

# School of Arts and Sciences

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The School of Arts and Sciences offers programs leading to the Bachelor of Arts degree, the Bachelor of Science degree, and the bachelor of fine arts degree. These programs are designed to provide a broad liberal education; the subject matter background for specific careers, including teaching; and the preparation for graduate work in a number of academic fields and professions, including law and medicine.

The programs in the School of Arts and Sciences include the fine arts, the humanities, mathematics, computer science, the natural sciences and the behavioral and social sciences. Some programs are designated “certifiable for teaching.” These programs all have additional requirements which are found in the catalog descriptions listed under the School of Education and Professional Studies.

When planning for majors and minors, students must consult with department chairs or program directors and be assigned a faculty advisor.

## MATHEMATICAL SCIENCES

### Faculty

J. McGowan, (*Chair*); F. Bensics, R. Bilisoly, N. Castaneda, Y. Chen, R. Crouse, D. Dzuida, I. Gotchev, S. L. Gould, P. Halloran, C. Jin (*Asst. Chair*), S. Jones, R. S. Kalder (*Asst. Chair*), D. T. Larose, F. Latour, S. Lesik, E. Makover, A. Miller, D. S. Miller, M. Mitchell, O. Perdomo, L. Recoder-Núñez, T. Roman, K. Saha, R. Schwell, R. Vogeler, C. Waiveris  
(Dept. phone 832-2835)

### Department Overview

The Mathematical Sciences Department has full-time faculty members with expertise in mathematics, mathematics education, developmental mathematics, actuarial science, statistics, data mining, and mathematical physics. Our programs prepare students for teaching, business, industry, and research. In addition, we provide students in the schools of Technology, Business, and Educational and Professional Studies, as well as in other departments within the School of Arts and Sciences, with the mathematics and statistics courses needed for success in their field.

If you are thinking about majoring in mathematics you should be sure to take a mathematics course during your senior year in high school, preferably a course in pre-calculus or calculus. CCSU awards credit to students who take advanced placement examinations in calculus and/or statistics and earn a score of 3 or higher. (AB Calculus gives credit for MATH 152; BC Calculus

gives credit for MATH 152 and 221; Advanced Placement Statistics gives credit for STAT 104 or 215).

Undergraduate mathematics majors have numerous opportunities to become part of the CCSU mathematics community. Students are invited to the weekly colloquium series hold on Friday afternoons. There is an active mathematics club, which brings speakers to campus and conducts seminars on advanced topics. Every year CCSU students participate in the nation-wide Putnam competition. Finally, mathematics majors may work in the Learning Center as tutors, either for pay or as part of their coursework for the Bachelor of Science degree.

For more information, visit our website at [www.math.ccsu.edu](http://www.math.ccsu.edu).

## Programs --

### Major in Mathematics, BA (38 credits)

#### Core (32 credits):

MATH 152	Calculus I	4 credits
MATH 218	Discrete Mathematics	4 credits
MATH 221	Calculus II	4 credits
MATH 222	Calculus III	4 credits
MATH 228	Introduction to Linear Algebra	4 credits
MATH 366	Introduction to Abstract Algebra	4 credits
MATH 377	Introduction to Real Analysis	4 credits
MATH 450	Seminar in Proof	4 credits

#### and Directed Electives (6 credits) selected from:

MATH 250	Symbolic Computation	4 credits
MATH 300	Mathematics Internship	3 credits
MATH 355	Introduction to Differential Equations with Applications	4 credits
MATH 383	College Geometry	3 credits
MATH 398	Independent Study in Mathematics	1-3 credits
MATH 421	History of Mathematics	3 credits
MATH 440	Selected Topics in Mathematics	1-3 credits
MATH 455	Introduction to Partial Differential Equations with Applications	4 credits
MATH 468	Symbolic Logic	3 credits
MATH 469	Number Theory	3 credits
MATH 470	Mathematical Methods in Operations Research	3 credits
MATH 477	Numerical Analysis	3 credits
MATH 491	Advanced Calculus	3 credits
STAT 315	Mathematical Statistics I	3 credits
STAT 416	Mathematical Statistics II	3 credits
STAT 425	Loss and Frequency Distributions and Credibility Theory	3 credits
STAT 455	Experimental Design	3 credits
STAT 456	Fundamentals of SAS	3 credits
STAT 465	Nonparametric Statistics	3 credits
STAT 476	Topics in Statistics	3 credits
ACTL 335	Theory of Interest	3 credits
ACTL 465	Actuarial Models I	4 credits
ACTL 480	Topics in Actuarial Science	1-3 credits
ACTL 481	Review-SOA/CAS Course I	3 credits
ACTL 482	Review-SOA/CAS Course II	3 credits

