School of Arts and Sciences

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The School of Arts and Sciences offers the M.A. degree in biological sciences, English, history, information design, mathematics, modern language, public history, and psychology and the M.S. in biological sciences, communication, computer information technology: computer science, criminal justice, data mining, geography, international studies, and natural sciences.

Many academic departments within the School of Arts and Sciences provide the major for the post-baccalaureate certification program for secondary school teachers.

Currently, two graduate-level Official Certification Programs are offered through the School of Arts and Sciences: the Post-Baccalaureate Certificate in Data Mining and the Post-Baccalaureate Certificate in Public Relations/Promotions. The School also contributes to the interdisciplinary Post-Baccalaureate Certificate in Pre-Health Studies.

A limited number of graduate assistantships are available in each department offering a master's degree program. Students seeking information about assistantships or program requirements should contact the academic department directly. For general information, students may call the Office of the Dean of Arts and Sciences (832-2600), located in DiLoreto 112 or the School of Graduate Studies Office (832-2363), located in Barnard Hall.

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 Department of Mathematical Sciences offers programs leading to the Master of Science and Master of Arts degrees. Master of Arts candidates may specialize in mathematics, computer science, statistics, or actuarial mathematics. Master of Science candidates may pursue a program for certified elementary or secondary school teachers or enroll in the data mining program. Students may also enroll in a program leading to certification to teach mathematics at the secondary level.

The department's newest program is a Sixth-Year Certificate Program in Mathematics Education Leadership, focusing on mathematics teachers in grades K-12 who want to become education leaders within their schools and districts. Contact Dr. Paulette Lemma, Dean of Graduate Studies, at Lemma@ccsu.edu for more information.

The Department of Mathematical Sciences may, at its discretion, admit an applicant with a GPA between 2.40 and 2.70 on an unconditional basis provided that the prospective student has both sufficient undergraduate course work and standardized test scores that meet any of the following standards:

- GRE (math subject area): 600 (45th percentile)
- GRE (general test quantitative reasoning): 720 (80th percentile)
- GMAT (quantitative): 50 (95th percentile)

Programs --

M.A. Program in Mathematics—General

Program Rationale:

The Master of Arts in Mathematics – General provides an abstract introduction to mathematics at an advanced level. This program is suitable for students wishing to improve their mathematics backgrounds before applying to doctoral programs, for candidates interested in teaching at the community-college level, and for high school teachers looking both to broaden and deepen their understanding so as to advance their teaching.

Program Learning Outcomes:

Students in this program will be expected to:

- deeply understand analytic arguments, using such common notions as epsilon/delta, infinite sums, and limits, as well as considerations for more general spaces than the real numbers, such as spaces of functions;
- develop a basic understanding of measure theory and use it to study the Lebesgue integral;
- deeply understand basic algebraic and discrete notions, such as facts about vector spaces and counting arguments, and expand this to include ideas about rings and fields;
- develop a basic understanding of Galois theory;
- follow and create analytic proofs involving abstract metric spaces;
- follow and create algebraic proofs, with an understanding of groups, rings, and fields; and
- independently investigate advanced topics in mathematics and present results to others in a clear way.

Course and Capstone Requirements (30 credits):

Requirements (18 credits):
MATH 515 Abstract Algebra I (3 credits)
MATH 516 Abstract Algebra II (3 credits)
MATH 519 Principles of Real Analysis I (3 credits)
MATH 520 Principles of Real Analysis II (3 credits)
MATH 523 General Topology (3 credits)
MATH 526 Complex Variables (3 credits)

Electives as approved by faculty advisor (12 credits).
These may include 3 credits for the thesis for a student electing Plan A. No more than 9 credits may be earned from 400-level courses.

Capstone Experience:
Plan A: Thesis (MATH 599, 3 credits). Students electing this option must also pass one qualifying examination* in an area not related to the thesis topic.
Plan B: Comprehensive Exam. Students selecting this option must pass two of three qualifying examinations* (in the areas of algebra, analysis, or topology) and also give oral presentations on topics approved by their advisors.

* Students must apply for qualifying examinations after completing appropriate coursework with the approval of their advisors. Applications are available in the School of Graduate Studies or on the web at www.ccsu.edu/grad under Graduate Forms (Degree Candidacy/Non Capstone Qualifying Form).

