New Proposal

Date Submitted: 01/06/22 10:44 am

Viewing: : Business + Data Science, BS

Last edit: 04/18/22 6:42 pm

Changes proposed by: Brian Fulton

In Workflow

1. **U Program Review**
2. **1902 Committee Chair**
3. **1902 Head**
4. **1434 Head**
5. **1257 Head**
6. **1992 Head**
7. **1583 Head**
8. **KP Committee Chair**
9. **KP Dean**
10. **KV Dean**
11. **LP Dean**
12. **KV Dean**
13. **KM Committee Chair**
14. **KM Dean**
15. **University Librarian**
16. **Provost**
17. **Senate EPC**
18. Senate
19. U Senate Conf
20. Board of Trustees
21. IBHE
22. HLC
23. DMI

Approval Path

1. 01/06/22 2:02 pm Deb Forgacs (dforgacs): Approved for U Program Review
2. 01/07/22 3:05 am Mark Wolters (mwolter): Approved for 1902 Committee Chair
3. 01/07/22 8:29 am Carlos Torelli

(ctorelli): Approved for 1902 Head

4. 01/13/22 11:37 am Elsa Gunter (egunter): Approved for 1434 Head
5. 01/13/22 1:07 pm Vera Hur (verahur): Approved for 1257 Head
6. 01/13/22 1:21 pm Ted Underwood (tunder): Approved for 1992 Head
7. 01/13/22 1:58 pm Bo Li (libo): Approved for 1583 Head
8. 01/25/22 1:44 pm Brooke Newell (bsnewell): Approved for KP Committee Chair
9. 01/25/22 1:45 pm Candy Deaville (candyd): Approved for KP Dean
10. 01/31/22 3:39 pm Stephen Downie (sdownie): Approved for KV Dean
11. 02/08/22 3:24 pm Ted Underwood (tunder): Approved for LP Dean
12. 02/08/22 4:03 pm Stephen Downie (sdownie): Approved for KV Dean

13. 02/14/22 5:18 pm
    Jiekun Huang (huangjk):
    Approved for KM Committee Chair
14. 02/23/22 9:59 pm
    Mark Peecher (peecher):
    Approved for KM Dean
15. 02/23/22 10:14 pm
    John Wilkin (jpwilkin):
    Approved for University Librarian
16. 02/24/22 8:24 am
    Kathy Martensen (kmartens):
    Approved for Provost
17. 03/08/22 9:33 am
    Barbara Lehman (bjlehman):
    Rollback to KM Dean for Senate EPC
18. 03/08/22 10:06 am
    Mark Peecher (peecher):
    Approved for KM Dean
19. 03/08/22 10:13 am
    John Wilkin (jpwilkin):
    Approved for University Librarian
20. 03/08/22 10:31 am
    Kathy Martensen (kmartens):
    Approved for Provost
21. 04/12/22 6:17 pm

Kathy Martensen (kmartens): Rollback to KM Dean for Senate EPC
22. 04/14/22 10:57 am
Mark Peecher (peecher): Approved for KM Dean
23. 04/14/22 12:43 pm
John Wilkin (jpwilkin): Approved for University Librarian
24. 04/14/22 1:33 pm
Kathy Martensen (kmartens): Approved for Provost

Proposal Type

Proposal Type:
Major (ex. Special Education)

Administration Details

Official Program Name	Business + Data Science, BS		
Sponsor College	Gies College of Business		
Sponsor Department	Business Administration		
Sponsor Name	Joseph Clougherty		
Sponsor Email	jaclough@illinois.edu		
College Contact	Kevin Jackson	College Contact Email	kjack@illinois.edu
College Budget Officer	Shelley Campbell		
College Budget Officer Email	scampbe2@illinois.edu		

List the role for rollbacks (which role will edit the proposal on questions from EPC, e.g., Dept Head or Initiator) and/or any additional stakeholders. *Purpose: List here who will do the editing work if proposal needs rolled back. And any other stakeholders.*

Brian Fulton, bfulton@illinois.edu

Does this program have inter-departmental administration?

Yes

Interdisciplinary Colleges and Departments (list other colleges/departments which are involved other than the sponsor chose above)

Please describe the oversight/governance for this program, e.g., traditional departmental/college governance. Inclusion of/roles of elected faculty committees? Inclusion of/roles of any advisory committees.

In Spring 2017, the College of Liberal Arts & Sciences submitted an Investment for Growth Proposal to "Jump Start Data Science", focusing on undergraduate data science education. Interim Provost John Wilkin supported the proposal, but called on LAS to work with three colleges (Engineering, the iSchool, and the Gies College of Business) to develop a collaborative approach to undergraduate data science at Illinois.

