

Date Submitted: 02/21/25 5:37 pm

Viewing: **BS-STAT-1 : Bachelor of Science in Statistics**

Last approved: 10/23/20 5:53 pm

Last edit: 02/21/25 5:37 pm

Changes proposed by: stasdes

Catalog Pages
Using this Program
[Bachelor of Science in Statistics](#)

Program Status	Active		
Requestor	Name	Despina Stasi Holli Pryor-Harris	E-mail
		stasdes@iit.edu	pryor@iit.edu
Origination Date	2020-10-23 <u>2025-2-21</u>		
Is this an interdisciplinary program?	No		
Academic Unit	Applied Mathematics		
College	College of Computing		
Program Title	Bachelor of Science in Statistics		
Effective Academic Year	2020 - <u>2025</u> - <u>2026</u>	Effective Term	Fall 2025
Academic Level	Undergraduate		

In Workflow

1. **AMAT Chair**
2. **Academic Affairs**
3. Undergraduate Academic Affairs
4. CC Dean
5. Undergraduate Studies Committee Chair
6. Faculty Council Chair
7. Academic Affairs

Approval Path

1. 02/21/25 5:38 pm
Chun Liu (cliu124):
Approved for AMAT Chair

History

1. May 24, 2018 by Sarah Pariseau (sparisea)
2. May 24, 2018 by Sarah Pariseau (sparisea)
3. May 30, 2018 by Sarah Pariseau (sparisea)
4. Jun 6, 2018 by Joseph Gorzkowski (jgorzkow)
5. Jun 6, 2018 by Joseph Gorzkowski (jgorzkow)
6. Jun 19, 2018 by Sarah Pariseau (sparisea)
7. May 16, 2019 by Sarah Pariseau (sparisea)

8. Mar 30, 2020 by Michael Pelsmajer (pelsmajer)
9. Oct 23, 2020 by Holli Pryor-Harris (pryor)

If all courses in a subject in your department are required, please enter each subject followed by the number ranges in the "Quick Add" field in the pop up box when you click the green plus button below. For example: ARCH 100-499.

What courses will factor the major GPA?

Program Type Degree

Degree Type Bachelor of Science (BS)

CIP Code
27.0503 - Mathematics and Statistics.

Is there more than one Academic Unit proposer?

No

Program Code BS-STAT-1

Program Attribute

Total Program Credit Hours 120 ~~126~~

Rationale for change in program credit hours.

Free electives credit hours are reduced by 6 credits, thereby reducing the number of credits to match the new minimum credit hours of IIT undergrad programs.

Please provide a summary and rationale for the requested program revision.

Reduce free elective credit hours by 6 credits.

Update Intro to Profession requirement to allow the new DS 100 course to be an option, consistent with current advising practices. ~~Clarify that the courses listed under Applied~~

~~Mathematics Electives are mostly suggestions, not the entire list of available~~

~~courses.10/23/2020 Updated program iteration code and effective CAT year/term for College~~

~~Reorg.HPH~~

Program Narrative and Justification

Narrative description of how the institution determined the need for the program. For example, describe what need this program will address and how the institution became aware of that need. If the program is replacing a current program(s), identify the current program(s) that is being replaced by the new program(s) and provide details describing the benefits of the new program(s). If the program will be offered in connection with, or in response to, an initiative by a governmental entity, provide details of that initiative.

The Applied Mathematics department proposes a new Bachelor of Science degree in Statistics. We believe that the proposed B.S. in Statistics will address an unmet demand from prospective students, and will consequently increase the number of undergraduate students in our programs. Currently, we do not offer a technically-intensive, mathematically-rigorous undergraduate degree designed to attract prospective students interested in careers in statistics or data analytics. With the proposed new degree in place, we can produce competent graduates who can satisfy the significant and increasing demand in the job market for talent in statistics, analytics, and data science. The degree will also serve to better prepare undergraduate students who wish to pursue graduate study in these fields.

