



Discrimination stinks! But if it happens to you, remember it is not your fault!

As an employee of an institution of higher education that receives Federal Funding, I am required to report known or suspected acts of sexual harassment including sexual violence as defined by Title IX. This includes the nature, date, time, and location of the incident, the disposition of the complaint, and other information, including involved parties, on a case-by-case basis. See plu.edu/title-ix for more information about Title IX at PLU. Students have access to confidential services through the Counseling Center, Health Center, Campus Pastor in Campus Ministry, and the Gender-Based Violence Advocate in the Center for Gender Equity.

Masking, Vaccinations, etc.

When on campus, students must adhere to the university's policies for masking, vaccinations, etc. As applicable to our course, specifics of those requirements will be updated in this document.

Inclement Weather & Other Emergencies.

Regarding questions of weather and other emergencies, please check the University website or hotline (after 6 am; (877) 322-0872) and PLU alerts regarding the status of college closure. Class cancellations due to other unexpected causes will be announced via e-mail.

Disclaimer

Certain aspects of the course may be modified in order to meet the needs of the class. Students are responsible for any changes announced in class or online.

If you've made it this far: WOW! You get a gold star! The next step is to click on your course's Daily Content page. Use the drop-down menu: click *Courses* —> click the dropdown arrow by your course number—> click your course 's *Daily Content* page. That is where the lessons and daily course info will be posted.

A huge thanks to my dear friend Kate for providing much of the artwork used on this website!

Contact me any time: njustice@plu.edu

DATA 499A & B: Capstone - Fall 2024 (A) and Spring 2025 (B)
MCLT 203

Dr. Jeffrey Caley
Office: MCLT 247
Zoom Office: https://plu-edu.zoom.us/j/7151078927
Email: caleyjb@plu.edu
Student Hours: M,W,F: 12:30pm-1:30pm
Thursday: 11:00am-1:45pm

Class Meeting Times
T,Th 1:45-3:30pm, MCLT 203

Course Goals
The capstone course is designed to give students the opportunity to apply their skills to a medium scale, team based project, over the course of two semesters. Under the guidance of a faculty mentor, teams will take a data-driven project from its inception through to a fully-realized implementation, encompassing all stages of the data science workflow.

The course will include oral presentations, written reports, and a presentation of your final product at the Data Science Capstone Symposium.

- To gain experience working on a medium-scale data project.
- To gain technical writing skills.
- To gain skills in oral presentation of technical material.
- To learn to document and be accountable for your progress.
- To become more aware of social, legal, and ethical issues in the data science field.

Learning Outcomes
1. Design: Be able to critically analyze a problem and to design, implement, and evaluate a solution that meets requirements.
2. Communication: Be able to effectively communicate technical concepts in oral and written form.
3. Application: Be able to apply mathematical or statistical concepts to concrete situations.
4. Disciplinary Citizenship: Develop collaborative skills and independence; have experience with open-ended inquiry.

Attendance

You are expected to attend all class sessions, discussions, guest speakers, etc.. You are responsible for all material that is covered during the class.

Grading

There will be a single grade assigned to you at the end of the Spring semester. This grade will be applied to both the Spring and the Fall semesters. At the end of the Fall semester you will receive an In-Progress grade (IP). The IP will be changed to your final grade at the end of the Spring semester. If you are not demonstrating adequate progress, you may receive a failing grade at the end of the Fall semester. If this happens, you will be prevented from proceeding to the next semester and will be required to retake the class. Your course grade will be based on the following:

Your final grade will be based on your weighted average using some approximation of the following table:

Component	Weight	Details
Project Quality	30%	Subjective and will be determined in collaboration with your faculty mentor. We will look at the size, scope, difficulty and how much you accomplished on your project when calculating this grade
Project Documents	20%	Aggregate score of all written documents required for the project. This includes but is not limited to: proposal, sprint plan, mid-term report, final report
Presentations	20%	Aggregate score of all presentations made in the class and critical evaluations of other presentations. This includes but is not limited to: weekly updates, mid-term presentation, final presentation
Ethics	15%	Comprised of written work and class discussions
Attendance/Participation/ Effort	15%	Attend classes and meetings with group and advisors Don’t be a passive participant Be a try hard

Your final grade will be based on your weighted average using some approximation of the following table:

Your final grade will be based on your weighted average using some approximation of the following table:

Overall Score	Grade
100%--90%	A/A-
90%--80%	B+/B/B-
80%--70%	C+/C/C-
70%--60%	D+/D/D-
60% -- 0%	E

Conduct
As members of the PLU community, it is all of our responsibility to provide a safe, inclusive classroom environment that is considerate of others, encourages exploration of ideas and allows opportunities for everyone to fully engage in classroom discussions, activities, lectures, etc. Examples of unacceptable classroom misconduct include:

- Coming to class late (on a regular basis)
- Failure to turn off electronic devices including cell phones,
- Private conversations during lectures, presentations etc. (via voice or electronic means)
- Playing Internet games, surfing the web, reading email/blogs, working on homework assignments or other activities inappropriate with what is happening in the class.
- Aggressive, threatening or demeaning behavior towards other students or the instructor.

