



UCDAVIS

DEPARTMENT OF STATISTICS

STATISTICS.UCDAVIS.EDU

4118 MATHEMATICAL SCIENCES BUILDING



OUTLINE

- Academic Advising @ UC Davis
- Major Programs & Tracks
- Scheduling and Sample Plans
- Non-Major Requirements
- Getting Involved & Final Reminders

ACADEMIC ADVISING

UC Davis has a decentralized advising structure. You have different advisors for different things (e.g. Financial Aid Office, Internship and Career Center, etc.). In terms of academic advising, you also have two different types of advisors.

COLLEGE ADVISING

COLLEGE OF LETTERS AND SCIENCE

Statistics is a major within the College of Letters and Science. Your advisors in the College of Letters and Science Office of the Dean can provide advice on your non-major requirements, academic difficulty, and more. They do not provide advice related to your major.

MAJOR ADVISING

DEPARTMENT OF STATISTICS

Advisors in the Department of Statistics can provide information specific to your major. They can help with academic planning, understanding policies and requirements, getting involved in department programs, etc.

If you don't know where to go, that is okay! Your advisors will refer you to the appropriate office/resource. We are all here to help you make the most of your time at UC Davis and share important resources, organizations, opportunities, etc.

STATISTICS ADVISING



Jeff Katz



Kim McMullen



**Professor
Ethan Anderes**

Cindy, Junhee, Jose, Kevin

STAFF ADVISORS

Assists students with general academic planning, clarifying department requirements and policies, approving forms and petitions, and providing referrals to campus resources.

FACULTY ADVISOR

Offers advice on the major program, course selection, post-graduation opportunities and research/independent study. They also approve electives and major modifications, and evaluate transfer course articulations.

PEER ADVISORS

Offer a peer perspective on course selection, research, internships, change of major and minor information, and navigating campus resources.

MAJOR PROGRAMS

The Department of Statistics houses two undergraduate major programs: **Statistics and Data Science**. In addition to the undergraduate program, the Department of Statistics offers MS and PhD programs in Statistics and houses a Graduate Group in Biostatistics.

MAJORS

764

STATISTICS OVERVIEW

The Statistics major has both a Bachelor of Science (BS) and a Bachelor of Arts (AB). The BS has five different major emphases called tracks. The tracks are Applied Statistics Track, Computational Statistics Track, General Statistics Track, Machine Learning Track, and the Statistical Data Science Track.

MAJORS

219

DATA SCIENCE OVERVIEW

Data Science is a new major at UC Davis that began in Fall 2022. Data Science is a BS degree and it has one track: the Foundations Track.

DATA SCIENCE MAJOR DETAILS

FOUNDATIONS TRACK

Combines applied and theoretical foundations in Data Science.

FEATURES

- specialized interdisciplinary data science classes.
- core course work in ECS, MAT and STA
- electives

UNITS

91

Data Science is an interdisciplinary major. It is a collaboration between the College of Letters and Science and the College of Engineering.

LEARNING OUTCOMES

Upon completion of the Data Science program, students should be able to:

- Use results from computer science, mathematics and statistics to design data science tools consistent with methodology in these core fields;
- Formulate and use appropriate models to find solutions to data scientific problems in areas of applications;
- Analyze and interpret data using an ethically responsible approach;
- Effectively communicate the findings of a data analysis in oral, visual and written formats.

Additional details can be found on the [Statistics Website](#) and Undergraduate Manual.