In addition, two laboratory science courses are required.

A minor is *required* for this major.

Note: CS 151 is strongly recommended.

## Major in Mathematics with Specialization in Actuarial Science, BA (58 credits)

### Core (40 credits):

MATH 152	Calculus I	4 credits
MATH 218	Discrete Mathematics	4 credits
MATH 221	Calculus II	4 credits
MATH 222	Calculus III	4 credits
MATH 228	Introduction to Linear Algebra	4 credits
STAT 315	Mathematical Statistics I	3 credits
STAT 416	Mathematical Statistics II	3 credits
STAT 425	Loss and Frequency Distributions and Credibility Theory	3 credits
ACTL 335	Theory of Interest	3 credits
ACTL 465	Actuarial Models I	4 credits
ACTL 466	Actuarial Models II	4 credits

### and Directed Electives (18 credits, as approved by advisor):

#### 6-12 credits from the following:

ACTL 480	Topics in Actuarial Science	1-3 credits
ACTL 481	Review-SOA/CAS Course I	3 credits
ACTL 482	Review-SOA/CAS Course II	3 credits
MATH 300	Mathematics Internship	3 credits

#### AND

#### 6-12 credits from the following:

AC 211	Financial Accounting	3 credits
AC 212	Managerial Accounting	3 credits
CS 151	Computer Science I	3 credits
CS 152	Computer Science II	3 credits
CS 213	Applications of Computing I	3 credits
CS 473	Simulation Techniques	3 credits
ECON 460	Economic Forecasting	3 credits
FIN 295	Managerial Finance	3 credits
FIN 320	Financial Markets and Institutions	3 credits
FIN 410	Securities Analysis	3 credits
FIN 420	Bank Management	3 credits
LAW 250	Legal Environment of Business	3 credits
MGT 295	Fundamentals of Management and Organizational Behavior	3 credits

Note: ECON 200 and 201 are strongly recommended.

Note: No minor is required for students selecting this major.

## Major in Mathematics with Specialization in Statistics, BA (58 credits)

### Core (36 credits):

MATH 152	Calculus I	4 credits
MATH 218	Discrete Mathematics	4 credits
MATH 221	Calculus II	4 credits
MATH 222	Calculus III	4 credits
MATH 228	Introduction to Linear Algebra	4 credits
MATH 366 or MATH 377	Introduction to Abstract Algebra Introduction to Real Analysis	4 credits or 4 credits
STAT 215	Statistics for Behavioral Sciences I	3 credits
STAT 315	Mathematical Statistics I	3 credits
STAT 416	Mathematical Statistics II	3 credits

STAT 216	Statistics for Behavioral Sciences II	3 credits
or		or
STAT 453	Applied Statistical Inference	3 credits

**and Directed Electives (2 courses) selected from:**

STAT 425	Loss and Frequency Distributions and Credibility Theory	3 credits
STAT 455	Experimental Design	3 credits
STAT 456	Fundamentals of SAS	3 credits
STAT 465	Nonparametric Statistics	3 credits
STAT 476	Topics in Statistics	3 credits
ACTL 335	Theory of Interest	3 credits
ACTL 465	Actuarial Models I	4 credits
ACTL 466	Actuarial Models II	4 credits
ACTL 481	Review-SOA/CAS Course I	3 credits
MATH 470	Mathematical Methods in Operations Research	3 credits

