

MATH136H : Honors Statistics

General Information

Author:	<ul style="list-style-type: none">Suzanne PalermoSchulten, Charlotte
Course Code (CB01) :	MATH136H
Course Title (CB02) :	Honors Statistics
Department:	MATH
Proposal Start:	Fall 2024
TOP Code (CB03) :	(1701.00) Mathematics, General
CIP Code:	(27.0101) Mathematics, General.
SAM Code (CB09) :	Non-Occupational
Distance Education Approved:	Yes
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000591644
Curriculum Committee Approval Date:	03/27/2024
Board of Trustees Approval Date:	06/18/2024
Last Cyclical Review Date:	04/01/2020
Course Description and Course Note:	MATH 136H is a one-semester course designed for students whose major requires a course in statistics. Topics in this course include the nature of statistical methods, types of data, introductory probability, sampling theory, experimental design, confidence intervals, hypothesis testing, regression analysis, and decision making. Emphasis is placed on the application of statistical concepts to real world data, development of statistical reasoning, and the interpretation of results. The honors section of this course features more in depth theory and one or more projects related to the topics of the course.
Justification:	Content Change
Academic Career:	<ul style="list-style-type: none">Credit
Author:	No value

Academic Senate Discipline

Primary Discipline:	<ul style="list-style-type: none">Mathematics
Alternate Discipline:	No value
Alternate Discipline:	No value

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

- Grade Only

Course Support Course Status (CB26)

Course is not a support course

Transferability & Gen. Ed. Options

General Education Status (CB25)

GE Status (CSU) B4, (UC) 2

Transferability

Transferable to both UC and CSU

Transferability Status

Approved

IGETC Area	Area	Status	Approval Date	Comparable Course
2-Math	Mathematical Concepts and Quantitative Reasoning	Approved	09/03/2019	No Comparable Course defined.

CSU GE-Breadth Area	Area	Status	Approval Date	Comparable Course
B4-Mathematics/Quantitative Reasoning	Mathematics/Quantitative Reasoning	Approved	08/27/2018	No Comparable Course defined.

C-ID	Area	Status	Approval Date	Comparable Course
MATH	Mathematics	Approved	02/20/2024	MATH 110 - Introduction to Statistics

Units and Hours

Summary

Minimum Credit Units (CB07)	4
Maximum Credit Units (CB06)	4
Total Course In-Class (Contact) Hours	72
Total Course Out-of-Class Hours	144
Total Student Learning Hours	216

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

Course Classification Code (CB11)

Credit Course.

 Variable Credit Course**Funding Agency Category (CB23)**

Not Applicable.

Cooperative Work Experience

 Education Status (CB10)**Weekly Student Hours**

	In Class	Out of Class
Lecture Hours	4	8
Laboratory Hours	0	0
Studio Hours	0	0

Course Student Hours**Course Duration (Weeks)** 18**Hours per unit divisor** 0**Course In-Class (Contact) Hours**

Lecture 72

Laboratory 0

Studio 0

Total 72**Course Out-of-Class Hours**

Lecture 144

Laboratory 0

Studio 0

Total 144**Time Commitment Notes for Students**

No value

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories**Prerequisite**

MATH90 - Intermediate Algebra for BSTEM

Objectives

- Solve absolute value equations and inequalities.
- Solve linear equations and compound inequalities.
- Perform operations with polynomials.
- Simplify complex fractions.
- Perform operations with radical expressions.
- Simplify expressions with rational exponents.
- Solve rational equations.
- Solve equations with radicals.
- Find the equation of a line parallel or perpendicular to a given line.
- Solve a system of linear equations using elimination substitution.
- Solve systems of linear inequalities.
- Find the composition of two functions.
- Solve applied problems.
- Solve quadratic equations with real and complex solutions.
- Find the inverse of a function.

- Use the properties of logarithms to simplify and expand expressions.
- Solve logarithmic and exponential equations.
- Graph parabolas and circles centered at any point.
- Graph functions (linear, quadratic, exponential, logarithmic).

AND

Advisory

ENGL101 - Introduction to College Reading and Composition

Objectives

- Read, analyze, and evaluate a variety of primarily non-fiction readings for content, context, and rhetorical merit with consideration of tone, audience, and purpose.
- Integrate the ideas of others through paraphrasing, summarizing, and quoting without plagiarism.
- Find, evaluate, analyze, and interpret primary and secondary sources, incorporating them into written essays using appropriate documentation format.

OR

Prerequisite

Placement is based on academic background or completion of MATH 90.