M.A. Program in Mathematics with Specialization in Computer Science

Program Rationale:
The Master of Arts in Mathematics with Specialization in Computer Science provides an abstract introduction to mathematics at an advanced level, combined with an introduction to some advanced topics in computer science. This program is suitable for students wishing to improve their mathematics backgrounds before applying to doctoral programs and for professionals in the informational sciences.

Program Learning Outcomes:
Students in this program will be expected to:

- deeply understand analytic arguments, using such common notions as epsilon/delta, infinite sums, and limits, as well as considerations for more general spaces than the real numbers, such as spaces of functions;
- develop a basic understanding of measure theory and use it to study the Lebesgue integral;
- deeply understand basic algebraic and discrete notions, such as facts about vector spaces and counting arguments, and expand this to include ideas about rings and fields; and
- develop an understanding of the fundamentals of computer science and the application of mathematics to computer programming and/or software engineering.

Course and Capstone Requirements (30 credits):
The student will choose a specialization in computer programming techniques and numerical methods or computer systems and software engineering. The student and faculty advisor will work out an appropriate plan of study within the framework of the following requirements.

Requirements:
Basic Mathematics Courses (12 credits):
Three (3) of:
MATH 515 Abstract Algebra I (3 credits)
MATH 516 Abstract Algebra II (3 credits)
MATH 519 Principles of Real Analysis I (3 credits)
MATH 520 Principles of Real Analysis II (3 credits)
And one (1) of:
MATH 523 General Topology (3 credits)
MATH 526 Complex Variables (3 credits)
STAT 551 Applied Stochastic Processes (3 credits)

Electives appropriate to the area of specialization as approved by the faculty advisor (18 credits); no more than nine of these credits may be earned in 400-level courses.

Comprehensive Examination

M.A. Program in Mathematics with Specialization in Actuarial Science

Program Rationale:

The Master of Arts in Mathematics with Specialization in Actuarial Science provides students with an understanding of the mathematical foundations of actuarial work and the professional development process. Consistent with this, the program provides course work which covers a substantial portion of the material on the first four examinations of the Society of Actuaries and the Casualty Actuarial Society. Students are encouraged to begin taking professional exams during their course of study. In conjunction with this, students are exposed to complementary disciplines, such as applied statistics or data mining.

Program Learning Outcomes:

Learning outcomes are consistent with those of the North American actuarial societies and the International Actuarial Association. Students in this program will be expected to:

- construct both deterministic and stochastic valuation models;
- have a working knowledge of insurance and financial instruments, including derivatives; and
- estimate both parametric and nonparametric models for frequency and severity and use the models to estimate the distribution of total losses and the probability of ruin.

Course and Capstone Requirements (30 credits):

(Plans A, B and C are offered as options.)

The student and faculty advisor will work out an appropriate plan of study within the framework of the following requirements.

Requirements:
Actuarial Core (8 credits):
ACTL 565 Graduate Actuarial Models I (4 credits)
ACTL 566 Graduate Actuarial Models II (4 credits)

Additional courses as approved by the advisor, including:

- 9 credits chosen from:
  - ACTL 480 Topics in Actuarial Science (1 to 3 credits)
  - ACTL 481 Review – SOA/CAS Course I (3 credits)
  - ACTL 482 Review – SOA/CAS Course II (3 credits)
  - ACTL 580 Advanced Topics in Actuarial Science (3 credits)
- 9 credits designated STAT or MATH at the 400 or 500 level, and
- 1–4 additional credits in actuarial science, mathematics, or statistics.
  No more than nine credits in the program may be earned in 400-level courses.

Capstone:
Plan A: Thesis (Math 599, 6 credits) with 27 credits of course work
Plan B: Comprehensive Exam with 30 credits of course work
Plan C: Special Project in Mathematics (MATH 590, 3 credits) with 30 credits of course work

M.A. Program in Mathematics with Specialization in Statistics

Program Rationale:

The Master of Arts in Mathematics with Specialization in Statistics prepares students for a career or advanced study in statistics by understanding the discipline as a collection of inferential tools derived mathematically from models and/or assumptions.

