Curricular Report

April 2017

For Action:

- **Statistics Minor**
- **Data Science Minor**
- **Special Minor Policy**
- **DSEM Policy for Transfer Students**

For Information:

New Courses:
- **STAT 120/Statistical Computing in R**
- **STAT 220/Special Topics in Statistics**
- **STAT 240/Statistical Machine Learning**
- **STAT 350/Statistical Theory**
- **STAT 380/Statistics in Context**
- **PHIL 214/Business Ethics (to be cross-listed with REL 214)**
- **REL 365/History of India: Medieval to Modern**
- **DATA 200/Data Science: Introduction, History, and Case Studies**
- **DATA 251/Data Visualization**
- **DATA 252/Modeling and Simulation**
- **DATA 253/Data Analysis**
- **DATA 299/Data Science Across the Curriculum**
- **DATA 400/Applied Data Science**

Revisions to Existing Courses:
- **PHIL 304/Problems of Ethics and Meta Ethics**
  - **Title and description change**
- **ARTH 242/PHIL 334/Aesthetics**
  - **Course number change**
- **ARTH 305/19th-Century European Art**
  - **Title change**

Revisions to Existing Major/Minor:
- **Law, Justice and Society**
  - **Adding courses to electives list**
- **Business Major**
  - **Adding courses to electives list, change to display of courses in catalog and change to number of 300 level courses in the elective category.**

General Education Designations:
- **PHIL 330/Philosophy of Law (course is cross-listed with PSCI 330) [BHUM]**
- **PHIL 214/Business Ethics (to be cross-listed with REL 214) [BHUM]**
- **REL 365/History of India: Medieval to Modern [BINT], [DVIT]**

For Action:

Statistics New Minor:

I. Rationale

What is the rationale for creating this new minor? How will it contribute to the undergraduate education at Drew? What evidence is there of student interest in the minor? How have external benchmarks for the minor such as national association standards or comparable programs at our comparison or peer institutions been used in developing this proposal?

Statistical tools and ways of thinking have become pervasive across the biological, physical and social sciences. In an increasingly data-driven world, an understanding of the mathematical and quantitative aspects of today's issues is an essential element of a liberal education.

The proposed minor in statistics is designed to complement existing science and social science majors and to enable students in these fields to develop a practical understanding of statistical techniques and principles. The proposed program has a strong computational, applied, and interdisciplinary focus which will prepare students to more effectively contribute to their major field of study and to better understand, improve, and protect the world in which we live.

Successful statistics minors will have advantages in the job market and will be more savvy consumers and critically thinking citizens. In addition, the benefits of a statistics minor to those interested in graduate study in almost any field, but particularly in the biological, bio-medical, physical, and social sciences, cannot be overstated.

According to the American Statistical Association, "The widely cited McKinsey report states that 'by 2018, the United States alone could face a shortage of 140,000 to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of big data to make effective decisions'. A large number of those will be at the bachelor's level. The number of bachelor's graduates in statistics has increased by more than 140% since 2003 (21% from 2012 to 2013)."

Due to the generous gift of Steven Gilbert, we were able to make two tenure track hires in statistics, so that we finally have the resources needed to offer a statistics minor at Drew. We originally proposed it in 2009, but it was tabled for lack of resources. There has been strong demand for additional statistical offerings for a while with Math 227, Intermediate Statistics over-enrolled for several years and Jon Kettenring supervising multiple independent studies each semester in statistics.

The American Statistical Association provides curriculum guidelines for statistics minors and ours conforms to those guidelines at http://www.amstat.org/asa/education/Resources-for-Department-Chairs.aspx. American Statistical Association Undergraduate Guidelines Workgroup. 2014. 2014 *curriculum guidelines for undergraduate programs in statistical science*. Alexandria, VA: American Statistical Association.

II. Learning Objectives for the Minor

Learning objectives for the minor: By the end of the minor course of study, students will be able to:

- Use statistical thinking, estimation, statistical testing and resampling.
- Use a variety of predictive and explanatory models in addition to methods for model building and assessment.
- Use professional software including SPSS and R
- Work with real data including accessing and manipulating data in various ways
- Communicate the results of complex statistical analyses in accessible terms to managers and other audiences, both in writing and visually

III. Curriculum/Minor Requirements

a. Outline the requirements for the minor and provide a rationale for the proposed minor structure and courses.

The proposed minor consists of 24 credits of coursework. All courses are 4 credits.

Required Courses (12 credits):

Course Number	Title	Substitutions

MATH 117	Introduction to Statistics	A 4 or 5 on the AP exam
MATH 227	Intermediate Statistics: Applied Linear Models	ECON 303 Economic Methodology and Introductory Econometrics
STAT 380*	Statistics in Context	Courses from other departments that may be taken to satisfy this requirement are applied research methods course (4 credits) with a MATH 117 prerequisite. Existing applicable courses include PSYC 211 Research Methods in Psychology, SOC 210 Sociological Research Methods, NEUR 210 Neuroscience Research Methods, and PH 340 Epidemiology

* Indicates New Course

Elective Courses (12 credits):

Choose three from among:

  STAT 120* Statistical Computing in R
  STAT 220* Special Topics in Statistics
  STAT 240* Statistical Machine Learning
  STAT 350* * Statistical Theory *Students may substitute MATH 320 Probability and MATH 303 Linear Algebra.*

Prerequisite structure:

Both of the courses that exist currently are labeled MATH (MATH 117 and MATH 227). All of the courses that are labeled STAT are newly proposed. With the solid foundation provided by the MATH courses, and with a desire to have the minor be as easy to fulfill as possible, we do not require any of the STAT courses as prerequisites to other courses. Instead, each of them addresses a different dimension of statistics. Classes at the 100 level have no prerequisites. Classes at the 200 level have MATH 117 as a prerequisite. Classes at the 300 level have MATH 117 and MATH 227 as prerequisites.

The following courses in the minor have no prerequisites:

MATH 117, STAT 120

The following courses in the minor have MATH 117 (or equivalent) as a prerequisite:

MATH 227, STAT 220, STAT 240

The following courses in the minor have both MATH 117 and MATH 227 (or equivalent) as a prerequisite:

STAT 350, STAT 380

Rationale: Students all take a common core. They may choose electives according to their desire to be more theory based or applied.

The prerequisite structure allows flexibility for students to enter the minor in different semesters with the ability to complete it within 3 – 4 semesters.

Note that we will need a new subject code to be created, STAT, for these courses. If that is not possible, it is okay to name them as MATH courses, but we will need to modify the numbers as some of them are already taken. Having the STAT code will allow students to easily search for classes in the minor. In that context, it probably makes sense to change the title of MATH 117 to

STAT 117 and MATH 227 to STAT 227. That will have consequences throughout the catalog as MATH 117 is a prerequisite for several courses. We defer to CAPC's expertise on the issue of appropriate subject code.

b. Provide complete catalog copy for the minor as you want it to appear in the on-line catalog and the next print catalog.

