To be adopted:

Proposed changes in the core requirements for Bachelor of Science and Bachelor of Arts in Statistics including the Statistical Computing and Quantitative Management Options.

| **PRESENT:** | **PROPOSED:** |
|---|---|
| **Major** | **Major** |
| The Department of Statistics is concerned with teaching, research, and statistical consulting. The courses offered present a comprehensive spectrum of statistical and probability theory, in so far as such theory is necessary for the understanding and analysis of observational data. The applications of the theory delineated in the courses may be made in any field of experience. Laboratory classes in which examples related to the student's actual field of interest are worked out, play an essential part. The department offers both B.A. and B.S. degrees in Statistics as well as a B.S. in Statistics with options in Statistical Computing and Quantitative Management; the M.S. degree in Statistics; and the Ph.D. degree in Applied Statistics. | (No Change) |

The courses STAT 040, STAT 048, STAT 100A, STAT 100B, STAT 104/BUS 104, STAT 110, STAT 130, STAT 140, STAT 146, and STAT 155 are intended for students of other departments who wish a knowledge of statistical techniques. Some of them may be taken as electives by statistics majors. The objective of these courses is to acquaint the student with the elements of statistics with only the necessary amount of mathematical training.

STAT 147 and STAT 157 are computer-oriented courses intended for students who would like to learn about computer programming in the most important languages and who would like to learn about statistical computing.

**Transfer Students** Students transferring to the Statistics major must complete courses comparable to the following one-year sequence before they transfer:

1. First-year calculus, equivalent to MATH 009A, MATH 009B, MATH 009C, each course completed with a grade of "B-" or better.

**Computing Laboratories**
The department has two large undergraduate Windows-based teaching laboratories. These laboratories provide users access to a wide variety of statistical software packages including SAS, R, Minitab, and SPSS, and other popular software packages including Mathematica, Adobe Acrobat, and Microsoft Office. The department also houses the Garber Research Computing Laboratory, which is a combination of a UNIX/LINUX-based system with multiple workstations and several Windows-based machines. ~~The department recently added a Windows-based simulations laboratory in Summer 2014.~~

**Statistical Consulting Center**

The Statistical Consulting Collaboratory provides a broad range of analytical and statistical support services, including design of experiments, statistical inference, hypothesis testing, and data modeling for the campus community, and promotes cooperative research between statisticians and other investigators in all fields of the application of statistics. The Collaboratory is staffed by:

~~**Daniel R. Jeske, Ph.D., Faculty Director Karen Huaying Xu, Ph.D., Associate Director**~~

~~and rotating graduate students.~~

**Change of Major Criteria**

All courses taken to fulfill major requirements must be completed with grades of "C-" or better after repeats.

**Transfer Students** Students transferring to the Statistics major must complete courses comparable to the following one-year sequence before they transfer:

1. First-year calculus, equivalent to <u>MATH 007A or</u> MATH 009A <u>or MATH 09HA</u>, <u>MATH 007B or</u> MATH 009B <u>or MATH 09HB</u>, MATH 009C <u>or MATH 09HC</u>, each course completed with a grade of "B-" or better.

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The department has two large undergraduate Windows-based teaching laboratories. These laboratories provide users access to a wide variety of statistical software packages including SAS, R, Minitab, and SPSS, and other popular software packages including Mathematica, Adobe Acrobat, and Microsoft Office. The department also houses the Garber Research Computing Laboratory, which is a combination of a UNIX/LINUX-based system with multiple workstations and several Windows-based machines.

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**Change of Major Criteria**

All courses taken to fulfill major requirements must be completed with grades of "C-" or better after repeats.