Program Learning Outcomes:

Students in this program will be expected to:

- comprehend the theory behind methods of statistical inference;
- develop proficiency in the design and analysis of univariate, multivariate, stochastic, and categorical data;
- become familiar with regression, log linear, and time series models;
- understand and apply parametric and nonparametric procedures; and
- develop expertise in using the latest statistical analysis software.

Course and Capstone Requirements (30 credits):
(Plans A, B and C are offered as options.)

The student and faculty advisor will work out an appropriate plan of study within the framework of the following requirements.

Requirements:
Statistics Core (6 credits):
STAT 567 Linear Models and Time Series (3 credits)
STAT 575 Mathematical Statistics III (3 credits)

Three courses (9-11 credits) chosen from:
ACTL 565 Graduate Actuarial Models I (4 credits)
ACTL 566 Graduate Actuarial Models II (4 credits)
MATH 470 Mathematical Methods in Operations Research (3 credits)
MATH 477 Numerical Analysis (3 credits)
MATH 519 Principles of Real Analysis I (3 credits)
MATH 520 Principles of Real Analysis II (3 credits)
STAT 551 Applied Stochastic Processes (3 credits)

Electives appropriate to the area of specialization (10–15 credits): No more than nine credits in the program may be earned in 400-level courses.

Capstone:
Plan A: Thesis (Math 599, 6 credits) with 27 credits of course work
Plan B: Comprehensive Exam with 30 credits of course work
Plan C: Special Project in Mathematics (MATH 590, 3 credits) with 30 credits of course work

Note: Once a graduate student has elected one of the three plans A, B or C, any change to one of the other plans must be made prior to the completion of 21 graduate credits and requires the approval of the student's advisor and the Dean, School of Graduate Studies.

M.S. in Data Mining

Program Rationale:
The Master of Science in Data Mining prepares students to find interesting and useful patterns and trends in large data sets. Students are provided with expertise in state-of-the-art data modeling methodologies to prepare them for information-age careers.

Program Learning Outcomes:
Students in the program will be expected to:
- approach data mining as a process, by demonstrating competency in the use of CRISP-DM (the Cross-Industry Standard Process for Data Mining), including the business understanding phase, the exploratory data analysis phase, the modeling phase, the evaluation phase, and the deployment phase;
- be proficient with leading data mining software, including *WEKA, Clementine* by *SPSS*, and the *R* language;

- understand and apply a wide range of clustering, estimation, prediction, and classification algorithms, including *k*-means clustering, BIRCH clustering, Kohonen clustering, classification and regression trees, the C4.5 algorithm, logistic Regression, *k*-nearest neighbor, multiple regression, and neural networks;
- understand and apply the most current data mining techniques and applications, such as text mining, mining genomics data, and other current issues; and
- understand the mathematical statistics foundations of the algorithms outlined above.

Admission Requirements

The minimum required undergraduate GPA for prospective candidates for the Master of Science in Data Mining is 3.00. Conditional admission may be granted to candidates with undergraduate GPAs as low as 2.40, conditioned on a student receiving no grades lower than a B in the first three core courses in the program.

The following materials are required, in addition to the materials required by the School of Graduate Studies:

- A formal application essay of 500–1000 words that focuses on (a) academic and work history, (b) reasons for pursuing the Master of Science in Data Mining, and (c) future professional aspirations. The essay will also be used to demonstrate a command of the English language.
- A detailed, itemized letter explaining whether and how the candidate has fulfilled each of the program prerequisites that applicants to the Master of Science in Data Mining program are expected to have completed, or be in the process of completing:
  • MATH 221 Calculus II (4 credits);
  • STAT 315 Mathematical Statistics I (3 credits); and
  • a second-semester course in undergraduate statistics.
  Students may be admitted on condition that they complete these prerequisite courses with a grade of B or better. These prerequisite courses are regularly offered in the classroom, and some may be offered online, for students who are missing one or more of these courses. In their letters, candidates are asked to show which courses on which transcripts are being used to fulfill each of these prerequisites. In particular, the candidate is asked to consider that mathematical statistics is calculus-based and represents a different approach beyond the usual undergraduate statistics course. Therefore, a course description or syllabus for the mathematical statistics course should be attached to the letter. If a candidate has not had courses that would fulfill certain program prerequisites, the candidate should so indicate. The candidate is reminded that conditional admission may be granted for students needing to complete any or all of the program prerequisites.
- Two letters of recommendation, one each from the academic and work environment (or two from academia if the candidate has not been employed).

