THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

DEPARTMENT OF STATISTICS
AND OPERATIONS RESEARCH

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Dear Administrative Boards of the College:

We are writing to request a number of changes to be made in our undergraduate curriculum.

In the current curriculum one of the required courses for students who are majoring in Statistics and Analytics is STOR 455. We would like to make STOR 320 an alternative for STOR 455 and add both STOR 320 and STOR 455 as Group A electives. Specifically, according to our proposal, students will have to take either STOR 320 or STOR 455 to fulfill the curriculum requirement and students who choose to take STOR 320 will have the option to take STOR 455 as a Group A elective while students who take STOR 455 will have the option to take STOR 320 as a Group A elective. In accordance with this change, we also would like to add STOR 320 into the list of possible electives for students who are doing a minor in Statistics and Analytics.

Despite the fact that STOR 320 and STOR 455 cover completely different topics, they both build on STOR 155 and their main common objective is to ensure that students who major in Statistics and Analytics develop a sufficient level of maturity in data analysis. Note that STOR 320 is a new course which is being offered for the first time this semester (although the same course was offered under STOR 390 in the last academic year) and was specifically designed to fulfill an important gap in our curriculum and offer an alternative path to graduation for our students.

The requested changes are noted in the attached files on the requirements for a major and a minor in Statistics and Analytics. Please do not hesitate to contact us at budhiraj@email.unc.edu or ziya@email.unc.edu if you have any questions or need additional information. Thank you for your attention to this matter.

Sincerely,

Amarjit Budhiraja

Chair,
Department of Stat. & O.R.

SerhanZiya

Director of Undergrad. Studies
Department of Stat. & O.R.

STATISTICS AND ANALYTICS MAJOR, B.S.

Contact Information

Department of Statistics and Operations Research
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ADD to Core Requirements:
STOR 320 Introduction to Data Science 3(credits) or STOR 455

Amarjit Budhi

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The major in statistics and analytics is an excellent program for students interested in statistical data science, operations research, and actuarial science, as well as in fields such as business, economics, public policy and health, psychology, and biomedicine where the decision and statistical sciences play an increasingly important role.

Department Programs

Major

- Statistics and Analytics Major, B.S. (p. 1)

Minor

- Statistics and Analytics Minor (http://catalog.unc.edu/undergraduate/programs-study/statistics-and-analytics-minor)

Graduate Programs

- M.S. in Statistics and Operations Research (http://catalog.unc.edu/graduate/schools-departments/statistics-operations-research)
- Ph.D. in Statistics and graduate/schools-dep

ADD to Group A:
STOR 320 Introduction to Data Science 3
STOR 455 Statistical Methods 1 3

Student Learning Outcomes

Upon completion of the statistics and analytics program, students should be able to:

- Demonstrate knowledge of the basic foundations of calculus, probability, statistics, and discrete mathematics
- Apply the analytical and computational skills needed to formulate and solve basic problems in the decision sciences
- Communicate the major ideas of the decision sciences, orally and in writing
- Find appropriate employment with academic institutions, government agencies, and industry, or continue their education in related graduate programs

Requirements

In addition to the program requirements listed below, students must

- attain a final cumulative GPA of at least 2.0
- complete a minimum of 45 academic credit hours earned from UNC–Chapel Hill courses
- take at least half of their major course requirements (courses and credit hours) at UNC–Chapel Hill
- earn a minimum of 18 hours of C or better in the major core requirements (some majors require 21 hours).

For more information, please consult the degree requirements section of the catalog (http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements/#degreerequirementstext).

Core Requirements		
MATH 547	Linear Algebra for Applications	3
STOR 415	Introduction to Optimization	3
STOR 435	Introduction to Probability	3
STOR 445	Stochastic Modeling	3
STOR 455	Statistical Methods I	3
Five courses from Group A and Group B, including at least three courses from Group A (see lists below)		15
Additional Requirements		
COMP 116	Introduction to Scientific Programming (COMP 110 may be substituted)	3
MATH 231	Calculus of Functions of One Variable I	4
MATH 232	Calculus of Functions of One Variable II	4
MATH 233	Calculus of Functions of Several Variables [H]	4
STOR 155 & STOR 215 or MATH 381	Introduction to Data Models and Inference and Foundations of Decision Sciences Discrete Mathematics	6
Remaining General Education (http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements) courses and electives to reach 123 hours.		72
Total Hours		123

