

Mathematics and Statistics

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The Department of Mathematics and Statistics offers a B.S. degree in three majors: Mathematics, Mathematics Secondary Education*, and Mathematics Teaching* for Elementary, Early Childhood, Deaf and Hard of Hearing, Special Education, and Urban Education.

*These programs are considered “dual majors” under the College’s system of classification. Dual majors are formed when at least one program must be attached to the other to be viable. The Elementary Education, Early Childhood Education, Special Education, Education of the Deaf and Hard-of-Hearing, and Urban Education sequences, and all secondary education programs fall into this category.

The Mathematics major offers specializations in three areas: Mathematics, Applied Mathematics, and Data Science and Statistics. In each of these programs, students are provided with a foundational mathematical background which will be utilized in advanced study in one of these areas:

Mathematics (Mathematics specialization): In this program students take a wide range of mathematics courses, including analysis and abstract algebra. Each student will develop a program, through advisement, of upper-level mathematics courses according to their own interests. These courses will reflect the student’s goals: to develop the student’s knowledge and appreciation of mathematics, to prepare the student for a variety of careers in both the public and private sectors, and/or prepare the student for future graduate study.

Mathematics (Applied Mathematics specialization): The applied math curriculum is designed to give students a solid mathematical foundation while emphasizing mathematical topics that are often used to solve real-world problems. Students in this program take courses including differential equations and analysis, with flexibility in their choice of upper-level courses to allow students to pursue their interests in mathematics and statistics. This specialization prepares students to pursue a variety of careers in both the public and private sectors following graduation and also prepares students for future graduate study.

Mathematics (Data Science and Statistics specialization): Students in this program develop a range of mathematical, statistical, and computational skills which can be applied to a wide variety of real-world, data-driven problems. After completing foundational courses in statistics and mathematics, students have freedom to further their studies in courses aligned with their interests in data science, statistics, or mathematics. Students are prepared to enter graduate study or employment in a variety of careers in both the public and private sectors.

Mathematics Secondary Education: In this program, students take mathematics and professional courses which prepare them to meet the educational requirements for the New Jersey certificate to teach mathematics K–12. Students participate in student-teaching experiences in their senior year. A 5-year Urban Secondary Education option and a 5-year Special Secondary Education option that lead to a Master’s degree in addition to the K-12 Mathematics certification are available.

Mathematics Teaching–Elementary, Early Childhood, Urban, Deaf and Hard of Hearing, and Special Education: In this program, students take mathematics and professional courses which prepare them to meet the educational requirements for the New Jersey certificate to teach in their respective education field. Students wishing to take the mathematics Praxis test could also be certified to teach mathematics K–12.

Minors: The department offers minors in three areas: Mathematics, Statistics, and Actuarial and Financial Risk Studies.

Academic Regulations

Prerequisites

- If a student has not met the exact prerequisites of a course as stated in this Bulletin but believes that the requirements have been satisfied through equivalent experiences, the student may gain admission to the course with the approval of the department chair.
- Majors must earn a minimum grade of C– in a course which is a prerequisite to another course.

Graduation Requirements

- A minimum of six course units in the major must be earned by taking TCNJ courses in the department. A minimum of four of the final six course units in the major must be earned in the department.
- Students must satisfy the retention requirements for their major to graduate.
- In courses offered by the Department of Mathematics and Statistics, a grade of C- or better must be earned in the courses that satisfy a graduation requirement, with the following exception. Students may count one D or D+ grade in a 300 or 400 level course.
- In addition to these general requirements, there are additional requirements for the following majors and specializations:

Mathematics major: Applied Math Specialization

1. A grade of C- or better must be earned in the Computer Science Correlate courses.

Mathematics Secondary Education and Mathematics Teaching majors

1. Overall 3.0 grade point average to meet the state certification requirements.
2. Students must meet the State of New Jersey’s Basic Skills requirement before applying for Clinical Practice I and II.

3. A 2.75 GPA in order to enroll in Clinical Practice I (SED 399, MTT 390 and RAL 328 for Secondary Education)
4. **Mathematics Secondary Education majors must earn a 3.0 GPA and a B-** in all Education courses (with the exception of MTT380) and Clinical Practice I courses in order to enroll in Clinical Practice II (MTT 490)
5. **Mathematics Secondary Education majors must earn a grade of B-** or better in MTT 490 (Student teaching) and SED 498 (capstone).

Retention Requirements

- Students must meet the above graduation requirements and the following grade requirements to be retained in the major. If a student fails to meet the standard, students will have one year to meet the standard. Students concerned about the standards should speak with their advisor.
- Majors must earn a C- in all courses that count towards the degree. A single grade of D or D+ may be earned in a 300/400 MAT/STA course that is not a prerequisite for a subsequent course.
- Majors must earn a grade of at least C- in the foundational courses MAT200 and MAT229.