DATA SCIENCE MAJOR DETAILS

PREPARATORY REQUIREMENTS

Mathematics

- MAT 21A Calculus
- MAT 21B Calculus
- MAT 21C Calculus
- MAT 22A Linear Algebra

Computer Science

- ECS 17 Data, Logic, and Computing
- ECS 32A Introduction to Programming
- ECS 32B Introduction to Data Structures

Statistics

- STA 35A Statistical Data Science I
- STA 35B Statistical Data Science II
- STA 35C Statistical Data Science III

DEPTH SUBJECT MATTER

Computer Science

- ECS 116 Databases for Non-Majors
- ECS 117 Algorithms for Data Science
- ECS 119 Data Processing Pipelines

Probability & Statistics

- STA 108 Linear Regression
- STA 141A Fundamentals of Statistical Data Science
- MAT 135A OR STA 131A Probability Theory

Machine Learning

- ECS 111 or STA 142A or MAT 170

Mathematics

- MAT 167 Applied Linear Algebra OR ECS 130
- MAT 168 Optimization

Science & Technology Studies

- STS 101 Data & Society

Upper Division Electives

Three elective courses in a related discipline.

TYPICAL SCHEDULES

DATA SCIENCE

1. MAT 21A CALCULUS

2. STA 35A DATA SCIENCE I

**3. ELWR OR COMPOSITION
COURSE**

4. GE COURSE/SEMINAR

TOTAL UNITS: 12-16

REMINDERS

- Continue to use the Aggie Advising Canvas Modules to review recommendations and requirements.
- We recommend 3-4 courses (12-16 units) in your first quarter. (12 units = full time status)
- No more than two major courses!
- No Upper Division Courses (courses number 100-199).
- Check the [First Year Seminars](#) and [First Year Aggie Connections](#) websites for new courses/connections.

ONLINE RESOURCE LINKS

- **Schedule Builder**
 - sisweb.ucdavis.edu
- **First Year Seminars**
 - fys.ucdavis.edu
- **First Year Aggie Connections**
 - aggieconnect.ucdavis.edu

SCHEDULING MATHEMATICS

RECOMMENDATIONS

All students should take a MAT course in their first quarter. **MAT 21A, MAT 21B, and MAT 21C** are required for the Data Science major, but some students may need to take pre-calculus or algebra before taking MAT 21A based on their placement exam scores.

MATH PLACEMENT EXAM

Required for ALL students who will take Pre-Calculus and/or the first quarter of Calculus at UC Davis:

MAT 12, 16A, 17A, 19A, 21A, 21M

| Course | Math Placement Total Score | with | Trigonometry Sub-Score |
|-----------|----------------------------|------|------------------------|
| MAT 12 | 25 or more | | ----- |
| MAT 16A | 30 or more | with | 2 or more |
| MAT 17A | 30 or more | with | 2 or more |
| MAT 19A | 30 or more | | ----- |
| MAT 21A | 35 or more | with | 3 or more |
| MAT 21M * | 40 or more | with | 3 or more |

* **MAT 21M:** Data Science majors may take MAT 21M in place of the MAT 21A and MAT 21B requirement.

You should only consider taking MAT 21M if you received a 5 on the AP Calculus BC exam (or a 6 or 7 in IB Mathematics), have a qualifying placement score, and are interested in a class that is more abstract and rigorous.

SCHEDULING MATHEMATICS

IB CREDIT

Mathematics: Analysis & Approaches

~Score 5, 6, 7
MAT 21AB

Mathematics HL

~Score 6, 7
MAT 21AB

AP CREDIT

Mathematics-Calculus AB

~Score 4, 5
MAT 12, 16A, 17A, or 21A

Mathematics-Calculus BC

~Score 5
MAT 12, 16AB, 17AB, 19AB, or 21AB
~Score 4, 3
MAT 12, 16A, 17A, 19A, or 21A

All MAT courses except MAT 12 may be retaken at UC Davis for full credit.

RECOMMENDATIONS

Calculus is the foundation for all of your future major courses. We want you to ensure your success in the MAT 21 series by being as prepared as possible. If you have AP/IB credit for MAT 21A and/or MAT 21B, we strongly recommend retaking at least one of the MAT 21 courses at UC Davis. For example, if you have credit for MAT 21A and MAT 21B, we recommend starting with at least MAT 21B in Fall. We don't recommend going into MAT 21C directly. Although you have the credit for these courses on paper, some of the focus and scope of the class may be taught differently at UC Davis.