We intend this program to have a strong computational emphasis, with its graduates taking several programming courses, and its statistics courses emphasizing statistics computational skills.

Narrative description of how the program was designed to meet local market needs, or for an online program, regional or national market needs. For example, indicate if Bureau of Labor Statistics data or State labor data systems information was used, and/or if State, regional, or local workforce agencies were consulted. Include how the course content, program length, academic level, admission requirements, and prerequisites were decided; including information received from potential employers about course content; and information regarding the target students and employers.

The target market is high school students with mathematical ability and interest in high-paying, high-satisfaction careers, including data science. We will also work with UG Admission to identify and recruit potential students. The current high level of awareness of statistics and data science provides a rich environment for recruiting students.

Narrative description of any wage analysis the institution may have performed, including any consideration of Bureau of Labor Statistics wage data related to the new program.

Statisticians are highly sought after, and such jobs are highly paid, and in high demand. One need only look at sources such as the U.S. News and World Report, where statisticians are listed as the number one best business job and the number six best job for 2018. We will, of course, work with the Career Management Center to identify specific potential employment opportunities also.

Narrative description of how the program was reviewed or approved by, or developed in conjunction with, one or more of the following: a) business advisory committees; b) program integrity boards; c) public or private oversight or regulatory agencies (not including the state licensing/authorization agency and accrediting agency); and d) businesses that would likely employ graduates of the program. For example, describe the steps taken to develop the program, identify when and with whom discussions were held, provide relevant details of any proposals or correspondence generated, and/or describe any process used to evaluate the program.

Admission Entry Details

What are the enrollment estimates?

Year 1	0	Year 2	20	Year 3	20
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Attach Additional
Program
Justification
Document(s)

Academic Information

Advising

Since quality advising is a key component of good retention, graduation, and career placement, how will students be mentored? What student professional organizations will be formed? How will the department work with the Career Services office to develop industry connections?

Students will have a designated faculty adviser, initially Despina Stasi, who will advise them on their choice of courses, their progress in the program, and the selective statistics and applied mathematics electives, according to their future plans.

The department will encourage and facilitate the establishment of a student chapter of the American Statistical Society (ASA), which can be done at no cost. The students would also benefit from the current student organizations associated with the department: the Society for Industrial and Applied Mathematics (SIAM) and the Association for Women in Mathematics (AWM).

AMAT currently works with the CDC to host a once-per-semester alumni career panel, which connects the students with alumni in companies that also hire statisticians. We also have faculty members with personal connections to industry, and to statistics jobs. And, of course, the department will happily work with CMC to develop further industry connections related to this new program.

Program Resources

Which program resources are necessary to offer this program?

Proposed Catalog Entry

Admission
Requirements

Course Requirements

Required Courses

Applied Mathematics Requirements		(29)
MATH 100	Introduction to the Profession	3
or DS 100	Introduction to the Profession	
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 230	Introduction to Discrete Math	3
MATH 251	Multivariate and Vector Calculus	4
MATH 332	Elementary Linear Algebra	3
MATH 350	Introduction to Computational Mathematics	3
MATH 435	Linear Optimization	3
Statistics Requirements		(15)
MATH 225	Introductory Statistics	3
MATH 446	Introduction to Time Series	3
MATH 475	Probability	3
MATH 476	Statistics	3
MATH 484	Regression	3
Applied Mathematics Electives		(15)
Select 15 credit hours from the following courses, or any other approved AMAT elective: ¹		15
MATH 252	Introduction to Differential Equations	4
MATH 380	Introduction to Mathematical Modeling	3
MATH 400	Real Analysis	3