Statistics Minor

Requirements for the Minor (24 credits)

I. Core (12 credits)

MATH 117 Introduction to Statistics or equivalent

MATH 227 Intermediate Statistics or ECON 303 Economic Methodology and Introductory Econometrics

STAT 380 Statistics in Context (Or a course with a MATH 117 prerequisite that uses statistics in the context of another discipline such as PSYC 211 Research Methods in Psychology, SOC 210 Sociological Research Methods, NEUR 210 Neuroscience Research Methods, or PH 340 Epidemiology)

II. Intermediate and Upper Level STAT (12 credits)

Choose three from among:

STAT 120 Statistical Computing in R
STAT 220 Special Topics in Statistics
STAT 240 Statistical Machine Learning
STAT 350 Statistical Theory

c. Provide a table showing a two-year rotation of course offering by semester with proposed instructors.

Fall Odd	Spring Even	Fall Even	Spring Odd
MATH 117 (4 sections)	MATH 117 (4 sections)	MATH 117 (4 sections)	MATH 117 (4 sections)
MATH 227 (SA) STAT 120 (CC)	STAT 350 (YL) STAT 380 (CC)	MATH 227 (SA) STAT 120 (CC) STAT 220 (YL)	STAT 240 (CC) STAT 380 (YL)

The proposed instructors for Math 117 are SA, CC, and YL, although these classes may be taught by CA or SK

SA is Sarah Abramowitz

CC is Chris Casement

YL is Yi Lu

CA is Chris Apelian

IV. Impact on and Connections with Other Departments/Programs

Does the proposed minor offer possibilities for interdisciplinary collaboration? Will the proposed minor depend on courses from other departments? Will the proposed minor offer courses that might be cross-listed by other departments? Will the proposed minor have a significant impact on enrollments in other departments/programs?

The minor has an applied focus and offers possibilities for interdisciplinary collaboration. Math majors can use two courses required for the major towards this minor, so they may complete the minor with only 4 additional courses. Psychology, sociology, neuroscience, and economics majors can also use two courses required for the major towards this minor, so they may complete the minor with only 4 additional courses. This minor should appeal to students in these disciplines. However, students can complete the minor without taking any courses in other disciplines, so it does not depend on courses from other departments. The proposed minor will not have significant impact on enrollments in other departments or programs, but the students in the statistics minor will probably come from these departments because those are the students who are currently enrolling in MATH 227.

V. Effective Date/Transition Plan

What is the effective date for the new minor? If an old minor is being phased out, what is the transition plan? Which students will under the old requirements and which under the new?

Students will be eligible to enroll in the minor starting in Fall 2017. There is no old minor.

VI. Course Descriptions

Attach complete course proposal forms and gen ed forms for each new or revised course included in the minor.

Course Descriptions :

MATH 117 Introduction to Statistics (4 credits)
This course is designed to enable students to use statistics for data analysis and to understand the use of statistics in the media. The course makes use of SPSS, a widely-used statistics package for the computer. Course topics include graphical and tabular presentation of data, measures of central tendency, dispersion, and shape, linear transformations of data, correlation, regression, probability, the normal probability mode[1]l, sampling, *t*-tests, and one-way analysis of variance.
Fulfills the Quantitative-General Education Requirement.

Prerequisite: None.

Same as: MAT 861.

MATH 227 Applied Linear Models (4 credits)
This course covers methods of statistical inference including multi-way analysis of variance and simple and multiple linear regression.
Prerequisite: C- or better in MATH 117.
Students may substitute ECON 303 Economic Methodology and Introductory Econometrics.

STAT 120 Statistical Computing in R (4 credits)

This course provides students with an introduction to computing in the popular statistical programming language R. Topics include: data structures, reading and storing data, data transformation and manipulation, accessing and using packages,

conditionals, loops, functions, graphics and data visualization, and introductory statistical methods for data analysis. No previous programming experience is required.

Prerequisite: None

STAT 220 Special Topics in Statistics (4 credits)

This course is intended to add depth to the minor by including a variety of supplemental topics. Depending on instructor and student interest, topics may include categorical data analysis (including generalized linear models), time series, sports statistics, sampling methods, survey research, and nonparametric statistics.

Prerequisite: C- or better in MATH 117

STAT 240 Statistical Machine Learning (4 credits)

This course provides students with an introduction to statistical machine learning techniques using the statistical programming language R. Emphasis will be on supervised learning methods such as linear and logistic regression, k-nearest neighbors, discriminant analysis, naïve Bayes, and decision trees, as well as model assessment tools such as cross-validation.

Prerequisite: C- or better in MATH 117

STAT 350 Statistical Theory (4 credits)

This course is intended for students interested in augmenting their understanding of the topics covered in MATH 117 and Math 227 with a more thorough treatment of the topics. Additional material includes mathematical notation and fundamental concepts used in statistics, basic discrete probability, probability models and distributions, and more in-depth, mathematical treatment of other topics found in MATH 117. The course also develops some basic mathematical (i.e., matrix algebra) and statistical topics needed for analyzing high-dimensional statistical data. Appropriate for students interested in attending graduate school in statistics or related discipline.

Prerequisite: C- or better in MATH 227 or ECON 303.
Students may substitute MATH 329 Probability and MATH 303 Linear Algebra (8 credits.)

STAT 380 Statistics in Context (4 credits)

In this research seminar, students complete a major research project that includes a significant statistical component. The research project may be a part of another credit -bearing experience (such as a departmental research seminar, honors thesis or independent study) or it may be original for the course.   In this course, students will conceptualize, implement, analyze, and communicate the results of the quantitative data analysis portion of their research project.

Prerequisite: C- or better in MATH 227 or ECON 303

Students may substitute a course with a MATH 117 prerequisite that uses statistics in the context of another discipline such as PSYC 211 Research Methods in Psychology, SOC 210 Sociological Research Methods, NEUR 210 Neuroscience Research Methods, or PH 340 Epidemiology.

APPENDIX A

Students may substitute MATH 303 and 320 for STAT 350 and ECON 303 for MATH 227. Existing research methods courses with a MATH 117 prerequisite that may be substituted for STAT 380 are NEUR 210 Neuroscience Research Methods, PH 340 Epidemiology, PSYC 211 Research Methods in Psychology, and SOC 210 Sociological Research Methods. Catalog descriptions of these courses follow.