CALCULUS HELP

MATH TUTORING

- **Calculus Room**

- https://www.math.ucdavis.edu/resources/calc_room/
- Drop-in tutoring services. This is a gathering place for students in Math 16, 17 and 21 series to study in groups or individually with Teaching Assistants available to answer questions.

- **Tutoring at the Academic Assistance and Tutoring Center (AATC)**

- <https://tutoring.ucdavis.edu/math>
- Drop-in tutoring services. You can form study groups, work on assignments, and get assistance from peer-tutors.
- In addition to drop-in tutoring, the AATC has math specialists you can consult with and online resources and tutorials.

SCHEDULING STATISTICS

Data Science majors are required to take the STA 35 series. These courses are designed specifically for the Data Science major.

INTRODUCTORY DATA SCIENCE COURSES

→ STA 35A Statistical Data Science I (4)

First introductory data science course, covers elementary statistics topics and R programming basics.

Prerequisites: MAT 16A or 17A or 21A (can be concurrent)

Offerings: Fall, Winter

Credit Restriction: Not open for credit to students who have taken STA 032 or STA 100. Only 2 units credit for students who have taken STA 013 (including AP/IB credit).

STA 35B Statistical Data Science II (4)

Continuation of STA 35A. More advanced R programming and data visualizations basics and additional statistics topics.

Prerequisites: STA 35A or STA 32 or 100 or (STA 13, ECS 32A); MAT 16B or 17B or 21B (can be concurrent)

Offerings: Winter, Spring

STA 35C Statistical Data Science III (4)

Final introductory data science course. Introduction to statistical learning methods.

Prerequisites: STA 35B; MAT 16C or 17C or 21C (can be concurrent)

Offerings: Spring

SCHEDULING COMPUTER SCIENCE

RECOMMENDATIONS

- Most students do not take a computer science course in their first quarter. Your priority in your first quarter is to take MAT and STA courses.
- Data Science majors require ECS 32A, ECS 32B, and ECS 17.

ECS 32A: Introduction to Programming (4)

Introduction to programming and problem solving in Python.

Offerings: Fall, Winter, Spring

ECS 32B: Introduction to Data Structures (4)

Design and analysis of data structures using Python; trees, heaps, searching, sorting, and graphs.

Offerings: Fall, Winter, Spring

ECS 17: Data, Logic, & Computing (4)

Display, processing, and representation of information and data on a computer. Understanding and analyzing the digital representations of numbers, images, and sounds. Basic computer operations and their logic. Introduction to discrete mathematics in computer science, including propositional logic, proofs by induction, recursions, and counting. Introduction to algorithms. Uses of computers and their influence on society.

Offerings: Winter

AP CREDIT

Comp Sci A

~Score 3, 4, 5

ECS 32A

ECS 32A cannot be
retaken at UC Davis

NON-MAJOR REQUIREMENTS

In addition to your major requirements, you have university, general education, and college requirements. You learned more about these and other scholarship and residency requirements in Aggie 101 and the Aggie Advising Canvas Modules, but below is a brief outline.

- **University Requirements**
 - 180 Unit Requirement
 - American History and Institutions Requirement
 - may have already been satisfied by previous high school or college coursework.
 - Entry Level Writing Requirement
- **General Education Requirements**
 - Courses in Topical Breadth (52 units) and Core Literacies (35 units)
 - Find out more at ge.ucdavis.edu/requirements.
- **College Requirements (for students in the College of Letters and Science Only)**
 - 64 Upper Division Unit Requirement
 - College English Composition Requirement (Lower Division & Upper Division)
 - Foreign Language Requirement-AB Degrees ONLY
 - Natural Science and Math Requirement-BS Degrees ONLY

SCHEDULING GENERAL EDUCATION

RECOMMENDATIONS

- The sections Science and Engineering (**SE**), Quantitative Literacy (**QL**), Scientific Literacy (**SL**), and Visual Literacy (**VL**) will be satisfied by your major requirements.
- Focus on Arts and Humanities (**AH**), Social Sciences (**SS**), Literacy with Words and Images (**WE, OL**), and Civic and Cultural Literacy (**ACGH, DD, WC**).