Those deans formed a task force (herein the "Data Science Education Task Force" or DSETF) to explore opportunities and make proposals for undergraduate data science education at Illinois. The DSETF conducted its work during academic years 2017—2018 and 2018—2019. At the core of their work was the vision that every Illinois undergraduate should have the opportunity to have a meaningful exposure to data science.

In February 2019, the four deans agreed to support a shared framework for X+Data Science majors, based on suggestions from the DSETF. The framework consisted of the following pieces.

1) A set of core competencies and common features which will be expected of X+Data science majors, together with a reference standard set of courses and activities that fulfills the data science portion of those expectations.

2) Each college can propose its own X+Data Science majors, which will be majors of that college. They may differ from the reference standard approach. When they do so, they should explain how the proposed major provides the expected competencies and features of an X+Data Science major in a manner that is appropriate for their students.

3) The deans will engage with the campus leadership to establish a Data Science Education committee. The committee will:

- Keep track of offerings related to data science to facilitate collaboration and reduce redundancy
- Facilitate the development of data science programs by connecting undergraduate data science education resources across the university
- Advise colleges on matters related to undergraduate data science education
- Review X+Data Science major proposals, commenting on how they meet the expectations for X+Data Science majors and engage collaboratively and strategically with the university's resources in data science education

College Grainger College of Engineering

Department Computer Science

Is there an additional department involved in governance?
Yes

College Liberal Arts & Sciences

Department Mathematics

Is there an additional department involved in governance?
Yes

College Information Science, School of

Department Information Sciences

Is there an additional department involved in governance?
Yes

College Liberal Arts & Sciences

Department Statistics

Proposal Title

Effective Catalog Term: Fall 2022

Provide a brief, concise description (not justification) of your proposal.

Establish the BS in Business + Data Science

A degree plan incorporating simultaneously a strong foundation in data science and a specialization in an area of business administration. The plan includes substantial research or discovery experiences as part of the degree.

The Business+DS degree is comprised of these components (please see the curriculum table below and the appendix for details):
1. Coursework from the Data Science core
a. This coursework is comprised of:
i. Two (2) courses from Statistics
ii. Two (2) courses from Computer Science
iii. Two (2) courses from the iSchool
iv. Two (2) courses from Mathematics
2. Coursework from the Business Core to set business foundations
3. Coursework from one area of specialization (Information Systems, International Business, Management, Operations Management) within Business Administration
4. Electives to round out 124 hour minimum degree requirement for majors in Gies BS programs.

List here any related proposals/revisions and their keys. *Example: This BS proposal (key 567) is related to the Concentration A proposal (key 145) and the Concentration B proposal (key 203).*

Program Justification

Provide a ***brief*** justification of the program, including highlights of the program objectives, and the careers, occupations, or further educational opportunities for which the program will prepare graduates, when appropriate.

Ubiquitous digital technology and the generation of massive amounts of data are rapidly transforming society and multiple fields of inquiry. This transformation has created exciting opportunities and worrisome scenarios across multiple domains of human endeavor. Like the industrial technologies of the early-20th century, the new digital technologies of the early-21st century have great potential to transform society, for good or ill. The University of Illinois has a high calling to prepare students to lead society's digital transformation.

There is substantial demand, both from students and from employers, for educational programs in data science. A study by researchers at IBM and Burning Glass Technologies predicted growth in demand for Data Scientists of some 28% from 2017 to 2020 . Furthermore, enrollment in the undergraduate majors "Statistics" and "Statistics and Computer Science," which provide students access to some of the competencies of data science, have grown by a factor of six in the last ten years.

Data science is emerging as a subject of great importance in many domains of human and scholastic endeavor. National policy documents for data science majors emphasize that engagement with an application domain is an important part of data science education. The University of Illinois' white paper on data science education recommended the development of "X+Data Science Majors" as an innovative approach to offering broad collaborative opportunities for Illinois students to engage with data science.

Instructional Resources

Will there be any reduction in other course offerings, programs or concentrations by your department as a result of this new program/proposed change?

No

Does this new program/proposed change result in the replacement of another program?

No

Does the program include other courses/subjects impacted by the creation/revision of this program?

No

Program Regulation and Assessment

Briefly describe the plan to assess and improve student learning, including the program's learning objectives; when, how, and where these learning objectives will be assessed; what metrics will be used to signify student's achievement of the stated learning objectives; and the process to ensure assessment results are used to improve student learning. (Describe how the program is aligned with or meets licensure, certification, and/or entitlement requirements, if applicable).