**and 16 credits selected from the courses listed above or from the following:**

MATH 300	Mathematics Internship	3 credits
MATH 491	Advanced Calculus	3 credits
CS 151	Computer Science I (strongly recommended)	3 credits
CS 152	Computer Science II	3 credits
CS 253	Data and File Structures	3 credits
CS 473	Simulation Techniques	3 credits
BIO 405	Ecology	4 credits
ECON 460	Economic Forecasting	3 credits
ECON 485	Econometrics	3 credits
GEOG 476	Advanced Cartography	3 credits
PSY 222	Research Methods in Psychology II	4 credits
PSY 451	Psychological Evaluation	3 credits

Note: No minor is required for students choosing this major.

Note: CS 151 is strongly recommended.

## **Major in Mathematics, BS (Certifiable for secondary teaching, 48 credits)**

**Core (43 credits):**

MATH 120	Problem Solving I	1 credit
MATH 152	Calculus I	4 credits
MATH 211	Clinical Experience in Mathematics Education I	1 credit
MATH 218	Discrete Mathematics	4 credits
MATH 220	Problem Solving II	1 credit
MATH 221	Calculus II	4 credits
MATH 228	Introduction to Linear Algebra	4 credits
MATH 313	Number Systems from an Advanced Viewpoint	3 credits
MATH 320	Problem Solving III	1 credit
MATH 327	Curriculum & Technology in Secondary Mathematics I	3 credits
MATH 328	Curriculum & Technology in Secondary Mathematics II	3 credits
MATH 366	Introduction to Abstract Algebra	4 credits
MATH 377	Introduction to Real Analysis	4 credits
MATH 383	College Geometry	3 credits
STAT 314	Introductory Statistics for Secondary Teachers	3 credits

**and Directed Electives (5 credits) selected from:**

MATH 222	Calculus III	4 credits
MATH 250	Symbolic Computation	4 credits
MATH 311	Clinical Experience in Mathematics Education II	1 credit
MATH 344	Mathematics in Diverse Cultures	3 credits
MATH 355	Introduction to Differential Equations with Applications	4 credits
MATH 411	Clinical Experience in Mathematics Education III	1 credit
MATH 421	History of Mathematics	3 credits

MATH 440	Selected Topics in Mathematics	1-3 credits
MATH 465	Introduction to Fractal Geometry and Chaos	3 credits
MATH 468	Symbolic Logic	3 credits
MATH 469	Number Theory	3 credits
MATH 470	Mathematical Methods in Operations Research	3 credits
MATH 477	Numerical Analysis	3 credits
MATH 491	Advanced Calculus	3 credits
STAT 315	Mathematical Statistics I	3 credits
STAT 416	Mathematical Statistics II	3 credits
STAT 453	Applied Statistical Inference	3 credits
STAT 455	Experimental Design	3 credits
STAT 456	Fundamentals of SAS	3 credits
STAT 465	Nonparametric Statistics	3 credits

In addition, students are required to take either of the following two blocks:

**A chemistry block consisting of ALL of the following:**

CHEM 161	General Chemistry I	3 credits
CHEM 162	General Chemistry I Lab	1 credit
CHEM 163	General Chemistry II	3 credits
CHEM 164	General Chemistry II Lab	1 credit

or

**A physics block consisting of ALL of the following:**

PHYS 125	University Physics I	4 credits
PHYS 126	University Physics II	4 credits

**Lastly, 3 credits are required of all students to be selected from:**

CS 151	Computer Science I	3 credits
or		or
CS 213	Applications of Computing I	3 credits

**Upon acceptance into the professional program in teacher education, students are required to complete a 30-credit program consisting of:**

SPED 315	Introduction to Educating Learners with Exceptionalities	3 credits
EDTE 316	Principles of Learning (Sec/K-12)	4 credits
RDG 440	Literacy in Secondary School	3 credits
EDF 415	Educational Foundations	3 credits
EDSC 425	Principles of Secondary Education	3 credits
MATH 413	Teaching Mathematics in the Secondary School (taken concurrently with EDSC 425 and RDG 440)	4 credits
EDSC 435	Secondary Education Student Teaching	9 credits
MATH 426	Student Teaching Seminar (taken concurrently with EDSC 435)	1 credit

No minor is required for students with this major.