[H] Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

Group A

STOR 305	Decision Making Using Spreadsheet Models	3
STOR 465	Simulation for Analytics	3
STOR 471	Long-Term Actuarial Models	3
STOR 472	Short Term Actuarial Models	3
STOR 555	Mathematical Statistics	3
STOR 556	Advanced Methods of Data Analysis	3
STOR 565	Machine Learning	3

Group B

BIOS 511	Introduction to Statistical Computing and Data Management	4
BIOS 664	Sample Survey Methodology	4
BUSI 403	Operations Management	3
BUSI 408	Corporate Finance	3
BUSI 410	Business Analytics	3
BUSI 532	Service Operations [H]	3
BUSI 533	Supply Chain Management [H]	3
COMP 401	Foundation of Programming [H]	4
COMP 410	Data Structures	3
COMP 521	Files and Databases	3

ECON 410	Intermediate Theory: Price and Distribution [H]	3
ECON 420	Intermediate Theory: Money, Income, and Employment [H]	3
ECON 511	Game Theory in Economics [H]	3
INLS 523	Introduction to Database Concepts and Applications	3
MATH 383	First Course in Differential Equations [H]	3
MATH 521	Advanced Calculus I [H]	3
MATH 522	Advanced Calculus II [H]	3
MATH 523	Functions of a Complex Variable with Applications	3
MATH 524	Elementary Differential Equations	3
MATH 548	Combinatorial Mathematics	3
MATH 566	Introduction to Numerical Analysis	3

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

Statistics and analytics majors must complete 123 academic hours. They also must attain at least a grade of C (not C-) in 18 hours of the courses listed under Core Requirements.

ADD to Group A
STOR 320 Introduction to Data Science 3
STOR 455 Statistical Methods 1 3

Sample Plan of St

Sample plans can be used as a to complete the major and other requirements needed for degree completion within the expected eight semesters. The actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Students should meet with their academic advisor to create a degree plan that is specific and unique to their interests. The sample plans represented in this catalog are intended for first-year students entering UNC–Chapel Hill in the fall term. Some courses may not be offered every term.

In the first two years, students are required to complete the standard calculus sequence as well as introductory courses in statistics, operations research, and computer science. At the beginning of their third year, students take advanced courses in statistics, probability, and operations research. They have a great deal of flexibility in tailoring their program to meet their individual interests.

First and Second Years		
COMP 116	Introduction to Scientific Programming (COMP 110 may be substituted)	3
MATH 231	Calculus of Functions of One Variable I	4
MATH 232	Calculus of Functions of One Variable II	4
MATH 233	Calculus of Functions of Several Variables [H]	4
STOR 155	Introduction to Data Models and Inference [1]	3
STOR 215	Foundations of Decision Sciences [1]	3
or MATH 381	Discrete Mathematics	
Third and Fourth Years		
MATH 547	Linear Algebra for Applications	3
	duction to Optimization	3
	duction to Probability	3
STOR 445	Stochastic Modeling	3
STOR 455	Statistical Methods I	3

ADD to Third and Forth Years:
STOR 320 Introduction to Data Science or STOR 455 3

Five courses from the following two groups of courses, including at least three from Group A [2]	15
Total Hours	51

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

1 Prospective statistics and analytics majors are encouraged to take STOR 155, and STOR 215 or MATH 381 as early as possible in their college careers. Each has a prerequisite of MATH 110 or its equivalent and may be taken before, or concurrently with, MATH 231.

2 Students wishing to prepare for an actuarial career should include STOR 471, STOR 472, STOR 555 and STOR 556 from Group A in their program and take ECON 410 and ECON 420 and BUSI 408 and BUSI 588 as electives. Students who plan to attend graduate school in statistics, operations research, analytics, or a related field, should include in their program COMP 401, STOR 555, STOR 565, and MATH 521.

Group A

STOR 305	Decision Making Using Spreadsheet Models	3
STOR 465	Simulation for Analytics	3
STOR 471	Long-Term Actuarial Models	3
STOR 472	Short Term Actuarial Models	3
STOR 555	Mathematical Statistics	3
STOR 556	Advanced Methods of Data Analysis	3
STOR 565	Machine Learning	3