<table>
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**Freshman (0-44.9 units earned)**

Completion of the following with grade of "C-" or better and must be in good academic standing. (2.0 quarter and cumulative GPA)

~~MATH 008B or~~ MATH 009A, MATH 009B

**Sophomores (45-89.9 earned units)**

Completion of the following with grade of "C-" or better and must be in good academic standing. (2.0 quarter and cumulative GPA)

~~MATH 008B or~~ MATH 009A, MATH 009B, MATH 009C

4 (four) additional units of college-level Mathematics or Statistics (STAT 100A recommended)

**Juniors (90-134.9 earned units)**

Completion of the following with grade of "C-" or better and must be in good academic standing. (2.0 quarter and cumulative GPA)

~~MATH 008B or~~ MATH 009A, MATH 009B, MATH 009C

12 (twelve) additional units of college level Mathematics or Statistics (MATH 031, STAT 100A and STAT 147 recommended)

**Seniors (135 or more earned units)**

Completion of the following with grade of "C-" or better and must be in good academic standing. (2.0 quarter and cumulative GPA)

~~MATH 008B or~~ MATH 009A, MATH 009B, MATH 009C, MATH 031, STAT 100A (or equivalent), STAT 100B (or equivalent), STAT 147, STAT 157

Major change requests are reviewed during the 2nd, 3rd, 4th & 10th weeks of each quarter.

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**Freshman (0-44.9 units earned)**

Completion of the following with grade of "C-" or better and must be in good academic standing. (2.0 quarter and cumulative GPA)

<u>MATH 007A or</u> MATH 009A <u>or MATH 09HA</u>, <u>MATH 007B or</u> MATH 009B <u>or MATH 09HB</u>

**Sophomores (45-89.9 earned units)**

Completion of the following with grade of "C-" or better and must be in good academic standing. (2.0 quarter and cumulative GPA)

<u>MATH 007A or</u> MATH 009A <u>or MATH 09HA</u>, <u>MATH 007B or</u> MATH 009B <u>or MATH 09HB</u>, MATH 009C <u>or MATH 09HC</u>

4 (four) additional units of college-level Mathematics or Statistics (STAT 100A recommended)

**Juniors (90-134.9 earned units)**

Completion of the following with grade of "C-" or better and must be in good academic standing. (2.0 quarter and cumulative GPA)

<u>MATH 007A or</u> MATH 009A <u>or MATH 09HA</u>, <u>MATH 007B or</u> MATH 009B <u>or MATH 09HB</u>, MATH 009C <u>or MATH 09HC</u>

12 (twelve) additional units of college level Mathematics or Statistics (MATH 031, STAT 100A and STAT 147 recommended)

**Seniors (135 or more earned units)**

Completion of the following with grade of "C-" or better and must be in good academic standing. (2.0 quarter and cumulative GPA)

<u>MATH 007A or</u> MATH 009A <u>or MATH 09HA</u>, <u>MATH 007B or</u> MATH 009B <u>or MATH 09HB</u>, MATH 009C <u>or MATH 09HC</u>, MATH 031, STAT 100A (or equivalent), STAT 100B (or equivalent), STAT 147, STAT 157

Major change requests are reviewed during the 2nd, 3rd, 4th & 10th weeks of each quarter.

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**Transfer Selection Criteria**

Applicants to majors in the College of Natural and Agricultural Sciences are selected on the basis of academic preparation, as assessed by their GPA and the strength of preparation for the intended major. A GPA of at least 2.70 is required. (This is a baseline GPA for consideration and not a guarantee of admission.)

In addition, applicants will need to complete college courses comparable to at least two of the following UCR year-long sequences in order to meet selection criteria for this major. Courses must be completed with "C" grades or better:

MATH 009A, MATH 009B, and MATH 009C (mandatory). A grade of "B-" or better is required in this series.

And at least one sequence from:

1. BIOL 005A/BIOL 05LA and BIOL 005B (and BIOL 005C, if articulated)

2. CHEM 001A, CHEM 01LA, CHEM 001B, CHEM 01LB, CHEM 001C, and CHEM 01LC

3. Organic chemistry (one-year lower-division), each course completed with a grade of "B" or better

4. PHYS 002A, PHYS 02LA, PHYS 002B, PHYS 02LB PHYS 002C, and PHYS 02LC

5. PHYS 040A, PHYS 040B, and PHYS 040C

6. MATH 010A and MATH 010B, or one course in linear algebra.

Courses must be completed with a letter grade, with no grade lower than a "C." Students should visit **assist.org** for updated and comprehensive major preparation requirements.