MATH 481	Introduction to Stochastic Processes	3
MATH 483	Design and Analysis of Experiments	3
CS 422	Data Mining	3
Minor Requirement		(15)
Select five related courses from an area outside of applied mathematics, computational mathematics, or statistics		15
Computer Science Requirements		(7-9)
Select one of the following sequences:		4-6
CS 115 & CS 116	Object-Oriented Programming I and Object-Oriented Programming II	4
CS 104 & CS 201	Introduction to Computer Programming for Engineers and Accelerated Introduction to Computer Science	6
CS 105 & CS 201	Introduction to Computer Programming and Accelerated Introduction to Computer Science	6
CS 331	Data Structures and Algorithms	3
Natural Science and Engineering Requirements		(10)
See Illinois Tech Core Curriculum, section D		10
Humanities and Social Science Requirements		(21)
See Illinois Tech Core Curriculum, sections B and C		21
Interprofessional Projects (IPRO)		(6)
See Illinois Tech Core Curriculum, section E		6
Free Electives		(0-2)
Select eight credit hours		8
Select up to two credit hours		0-2

Minimum degree credits required: **120**

1

Applied mathematics/statistics electives are to be chosen after consultation with an academic adviser. Student goals, interests, and course availability should be determining factors in this selection process. Students can take [CS 422](#) to replace one applied mathematics/statistics elective. [CS 422](#) must be taken after [CS 331](#), which is a required computer science course in this curriculum. The following courses do not count toward the requirements for this degree: [MATH 119](#), [MATH 122](#), [MATH 130](#), [MATH 148](#), [MATH 180](#), [MATH 333](#), [MATH 374](#), [MATH 425](#), [MATH 426](#), and [MATH 474](#).

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Sample
Curriculum/Program

Bachelor of Science in Statistics Curriculum

		Year 1	
Semester 1	Credit Hours	Semester 2	Credit Hours
MATH 225	3	MATH 152	5
MATH 100	3	MATH 230	3
MATH 151	5	Science Elective	4
Computer Science Course ¹	2	Computer Science Course ¹	2
Humanities 200-level Course	3	Social Sciences Elective	3
	16		17
		Year 2	
Semester 1	Credit Hours	Semester 2	Credit Hours
MATH 251	4	MATH 435	3
MATH 332	3	Applied Mathematics/Statistics Elective ²	3
CS 331	3	Minor Elective	3
Minor Elective	3	Science Elective	3
Humanities or Social Sciences Elective	3	Social Sciences Elective (300+)	3
	16		15
		Year 3	
Semester 1	Credit Hours	Semester 2	Credit Hours
MATH 475	3	MATH 350	3
Applied Mathematics/Statistics Elective ²	3	MATH 476	3
Minor Elective	3	Applied Mathematics/Statistics Elective ²	3
Science Elective	3	IPRO Elective I	3
Humanities Elective (300+)	3	Social Sciences Elective (300+)	3
Free Elective	2		
	15		15
		Year 4	
Semester 1	Credit Hours	Semester 2	Credit Hours
MATH 484	3	MATH 446	3
Applied Mathematics/Statistics Elective ²	3	Applied Mathematics/Statistics Elective ²	3
Minor Elective	3	Minor Elective	3
Humanities Elective (300+)	3	Humanities Elective (300+)	3
IPRO Elective II	3	Free Elective	3
<u>Free Elective</u>	<u>2</u>		
	14		12

Total Credit Hours: 120

¹

Students must complete one of the following computer science sequences: [CS 115](#) and [CS 116](#), [CS 104](#) and [CS 201](#), or [CS 105](#) and [CS 201](#).

²

Applied mathematics/statistics electives are to be chosen after consultation with an academic adviser. Student goals, interests, and course availability should be determining factors in this selection process. Students can take [CS 422](#) to replace one applied mathematics/statistics elective. [CS 422](#) must be taken after [CS 331](#), which is a

required computer science course in this curriculum. The following courses do not count toward the requirements for this degree: [MATH 119](#), [MATH 122](#), [MATH 130](#), [MATH 148](#), [MATH 180](#), [MATH 333](#), [MATH 374](#), [MATH 425](#), [MATH 426](#), and [MATH 474](#).

Specialization
Requirements

Program Outcomes and Assessment Process

What are your learning objectives in this program? Please list each learning objective in the boxes below:

Note: These should be the same as described in your assessment plan at the bottom of this form.