The application and all transcripts should be sent to the Graduate Admissions Office. The deadline for submitting applications for the fall semester is May 1. The other materials, including the formal application essay, the prerequisites letter, and the two letters of recommendation, should be sent to:

Dr. Daniel T. Larose
Re: MS in Data Mining Admissions Materials
Department of Mathematical Sciences
Marcus White 118
Central Connecticut State University
New Britain, CT, 06050

Note: Only hard copy materials are acceptable. No attachments to e-mails or other electronically transmitted material will be considered in admissions decisions.

Course and Capstone Requirements (36 Credits):

Core Courses (27 credits)
The following courses are required of *all* students:
STAT 416 Mathematical Statistics II (3 credits)
STAT 521 Introduction to Data Mining (4 credits)
STAT 522 Data Mining Methods (4 credits)
STAT 523 Applied Data Mining (4 credits)
STAT 525 Web Mining (3 credits)
STAT 526 Data Mining for Genomics and Proteomics (3 credits)
STAT 527 Text Mining (3 credits)
STAT 570 Applied Multivariate Analysis (3 credits)

Thesis Course (3 credits)
STAT 599 Thesis
All students must elect capstone Plan A, thesis. Students must make a presentation of their thesis on the CCSU campus. Students who cannot come to campus must make a web presentation of their thesis.

Elective Courses (6 credits)
Choose any two (2) courses from the following list:
CS 570 Topics in Artificial Intelligence (3 credits)
CS 580 Topics in Database Systems and Applications (3 credits)
STAT 455 Experimental Design (3 credits)
STAT 529 Current Issues in Data Mining (3 credits)
STAT 551 Applied Stochastic Processes (3 credits)
STAT 567 Linear Models and Time Series (3 credits)
STAT 575 Mathematical Statistics III (3 credits)
Other appropriate graduate course, with permission of advisor

Note: New students may take the first course in the program while working on the prerequisites for the more advanced courses.

Note: No more than nine credits at the 400 level, as approved by the graduate advisor, may be counted toward the graduate planned program of study.

More information can be found at: http://web.ccsu.edu/datamining/

Graduate Certificate in Data Mining

Program Prerequisites:
Applicants to the Graduate Certificate in Data Mining program are expected to have completed, or be in the process of completing, a second semester course in undergraduate or graduate statistics. Students may be admitted on condition that they complete these prerequisite courses with a grade of B or better.

Admission Criteria:
Students must hold a Bachelor's degree from a regionally accredited institution of higher education. The undergraduate record must demonstrate clear evidence of ability to undertake and pursue studies successfully in a graduate field.
A minimum undergraduate GPA of 3.00 on a 4.00 scale (where A is 4.00), or its equivalent, and good standing (3.00 GPA) in all post-baccalaureate course work is required. Conditional admission may be granted to a candidate with an undergraduate GPA as low as 2.40, only if the student receives no grades lower than a B in his/her first three core courses in the program.

The following materials, in addition to those required by the School of Graduate Studies, are required:

- A formal application essay of 500-1000 words, focusing on academic and work history, reasons for pursuing the Graduate Certificate in Data Mining, *and* future professional aspirations. The essay will also be used to demonstrate a command of the English language;
- A detailed, itemized letter explaining how the candidate has fulfilled the program prerequisites-or that he/she is in the process of completing a second semester course in undergraduate or graduate statistics. In the latter, candidates are asked to explain which courses on each transcript are being used to fulfill each of these prerequisites. If all prerequisite courses have not been taken, the candidate should so indicate. Conditional admission may be granted for students needing to complete any or all of the program prerequisites; and
- Two letters of recommendation.

The application and all transcripts should be sent to the Graduate Admissions Office. The other materials, including the formal application essay, the prerequisites letter, and the two letters of recommendation, should be sent to:
Dr. Daniel T. Larose
Re: Graduate Certificate in Data Mining
Admissions Materials
Department of Mathematical Sciences
Marcus White 118
Central Connecticut State University
New Britain, CT 06050

Note: Only hard copy materials are acceptable. No attachments to emails or other electronically transmitted material will be considered in admission decisions.