**University Requirements**

See Undergraduate Studies section.

(No change)

**College Requirements**

**College Requirements**

See College of Natural and Agricultural Sciences, Colleges and Programs section.

(No Change)

Some of the following requirements for the major may also fulfill some of the college's breadth requirements. Consult with a department advisor for course planning.

**Major Requirements**

**Major Requirements**

The department offers both a B.A. and a B.S. degree in Statistics as well as a B.S. in Statistics with options in Statistical Computing and Quantitative Management.

The department offers both a B.A. and a B.S. degree in Statistics as well as a B.S. in Statistics with options in Statistical Computing and Quantitative Management.

The major requirements for the B.A. and the B.S. degrees in Statistics are as follows:

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**For the Bachelor of Arts**

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1. Core requirements (24–25 units)

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a) CS 010, MATH 009A, MATH 009B, MATH 009C, MATH 010A

a) CS 010, <u>MATH 007A</u> or MATH 009A <u>or MATH 09HA</u>, <u>MATH 007B or</u> MATH 009B <u>or MATH 09HB</u>, MATH 009C <u>or MATH 09HC</u>, MATH 010A

b) MATH 031

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2. Upper-division requirements

2. Upper-division requirements

a) Thirty-six (36) units of upper-division course work

a) Thirty-six (36) units of upper-division course work <u>to include thirty-two units in (1) and four units in (2)</u>

(1) STAT 147, STAT 157, STAT 160A, STAT 160B, STAT 160C, STAT 170A, STAT 170B, STAT 171

(1) STAT 147, STAT 157, STAT 160A, STAT 160B, STAT 160C, STAT 170A, STAT 170B, STAT 171

(2) Four (4) units of STAT 183 taken during senior year

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**Note** An introductory Statistics class such as STAT 048 or STAT 100A is strongly recommended.

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**For the Bachelor of Science**

1. Core requirements (24–25 units)

   a) CS 010, MATH 009A, MATH 009B, MATH 009C, MATH 010A

   b) MATH 031

2. Upper-division requirements (52 units)

   a) Thirty-six (36) units of upper-division course work

   (1) STAT 147, STAT 157, STAT 160A, STAT 160B, STAT 160C, STAT 170A, STAT 170B, STAT 171

   (2) Four (4) units of STAT 183 taken during senior year

   b) Sixteen (16) units of additional course work chosen, with the approval of the major advisor from STAT/BUS 104, STAT 127/BUS 127, STAT 130, STAT 140, STAT 146, STAT 161, or from related fields.

**Note** An introductory Statistics class such as STAT 048 or STAT 100A is strongly recommended.

**Statistical Computing Option**

The requirements for this option are in addition to the requirements for the B.S. in Statistics, except that the option requirement takes the place of the 16 units in 2.b) above.

1. Lower-division requirements (8 units): CS 012, CS 014

2. Upper-division requirements (16 units)

   a) Sixteen (16) units of coursework selected from

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**For the Bachelor of Science**

1. Core requirements (24–25 units)

   a) CS 010, MATH 007A or MATH 009A, or MATH 09HA, MATH 007B or MATH 009B or MATH 09HB, MATH 009C or MATH 09HC, MATH 010A

   b) MATH 031

2. Upper-division requirements (52 units)

   a) Thirty-six (36) units of upper-division course work to include thirty-two units in (1) and four units in (2)

   (1) STAT 147, STAT 157, STAT 160A, STAT 160B, STAT 160C, STAT 170A, STAT 170B, STAT 171

   (2) Four (4) units of STAT 183 taken during senior year

   b) Sixteen (16) units of additional course work chosen from STAT 110, STAT 127/BUS 127, STAT 130, STAT 140, STAT 146, STAT 161, STAT 167 or from related fields with the approval of the major advisor.

**Note** An introductory Statistics class such as STAT 048 or STAT 100A is strongly recommended.

**Statistical Computing Option**

The requirements for this option are in addition to the requirements for the B.S. in Statistics, except that the option requirement takes the place of the 16 units in 2.b) above.