ECON 303 Economic Methodology and Introductory Econometrics

This course studies empirical economic research, especially focused on the classical linear regression model and how to proceed with econometric analysis when some assumptions of the classical model do not hold. It examines sampling, statistical theory and hypothesis testing. This course also examines criticisms of and alternatives to common econometric methodologies. Students are expected to take this course in their second or third year. Prerequisite: ECON 101, ECON 102, and MATH 117 or MATH 320. Spring Semester

MATH 303 Linear Algebra
Matrices, determinants, systems of linear equations, linear transformations, vector spaces, eigenvalues, applications, and additional topics chosen from numerical methods for solving linear equations, canonical forms, quadratic forms. Prerequisite: C- or better in MATH 250 or MATH 310. Offered spring semester.

MATH 320 Probability
The fundamentals of probability theory including discrete and continuous random variables and their distributions, conditional probability and independence, joint probability distributions, expected values, moment generating functions, laws of large numbers, and limit theorems. Special topics selected from random walks, Markov chains, and applications as time permits. Prerequisite: C- or better in MATH 250 and MATH 310. Same as: MAT+866. Offered fall semester in odd years.

NEUR 210 Neuroscience Research Methods

This course examines research methods commonly employed in the neurosciences, with an emphasis on experimental procedures. The course encourages development of skills in collecting and analyzing quantitative data and in scientific writing. Prerequisite: NEUR 101 and MATH 117. Offered annually. CLA-Writing in the Major

PH 340 Epidemiology

An in-depth study of disease profiles, patterns and frequencies. Concepts of cause and effect; disease transmission, prevention and control; efficacy and effectiveness of intervention strategies; frameworks for development of evidence-based recommendations; as well as applications of epidemiological methods to screening, outbreak investigations, and policy will be examined. Prerequisite: MATH 117 or permission of Instructor. Offered fall Semester.

Data Science New Minor:

I. Rationale

What is the rationale for creating this new minor? How will it contribute to the undergraduate education at Drew? What evidence is there of student interest in the minor? How have external benchmarks for the minor such as national association standards or comparable programs at our comparison or peer institutions been used in developing this proposal?

From the blog https://blogs.valpo.edu/datadesk/2017/04/11/why-undergrad-data-science/: "The job 'Data Scientist' was heralded as "The Sexiest Job of the 21st Century" by Harvard Business Review in 2012[1] at a crest of the ongoing publicity in the career fields associated with 'big data.' Articles on both the discipline and reality regularly appear in a variety of popular press outlets, including The Economist[2] and The New York Times[3], concurrently with growing discussion in more scholarly venues. The increased need for this specialty is driven by the fact that human activity is already generating petabytes of data each day and "data is projected by some experts to increase by 2,000 percent between now and 2020"[4]. Society will need more professionals and researchers capable of competently dealing with the huge influx of data that will be accumulated in the next decade and onward."

In the last forty years, data analysis and visualization, computer simulation, and computer modeling have become important tools for disciplinary research and inquiry. In many areas the change has been revolutionary, transforming the nature of knowledge itself. For example, without computing technology, we simply could not know what we do today about genomics, neuroscience, or geography. Further from traditional science disciplines, data, supported by tools that access, process, summarize, and visualize it, have given us Google Translate, GPS, instant access to centuries' worth of music and art, and much more. Data science has arguably democratized knowledge and information (if sometimes imperfectly). This minor would enable students to participate in the data revolution not only as consumers, but as creators and developers, and to understand and experience the role of data technology in modern research and decision making.

According to the American Statistical Association statement on the role of statistics in data science (http://magazine.amstat.org/blog/2015/10/01/asa-statement-on-the-role-of-statistics-in-data-science/): "Certainly, data science intersects with numerous other disciplines and areas of research. Indeed, it is difficult to think of an area of science, industry, commerce, or government that is not in some way involved in the data revolution. But it is databases, statistics, and distributed systems that provide the core pipeline. At its most fundamental level, we view data science as a mutually beneficial collaboration among these three professional communities, complemented with significant interactions with numerous related disciplines. For data science to fully realize its potential requires maximum and multifaceted collaboration among these groups." This statement explains the interdisciplinary nature of data science and the need for student expertise in a discipline in which these computational and statistical techniques may be used.

Sarah Abramowitz attended the ASA Statistics and Biostatistics Department Chairs workshop in July. While there was a lot of discussion about innovative programs in Data Science and she learned about important components of these programs, all the exemplars were at the Master's level, yet there was a lot of interest at the undergraduate level too. We have an exciting opportunity to create a program at the Bachelor's level that will give students valuable skills that they can apply in graduate work or in the workplace.

In conversations with members of the Digital Humanities initiative and with the faculty involved in the development of the Communications minor, it has become clear that there is widespread interest in this minor. Faculty in fields as wide-ranging as Art, Business, Media and Communications, and Political Science have noted their students' desire for data studies courses. We particularly expect a lot of student interest in DATA 251: Data Visualization. The Mellon Digital Humanities planning group, of which Emily Hill and Steve Kass were a part, discussed the synergies of a data studies and the DH initiative. In fact, Emily Hill was one of five faculty members to work with a group of students in Drew's first Digital Humanities Summer Institute.

This minor in data science is structured to focus on the intersection of statistics, computer science and content knowledge from another discipline. For that reason, the required courses include preparatory and core courses in statistics, models, and computer science and also content knowledge in another discipline. Students take at least four credits at the intermediate or advanced level in another discipline so that they have some expertise in a domain in which they can apply their computational and statistical thinking

Goals:

1. Engagement. Engage students in data science as it applies to disciplines, through data analysis, visualization, computer simulation, and computer modeling. Encourage students to investigate and assess data science used by others to support research and public policy;

2. Perspective. Teach students the uses, potential, and limitations of the tools of computing technology as a foundation for research and knowledge acquisition in disciplines and in society.

3. Collaboration. Applied data science is multidisciplinary. It requires expertise in three areas: in computing, in mathematics and statistics, and as content knowledge and understanding in the domain of application. Beginning in the DATA 25x courses, which have flexible prerequisites, and manifestly in DATA 299 (Data Science across the Curriculum), collaboration will be vital.

Rationale. The role of computing technology in research and public policy, and the use of data in particular, is growing rapidly. To participate fully in modern discourse, students and scholars increasingly need to use computers to model the world, to make predictions, and to analyze data. In addition, they need to understand how computational methods and tools can be used and what potential and limitations they have. Students enrolled in this minor will learn how to investigate disciplinary questions computationally, and they will learn to consider the social and ethical issues of computational study. The minor provides a

multidisciplinary foundation in these skills as well as individual experience applying that foundation through projects in a chosen field of study.