Academic Honesty
The basic presumption is that the work you do is your own. Occasionally, especially when working problem sets or writing programs (but never on exams), it may be necessary to ask someone for help. You are permitted to do so, provided you meet the following two conditions:

1. You understand the work you hand in, so that you could explain the reasoning behind the parts of the work done for you by another.
2. You do not use handwritten, printed or electronic copies of other's work.

Any other assistance constitutes a violation of the academic integrity policy and will be treated as such. Please also refer to the PLU catalog or http://www.plu.edu/srr/code-of-conduct/academic-integrity.php for the official PLU Academic Integrity Policy. Make sure that

you protect your own work. If you store your files on a public server, make sure the permissions are set so that only you can read them. Ask your professor if you don't know how to do this. Never give printed copies of your own work to other students. Do not throw printed copies of your programs in the recycle bin in the computer lab. Recycle them where other students in the class do not have access to them.

If you have any questions about what this policy means, please discuss the matter with the instructor now.

Statement on AI
You are encouraged to use generative AI tools to support your learning, understanding, and creative processes during the course. However, AI tools should be utilized responsibly and ethically, adhering to the academic principles of academic honesty and originality.

Content Warning
Students are advised that difficult or sensitive issues may be represented or discussed in this class. While care will always be taken not to cause distress and to create a welcoming learning environment for everyone, there may be occasions where you will confront images or texts, or where you hear discussions that are uncomfortable for you. I will not issue trigger warnings with respect to potentially challenging or distressing content, for several reasons. I do not presume in advance to know what content or discussions may cause you distress; trauma is a deeply complex and personal experience. Instead, I will provide context for materials that feature content generally found to be challenging and make it clear why I am showing particular images or we are reading particular texts. If you ever feel unable to continue to participate in a particular class, you may leave at any point and will not be challenged. I will follow up to address any concerns and provide additional resources for support. You are also, of course, welcome to share any concerns about the course content you may have at any time during the term, and I promise to listen openly and respectfully.

Weather Related Closures
For face-to-face meetings, you may want to confirm whether class is meeting if you have any concerns about weather conditions that would make travel to campus unsafe. You can call the University's hotline after 6 a.m. (253-535-7100) or access the PLU website (www.plu.edu) to see if campus has been closed. As soon as I know if campus has been closed due to weather, I will communicate this to the class as well using Sakai announcements. Please do not risk your health or safety if weather conditions make traveling dangerous.

Commitment to Inclusion
It is my intent that students from all backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. It is my intent to present materials and activities that are respectful of diversity across all dimensions,

including gender, sexuality, disability, age, socio-economic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students. In addition, if any of our class meetings conflict with life events, please let me know so that I can make arrangements for you.

Student Care Network

PLU has established the Student Care Network (SCN) to work with students and partners for a successful academic, social, and emotional experience at PLU. Students, faculty and staff can submit a Care Form (available on the main page of the PLU web-site under EPass) if they have concerns (academic, emotional, physical or social) related to the well-being of a PLU student. The SCN will work with campus partners to support a culture of care and response for all community members. Please go to: www.plu.edu/srr/student-care-network to learn more or to submit a report.

Mental Health & Wellness Resources

We all may experience a range of mental health issues that can impact our life in all variety of ways. These might include anxiety, high levels of stress, alcohol/drug problems, strained relationships, feeling down, or loss of motivation. PLU's Counseling Center is here to help you with these or other issues you may experience. You can learn about the free, confidential mental health services available on campus by calling 253-535-7838, visiting https://www.plu.edu/chws/ or emailing counseling@plu.edu. For urgent mental health support after business hours, including weekends and holidays, contact the Counseling Center Crisis Line at 253-535-7075. Help is always available.

Additionally, Lute Telehealth is a resource for you that expands access to mental health and medical care by providing on-line or phone-based services 24/7/365 from licensed mental health providers and nurse practitioners.