Course Requirements: (18 Credits):

Required Courses (12 Credits)
Stat 521 Introduction to Data Mining (4 credits)
Stat 522 Data Mining Methods and Models (4 credits)
Stat 523 Applied Data Mining (4 credits)

Elective Courses (6 Credits)
Choose two (2) of:
Stat 525 Web Mining (3 credits)
Stat 526 Data Mining for Genomics and Proteomics (3 credits)
Stat 527 Text Mining (3 credits)
Stat 529 Current Issues in Data Mining (3 credits)
Some other graduate-level data mining or statistics course, with approval of program coordinator.

More information can be found at: http://web.ccsu.edu/datamining/

Can I start out with the Certificate program, and then transfer those courses to the Master of Science program?
Yes. However, the student will need to apply for the MS program separately. The mathematical and statistical requirements for the MS program are more stringent than for the Certificate program.

M.S. in Mathematics for Certified Elementary or Middle School Teachers

Program Rationale:

The Master of Science in Mathematics provides certified elementary and middle school teachers with additional content and pedagogical knowledge that will make them effective elementary or middle school teachers. (Note: There are two tracks in this program, one focusing on elementary grades and the other on middle grades.)

Program Learning Outcomes:

Students in this program will be expected to:

- deepen their comprehension of mathematics by re-examining, in detail, the mathematics topics taught in elementary or middle school, using topics introduced in the undergraduate program as a basis to build an increased understanding of the underlying mathematical structure;
- develop as reflective practitioners and self-motivated life-long learners who strive for continual improvement in their teaching and seek to facilitate deep student learning;
- understand emerging research on the psychological and intellectual development of children and adolescents and develop their understanding of current research on the teaching and learning of mathematics, trends and issues in mathematics curriculum, and the effective use of technology, data gathering and hands-on methods in the teaching of mathematics;
- acquire skills necessary to conduct research in mathematics education; and
- acquire skills necessary to make creative contributions to the field, such as writing, collecting data, and developing their own curriculum activities.

Course and Capstone Requirements:

(Plans A and C are offered as options. No more than nine credits at the 400 level may be counted toward the degree.)

Professional Education (3 credits):
One (1) of the following:
EDF 500 Contemporary Educational Issues (3 credits)
EDF 516 School and Society (3 credits)
EDF 524 Foundations of Contemporary Theories of Curriculum (3 credits)
EDF 525 History of American Education (3 credits)
EDF 538 The Politics of Education (3 credits)
EDF 583 Sociological Foundations of Education (3 credits)

Elementary/Middle School Mathematics Education Core (12 credits):
Elementary school track:
MATH 506 Teaching Number Concepts in the Elementary Grades (3 credits)
MATH 507 Teaching Geometry and Measurement in the Elementary Grades (3 credits)
MATH 508 Teaching Probability and Statistics in the Elementary Grades (3 credits)
MATH 509 Teaching Algebraic Thinking in the Elementary Grades (3 credits)
or
Middle school track:
MATH 536 Teaching Number Concepts in the Middle Grades (3 credits)
MATH 537 Teaching Geometry and Measurement in the Middle Grades (3 credits)
MATH 538 Teaching Probability and Statistics in the Middle Grades (3 credits)
MATH 539 Teaching Algebraic Thinking in the Middle Grades (3 credits)

Mathematics Electives (6 credits):
Choose two (2) courses from:
MATH 449 Mathematics Laboratory for Elementary School (3 credits)
MATH 504 Topics in Mathematics (1 to 3 credits)
MATH 534 Techniques in Diagnosis and Remediation for the Teaching of Mathematics K–12 (3 credits)

MATH 580 Directed Study in Mathematics (1 to 3 credits)
STAT 453 Applied Statistical Inference (3 credits)

General Electives (6 credits):
Courses chosen from the electives listed above, graduate education courses, and MATH 531 – Basic Concepts of Elementary School Mathematics (3 credits), as approved by faculty advisor.

Research (3 credits):
MATH 598 Research in Mathematics Education (3 credits)

Capstone:
Plan A: 33 credits consisting of 30 credits from the above listings plus MATH 599 - Thesis (3 credits).

Plan C: 33 credits consisting of 30 credits from the listings above plus MATH 590 - Special Project in Mathematics (3 credits).