The learning objectives related to student learning outcomes includes competence in selected concentration, data science, critical thinking, group work, communication. These outcomes are mapped to questions concerning student ability to use data analytics and problem solving to effectively understand real-world business issues, problem analysis and articulating conclusions, assuming leadership roles, grasp of international complexities effect business and data science.

Is the career/profession for graduates of this program regulated by the State of Illinois?

No

Program of Study

"Baccalaureate degree requires at least 120 semester credit hours or 180 quarter credit hours and at least 40 semester credit hours (60 quarter credit hours) in upper division courses" (source: https://www.ibhe.org/assets/files/PrivateAdminRules2017.pdf). For proposals for new bachelor's degrees, if this minimum is not explicitly met by specifically-required 300- and/or 400-level courses, please provide information on how the upper-division hours requirement will be satisfied.

All proposals must attach the new or revised version of the Academic Catalog program of study entry. Contact your college office if you have questions.

For new programs, attach Program of Study

Catalog Page Text - Overview Tab

Text for Overview tab on the Catalog Page. This is not official content, it is used to help build the new catalog page for the program. Can be edited in the catalog by the college or department.

This major is sponsored by the Department of Business Administration within the Gies College of Business, in collaboration with the iSchool and the Departments of Statistics, Computer Science, and Mathematics. The Business+Data Science major is designed for students seeking to supplement their business specialization foundations with a strong background in data science. The major prepares students for professional and graduate work while involving a particular distinction with respect to analytics.

Statement for Programs of Study Catalog

University Composition Requirement

For a list of the specific courses that meet this requirement, see the college Office of Undergraduate Affairs in 1055 Business Instructional Facility or see the Course Explorer for a list of approved general education courses.

Course List

Code	Title	Hours
Composition I: Principles of Composition		4-7
Advanced Composition		3

General Education Requirements

Three courses in the Humanities & the Arts area are required and students must complete at least one course in the Literature & the Arts and Historical & Perspectives subcategories. At least one of the courses must be a 200 or higher level course.

Two courses in the Natural Sciences & Technology area are required. It is strongly recommended that students complete one course in the Physical Sciences and Life Sciences subcategories.

Course List

Code	Title	Hours
A minimum of six courses is required, as follows:		18
Humanities & the Arts: Literature & the Arts (1-2 courses)		
Humanities & the Arts: Historical & Philosophical Perspectives (1-2 courses)		
Natural Sciences & Technology: Physical Sciences (0-2 courses)		
Natural Sciences & Technology: Life Sciences (0-2 courses)		
Behavioral Sciences (1 course)		
Cultural Studies: Non-Western Cultures (1 course)		
Cultural Studies: U.S. Minorities Cultures (1 course)		
Cultural Studies: Western/ Comparative Cultures (1 course)		
Quantitative Reasoning (2 courses)		

Language Other than English

Course List

Code	Title	Hours
Completion of the third semester or equivalent of a language other than English is required. Completion of three years of a single language in high school satisfies this requirement.		0-15

Course List

Code	Title	Hours
Business Core		42
ACCY 201	Accounting and Accountancy I	3
ACCY 202	Accounting and Accountancy II	3
BADM 275	Fundamentals of Operations Management	3
BADM 300	The Legal Environment of Bus	3
BADM 310	Mgmt and Organizational Beh	3
BADM 320	Principles of Marketing	3
BADM 449	Business Policy and Strategy	3
BUS 101	Professional Responsibility and Business	3
BUS 201	Business Dynamics	3
BUS 401	Global Business Perspectives	3
CMN 101	Public Speaking	3
ECON 102	Microeconomic Principles	3
ECON 103	Macroeconomic Principles	3
FIN 221	Corporate Finance	3
Data Science Core		29-30
STAT/CS/IS 107	Data Science Discovery	4
STAT 207	Data Science Exploration	4
CS 307	Modeling and Learning in Data Science	4
CS 277	Algorithms and Data Structures for Data Science	4
IS 467	Ethics and Policy for Data Science	3
IS 477	Data Management, Curation & Reproducibility	3
Choose one Calculus:		4-5