Finally, the Couple and Family Therapy Center (part of PLU's Marriage and Family Therapy program) offers affordable, high-quality care to individuals, couples, and families -- including PLU students -- using the latest advances in the field.

Center for Student Success

PLU has established the Center for Student Success to serve as a campus-wide network of units dedicated to helping students succeed. The website is: www.plu.edu/student-success. Students can find out about Academic Advising and Degree Planning; Tutoring and Assignment Help, Career and Vocation Planning, Personal Health and Wellness, Financial Services and many affinity group connections. Students can make appointments with advising, the writing center, academic assistance, and many other forms of support.

Special Needs and Circumstances
Students with medically recognized and documented disabilities and who are in need of special accommodation have an obligation to notify the University of their needs. Students in need of accommodation should contact the Office of Disability Support Services (http://www.plu.edu/dss/, x7206). If you need course adaptations or accommodations because of a disability, if you have emergency medical information, or if you need special arrangements in case the building must be evacuated, please make an appointment with your instructor as soon as possible.
Students are also reminded that they are responsible for notifying instructors of any conditions that may impair their academic performance. Without advance warning, such difficulties cannot be used later as a basis for requesting make-up exams or reconsideration of grades.

Religious Accommodations
As a university rooted in the tradition of Lutheran Higher Education, enacting a mission of critical inquiry, service, leadership, and care, and committed to Diversity, Justice, and Sustainability, PLU values the various religious and spiritual traditions and practices within our campus community and supports faculty, staff, and students in living them out. This also includes supporting community members in the process of exploration and asking critical questions with regard to faith and spirituality.

Therefore, I will make every effort to provide reasonable accommodations for any of you who, because of religious observances, have conflicts with scheduled exams, assignments, or attendance in our class. To help me in doing this, please review the course schedule at the beginning of the semester to see if there are any dates when you would need accommodation. If you could let me know at least three weeks before the date, that would be ideal. While I am happy to provide such accommodations, I understand that approaching a faculty member within this context may be intimidating; if that's the case, you can contact PLU's University Pastor Jen Rude (rudejl@plu.edu or 253-535-7465) for support in making an accommodations request. You can also find more information about resources and other religious accommodations you can request related to employment, athletics, etc. here.

Land Acknowledgment
PLU is on the traditional lands of the Nisqually, Puyallup, Squaxin Island and Steilacoom peoples; we acknowledge and respect the traditional caretakers of this land.

Registrar's Deadlines
https://www.plu.edu/registrar/

Timestamp	**My level of support for this proposal is as follows:**	If you are undecided or do not support, please share your concerns.	Email Address
10/16/2023 8:11:36	I support.		yadenlbe@plu.edu
10/16/2023 8:12:47	I support.		simicmka@plu.edu
10/16/2023 8:45:41	I support.		plaehnkh@plu.edu
10/16/2023 9:47:02	I support.		murphylc@plu.edu
10/16/2023 10:08:12	I support.		mcconnke@plu.edu
10/16/2023 12:35:00	I am undecided.	This is a wonderful major and I believe it will do well here at PLU. I support the initial year of the proposal and perhaps the next several years, however I am concerned about the need for additional employees as the program grows. If the program does grow - will the increase cover the positions needed is only one consideration. Other considerations: (1) will the salary amount be enough to sustain the IT and administrative assistant support positions in two years time? (2) Will the responsibilities for the IT hire be determined by IT or the academic department? (3) Should priority be given to this administrative support need over several other departments and offices (academic and non-academic) that currently are without any administrative assistance? I'm not sure this is a big enough concern to stop the exploration, but it is a concern that needs consideration when looking at the university as a whole.	boylekm@plu.edu
10/25/2023 8:30:51	I support.		frechemt@plu.edu
10/25/2023 8:55:51	I support.		jtoth@plu.edu
10/25/2023 8:56:24	I support.		fergusma@plu.edu
10/30/2023 8:39:47	I support.		gehrinpd@plu.edu

Responses to Questions Raised Regarding Data Science Major EPC Proposal:

Just a comment that the major seems like a very large number of credits. Is that really necessary?

The Data Science major requires 64 credits. Part of the reason for the various requirements is that we're looking ahead to possible accreditation requirements and aligning the courses with pre-publications of those, as well as with recommendations from professional organizations for the courses that should be included. Thus, there is little we can do to reduce the requirements, at least the way our MATH and CSCI curricula are currently bundled.