A number of schools offer minors with related, but generally more narrowly-focused goals. These are typically focused on scientific computation with courses in computer science and applied mathematics (Capital University, Boston College), are minors within engineering programs (Ohio State), or are directed towards a single discipline (Nebraska-Lincoln and Duke programs in Bioinformatics). Interdisciplinary, but more (or perhaps too) broadly-conceived "studies" programs, or programs focused on digital archives and resources more than computational tools and data analysis, also exist (Davidson College, Hamilton College, the Ohio Five).

The proposed Drew minor is broadly conceived, innovative, and, for now, distinctive. Without a doubt, though, other schools will develop similar programs soon. Data science is not a fad. Bates College, for example, has announced that it will begin a Digital and Computational Studies Major in 2018, supported by $19 million in gifts.

The American Statistical Association provides curriculum guidelines for data science programs and ours conforms to those guidelines at https://www.amstat.org/asa/files/pdfs/EDU-DataScienceGuidelines.pdf. American Statistical Association Undergraduate Guidelines Workgroup. 2017. 2017 *curriculum guidelines for undergraduate programs in data science*. Alexandria, VA: American Statistical Association.

II. Learning Objectives for the Minor

Learning objectives for the minor: By the end of the minor course of study, students will be able to:

- Demonstrate the ability to communicate effectively about mathematical and statistical concepts, as well as complex data analysis, in both written and verbal formats.

- Implement solutions to mathematical and analytical questions in language(s) and tools appropriate for computer-based solutions, and do so with awareness of performance and design considerations.

- Apply computational and statistical thinking practices to problems in other disciplines.

III. Curriculum/Minor Requirements

a. Outline the requirements for the minor and provide a rationale for the proposed minor structure and courses.

Students minoring in Data Science must complete the following requirements (26 credits)

<u>**Data Science Minor**</u>

I. Preparatory courses (8 credits):

      a. An introductory course in computer programming selected from the following list:
            CSCI 149: Introduction to Computer Science in JavaScript
            CSCI 150: Introduction to Computer Science in Python
            STAT 120 Statistical Computing in R (Proposed for statistics minor)
      b. MATH 117: Introductory Statistics

II. Core courses (10 credits):

      DATA 200: Data Science: History and Case Studies

DATA 400: Applied Data Science

One of the following courses (4 credits) in principles, methods, and tools:
DATA 251: Data Visualization
DATA 252: Modeling and Simulation
DATA 253: Data Analysis

III. Elective courses (8 credits). At least 4 credits separate from DATA 251-253.:

DATA 251: Data Visualization
DATA 252: Modeling and Simulation
DATA 253: Data Analysis
DATA 299: Data Science across the Curriculum
HIST 215 History by the Numbers
ESS 302/BIO 302: Geographic Information Systems
CSCI 330/DATA 330: Information Management
STAT 240/DATA 240: Statistical Machine Learning
PH 340: Epidemiology
NEUR 366/PHYS 366 Computational Modeling of Neural Systems

Students must take eight elective credits, no more than four of which can come from DATA 251-253. We are distributing the credits in this way to ensure that each minor will include at least one course where students apply their computational and statistical thinking in a particular discipline. We anticipate that many courses will be added to this list as we are made aware of them or as departments and programs develop appropriate courses. In a case, for instance, where a student is majoring in basket weaving but we have no data-related basket weaving options available, the student could register for DATA 299 where they would pair their knowledge of basket weaving with their computational expertise.

Internship or Independent Study credits may count as electives for the minor, when relevant and approved by the director of the minor.

The following are being proposed as new courses for the data studies minor:

DATA 200, 251, 252, 253, 299, 400

The following are being proposed as new courses for the statistics minor but would also count toward the Data Studies minor:

STAT 120, 240

b. Provide complete catalog copy for the minor as you want it to appear in the on-line catalog and the next print catalog.

Data Science Minor (26 credits)

I. Preparatory courses (8 credits):

An introductory course in computer programming selected from the following list:

CSCI 149: Introduction to Computer Science in JavaScript

CSCI 150: Introduction to Computer Science in Python
STAT 120 Statistical Computing in R
MATH 117: Introductory Statistics

II. Core courses (10 credits):

DATA 200: Data Science: History and Case Studies
DATA 400: Applied Data Science (2 credits)

One of the following courses in principles, methods, and tools:

DATA 251: Data Visualization
DATA 252: Modeling and Simulation
DATA 253: Data Analysis

III. Electives (8 credits). At least 4 credits separate from DATA 251-253:

DATA 251: Data Visualization
DATA 252: Modeling and Simulation
DATA 253: Data Analysis
DATA 299: Data Science across the Curriculum
CSCI 330/DATA 330: Information Management
ESS 302/BIO 302: Geographic Information Systems
HIST 215 History by the Numbers
NEUR 366/PHYS 366 Computational Modeling of Neural Systems
PH 340: Epidemiology
STAT 240/DATA 240: Statistical Machine Learning

Internship or Independent Study credits may count as electives for the minor, when relevant and approved by the director of the minor.

c. Provide a table showing a two-year rotation of course offering by semester with proposed instructors.

Fall Odd	Spring Even	Fall Even	Spring Odd
CSCI 150 (x2 secs.) MATH 117 (x4) STAT 120 (CC) CSCI 330 (EH) DATA 253 (YL) DATA 400 (SK)	CSCI 150 (EH) MATH 117 (x4) CSCI 149 (BB) DATA 200 (SK, CC or YL)	CSCI 150 (x2 secs.) MATH 117 (x4) STAT 120 (CC) DATA 252 (CA) DATA 251 (SK, YL, or CC) DATA 400 (SK)	CSCI 150 (x2 secs.) MATH 117 (x4) CSCI 150 (EH) CSCI 149 (BB) DATA 200 (SK, CC or YL) STAT 240 (CC)

For DATA 299, the anticipated instructor and timing depends on student interest as determined by associated course or project. Students who are already participating in a project based course or experience in their majors may get credit if they augment these works using data science techniques learned in classes in this minor. These additions to the work that they are already doing will be overseen by their primary instructor or advisor, assuming they have the expertise, or someone associated with the Data Science minor if they do not. Note that students may complete the minor without taking this course. This will not be a regularly scheduled course, but instead a type of interdisciplinary independent study. Because the prerequisite, DATA 200 will not be offered until Spring 2018, we anticipate that DATA 299 will not be offered before Fall 2018.

Notes:

SK is on sabbatical leave for AY 2017-18 and will resume teaching CSCI 330 and begin teaching DATA 200 thereafter.

MATH 117: Proposed instructors are SA, CC, and YL, although these classes may be taught by CA or SK.

CSCI 150: Regularly taught by EH, and sometimes by NH, BB, or SK.

The Computer Science department offers CSCI 290 and CSCI 390 at least three times per year. This course is not listed above, since not every offering may be appropriate for the Data Science minor.