Entry Standards

Entry Standards

Course Limitations

Cross Listed or Equivalent Course

MATH 136 Statistics

MATH 136+ Statistics with Support

MATH 136B Statistics B

Specifications

Methods of Instruction

Methods of Instruction

Lecture

Methods of Instruction

Discussion

Methods of Instruction	Multimedia															
Methods of Instruction	Collaborative Learning															
Methods of Instruction	Demonstrations															
Out of Class Assignments <ul style="list-style-type: none"> • Homework (e.g. problems sets related to course content) • Projects involving analysis of real-world data using statistical software, the Poisson distribution (honors enhancement), Two way ANOVA (honors enhancement), ANOVA Post-Hoc tests, Combinatorics (honors enhancement), Non-linear regression (honors enhancement), and multiple regression (honors enhancement). (e.g. collect data and create a written report including graphical displays and numeric summaries.) 																
Methods of Evaluation	Rationale															
Exam/Quiz/Test	Four to five chapter exams															
Exam/Quiz/Test	A comprehensive final examination to test problem solving															
Textbook Rationale No Value																
Textbooks <table border="1"> <thead> <tr> <th>Author</th> <th>Title</th> <th>Publisher</th> <th>Date</th> <th>ISBN</th> </tr> </thead> <tbody> <tr> <td>Sullivan, Michael</td> <td>Statistics: Informed Decisions using Data</td> <td>Pearson</td> <td>2020</td> <td>9780136872740</td> </tr> <tr> <td>Illowsky, Barbara Dean, Susan</td> <td>Introductory Statistics</td> <td>OpenStax</td> <td>2022</td> <td>978-1-947172-05-0</td> </tr> </tbody> </table>		Author	Title	Publisher	Date	ISBN	Sullivan, Michael	Statistics: Informed Decisions using Data	Pearson	2020	9780136872740	Illowsky, Barbara Dean, Susan	Introductory Statistics	OpenStax	2022	978-1-947172-05-0
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Other Instructional Materials (i.e. OER, handouts) No Value																
Materials Fee No value																

Learning Outcomes and Objectives
Course Objectives

Describe and analyze realistic data sets both large and small from disciplines including business, social science, psychology, life science, health science and education using graphs and statistics.

Analyze real world results, interpret the output of a technology-based statistical analysis and identify flaws in statistical reasoning.

Identify the standard methods of obtaining data and identify advantages and disadvantages of each.

Calculate probability using the normal distribution, the t distribution, the Poisson distribution (honors enhancement), the basic laws of probability and combinatorics (honors enhancement).

Describe sampling distributions, distinguish them from population distributions and analyze the role played by the Central Limit Theorem.

Compute and interpret (honors enhancement) confidence intervals of population means, proportions and standard deviations.

Identify the basic concept of hypothesis testing including Type I and II errors, finding and interpreting levels of significance including p-values, selecting the appropriate techniques for testing a hypothesis from one and two populations and interpreting the result.

Perform chi-square tests using chi-square tables and statistical software or calculator.

Use linear, nonlinear and multiple regression (honors enhancement) and one and two way (honors enhancement) ANOVA analysis for estimation and inference, and interpret the statistics.

Calculate and present results using sound statistical reasoning, accurate statistical terminology and technology such as spreadsheets, graphing calculators or StatCrunch.

SLOs

Analyze and describe studies, data sets, and probability models including the Poisson distribution (honors enhancement).

Expected Outcome Performance: 70.0

ILOs Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.

Core

ILOs

Communicate clearly, ethically, and creatively; listen actively and engage respectfully with others; consider situational, cultural, and personal contexts within or across multiple modes of communication.

Use quantitative and/or analytical mathematical skills to solve problems and to interpret, evaluate, and process information and data to draw logical conclusions and support claims.

Design (honors enhancement) and apply confidence intervals and hypothesis testing to form conclusions about realistic data.

Expected Outcome Performance: 70.0

ILOs Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.

Core

ILOs

Use quantitative and/or analytical mathematical skills to solve problems and to interpret, evaluate, and process information and data to draw logical conclusions and support claims.

Additional SLO Information

Does this proposal include revisions that might improve student attainment of course learning outcomes?

No

Is this proposal submitted in response to learning outcomes assessment data?

No

If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.

No Value

SLO Evidence

No Value

Course Content

Lecture Content

Descriptive Statistics (20)

- Graphical descriptions of data
- Measures of center: mean, median, and mode
- Measures of spread; standard deviation/variance, quartiles, and range
- Density curves, including normal distributions
- Linear regression, including residual analysis
- Correlation
- 2-Way Tables
- Data set analysis using statistical software and or statistical calculators
- Identification of confounding and lurking variables and other possible misinterpretations of statistical conclusions

Producing Data (7)

- Design of sampling procedures
- Design of experiments
- Strengths and limitations of experimental designs

Probability and Sampling Distributions (13)

- Probability models
- Computing probabilities using the addition and multiplication rules
- Expected value
- The Central Limit Theorem
- Binomial distributions

Inferences Using Sample Means, Proportions, and Standard Deviations (32)

- Confidence intervals for the population proportion and mean
- One and two-sample hypothesis tests of population proportions and means; Z-test and Student's t-test
- Type I and Type II errors
- Chi-square distribution
- Linear regression and ANOVA analysis for estimation and inference
- Accurate presentation of inferential conclusions

Total Hours: 72

Additional Information

Is this course proposed for GCC Major or General Education Graduation requirement? If yes, indicate which requirement in the two areas provided below.

Yes

GCC Major Requirements

Mathematics

GCC General Education Graduation Requirements

Communication and Analytical Thinking

Repeatability

Not Repeatable

Justification (if repeatable was chosen above)

No Value

Resources

Did you contact your departmental library liaison?

No

If yes, who is your departmental library liaison?

No Value

Did you contact the DEIA liaison?

No

Were there any DEIA changes made to this outline?

No

If yes, in what areas were these changes made:

No Value

Will any additional resources be needed for this course? (Click all that apply)

- No

If additional resources are needed, add a brief description and cost in the box provided.

No Value