Additionally, 64 credits for a B.S. falls into alignment with the other B.S. degrees offered by the College of Natural Sciences:

Biology: 69 credits
Chemistry: 61-76 credits (most students are doing the 72 credit option)
Computer Science: 68-70 credits
Mathematics: 45-53 credits
Physics: 64-70 credits
Psychology: 62 credits

Despite the large number of credits required for a B.S. degree, the College of Natural Sciences has many students in our majors who double major (even in disciplines outside NSCI) and/or do major/minor combos. Thus, we anticipate that many Data Science majors will be able to do so as well.

This is a wonderful major and I believe it will do well here at PLU. I support the initial year of the proposal and perhaps the next several years, however I am concerned about the need for additional employees as the program grows. If the program does grow - will the increase cover the positions needed is only one consideration. Other considerations: (1) will the salary amount be enough to sustain the IT and administrative assistant support positions in two years' time? (2) Will the responsibilities for the IT hire be determined by IT or the academic department? (3) Should priority be given to this administrative support need over several other departments and offices (academic and non-academic) that currently are without any administrative assistance? I'm not sure this is a big enough concern to stop the exploration, but it is a concern that needs consideration when looking at the university as a whole.

1. With respect to whether the increased tuition brought in by the major will continue to support staff support as the staff salaries increase, we certainly hope so. Hopefully, the net tuition raised per student also increases over time, covering these salary increases.

2. With respect to oversight of the increased IT support, Dean Auman has been in conversation with Kevin Berg, and while we don't have a perfect plan, we are both willing to collaborate to figure this out. With the most recent round of staff cuts, I&TS cut the staff person who supported CSCI. With the addition of another technology-focused major, we are hoping to regain some of that support. Additionally, there is one I&TS staff person, Matthew Hacker, who is currently focused on NSCI college needs. In fact, he was NSCI's employee before being shifted to I&TS a few years back. Thus, NSCI does have a history of working together with I&TS, which oversight of the new person would build upon.

3. Finally, the question about priority for staff over other offices is another good one. The argument here is that this major would bring in *new* revenue for a new program. While we could use more staff in every college, the current revenue does not support those positions. With any new program, there is an opportunity to add, and we are asking for the positions we need to effectively run the program. If we don't ask for what we need as part of a new revenue-making opportunity, how are we ever going to get it? It's also our understanding that these types of staff additions have been included in the past as part of new programs: MSW, ABSN, MSK, and even the EdD, etc. Additionally, looking at our existing support staff, who are stretched very thin (as is everyone), we couldn't imagine adding another program to the college without more support staff. We envision that the support offered by these new staff persons (both the administrative support and the I&TS support) may extend outside of DATA, CSCI, and MATH to the college more broadly.

Overall, our team is asking for what we really need. We do not want to build a new program on the backs of existing colleagues and good intentions. Thus, we've written the proposal with that in mind, requesting the new faculty and staff we need to support the program.

PLU

Ann Auman <aumanaj@plu.edu>

Request for program approval for Data Science Major EPC Proposal

Kathy Richardson <richarkk@plu.edu> Thu, Oct 26, 2023 at 4:32 PM
To: Ann Auman <aumanaj@plu.edu>, Carol Seavor <seavorcm@plu.edu>

My apologies.
It was approved unanimously. There were no questions and several comments about how this would be a great fit for individuals looking to go into nursing/health care informatics.
Kathy
Kathleen Richardson, DNP, ARNP, FNP-C, ENP-BC, CEN, FAEN, FAWM, FAAN, LTC USA (ret)
Associate Dean & Associate Professor
School of Nursing
Pacific Lutheran University
Ramstad 214
richarkk@plu.edu
Phone: 253-535-7672

[Quoted text hidden]

PLU

Ann Auman <aumanaj@plu.edu>

Confirmation - BUSA

Mark Mulder <muldermr@plu.edu> Wed, Nov 1, 2023 at 11:01 AM
To: Ann Auman <aumanaj@plu.edu>

Hi Ann,
This email confirms support for the Data Science Major proposal from the School of Business with more than 2/3 faculty voting.
-Mark

Dr. Mark Mulder | Ph.D.
DEAN OF THE SCHOOL OF BUSINESS
MARKETING PROFESSOR & RESEARCHER
SCHOOL OF BUSINESS | PACIFIC LUTHERAN UNIVERSITY
12180 PARK AVENUE SOUTH | TACOMA, WA 98447
OFFICE: 253.535.7258 | muldermr@plu.edu
PRONOUNS: he/him/his