REMEMBER!

Anything you take in your first quarter will count for something!

Focus on having a BALANCED schedule with diverse classes that genuinely interest you.

| TOPICAL BREADTH | | | | | |
|---|---|--|----|---|---|
| A. Arts and Humanities (AH) *: | | B. Science and Engineering (SE) *: | | C. Social Sciences (SS) *: | |
| | | STA 35B | 4 | STS 101 | 4 |
| | | STA 35C | 4 | | |
| | | STA 108 | 4 | | |
| | | ECS 116 | 4 | | |
| | | ECS 111 | 4 | | |
| 12-20 units* | 0 | 12-20 units* | 20 | 12-20 units* | 4 |
| <input type="checkbox"/> Satisfied | | <input checked="" type="checkbox"/> Satisfied | | <input type="checkbox"/> Satisfied | |
| (AH) _____ units* + (SE) 20 units* + (SS) _____ units* = 20 Total of 52 units required <input type="checkbox"/> Satisfied | | | | | |
| *Minimum of 12 units is required per Topical Breadth area and Maximum 20 units allowed per area | | | | | |
| CORE LITERACIES | | | | | |
| I. Literacy With Words and Images (20 units) | | II. Civic and Cultural Literacy (9 units)* | | III. Quantitative Literacy (3 units) * IV. Scientific Literacy (3 units)* | |
| a. College English Composition Requirement ¹ : | | a. American Cultures, Governance and History (ACGH): | | Quantitative Literacy (QL) * Scientific Literacy (SL) * | |
| | | | | | |
| 6 units, or equivalent | | 3 units | | 3 units | |
| 0 | | 0 | | 4 | |
| <input type="checkbox"/> Satisfied | | <input type="checkbox"/> Satisfied | | <input checked="" type="checkbox"/> Satisfied | |
| b. Writing Experience and Oral Literacy | | b. Domestic Diversity (DD) *: | | Notes: | |
| 1. Writing Experience (WE) ² *: | | | | | |
| | | | | | |
| 6 units | | 3 units | | | |
| 0 | | 0 | | | |
| <input type="checkbox"/> Satisfied | | <input type="checkbox"/> Satisfied | | | |
| 2. Oral Literacy (OL) or additional Writing Experience (WE) *: | | c. World Cultures (WC) *: | | | |
| | | | | | |
| 3 units | | 3 units | | | |
| 0 | | 0 | | | |
| Total: 9 units | | Total: 9 units | | | |
| 0 | | 0 | | | |
| <input type="checkbox"/> Satisfied | | <input type="checkbox"/> Satisfied | | | |
| c. Visual Literacy (VL) *: | | | | | |
| STA 35B | | 4 | | | |
| 3 units | | 4 | | | |
| <input type="checkbox"/> Satisfied | | <input type="checkbox"/> Satisfied | | | |

¹Courses used to satisfy the English Composition Requirement may not be used to satisfy any other Topical Breadth or Core Literacy component

²The Entry Level Writing Requirement (ELWR) must be satisfied prior to the completion of this requirement.

*Requirement satisfied by certified completion of Intersegmental General Education Transfer Curriculum (IGETC).

GETTING INVOLVED

CLUBS TO JOIN

- Data Science Club
- Actuarial Science Club
- Moneyball Club
- & 800+ More!

RESEARCH

- Statistics students work with Statistics faculty as well as with faculty all over campus. Students working with Statistics faculty can get academic credit (DSC/STA 199) for their research to replace a major requirement.

STAYING INFORMED

- **Read the Statistics Newsletter!**
 - You will be automatically enrolled in the Statistics Newsletter. Get updates on department events, internships, and other important announcements.

QUESTIONS?

DATA SCIENCE ADMISSION

DATA SCIENCE CAPPED ADMISSION PROCESS

The Data Science major will only be open to continuing students through a lottery. In order to be eligible for the lottery, you need to have completed the following courses and received a minimum **3.2 GPA** in the entire group of courses. All courses must also be taken for a letter grade with **no grade less than a C**.