In addition, Mathematics Secondary Education majors in both 4- and 5-year programs must meet the following grade requirements:

- After attempting 8 units at the college, if the cumulative GPA is 2.75 or below, a student will be placed on probation for the major. They are expected to consult with their advisor to come up with plan to get to an overall GPA of 3.0 and submit the plan to the Math Education Coordinator. If by end of 2 subsequent (regular) semesters, the overall GPA does not rise above 3.0, the department reserves the right to dismiss the student from the program. Non-matriculated and provisional students are immediately subject to the policy at time of matriculation if GPA below 2.75.

Dismissal Policy

At the end of the semester, if a major in the Department of Mathematics and Statistics has not met one or more of the department's retention standards, he/she will be given notice that he/she must meet the standard(s) within one calendar year in order to continue in the major. If the standard has not been satisfied within one calendar year the student may be dismissed from the major. In addition, if a student who is a major in the Department of Mathematics and Statistics does not pass any courses satisfying requirements for the major for a calendar year (2 regular semesters), he/she may be dismissed from the major.

Entrance Requirements

In order to transfer into all Mathematics majors, a student must meet the following grade requirements and be approved by the chair(s):

- a. C- or better in MAT 127
- b. C- or better in MAT 200

For the **Mathematics Secondary Education or Mathematics Teaching majors**, students must also meet:

- c. Praxis Core Basic Skills Test passing score (or equivalent)
- d. Additional requirements for the respective Education department.

Seminar Requirement

All students except for Mathematics Teaching students are required to attend four departmental seminars in their junior and/or senior year before they can take the capstone course. Both department seminars and School of Science colloquia (in which mathematics or statistics is presented) will count.

All students in the Mathematics major (Mathematics, Applied Mathematics, and Data Science and Statistics specializations) are required to take a 0.5 unit seminar in their sophomore year. Details will be provided by the department.

Requirements for Honors

For all majors and specializations within the Department of Mathematics and Statistics:

1. Eligibility: A 3.5 GPA in math and stats courses.
2. To receive departmental honors, a student must engage in independent research during their junior or senior year. The student should successfully complete a full unit of a MAT/STA/MTT 493: Independent Research course during a semester they spend on-campus, prior to their graduating semester, and prepare a paper which will be due the middle of their last (graduating) term. A public presentation will be given in the two-week period following the submission of the paper.

Independent Study/Guided Study/Independent Research Courses

- At most one course unit of Independent Study, Guided Study, or Independent Research may count as one of the options courses listed in the major requirements under “Courses in the major.”
- The total course load of a student taking Independent Study, Guided Study, or Independent Research should be at most 4.5 course units.
- Independent Study, Guided Study, or Independent Research may not be taken in order to improve a grade, or to replace a course that a student failed to sign up for.

- In exceptional circumstances, the above rules may be overruled by the department chair.
- A minimum 3.0 GPA in courses taken in the Department of Mathematics and Statistics is required of any student enrolling in Independent Study or Guided Study.

Course Waiver

If a student has a strong background in a particular course, then the student may acquire or receive a course waiver in one of two ways: 1) credit by examination; or 2) waiver of the course through prior equivalent experience (transfer credit).

Calculus Readiness Requirement

Any student who has not satisfied the College's calculus readiness requirements is not allowed to register for any calculus course offered by the Department of Mathematics and Statistics. Students may choose to be placed based on SAT or ACT scores, or they may submit AP scores or they may opt to take a placement test. Students who choose placement based on SAT or ACT scores will be placed as follows:

SAT-Math score 630 or ACT score 28 or higher and four years of math including Algebra I, Algebra II, Geometry and Trigonometry

Placed into Calculus

SAT-Math score between 550 and 620 or ACT score between 24 and 27 and at least two years of math including Algebra and Geometry.

Placed into Introduction to Functions (MAT 119) or Precalculus (MAT 120). Upon completion of MAT 119, a student may take MAT 125: Calculus for Business and Social Sciences. Upon completion of MAT 120, a student may take MAT 125 or MAT 127: Calculus A.

SAT-Math score below 550 and ACT score below 24

Placed into Intermediate Algebra, MAT 095. (*MAT 095 does not count toward graduation but is considered credit-bearing for financial aid, tuition and full-time status.*)

Note: Introduction to Functions (MAT 119), Precalculus (MAT 120) and Intermediate Algebra (MAT 095) are offered every semester and often during the Summer Sessions.