DATA 251: First offering will be during Fall 2018. After that, instructor and semester may depend on hires made in Computer Science and Media and Communications.

DATA 253: First offering will be Fall 2019.

DATA 400: First offering expected to be Fall 2019.

EH is Emily Hill

BB is Barry Burd

NH is the new non-tenure-track hire in Computer Science (job offer out and pending)

CC is Chris Casement

YL is Yi Lu

CA is Chris Apelian

SK is Steve Kass

IV. Impact on and Connections with Other Departments/Programs

Does the proposed minor offer possibilities for interdisciplinary collaboration? Will the proposed minor depend on courses from other departments? Will the proposed minor offer courses that might be cross-listed by other departments? Will the proposed minor have a significant impact on enrollments in other departments/programs?

The minor has an applied focus and offers possibilities for interdisciplinary collaboration.

Over time, individual disciplines will continue to train their students in more and more computational techniques as appropriate, but this minor will remain valuable for students who want to delve into applied computation more deeply or more broadly, or to anticipate careers — like data journalism or public policy — that transcend single academic disciplines. Careful planning and cooperation across departments will be required in order for this vision to be realized. Once established, this program will also provide a natural opportunity for visiting and interdisciplinary faculty.

V. Effective Date/Transition Plan

What is the effective date for the new minor? If an old minor is being phased out, what is the transition plan? Which students will under the old requirements and which under the new?

Students will be eligible to enroll in the minor starting in Fall 2017. There is no old minor.

VI. Course Descriptions

Note that the course name DATA needs to be created and two cross listed courses need to be created:

CSCI 330/DATA 330: Information Management
STAT 240/DATA 240: Statistical Machine Learning

Attach complete course proposal forms and gen ed forms for each new or revised course included in the minor.

DATA 200: Data Science: Introduction, History, and Case Studies (4 cr.) An introduction to data science centered around small projects and case studies. Basic techniques for data acquisition, public data sources, privacy and security, ethical and legal issues. Case studies will include uses of data and data science in industry and public policy and examples of data journalism. Prerequisite: None

DATA 251: Data Visualization (4 cr.)
A survey of techniques and tools for effectively visualizing small and large data sets in informative ways for a variety of audiences. Examples from a range of disciplines are used.
Prerequisite: C- or better in MATH 117

Data 252: Modeling and Simulation (4 cr.) Techniques for modeling and simulating systems using a variety of techniques, including statistical models, Monte Carlo simulations, agent-based models, and machine learning.

Prerequisite: C- or better in CSCI 149: Introduction to Computer Science in JavaScript or C- or better in CSCI 150: Introduction to Computer Science in Python or C- or better in STAT 120 Statistical Computing in R (Proposed for statistics minor)

DATA 253: Data Analysis (4 cr.) Techniques for analysis of data using statistics, neural networks, Prerequisite: Minor requirements 1a (an introductory course in computer programming) and 1b (an introductory course in statistics). One of the two prerequisites may be taken concurrently with DATA 253.

Prerequisite: Prerequisite: C- or better in MATH 117 and C- or better in CSCI 149: Introduction to Computer Science in JavaScript or C- or better in CSCI 150: Introduction to Computer Science in Python or C- or better in STAT 120 Statistical Computing in R (Proposed for statistics minor). One of the two prerequisites may be taken as a co-requisite.

DATA 299: Data Science Across the Curriculum (1-4 credits)
Students who wish to undertake a significant data science project may propose to enroll in DATA 299 in conjunction with a civic engagement project, an off-campus experience, a senior thesis, or a faculty research project. DATA 299 proposals must be approved by a faculty member with the requisite expertise who is willing to supervise the project and by the director of the minor. To the extent that supervision of DATA 299 is not counted towards faculty workload, a limited number of proposals can be undertaken. Open to students who have declared a Data Science minor.
Prerequisite: DATA 200.

Students who are already participating in a project-based course or experience in their majors may get credit if they augment these works using data science techniques learned in classes in this minor. These additions to the work that they are already doing will be overseen by their primary instructor or advisor, assuming they have the expertise, or someone associated with the Data Science minor if they do not

DATA 400: Applied Data Science (2 cr.) A weekly seminar for advanced Data Science minors. Students present individual work from previous courses and collaborate to organize a poster session, and students participate in a (new) collaborative data science project in cross-disciplinary groups.

Prerequisite: 16 credits toward the Data Studies minor

Descriptions of current discipline specific Drew courses involving data that may be used for the minor:

CSCI 330 - Information Management

4 credits Theory and practice of information storage, management and retrieval, emphasizing relational database management systems. Case studies of small-scale (personal computing) and large-scale (corporate records on distributed systems) applications. Data modeling, database design and management, query processing, data integrity, and security. Legal and social contexts of data management; the responsibility of professionals to understand requirements, risks, and liabilities. Prerequisite: C- or better in CSCI 151 and CSCI 210.

ESS 302 - Geographic Information Systems

4 credits This course explores GIS (Geographic Information System) and related spatial analysis tools, which are used to elucidate the natural landscape and human modification of the earth's surface. Students will acquire cartographic, ArcGIS, and remote sensing skills through case studies and individual research investigations. Enrollment priority: Given to majors in Biology,Environmental Studies,and Archaeology. Same as: BIOL 302. CLA-Breadth/Interdisciplinary, CLA-Quantitative

HIST 215 - History by the Numbers

4 credits This mid-level course explores various historical topics using the U.S. Census, Statistical Abstracts, opinion polls, online historical archives, and selected European sources. Topics include politics, public opinion, immigration, lifestyle, ethnicity and race, gender and sexuality, economic growth, income inequality, technology and manufacturing, and natural resource utilization. This course seeks to develop students' competency in analyzing quantitative information, and in relating this information to real-world conditions. Students will learn how to read statistical tables, import data to spreadsheet programs, generate graphs, and perform basic analyses using spreadsheet functions. Advanced students will be encouraged to undertake more sophisticated analyses such as word frequency counts and arguments using logical operators. A laptop computer with an installed spreadsheet program required. No mathematics background needed.