Code	Title	Hours
MATH 220	Calculus	
MATH 221	Calculus I	
MATH 234	Calculus for Business I	
Choose one Linear Algebra		3
MATH 227	Linear Algebra for Data Science	
MATH 257	Linear Algebra with Computational Applications	
Business Administration Specialization (choose one of the four specializations below)		12
Information Systems Specialization:		
BADM 350	IT for Networked Organizations	3
BADM 351	Social Media Strategy	3
BADM 352	Database Design and Management	3
BADM 353	Info Sys Analysis and Design	3
International Business Specialization:		
BADM 380	International Business	3
BADM 381	Multinational Management	3
BADM 382	International Marketing	3
BADM 383	Topics in International Business	3
Management Specialization:		
BADM 311	Leading Individuals and Teams	3
BADM 312	Designing and Managing Orgs	3
BADM 313	Strategic Human Resource Management	3
BADM 314	Leading Negotiations	3
Operations Management Specialization:		
BADM 374	Management Decision Models	3
BADM 375	Operations Strategy	3
BADM 377	Project Management	3
BADM 379	Business Process Improvement	3

Meaningful Research or Discovery Experience

Course List

Code	Title	Hours
One of the most important skills a student will gain in a BUS+ DS degree will be the ability to present data in meaningful ways. A meaningful research and experience is as much a pillar of this degree program as both the core coursework and the area of specialization. This capstone experience can be fulfilled through BUS 301. This course is an active learning, real-client experience that will allow students to join their data science skills with their business skills.		
Total Hours		3

Summary of Total Hours

Course List

Code	Title	Hours
Total General Education Hours		25
Total Business Core Hours		42
Total Business Specialization Hours		12
Total Data Science Core Hours		29-30
Meaningful Research or Discovery Experience		3
Electives		13-14
Total Hours		124

Corresponding Degree	BS Bachelor of Science

Program Features

Academic Level	Undergraduate
Does this major have transcripted concentrations?	No

What is the typical time to completion of this program?

4 years

What are the minimum Total Credit Hours required for this program?

124

CIP Code	521399 - Management Sciences and Quantitative Methods, Other.

Is This a Teacher Certification Program?

No

Will specialized accreditation be sought for this program?

No

Delivery Method

This program is available:

On Campus - Students are required to be on campus, they may take some online courses.

Institutional Context

University of Illinois at Urbana-Champaign

Describe the historical and university context of the program's development. Include a short summary of any existing program(s) upon which this program will be built.

Explain the nature and degree of overlap with existing programs and, if such overlap exists, document consultation with the impacted program’s home department(s).

Outside of the Gies College, the addition of the Business+DS program will impact only the fields involved within the Business+DS program. No changes of enrollment impacting departments other than Computer Science, Statistics, Math, and the iSchool are expected.

University of Illinois

Briefly describe how this program will support the University's mission, focus and/or current priorities. Demonstrate the program's consistency with and centrality to that mission.

Businesses are being transformed by technology and data. As such, the business professionals of the present and future must increasingly have a native familiarity with data, a natural facility for consuming and analyzing data, and a ready ability to communicate the lessons from that analysis. Furthermore, data science is an increasingly important part of scholarship across multiple fields of inquiry. New tools are enabling new modes of discovery in multiple disciplines. Demand for these jobs is growing rapidly in all sectors of the economy, including agriculture, finance, manufacturing, and services. At the same time, the advent of automated tools to suggest conclusions from massive data sets has serious social and ethical implications. The Business+DS major will prepare a student for deep engagement in contemporary business analytics using the tools of data science. Accordingly, the program will serve the University’s educational mission by preparing students to collaborate, communicate, and work effectively and ethically in a data-rich and interdisciplinary work environment.

Admission Requirements

Desired Effective Admissions Term: Fall 2022

Provide a brief narrative description of the admission requirements for this program. Where relevant, include information about licensure requirements, student background checks, GRE and TOEFL scores, and admission requirements for transfer students.

The admissions to this program will follow the same process of admissions to the Gies College of Business

Describe how critical academic functions such as admissions and student advising are managed.

Admissions and advising will be managed by the Office of Undergraduate Affairs in the Gies College of Business

Enrollment

Number of Students in Program (estimate)

Year One Estimate	20	5th Year Estimate (or when fully implemented)
50		

Estimated Annual Number of Degrees Awarded

Year One Estimate	0	5th Year Estimate (or when fully implemented)
45		

What is the matriculation term for this program?

Fall

Budget

Will the program or revision require staffing (faculty, advisors, etc.) beyond what is currently available?

No

Additional Budget Information

Attach File(s)

Financial Resources

How does the unit intend to financially support this proposal?

This proposal builds upon existing degree programs offered by the Department of Business Administration to partner with a data science component, and thus involves a small shift in enrollments for courses already available in the unit. As the appendix depicts, this new major adds a core of data science courses to a body of existing courses that serve existing degree programs offered by the Department of Business Administration within the Gies College.