- **ECS 32A/B**
- **MAT 21A/B/C**
- **MAT 22A**
- **STA 13 or STA 32 or STA 35A or STA 100**

Since admission into Data Science is not guaranteed, we strongly recommend having a backup plan. University requirements also state that all students considering switching their major must have completed at least one quarter at UC Davis, as well as be in good academic standing.

CAREER OPPORTUNITIES

FUTURE CAREERS

Statistics students work in diverse roles in academics, government, and industry.

Sample Employers

- Facebook
- Nielsen
- Public Policy Institute of California
- Blizzard Entertainment
- Google
- Kaiser Permanente
- Survey Monkey
- Wells Fargo

Career Possibilities

- Statistician/Biostatistician in government and industry
- Data Scientist
- Researcher
- Business Analyst
- Actuarial Analyst
- Statistical Consultant for business and industries
- College/University Faculty

GRADUATE SCHOOL

GRADUATE SCHOOL OPTIONS

- Statistics students attend a wide variety of degree programs after graduation. It is important to research the various degree programs that interest you as they may require additional prerequisites beyond your major requirements.
 - **Examples:**
 - Statistics
 - Biostatistics
 - Data Science
 - Machine Learning
 - Quantitative Finance
 - Business Analytics
 - Epidemiology and Public Health Sciences
 - Economics
- **Graduate School Resources**
 - Pre-Grad Advising Office: Offers workshops, advising, information sessions and more!
 - Statistics Faculty Advisor: If you are interested in a graduate program related to Statistics, you can meet with our faculty advisor to discuss your plans, get course recommendations, etc.

STATISTICS MAJOR DETAILS

APPLIED

Emphasizes statistical applications. AB or BS options.

FEATURES

- core statistics courses
- statistics electives
- electives in area of emphasis

UNITS

AB: 65-71
BS: 75-83

GENERAL

Emphasizes statistical theory.

FEATURES

- core statistics courses
- advanced math courses
- statistics electives

UNITS

82-84

STATISTICAL DATA SCIENCE

Emphasizes data handling skills.

FEATURES

- core courses
- specialized data science courses
- electives in Stats, Math, and Computer Science

UNITS

79

COMPUTATIONAL

Emphasizes computing.

FEATURES

- core statistics and computer science courses
- electives in Stats, Math, and Computer Science

UNITS

79-80

MACHINE LEARNING

Emphasizes statistical learning methods.

FEATURES

- core courses
- specialized machine learning courses
- electives in Stats, Math, and ECS

UNITS

79

Additional details can be found on the [Statistics Website](#) and Undergraduate Manual.

TYPICAL SCHEDULES

STATISTICS (ALL TRACKS)

1. MAT 21A CALCULUS
 2. ELWR OR COMPOSITION
COURSE
 3. GE COURSE OR ECS 32A/36A
 4. GE COURSE/SEMINAR
- TOTAL UNITS: 12-16

DATA SCIENCE

1. MAT 21A CALCULUS
 2. STA 35A DATA SCIENCE I
 3. ELWR OR COMPOSITION
COURSE
 4. GE COURSE/SEMINAR
- TOTAL UNITS: 12-16

REMINDERS

- Continue to use the Aggie Advising Canvas Modules to review recommendations and requirements.
- We recommend 3-4 courses (12-16 units) in your first quarter. (12 units = full time status)
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ONLINE RESOURCE LINKS

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 - sisweb.ucdavis.edu
- **First Year Seminars**
 - fys.ucdavis.edu
- **First Year Aggie Connections**
 - aggieconnect.ucdavis.edu

SCHEDULING MATHEMATICS

RECOMMENDATIONS

- All students should take a MAT course in their first quarter. Most will take MAT 21A, but some may need to take pre-calculus or algebra before taking MAT 21A based on their placement exam scores.
- There are three calculus series offered at UC Davis (MAT 21, MAT 17, MAT 16), but all Statistics and Data Science majors should take the **MAT 21 series**.
 - The Applied Tracks in Statistics technically allow students to take the MAT 16 or 17 series, but the MAT 21 series is strongly recommended. The MAT 21 series prepares students better for their future mathematical statistics classes.