Group B

BIOS 511	Introduction to Statistical Computing and Data Management	4
BIOS 664	Sample Survey Methodology	4
BUSI 403	Operations Management	3
BUSI 408	Corporate Finance	3
BUSI 410	Business Analytics	3
BUSI 532	Service Operations [H]	3
BUSI 533	Supply Chain Management [H]	3
COMP 401	Foundation of Programming [H]	4
COMP 410	Data Structures	3
COMP 521	Files and Databases	3
ECON 410	Intermediate Theory: Price and Distribution [H]	3
ECON 420	Intermediate Theory: Money, Income, and Employment [H]	3
ECON 511	Game Theory in Economics [H]	3
INLS 523	Introduction to Database Concepts and Applications	3
MATH 383	First Course in Differential Equations [H]	3
MATH 521	Advanced Calculus I [H]	3
MATH 522	Advanced Calculus II [H]	3
MATH 523	Functions of a Complex Variable with Applications	3
MATH 524	Elementary Differential Equations	3
MATH 548	Combinatorial Mathematics	3
MATH 566	Introduction to Numerical Analysis	3

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

It is recommended that all statistics and analytics majors take ECON 101 as a social and behavioral sciences Approaches course. Students interested in the actuarial profession also should take BUSI 101 as a general elective.

Dual Bachelor's – Master's Degree Program

The Department of Statistics and Operations Research offers a dual bachelor's – master's degree program. Interested students should consult the graduate program director.

Special Opportunities in Statistics and Analytics

Honors in Statistics and Analytics

Candidates for honors or highest honors must secure approval from the program director. They must take STOR 691H and STOR 692H, and maintain an overall grade point average of 3.3 and a grade point average in statistics and analytics courses of at least 3.3 at the end of the semester preceding the semester in which they graduate.

Departmental Involvement

The Department of Statistics and Operations Research sponsors Carolina's Actuarial Student Organization (CASO), for students interested in careers in the actuarial sciences. CASO organizes study groups for the actuarial exams, sponsors talks by professional actuaries, keeps members aware of employment opportunities, and maintains contact with alumni and corporations in the field. The department is also a co-sponsor of Carolina Analytics and Data Science (CADS) student organization, which aims to foster communication among the students who are interested in careers in data science and analytics and contribute to their intellectual growth by hosting speakers from industry as well as academia.

Experiential Education

When arranged in advance with a supervising faculty member, STOR 493 can be used to earn credit for appropriate work experience in the summer or during the academic year. STOR 493 satisfies the experiential education requirement. Students interested in STOR 493 should secure approval from the program director before starting their work. STOR 496 can also be used to satisfy the experiential education requirement.

Undergraduate Awards

Two undergraduate awards for graduating seniors are given each year by the statistics and analytics program. One is the Statistics and Analytics Award, given to the outstanding graduating senior, and the second is the W. Robert Mann Award, given for excellence in actuarial science. Plaques bearing the names of winners are located in the undergraduate study room in Hanes Hall.

Undergraduate Research

Undergraduate research under the direction of faculty members from the Department of Statistics and Operations Research is offered through the independent study and research course, STOR 496, and the senior honors thesis courses, STOR 691H and STOR 692H.

STATISTICS AND ANALYTICS MINOR

Contact Information

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Department Programs

Major

- Statistics and Analytics Major, B.S. (http://catalog.unc.edu/undergraduate/programs-study/statistics-analytics-majors-bs)

Minor

- Statistics and Analytics Minor (p. 1)

Graduate Programs

- M.S. in Statistics and Operations Research (http://catalog.unc.edu/graduate/schools-departments/statistics-operations-research)
- Ph.D. in Statistics and Operations Research (http://catalog.unc.edu/graduate/schools-departments/statistics-operations-research)

In addition to the program requirements listed below, students must:

- take at least nine hours of their minor course requirements at UNC–Chapel Hill
- earn a minimum of 12 hours of C or better in the minor (some minors require more)

For more information, please consult the degree requirements section of the catalog (http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements/#degreerequirementstext).

Core Requirements

STOR 155	Introduction to Data Models and Inference	3
STOR 215	Foundations of Decision Sciences	3
or MATH 381	Discrete Mathematics	
Three courses from among:		9
STOR 305	dels	
STOR 415		
STOR 435	Introduction to Probability	
STOR 445	Stochastic Modeling	
STOR 455	Statistical Methods I	
STOR 465	Simulation for Analytics	
STOR 471	Long-Term Actuarial Models	
STOR 472	Short Term Actuarial Models	
STOR 555	Mathematical Statistics	
STOR 556	Advanced Methods of Data Analysis	
STOR 565	Machine Learning	
Total Hours		15

ADD to Three courses from among:
STOR 320 Introduction to Data Science

See the program page here (http://catalog.unc.edu/undergraduate/programs-study/mathematical-decision-sciences-major-bs/#opportunitiestext) for special opportunities.

CHANGE mathematical-decision-sciences to statistics-and-analytics