## **Major in Mathematics, BS (Certifiable for elementary teaching, 33 credits)**

**Core (21-22 credits):**

MATH 113	Structures of Mathematics I: Number Systems	3 credits
MATH 213	Structures of Mathematics II: Probability & Geometry	3 credits
MATH 305	Structures of Mathematics III: Number Patterns	3 credits
MATH 306	Structures of Mathematics IV: Development of Geometric Ideas	3 credits
MATH 409	Mathematics through Computers	3 credits
STAT 215	Statistics for Behavioral Sciences	3 credits

MATH 125	Applied Calculus	3 credits
or		or
MATH 152	Calculus I	4 credits

**and Directed Electives (11-12 credits) selected from:**

MATH 110	Finite Mathematics	3 credits
MATH 115	Trigonometry	3 credits
MATH 116	Pre-Calculus Mathematics (formerly MATH 121)	3 credits
MATH 119	Pre-Calculus with Trigonometry	4 credits
MATH 120	Problem Solving I	1 credit
MATH 211	Clinical Experience in Mathematics Education I	1 credit
MATH 218	Discrete Mathematics	4 credits
MATH 221	Calculus II	4 credits
MATH 307	Topics in Elementary Mathematics	1-3 credits
MATH 344	Mathematics in Diverse Cultures	3 credits
STAT 216	Statistics for Behavioral Sciences II	3 credits

Note: Please consult with the School of Education and Professional Studies concerning additional requirements for dual subject programs and interdisciplinary majors.

**Minor in Mathematics (For students completing secondary certificates, 19 credits)**

MATH 152	Calculus I	4 credits
MATH 218	Discrete Mathematics	4 credits
MATH 221	Calculus II	4 credits
STAT 314	Introductory Statistics for Secondary Teachers	3 credits
MATH 228	Introduction to Linear Algebra	4 credits
or		or
MATH 366	Introduction to Abstract Algebra	4 credits

Note: For certification in mathematics as a second teaching field, the State of Connecticut requires a minimum of 30 credits in mathematics and an acceptable score on the Praxis II examination.

**Minor in Mathematics (Non-teaching, 20 credits)**

MATH 152	Calculus I	4 credits
MATH 221	Calculus II	4 credits
MATH 222	Calculus III	4 credits

**and 2 courses selected from:**

MATH 218	Discrete Mathematics	4 credits
MATH 226	Linear Algebra and Probability for Engineers	4 credits
MATH 228	Introduction to Linear Algebra	4 credits
MATH 250	Symbolic Computation	4 credits
MATH 355	Introduction to Differential Equations with Applications	4 credits
MATH 366	Introduction to Abstract Algebra	4 credits
MATH 377	Introduction to Real Analysis	4 credits

**Minor in Statistics (21 credits)**

STAT 215	Statistics for Behavioral Sciences I	3 credits
STAT 216	Statistics for Behavioral Sciences II	3 credits
CS 151	Computer Science I	3 credits

**and 9 credits selected from:**

MATH 110	Finite Mathematics	3 credits
MATH 470	Mathematical Methods in Operations Research	3 credits
STAT 455	Experimental Design	3 credits
STAT 456	Fundamentals of SAS	3 credits
STAT 465	Nonparametric Statistics	3 credits
STAT 476	Topics in Statistics	3 credits

**and one course selected from the courses listed above or from:**

CS 473	Simulation Techniques	3 credits
BIO 405	Ecology	4 credits
ECON 460	Economic Forecasting	3 credits
ECON 485	Econometrics	3 credits
GEOG 476	Advanced Cartography	3 credits
PSY 222	Research Methods in Psychology II	4 credits
PSY 451	Psychological Evaluation	3 credits

Note: No more than one course may be used in both the student's major and the minor in statistics.