CLA-Breadth/Humanities, CLA-Quantitative

NEUR 366 - Computational Modeling of Neural Systems

4 credits Computational neuroscience is the study of the brain as a computational and information-processing organ. It is a highly interdisciplinary field that employs various ideas and techniques from physics, biology, chemistry, mathematics, computer science, psychology, and (of course) neuroscience. In this course, we cover the following topics: biophysics of a single neuron; dynamics of neural networks; models of associative memory and object recognition; and numerical methods and tools for analyzing and simulating a dynamical system. We study the fundamental biophysical properties and processes of the neurons and their networks, while also learning to use several analytical and numerical methods for studying a complex dynamical system. The goal of the course is to develop an interdisciplinary approach for analyzing a biological system. Prerequisite: PHYS 150, MATH 150. Corequisite: PHYS 160, MATH 151. Same as: PHYS 366. CLA-Breadth/Interdisciplinary

PH 340 - Epidemiology

4 credits An in-depth study of disease profiles, patterns and frequencies. Concepts of cause and effect; disease transmission, prevention and control; efficacy and effectiveness of intervention strategies; frameworks for development of evidence-based recommendations; as well as applications of epidemiological methods to screening, outbreak investigations, and policy will be examined. Prerequisite: MATH 117 or permission of Instructor. Offered fall Semester.

STAT 240 - Statistical Machine Learning (Approved last week)

4 credits This course provides students with an introduction to statistical machine learning techniques using the statistical programming language R. Emphasis will be on supervised learning methods such as linear and logistic regression, k-nearest neighbors, discriminant analysis, naïve Bayes, and decision trees, as well as model assessment tools such as cross-validation.

Prerequisite: C- or better in MATH 117

Special Minor Catalog Copy:

Note from CAPC: Currently, the guidelines for the Special Minor only exist in UKNOW. CAPC is recommending that we vote it into the Academic Policies page of the catalog. The policy remains unchanged.

Special Minor

Students may design a minor that focuses on a particular topic, question, problem, or theme not covered by any of the disciplinary or interdisciplinary minors regularly offered as part of the College curriculum. To propose a minor, the student must have an overall GPA of 3.1 or better and should develop the proposal in consultation with a faculty member who agrees to sponsor the minor and to serve as the student's minor advisor.

The self-designed minor:

- must include at least twenty four (24) credits related to the theme, question, topic, or problem.;
- may include no more than four (4) credits at the introductory level;
- will include courses drawn from more than one department or program.

Students proposing a self-designed minor should submit a proposal including:

- a description of the topic, question, problem, or theme on which the minor focuses;
- a clear statement of the rationale for the minor and for the inclusion of the particular courses selected;
- a list of the courses included in the minor and the semester when they will be taken;
- the signature of the sponsoring faculty member as well as a statement of endorsement from him or her.

Students must propose self-designed minors no later than the first semester of the junior year. Proposals, accompanied by the completed form, should be submitted to the Associate Dean for Curriculum and Faculty Development and require approval by the Committee on Academic Policy and Curriculum.

DSEM Policy for Transfer Students:

Current Policy

Applicability of Transfer Credit to General Education Requirements

- Transferred courses are eligible to fill general education requirements in cases where they meet the learning objectives of a specific Drew requirement.
- Drew's first-year college writing requirement is waived if a student transfers in two semesters of college writing from a community college or one semester from a four year college or university.
- Drew's first-year seminar requirement (DSEM) will be waived for students entering Drew with 24 or more credits.

- If Drew transfers 2.5 credits or more for a course taken at another institution, that course may be used to satisfy one 4-credit Drew general education requirement.

Proposed Policy

Applicability of Transfer Credit to General Education Requirements

- Transferred courses are eligible to fill general education requirements in cases where they meet the learning objectives of a specific Drew requirement.
- The Drew Seminar (DSEM) Drew's first-year college writing requirement is waived if a student transfers in two semesters of college writing from a community college or one semester from a four year college or university.
- Drew's first-year seminar requirement (DSEM) will be waived for students entering Drew with 24 or more credits.
- If Drew transfers 2.5 credits or more for a course taken at another institution, that course may be used to satisfy one 4-credit Drew general education requirement.

Rationale

There are relatively few transfer students who arrive at Drew having completed the first year writing requirement but who also have fewer than 24 credits. However, for those students who are in this situation (e.g., spring semester transfer students who started college at a different school and transfer to Drew in the first year), the fact that we have combined the first year writing requirement and the first year seminar into a single course poses problems. Per the current policy, those students need to complete the DSEM still because they have not earned more than 24 credits, and a workaround has to be developed to both get them into the DSEM and still give them credit for the writing course(s) that they took elsewhere. That workaround also has to then be applied in Ladder manually. These students have also expressed unhappiness about the fact that they must complete the DSEM when they have almost always completed a first year seminar at their previous institution (often combined with the writing requirement). (NOTE: the current workaround is that the students complete the DSEM and the course(s) that the students completed to meet the writing requirement are being manually applied to the writing intensive requirement.) The current policy is worded as it is due to the previous iteration of the first year experience where the seminar and writing were separate courses; now that they are combined, it is proposed that we simply eliminate this redundancy and the workaround that it is necessitating. Should students who transfer with fewer than 24 credits wish to take the DSEM, or Academic Writing (WRTG 120), they could still do so.

New Course Descriptions:

STAT 120/Statistical Computing in R

This course provides students with an introduction to computing in the popular statistical programming language R. Topics include: data structures, reading and storing data, data transformation and manipulation, accessing and using packages, conditionals, loops, functions, graphics and data visualization, and introductory statistical methods for data analysis. No previous programming experience is required.

STAT 220/Special Topics in Statistics

This course is intended to add depth to the minor by including a variety of supplemental topics. Depending on instructor and student interest, topics may include categorical data analysis (including generalized linear models), time series, sports statistics, sampling methods, survey research, and nonparametric statistics. Prerequisite: C- or better in MATH 117

STAT 240/Statistical Machine Learning

This course provides students with an introduction to statistical machine learning techniques using the statistical programming language R. Emphasis will be on supervised learning methods such as linear and logistic regression, k-nearest neighbors, discriminant analysis, naïve Bayes, and decision trees, as well as model assessment tools such as cross-validation. Prerequisite: C- or better in MATH 117

STAT 350/Statistical Theory

This course is intended for students interested in augmenting their understanding of the topics covered in MATH 117 and Math 227 with a more thorough treatment of the topics. Additional material includes mathematical notation and fundamental concepts used in statistics, basic discrete probability, probability models and distributions, and more in-depth, mathematical treatment of other topics found in MATH 117. The course also develops some basic mathematical (i.e., matrix algebra) and statistical topics needed for analyzing high-dimensional statistical data. Appropriate for students interested in attending graduate school in statistics or related discipline. Prerequisite: C- or better in MATH 227 or ECON 303. Students may substitute MATH 329 Probability and MATH 303 Linear Algebra (8 credits.)