Note: Once a graduate student has elected one of the two plans, A or C, any change to the other plan must be made prior to the completion of 21 graduate credits and requires the approval of the student's advisor and the Dean, School of Graduate Studies.

M.S. in Mathematics for Certified Secondary Teachers

Program Rationale:
The Master of Science in Mathematics provides teachers of secondary mathematics with additional content and pedagogical knowledge that will make them more effective in their profession.

Program Learning Outcomes:
Students in this program will be expected to:

- deepen their comprehension of mathematics by studying advanced topics not covered in undergraduate curriculum and thus develop the dispositions of life-long learners of mathematics;
- develop as reflective practitioners, striving for continual improvement in their teaching and student learning;
- understand current research on teaching and learning mathematics, trends in mathematics curriculum, and the effective use of technology in the teaching of mathematics;
- acquire skills necessary to conduct research in mathematics education; and
- acquire skills necessary to make creative contributions to the field, such as writing, collecting data, and developing curriculum activities.

Course and Capstone Requirements:
(Plans A and C offered as options. No more than nine credits may be earned in 400-level courses.)

General Education Electives (3 credits):
As approved by faculty advisor

Educational Foundations (3 credits):
One (1) of the following:
EDF 500 Contemporary Educational Issues (3 credits)
EDF 516 School and Society (3 credits)
EDF 524 Foundations of Contemporary Theories of Curriculum (3 credits)
EDF 525 History of American Education (3 credits)
EDF 538 The Politics of Education (3 credits)

EDF 583 Sociological Foundations of Education (3 credits)

Secondary Mathematics Education (9 credits):
MATH 547 Reflective Practice in Teaching Mathematics (3 credits)
plus 6 credits chosen from:
MATH 504 Topics in Mathematics (1 to 3 credits)
MATH 534 Techniques in Diagnosis and Remediation for the Teaching of Mathematics – K-12 (3 credits)
MATH 540 Curriculum Problems in School Mathematics (3 credits)
MATH 543 Secondary School Algebra with Technology from an Advanced Viewpoint (3 credits)
MATH 544 Secondary School Geometry with Technology from an Advanced Viewpoint (3 credits)
MATH 580 Directed Study in Mathematics (1 to 3 credits)

Mathematics and Statistics Content Courses (12 credits):
No more than six credits in courses with the STAT designation. One course must be STAT 453 – Applied Statistical Inference (3 credits) unless this course was taken as an undergraduate.
Courses to be chosen from:
MATH 421 History of Mathematics (3 credits)
MATH 440 Selected Topics in Mathematics (1 to 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)
MATH 515 Abstract Algebra I (3 credits)
MATH 516 Abstract Algebra II (3 credits)
MATH 519 Principles of Real Analysis I (3 credits)
MATH 520 Principles of Real Analysis II (3 credits)
MATH 523 General Topology (3 credits)
MATH 525 Higher Geometry (3 credits)
MATH 526 Complex Variables (3 credits)
STAT 453 Applied Statistical Inference (3 credits)
STAT 455 Experimental Design (3 credits)
STAT 567 Linear Models and Time Series (3 credits)

Research (3 credits):
MATH 598 Research in Mathematics Education (3 credits)

Capstone:
Plan A: 33 credits consisting of 30 credits from the above plus MATH 599 - Thesis (3 credits)

Plan C: 33 credits consisting of 30 credits from the above plus MATH 590 – Special Project (3 credits)

Note: Once a graduate student has elected one of the two plans, A or C, any change to the other plan must be made prior to the completion of 21 graduate credits and requires the approval of the student's advisor and the Dean, School of Graduate Studies.

Post-Baccalaureate Program for Secondary Teacher Certification

Any student with a Bachelor's Degree with at least a 2.70 GPA is eligible to apply for the Certification Program in Secondary Mathematics. Steps that need to be taken:

1) Apply to the Graduate School and check off Certification Program, Secondary Mathematics. Applications are available in the Graduate School or online at: www.ccsu.edu/page.cfm?p=1177.

2) Your transcripts will be reviewed in the Department of Mathematical Sciences to determine if additional undergraduate mathematics courses must be taken. (Please see required list "A" of courses below.)

3) Your transcripts will be reviewed in the School of Education to determine if additional general education courses must be taken. (Please see required list "B" of courses below.)