LO #1: SWBA to demonstrate the fundamentals of probability theory, statistical reasoning, and inferential methods.

LO #2: SWBA to work with data: to describe it, model it, analyze it, and present it.

LO #3: SWBA to propose statistical models, evaluate their validity, use them to draw conclusions, and understand their limitations.

LO #4: SWBA to effectively use statistical computing to answer real-world questions and demonstrate strong computational skills.

LO #5: SWBA to communicate statistical analyses and conclusions clearly and effectively.

LO #6: SWBA to discuss the broader and dynamical societal context in which statistics is used and demonstrate awareness in ethical issues associated with sound statistical practice.

Upload your
assessment plan
here:

[BS Stats Assessment Plan-v2023-06-15-2023.xlsx](#)

Undergraduate Program Requirements

What courses will
factor the major
GPA?

Undergraduate Degree Requirements

Minimum credit hours 120 ~~126~~

Specialization required?
No

Minor required?
Yes

How many credit hours are required for the minor? 15

Details about the minor requirement

Must be from a department outside of applied mathematics.

Proposed General Curriculum

List Major Course Requirements

Applied Mathematics Requirements

<u>MATH 100</u>	Introduction to the Profession	3
<u>MATH 151</u>	Calculus I	5
<u>MATH 152</u>	Calculus II	5
<u>MATH 230</u>	Introduction to Discrete Math	3
<u>MATH 251</u>	Multivariate and Vector Calculus	4
<u>MATH 332</u>	Elementary Linear Algebra	3
<u>MATH 350</u>	Introduction to Computational Mathematics	3
<u>MATH 435</u>	Linear Optimization	3

Total Credit Hours 29

Statistics Requirements

<u>MATH 225</u>	Introductory Statistics	3
<u>MATH 475</u>	Probability	3
<u>MATH 476</u>	Statistics	3
<u>MATH 484</u>	Regression	3
<u>MATH 4XX</u>	Course MATH 4XX Not Found (TIME SERIES-NEW COURSE)	3

<u>MATH 446</u>	<u>Introduction to Time Series</u>	<u>3</u>
Total Credit Hours		15
Applied Mathematics/Statistics Electives		
Select 15 credit hours from the following: ¹		15
<u>MATH 252</u>	Introduction to Differential Equations	4
<u>MATH 380</u>	Introduction to Mathematical Modeling	3
<u>MATH 400</u>	Real Analysis	3
<u>MATH 481</u>	Introduction to Stochastic Processes	3
<u>CS 422</u>	Data Mining	3
¹ Applied Mathematics/Statistics Electives are to be chosen after consultation with an academic adviser. Student goals, interests, and course availability should be determining factors in this selection process. Students can take CS 422 Data Mining to replace one Applied Mathematics/Statistics Elective. CS 422 must be taken after CS 331, which is a required CS course in this curriculum. The following courses do not count towards the requirements for this degree: MATH 119, 122, 130, 148,180, 333, 374, 425, 426, 474.		
List Mathematics Requirements		
List Science Requirements		
10 credit hours - see general education requirements		
List Computer Science Requirements		
Select one of the following sequences:		4-6
<u>CS 115</u> & <u>CS 116</u>	Object-Oriented Programming I and Object-Oriented Programming II	4
<u>CS 104</u> & <u>CS 201</u>	Introduction to Computer Programming for Engineers and Accelerated Introduction to Computer Science	6
<u>CS 105</u> & <u>CS 201</u>	Introduction to Computer Programming and Accelerated Introduction to Computer Science	6
<u>CS 331</u>	Data Structures and Algorithms	3
Total Credit Hours		7-9
List Humanities and Social Sciences Requirements		
21 credit hours - see general education requirements		
List Interprofessional		

Project (IPRO) 6 hours

Requirements

List Technical
Elective Course
Options

List Free Elective
Credit Hours (if
applicable) 28

Semester-by-
semester plan of
study for the
degree program

Reviewer
Comments