1. Lower-division requirements (8 units): CS 012, CS 014

2. Upper-division requirements (16 units)

   a) STAT 167

   b) Twelve (12) units of coursework selected from

(1) CS 141, CS 177

(2) MATH 120, MATH 135A, MATH 135B

**Quantitative Management Option**

The requirements for this option are in addition to the requirements for the B.S. in Statistics, except that the option requirement takes the place of the 16 units in 2.b) above.

1. Lower-division requirements (18 units)

   a) ECON 002, ECON 003

   b) BUS 010, BUS 020

2. Upper-division requirements (16 units)

   a) ~~Three courses from one area and four (4) additional units from one other area~~

   ~~(1) Marketing: BUS 103, BUS 113, BUS 117~~

   ~~(2) Finance: BUS 106/ECON 134, BUS 134, BUS 135, BUS 136, BUS 138~~

   ~~(3) Accounting: BUS 108, BUS 165A, BUS 165B, BUS 168A, BUS 168B~~

   ~~(4) Management Information Systems: BUS 101, BUS 171, BUS 173~~

**Quantitative Management Option**

The requirements for this option are in addition to the requirements for the B.S. in Statistics, except that the option requirement takes the place of the 16 units in 2.b) above.

1. Lower-division requirements (18 units)

   a) ECON 002, ECON 003 or ECON 03H

   b) BUS 010, BUS 020; BUS 020, BUS 021 for those who choose area (3) Accounting under below 2 b).

2. Upper-division requirements (16 units)

   a) BUS/STAT 104

   b) Three courses from one area:

   (1) Marketing: BUS 103 and two other courses from BUS 111, BUS 112, BUS 114, BUS 115, BUS 116, BUS 117, BUS 118, BUS 119

   (2) Finance: BUS 106 and two other courses from BUS 138, BUS 139, BUS 140

   (3) Accounting: BUS 108, BUS 165A, BUS 165B, BUS 168A, BUS 168B, BUS 169A

   (4) Management: BUS 143, BUS 144, BUS 145, BUS 149, BUS 150

   (5) Information Systems: BUS 101 and two other courses from BUS 171, BUS 173, BUS 174, BUS 175

   (6) Operations & Supply Chain Management: BUS 122, BUS 123, BUS 124, BUS 125, BUS 126, BUS

**Justification:**

There are a few editorial changes to include previously approved equivalent courses. Another change made for the Bachelor of Arts and the Bachelor of Science (see 2 a)) is to explain more clearly what the 36 units of upper-division course work are. The other change made for the Bachelor of Science (see 2 b)) is updating the list of upper-division courses the students can choose from to include all the upper-division courses currently being offered.

Another change made for the Bachelor of Science with Statistical Computing Option (see 2 a) and b)) is adding the new course STAT 167: Introduction to Data Science as a required course for this option, since it is important for the students who are interested in statistical computing to have some general knowledge of data science. The deletion of STAT 198-I is because it is difficult for faculty to evaluate the quality of internship the students find independently.

For the Bachelor of Science with Quantitative Management Option, students are required to take 6 courses from SoBA. However, the list of business courses students can choose from has not been updated for a long time. Every year students experience the following problems: (i) some of the business courses require some prerequisites students lack; (ii) some of the business courses impacted by SoBA students so that Statistics students cannot enroll; (iii) some of the students want to choose courses from Information Systems, Operation & Supply Chain Management; the two areas SoBA offers, but not on the Statistics list. To address the above problems, the Department of Statistics worked with the Assistant Dean Kazi Mamun of SoBA to create the updated list of business courses to give students more options.

**Approvals:**

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| Approved by the faculty of the Department of Statistics: | October 16, 2017 |
| Approved by the Executive Committee of the College of Natural and Agricultural Sciences: | January 9, 2018 |
| Reviewed by the Committee on Undergraduate Admissions: | April 10, 2018 |
| Approved by the Committee on Educational Policy: | May 7, 2018 |