4) You will be sent a letter that informs you whether or not you have been accepted into the Graduate School.

5) If you have been accepted, you will be assigned an advisor. It is strongly recommended that you immediately contact your advisor to establish a final program that will result in your certification. In this program a number of required courses can be taken at the undergraduate level or the graduate level. If you plan to earn a Master's Degree at CCSU, it is in your best interest to take as many of these as possible at the graduate level. Your advisor can help you choose the appropriate classes as you progress through the program.

6) You and your advisor will determine when you apply to the Professional Program, but generally this occurs once the majority of your mathematics and general education courses are completed. Applications to the Professional Program are available in the information racks outside the Dean's Office (HB 248) and on the CCSU School of Education and Professional Studies Web site at: www.education.ccsu.edu.

7) At least one semester before you plan to apply to the Professional Program, either take the Praxis I exam, or obtain a waiver from the State Education Department if you are eligible. If you plan to take the Praxis I exam, information can be found at: www.ets.org/praxis. Eligibility information and/or information on reporting SAT, ACT and PAA scores to the Connecticut State Department of Education for the purposes of obtaining this waiver can be found at: www.sde.ct.gov/sde/cwp/view.asp?a=2613&q=3212116.

8) Once accepted into the Professional Program, most students complete the remaining required coursework in three semesters.

Professional Program for 7-12 Mathematics Certification
(Courses marked with § may also be counted towards the MS in Mathematics)

EDTE 316	4 credits	
EDF 415	3 credits	
SPED 501	3 credits §	
RDG 506	3 credits §	
MATH 413	4 credits	must be taken
EDSC 425	3 credits	together
EDSC 435 Student Teaching	9 credits	must be taken
MATH 426 Student Teaching Seminar	1 credit	together

Mathematics Methods Courses

MATH 327 Curriculum & Technology in Secondary Mathematics I (focus on Algebra) — 3 credits

OR

MATH 543 Secondary School Algebra with Technology from an Advanced Viewpoint — 3 credits §

AND

MATH 328 Curriculum & Technology in Secondary Mathematics II (focus on Geometry) — 3 credits

OR

MATH 544 Secondary School Geometry with Technology from an Advanced Viewpoint — 3 credits §

*The Praxis II Exam, #0061: Mathematics: Content Knowledge, is also required for certification. Information about both the Praxis I and Praxis II exams is available at:
www.ets.org/praxis

A) Undergraduate Mathematics Requirements* (30 credit minimum)

MATH 152 Calculus I	4 credits
MATH 218 Discrete Mathematics	4 credits
MATH 221 Calculus II	4 credits
MATH 228 Linear Algebra	4 credits
MATH 366 Introduction to Abstract Algebra	4 credits
MATH 383 or MATH 525 Geometry	3 credits each §
MATH 377 Introduction to Real Analysis	4 credits
STAT 314 Statistics for Secondary Teachers	3 credits

* Equivalent courses can be counted in lieu of any of the courses on the list with permission of the department chairperson.

B) Undergraduate General Education Requirements

39 Credits distributed over 5 out of 6 different study areas:
a) English
b) Natural Sciences
c) Mathematics
d) Social Studies (including American History and Life Span Psychology)
e) World Language
f) Fine Arts

For answers to any additional questions, please contact:
Dr. Robin S. Kalder at (860) 832-2842 or kalderr@ccsu.edu

Sixth-Year Certificate Degree in Mathematics Education Leadership

Program Rationale:

This program is designed for mathematics teachers in grades K-12 who want to become highly skilled and knowledgeable education leaders within their schools and districts. It is the only education leadership program in the state geared to mathematics educators, and it addresses a growing need in all Connecticut schools.

The program offers two tracts – department chair certification (DCC) or intermediate administrator certification (IAC). Students progress through the program in cohorts (20 students maximum). Course and classroom work are enlivened by internships in area schools. Students complete coursework within three years (two academic years including three summer sessions). Students in the DCC track will perform one semester of internship, while those in the IAC track will perform two semester-long internships. Course work begins in August of odd number years.