The Gies curriculum involves a core of classes (the Business Core) that all Gies students complete in addition to specializing in their major-based coursework. Due to overlap in content and the need to allow students to complete the proposed major within four years of study, this proposal follows the precedent set by the 'Accountancy+DS' and 'Finance+DS' degrees by having three courses from the Data Science Core take the place of courses from the Business Core. Specifically, (1) STAT/CS/IS 107 from the Data Science Core takes the place of an existing course (CS 105) in the Business Core; (2) STAT 207 from the Data Science Core takes the place of an existing course (BADM 210) in the Business Core; (3) CS 307 from the Data Science Core takes the place of an existing course (BADM 211) in the Business Core. See the Curriculum sub-section below and the appendix for more details.

Will the unit need to seek campus or other external resources?

No

Attach letters of support

What tuition rate do you expect to charge for this program? e.g, Undergraduate Base Tuition, or Engineering Differential, or Social Work Online (no dollar amounts necessary)

Business Differential

Resource Implications

Facilities

Will the program require new or additional facilities or significant improvements to already existing facilities?

No

Technology

Will the program need additional technology beyond what is currently available for the unit?

No

Non-Technical Resources

Will the program require additional supplies, services or equipment (non-technical)?

No

Resources

For each of these items, be sure to include in the response if the proposed new program or change will result in replacement of another program(s). If so, which program(s), what is the anticipated impact on faculty, students, and instructional resources? Please attach any letters of support/acknowledgement from faculty, students, and/or other impacted units as appropriate.

Attach File(s)

Faculty Resources

Please address the impact on faculty resources including any changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc. Describe how the unit will support student advising, including job placement and/or admission to advanced studies.

No changes in the number of faculty outside of the Gies College is needed beyond the faculty increases outlined in the “Data Science” major proposal. No increases in the number of faculty within the Gies College are required.

Library Resources

Describe your proposal's impact on the University Library's resources, collections, and services. If necessary please consult with the appropriate disciplinary specialist within the University Library.

Current collections and services are adequate for the proposed program.

Market Demand

What market indicators are driving this proposal? If similar programs exist in the state, describe how this program offers a unique opportunity for students:

In the private sector, the demand for data science professionals is growing at a very rapid pace, with the number of data science job openings expected to grow by 15% to 25% over the next five years, depending on the job description.

Explain how the program will meet the needs of regional and state employers, including any state agencies, industries, research centers, or other educational institutions that expressly encouraged the program's development.
Discuss projected future employment and or additional educational opportunities for graduates of this program. Compare estimated demand with the estimated supply of graduates from this program and existing similar programs in the state. Where appropriate, provide documentation by citing data from such sources as employer surveys, current labor market analyses, and future workforce projections.
(Whenever possible, use state and national labor data, such as that from the Illinois Department of Employment Security at http://ides.illinois.gov/ and/or the U.S. Bureau for Labor Statistics at http://www.bls.gov/).

Given employer demand for data science skills and the economic returns to employees with both analytical and business application skillsets, the Business+DS major positions graduates for meaningfully contributions to the success of their employing organizations, while enabling them to succeed throughout their careers.

What resources will be provided to assist students with job placement?

These graduates will benefit from the same extensive career services and advising services provided to all Gies students. Career Services in the Gies College notes that these students will receive particular interest by employers.

If letters of support are available attach them here:
Bus+DS CS Support Letter.pdf
Bus+DS STAT Letter.pdf
Bus+DS Math Support Letter.pdf
Bus+DS Ischool Support Letter.docx

EP Documentation

EP Control Number	EP.22.112
Attach Rollback/Approval Notices	EP22112_CorrespondencewSponsor.pdf
This proposal requires HLC inquiry	Yes

DMI Documentation

Attach Final Approval Notices	
Banner/Codebook Name	

Program Code:

Minor Code	Conc Code	Degree Code	Major Code

Senate Approval Date

Senate Conference Approval Date

BOT Approval Date

IBHE Approval Date

HLC Approval Date

Effective Date:

Attached Document

Justification for this request

Program Reviewer Comments

Deb Forgacs (dforgacs) (01/05/22 4:23 pm): Rollback: requested.
Barbara Lehman (bjlehman) (03/08/22 9:33 am): Rollback: rollback: see attached EP Documentation.
Kathy Martensen (kmartens) (04/12/22 6:17 pm): Rollback: To address email from Senate Ed Pol and follow up communication with Ed Pol Subcommittee chair.

Key: 1117