STAT 380/Statistics in Context

In this research seminar, students complete a major research project that includes a significant statistical component. The research project may be a part of another credit -bearing experience (such as a departmental research seminar, honors thesis or independent study) or it may be original for the course. In this course, students will conceptualize, implement, analyze, and communicate the results of the quantitative data analysis portion of their research project. Prerequisite: C- or better in MATH 227 or ECON 303. Students may substitute a course with a MATH 117 prerequisite that uses statistics in the context of another discipline such as PSYC 211 Research Methods in Psychology, SOC 210 Sociological Research Methods, NEUR 210 Neuroscience Research Methods, or PH 340 Epidemiology.

PHIL 214/Business Ethics (to be cross-listed with REL 214)

A philosophical and theological study of those ethical, religious, and social issues that play an important role in thinking morally about economic and business practices. Attention is paid to practical ethical problems arising out of the functional areas of management and the wider areas of business and social responsibility in relation to the community, ecology, minorities, the role of multinationals and public safety. Offered spring semester and occasional summers CLA-Breadth/Humanities

REL 365/History of India: Medieval to Modern

This course covers medieval to modern history of India, surveying classical to colonial modes of social order through Independence (1947), with selective postcolonial materials. Major topics include the shift from governance by imperial divine right to the colonialist empire, the project to redefine India as a nation, Gandhi's theories of non-violent resistance and self-rule, women's status and participation in defining modernity, partition and Kashmir, and post-colonial identity and priorities. The course engages a rich variety of primary materials, such as traditional legal treatises, courtly chronicles, fine art and monuments, speeches, and documentary film to study major developments in medieval to modern history of India.

DATA 200/Data Science: Introduction, History, and Case Studies

An introduction to data science centered around small projects and case studies. Basic techniques for data acquisition, public data sources, privacy and security, ethical and legal issues. Case studies will include uses of data and data science in industry and public policy and examples of data journalism.

DATA 251/Data Visualization

A survey of techniques and tools for effectively visualizing small and large data sets in informative ways for a variety of audiences. Examples from a range of disciplines are used.
Prerequisite: C- or better in MATH 117

DATA 252/Modeling and Simulation

Techniques for modeling and simulating systems using a variety of techniques, including statistical models, Monte Carlo simulations, agent-based models, and machine learning. Prerequisite: C- or better in CSCI 149: Introduction to Computer Science in JavaScript or C- or better in CSCI 150: Introduction to Computer Science in Python or C- or better in STAT 120 Statistical Computing in R

DATA 253/Data Analysis

Techniques for analysis of data using statistics, neural networks, Prerequisite: Minor requirements 1a (an introductory course in computer programming) and 1b (an introductory course in statistics). One of the two prerequisites may be taken concurrently with DATA 253. Prerequisite: C- or better in MATH 117 and C- or better in CSCI 149: Introduction to Computer Science in

JavaScript or C- or better in CSCI 150: Introduction to Computer Science in Python or C- or better in STAT 120 Statistical Computing in R (Proposed for statistics minor). One of the two prerequisites may be taken as a co-requisite.

DATA 299/Data Science Across the Curriculum

Students who wish to undertake a significant data science project may propose to enroll in DATA 299 in conjunction with a civic engagement project, an off-campus experience, a senior thesis, or a faculty research project. DATA 299 proposals must be approved by a faculty member with the requisite expertise who is willing to supervise the project and by the director of the minor. To the extent that supervision of DATA 299 is not counted towards faculty workload, a limited number of proposals can be undertaken. Open to students who have completed 16 credits in the Data Science minor.
Prerequisite: C- or better in DATA 200.

DATA 400/Applied Data Science

A weekly seminar for advanced Data Science minors. Students present individual work from previous courses and collaborate to organize a poster session, and students participate in a (new) collaborative data science project in cross-disciplinary groups.Prerequisite: 16 credits toward the Data Studies minor

Changes to Existing Courses:

PHIL 304/Problems of Ethics and Meta Ethics

Current:

Critical discussions of issues in contemporary moral philosophy in the areas of applied ethics, normative ethics, and meta-ethics. At the most highly theoretical level are considerations about the meaning of moral terms that give rise to cognitive and noncognitive theories of ethics. At a more immediate level are problems of practical concern having to do with such issues as euthanasia, abortion, animal rights, and world hunger. Readings are from 20th-century philosophers, most of whom are alive today. Offered spring semester.

Proposed:

PHIL 304/Ethics and Society

Critical discussions of issues in contemporary moral philosophy in the areas of applied ethics, normative ethics and social policy.Issues to be covered include euthanasia, abortion, sexual morality, pornography and censorship, religious freedom, sexual morality, drug control, terrorism, torture, war, spying, animal rights, environment and global climate change,and world hunger. Readings are from 20th-century philosophers, most of whom are alive today. Offered spring semester. CLA-Breadth/Humanities .

ARTH 242/Aesthetics

Current title:

ARTH 242/Aesthetics (cross-listed with PHIL 334)

Proposed Title:

ARTH 334/Aesthetics (cross-listed with PHIL 334)

ARTH 305/19th Century European Art

Current Title:

ARTH 305/19th Century European Art

Proposed Title:

ARTH 305/19th-Century European Art: Neoclassicism to Post-Impressionism

Changes to Existing Major/Minor:

Current Law, Justice and Society Minor:

Requirements for the Minor (24 Credits)

I. Required Core/Gateway Course

- **PSCI 211 - Law, Justice, and Society**
  II. Electives

Five other courses are to be chosen from the following courses, provided that courses are from at least two different departments, and at least two courses must have a non-U.S. or International focus.
U.S. Focus:

- **ENGL 309 - Law and Literature**
- **HIST 320 - Modern American Legal History**
- **PSCI 301 - Civil Liberties**
- **PSCI 303 - Constitutional Law and Civil Rights**
- **SOC 307 - Criminology** Prerequisite: **SOC 101** or equivelent.
- **SOC 314 - Engendering Prison** OR:
- **WGST 314 - Engendering Prisons** Prerequisite: **SOC 101** or permission of the instructor.
  Non-U.S./International Focus:

- **CLAS 275 - Law and Trials in Ancient Society**
- **ENGL 310 - Human Rights in Literature and Film** Prerequisites: **ENGL 150** or **ENGL 109** or permission of the instructor.
- **PSCI 248 - Special Topics in Human Rights**
- **PSCI 344 - Torture: Pain, Body, and Truth**
- **PSCI 365 - Seminar on Human Rights**
- **PSCI 383 - The United Nations System and the International Community** Prerequisite: **PSCI 104**.
- **RUSS 350 - Banned Books: Russian Literature and Censorship**
  Note:

ARGS 863 - Banned Books: Russian Literature and Censorship (Caspersen School of Graduate Studies) and CSOC 561 - Mass Incarceration and Economic Justice (Theological School) may be taken and counted toward the electives portion of the minor requirements.
Other courses offered as special topics may be applied to the minor as deemed appropriate.
Example:
PSYC 360 - Psychology Seminar: Contemporary Issues in Psychology (if topic was: Psychology and the Law [U.S. Focus] or topic similar)
PSCI 256 - Selected Studies in Political Science (if topics was: Introduction to Legal Education [U.S. Focus] or topic similar)
PSCI 332 - Advanced Topics in Political Theory (if topic was: Cultural Diversity and the Law [US Focus] or topic similar -)

Proposed Law, Justice and Society Minor:

Requirements for the Minor (24 Credits)

I. Required Core/Gateway Course

- **PSCI 211 - Law, Justice, and Society**
  II. Electives

Five other courses are to be chosen from the following courses, provided that courses are from at least two different departments, and at least two courses must have a non-U.S. or International focus.
U.S. Focus:

- **ENGH 363 - Law and Literature**
- **HIST 320 - Modern American Legal History**
- **PHIL 330 – Philosophy of Law**
- **PSCI 301 - Civil Liberties**
- **PSCI 303 - Constitutional Law and Civil Rights**
- **SOC 307 - Criminology Prerequisite: SOC 101 or equivalent.**
- **SOC 314 - Engendering Prison OR:**
- **WGST 314 - Engendering Prisons Prerequisite: SOC 101 or permission of the instructor.**
  Non-U.S./International Focus:

- **CLAS 275 - Law and Trials in Ancient Society**
- **ENGH 313 - Human Rights in Literature and Film Prerequisites: ENGH 150 or ENGH 120 or permission of the instructor.**
- **ENGH 323 - Cinema and Social Justice Prerequisites: ENGH 150 or ENGH 120 or permission of the instructor.**
- **PHIL 330 – Philosophy of Law**
- **PSCI 248 - Special Topics in Human Rights**
- **PSCI 344 - Torture: Pain, Body, and Truth**
- **PSCI 365 - Seminar on Human Rights**
- **PSCI 383 - The United Nations System and the International Community Prerequisite: PSCI 104.**
- **RUSS 350 - Banned Books: Russian Literature and Censorship**

Current Business Major:

Business Major

Return to: Major & Minor Requirements

Requirements for the Major (52 credits)

I. Introductory (20 credits)

ECON 101 - Economic Principles: Microeconomics
ECON 102 - Economic Principles: Macroeconomics
MATH 117 - Introductory Statistics
BST 115 - Fundamentals of Financial Accounting
Choice of any one course:
ANTH 104 - Cultural Diversity: Cultural Anthropology and Linguistics
HIST 102 - History of the United States, 1876-Present
PSCI 102 - Comparative Political Systems
PSCI 103 - American Government and Politics
PSCI 104 - International Relations
PSYC 101 - Introduction to Psychology

II. Core (16 credits)

ECON 301 - Intermediate Microeconomic Theory (C- or higher)
REL 214 - Business Ethics

Choice of any two of the following courses: (C- or higher for each)
BST 304 - Finance
BST 305 - Market Strategy & Marketing
BST 310 - Management

III. Electives (16 credits)

Students choose courses from at least three different departments on the list (check semester offerings for a complete list as new courses can be added each semester). At least one of these electives must have a global component or perspective (these are marked with *). A minimum of two of these courses must be outside of BST or ECON. A minimum of two of these courses must be at the 300-level. Students may use an internship INTC 200 - Internship Project for one elective class (four credits), if the project is approved by the Director of Business and the student satisfactorily completes the Business internship paper. Note: some of these electives may require a prerequisite course.

ANTH 203 - Cultures, Economies, and Globalization *
BST 111 - Corporations in Context
BST 120 - Business and Technology: Perfect Together?
BST 150 - Special Topics in Business Studies
BST 219 - Business and Government in the U.S.
BST 250 - Business Studies Special/Selected Topics
BST 305 - Market Strategy & Marketing
BST 310 - Management
BST 321 - Corporate Finance
BST 340 - Strategic Decision Making
BST 355 - Selected Topics in Marketing
CE 215 - The Non-Profit Sector
CE 250 - Leadership in Practice
CSCI 270 - Computing Technology, Society and Culture
CSCI 330 - Databases & Information Management
CSCI 350 - Computer Networks & Security
ECON 230 - The Economics of Health and Health Care
ECON 238 - Economics of Labor and Trade Unions
ECON 240 - Economics of the Third World
ECON 241 - Global Economy *
ECON 242 - International Business *
ECON 247 - Economics of Business and Sustainability
ECON 281 - Wall Street and the Economy
ECON 302 - Intermediate Macroeconomic Analysis
ECON 303 - Economic Methodology And Introductory Econometrics
ECON 315 - Political Economy of Race, Class, and Gender
ECON 320 - Money and Banking
ECON 321 - Corporate Finance
ECON 338 - Industrial Organization and Public Policy Toward Business
ENGL 215 - Writing For and About Business
ENGL 386 - Theories and Effects of Media Communication
ENGL 387 - New York Semester on Communications and Media Colloquium
FREN 334 - International Business French *
HUM 201 - Culture and Exchange

ITAL 306 - Italian for Business *
MATH 227 - Intermediate Statistics
MATH 320 - Probability
MUS 270 - Introduction to Performing Arts Administration
THEA 270 - Introduction to Performing Arts Administration
PSCI 212 - Public Policy and Administration
PSCI 228 - Chinese Politics *
PSCI 246 - The Political Economy of Development *
PSCI 314 - American Political Economy
PSCI 316 - Social Policy and Inequality in America
PSCI 320 - Environmental Policy and Politics
PSCI 321 - International Environmental Policy and Politics *
PSCI 346 - Comparative Political Economy *
PSCI 362 - International Political Economy *
PSCI 369 - Strategies of War and Peace
SOC 217 - The Sociology of Management
SOC 249 - Sociology of Work
SOC 309 - Sociology of Mass Communications
SPAN 379 - Doing Business in the Hispanic World *

IV. Capstone (0 credits)

The capstone course asks students to take previous work they have done and apply it to a major course project. Students will have to present their research to each other, alumni, faculty members, and local business leaders in a public event. This requirement will be fulfilled at the end of the semester in which students take either BST 304 , BST 305 , and/or BST 310 and it will be integrated into the requirements for these courses. While students are likely to have this experience twice in their major, completing one such public presentation will meet the major capstone requirement.

Notes

1. Business majors may not double major or minor in Economics.

2. For the purpose of the major, Economics and Business are counted as two separate departments.

Proposed Business Major:

Business Major

⬅ Return to: Major & Minor Requirements

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ECON 101 - Economic Principles: Microeconomics
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PSCI 102 - Comparative Political Systems
PSCI 103 - American Government and Politics
PSCI 104 - International Relations
PSYC 101 - Introduction to Psychology

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