Program Learning Outcomes:

When students complete this program they will be effective leaders in mathematics and as such will have the following abilities:

- possess deep content knowledge of the mathematics that is taught in the school, with a focus on grades K-12, and are able to analyze any mathematics curriculum in terms of its logical, psychological, and sociological sources;
- are knowledgeable about research on the learning and teaching of mathematics and its impact in the classroom;
- can examine cultural connections with mathematics and mathematics education and are aware of equity issues, such as gender, race, ethnicity, social class, language acquisition, access to technology, and achievement;
- understand how to use assessment as a tool for continued program improvement; and
- apply their deep understanding of curriculum, learning, teaching, the social context of education, and assessment issues to the challenges of improving teaching and learning in their school and district

Admissions Requirements:

(This is a cohort program. The first cohort will begin the program in August 2009 and complete the program in 2011 or 2012. The second cohort will begin the program in August 2011.)

- Master's degree, preferably in mathematics or mathematics education. Applicants with Master's degrees in other fields may be asked to successfully complete additional mathematics courses as a condition for admission;
- Minimum of three years of experience teaching mathematics within grades K-12;
- Praxis II (secondary mathematics-Exam #0061) for applicants without secondary certification. Students who have not taken Praxis II may be conditionally admitted;
- Applicants will be expected to have passed STAT 453 (Applied Statistical Inference) or its equivalent with a B or higher. Applicants who do not meet this requirement may be admitted on condition that they successfully complete STAT 453 within the first year, earning a B or higher;
- Applicants are strongly encouraged to become certified as BEST (Beginning Educator Support and Training) mentors, if appropriate to current teaching position;
- Students who are admitted to this sixth year program are guaranteed acceptance into the Department Chair Certification Track and may, upon completion of EDL 655 – Leadership and Supervision (3 credits), apply for candidacy for the Intermediate Administrator Track to the Department of Educational Leadership through the School of Graduate Studies;
- Submission of portfolio documenting teaching ability and other professional activities; and
- Interview with CCSU mathematics department committee

Application deadline is May 1 for admission to the program for Summer 2011 matriculation. Review of applications will begin March 1. Applicants will be notified of admission decisions by June 15.

Course and Capstone Requirements:

Department Chair Certification (DCC) Track (33 credits):

FIRST YEAR:

Summer:

- EDL 655 Leadership and Supervision (3 credits)

Fall:

- MATH 611 Mathematics Curriculum K-8: Theory & Implementation (3 credits)

Spring:

- MATH 612 Mathematics Curriculum 7-12: Theory & Implementation (3 credits)
- MATH elective (3 credits)

SECOND YEAR:

Summer:

- MATH 615 The Cultural Context of Mathematics Education (3 credits)
- STAT 453 (if needed) (3 credits)

Fall:

- MATH 613 Research on the Learning of Mathematics (3 credits)
- MATH elective (3 credits)

Spring:

- MATH 614 Research on the Teaching of Mathematics (3 credits)
- EDL 514 Administration (3 credits)

THIRD YEAR:

Summer:

- MATH 616 Assessment in Mathematics Education (3 credits)

Fall:

- MATH 622 Internship in Mathematics Education Leadership (2 credits)

Intermediate Administrator Certification (IAC) Track (37 credits):

FIRST YEAR:

Summer:

- EDL 655 Leadership and Supervision (3 credits)

Fall:

- MATH 611 Mathematics Curriculum K-8: Theory & Implementation (3 credits).
  Students notified of acceptance to IAC track at this point

Spring:

- MATH 612 Mathematics Curriculum 7-12: Theory & Implementation (3 credits)

SECOND YEAR:

Summer:

- MATH 615 The Cultural Context of Mathematics Education (3 credits)
- STAT 453 (if needed) (3 credits)

Fall:

- MATH 613 Research on the Learning of Mathematics (3 credits)
- EDL 610 School Leadership I (3 credits)

Spring:

- MATH 614 Research on the Teaching of Mathematics (3 credits)
- EDL 611 School Leadership II (3 credits)

THIRD YEAR:

Summer:

- MATH 616 Assessment in Mathematics Education (3 credits)

Fall:

- EDL 615 Understanding External Environments of School Leadership I (3 credits)
- EDL 690 Internship in Educational Leadership I: Theory and Practice (2 credits)

Spring:

- EDL 616 Understanding External Environments of School Leadership II (3 credits)
- EDL 691 Internship in Educational Leadership II: Research and Practice (2 credits)

Summer:

- Prepare for Connecticut Administrators Test