MATH PLACEMENT EXAM

Required for ALL students who will take Pre-Calculus and/or the first quarter of Calculus at UC Davis:

➔ **MAT 12, 16A, 17A, 21A, 21M**

| COURSE | TOTAL SCORE | WITH | TRIG SUB-SCORE |
|----------|-------------|------|----------------|
| MAT 12 | 25 or more | | |
| MAT 16A | 30 or more | with | 2 or more |
| MAT 17A | 30 or more | with | 2 or more |
| MAT 21A | 35 or more | with | 3 or more |
| MAT 21M* | 40 or more | with | 3 or more |

AP CREDIT

Mathematics-Calculus AB

~Score 4, 5

MAT 12, 16A, 17A, or 21A

Mathematics-Calculus BC

~Score 5

MAT 12, 16AB, 17AB, or 21AB

~Score 4, 3

MAT 12, 16A, 17A, or 21A

STATISTICS FOR STATISTICS

Statistics majors have the option to take STA 13 or STA 32 or STA 100 for their introductory statistics requirement. We strongly recommend taking STA 32 or STA 100. Most students take STA 32 and they take it in Spring quarter.

INTRODUCTORY STATISTICS COURSES

STA 13 Elementary Statistics

Designed for students who do not have a background in calculus and who will not be taking any further advanced statistics coursework.

Prerequisites: high school algebra

STA 32 Gateway to Statistical Data Science

Designed for students who have a background in calculus and who plan to take higher level statistics coursework. In addition to covering the fundamentals of statistics, this course also has a programming component. Most higher level STA courses require the statistical programming techniques emphasized in this course.

Prerequisites: MAT 16B or 17B or 21B

STA 100 Applied Statistics for Biological Sciences

Designed for students in the biological sciences. This is an alternative option for statistics majors with an interest in the biological sciences.

Prerequisites: MAT 16B or 17B or 21B

RECOMMENDATIONS

- You **should not** take an introductory statistics course in your first quarter!
- STA 32 or STA 100 is strongly recommended for Statistics majors
- Even if you have AP credit for STA 13, you are still recommended to take STA 32.

AP CREDIT
Statistics
~Score 4, 5
STA 13

SCHEDULING COMPUTER SCIENCE

RECOMMENDATIONS

- Most students do not take a computer science course in their first quarter.
- All Statistics major tracks require at least one introductory computer science course (ECS 32A or ECS 36A) . More courses may be required and/or recommended depending on the major track you choose. Data Science majors require ECS 32A, ECS 32B, and ECS 17.

ECS 32A vs. ECS 36A

ECS 32A Introduction to Programming

Recommended! Designed for non-computer science majors. Covers the fundamentals of programming and problem solving in Python.

ECS 36A Programming and Problem Solving

Designed for computer science majors and for students with some background in programming. Requires a placement exam. Non-computer science majors cannot enroll until Pass 2 registration.

AP CREDIT
Comp Sci A
~Score 3, 4, 5
ECS 32A

SCHEDULING REVIEW

STATISTICS (ALL TRACKS)

01

Take MAT 21A

02

Do not take a STA course!

03

Take *at least* 12 units.

SAMPLE SCHEDULE

1. MAT 21A CALCULUS
2. ELWR OR COMPOSITION COURSE
3. GE COURSE OR ECS 32A/36A
4. GE COURSE/SEMINAR

TOTAL UNITS: 12-16

DATA SCIENCE

01

Take MAT 21A

02

Take STA 35A

03

Take *at least* 12 units.

SAMPLE SCHEDULE

1. MAT 21A CALCULUS
2. STA 35A DATA SCIENCE I
3. ELWR OR COMPOSITION COURSE
4. GE COURSE/SEMINAR

TOTAL UNITS: 12-16