Students who choose placement based on AP Scores will be placed as follows:

| <i>AP Course</i> | <i>Score</i> | <i>TCNJ Equivalent</i> | <i>Course Units</i> | <i>Next Math Course to Take</i> |
|------------------|--------------|---|---------------------|---------------------------------|
| PreCalculus | 4 or higher | MAT 120 | 0* | Calculus (MAT 125 or MAT 127) |
| AB Calculus | 4 or higher | MAT 127: Calculus A or MAT 125: Business Calculus | 1 | MAT 128: Calculus B |
| BC Calculus | 3 | MAT 127: Calculus A or MAT 125: Business Calculus | 1 | MAT 128: Calculus B |
| BC Calculus | 4 | MAT 127: Calculus A and MAT 128: Calculus B | 2 | MAT 229: Multivariable Calculus |
| Statistics | 3, 4 | STA 115 Statistics (Liberal Learning/Quantitative Reasoning) | 1 | Discuss with an adviser |
| Statistics | 5 | STA 215 Statistical Inference (Liberal Learning/Quantitative Reasoning) | 1 | Any 300-level course |

*Note: AP PreCalculus scores are considered for placement into Calculus only and not for transfer credit.

Study Abroad

One of the opportunities available to students pursuing a degree in Mathematics or Statistics is to study abroad for a semester or a year. Students interested in studying abroad should meet with their faculty advisor early in their college career to plan a curriculum so that they may complete their studies in four years. They will also need to meet with the Director of the Center for Global Engagement. The students must receive approval from the chair of the department in order for courses taken abroad to count toward requirements for the major.

Mathematics Major: Mathematics Specialization

Requirements for the Major: Please see above for the program retention and graduation requirements. All Mathematics specialization students are required to take 13.5 mathematics course units and a 0-course-unit orientation. The 13.5 course units will consist of the following **nine required** courses:

| | |
|--|----------------|
| MAT 099/Orientation to Mathematics and Statistics | 0 course units |
| MAT 128/Calculus B | 1 course unit |
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| MAT 205/Linear Algebra: Theory and Applications | 1 course unit |
| MAT 229/Multivariable Calculus | 1 course unit |
| MAT 275/Sophomore Seminar | .5 course unit |
| MAT 305/Abstract Algebra | 1 course unit |
| MAT 310/Real Analysis | 1 course unit |
| MAT 498/Capstone | 1 course unit |

and **six additional** course units. The six additional course units can be any MAT courses at the 300- or 400-level. One non-MAT course from a departmentally approved list in PAWS may be counted. Two of these course units must be MAT courses at the 400-level.

Additional Required Correlates (two course units): 1) CSC 220/Computer Science I;

2) One natural science lab course from the list approved by the Department of Mathematics and Statistics, (posted on the department's website).

*Suggested First-Year Course Sequence***Fall**

| | |
|---|----------------|
| First Year Seminar (FYS) course | 1 course unit |
| MAT 099/Orientation to Mathematics and Statistics | 0 course units |
| MAT 127/Calculus A (if not exempted)* | 1 course unit |
| CSC 220/Computer Science I | 1 course unit |
| Foreign Language (if not exempted)** | 1 course unit |

Spring

| | |
|--|---------------|
| MAT 128/Calculus B | 1 course unit |
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| College Core Course | 1 course unit |
| Foreign Language (if not exempted)*** | 1 course unit |

*It is recommended that students exempted from this course take Calculus B.

** It is recommended that students exempted from these courses take other College Core courses.

***It is recommended that students exempted from these courses take other College Core courses. Note: *Chinese 151 and 152, Japanese 151 and 152 are intensive courses and carry two course units of credit each. Students should take this into account when planning a normal four-course semester.*

Mathematics Major: Applied Mathematics

Requirements for the Major: Please see above for program retention and graduation requirements. The Applied Mathematics Specialization requires 14.5 course units in the major and a 0-course-unit orientation. The 14.5 course units will consist of the following ten required courses:

| | |
|---|----------------|
| MAT 099/Orientation to Mathematics and Statistics | 0 course units |
| MAT 128/Calculus B | 1 course unit |
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| MAT 205/Linear Algebra: Theory and Applications | 1 course unit |
| STA 215/Statistical Inference or STA216/Statistical Inference and Probability | 1 course unit |
| MAT 229/Multivariable Calculus | 1 course unit |
| MAT 275/Sophomore Seminar | .5 course unit |
| MAT 310/Real Analysis | 1 course unit |
| MAT 326/Differential Equations | 1 course unit |
| MAT 498/Capstone | 1 course unit |

and six additional course units. The six additional course units can be any MAT/STA courses at the 300- or 400-level subject to the following conditions:

1. One 400 level course must be on the Applied Mathematics Options List, available in the Applied Mathematics Advising Checklist on the department website
2. Two additional 300 or 400 level courses must be on the Applied Mathematics Options List
3. At most two STA 300 or 400 level courses and at most 1 non-MAT/STA course from the approved list in PAWS may be counted towards this 6 unit requirement

Additional Required Correlates (normally three course units):

- 1) CSC 220 or CSC250 (with prior permission) 1 course unit
- 2) CSC230 or CSC250* or MAT341**. 1 course unit*
- 3) One natural science lab course from the list approved by the Department of Mathematics and Statistics (posted on the department's website). 1 course unit

**Students who take CSC250 satisfy both computing correlates with this one course*

*** Students who use MAT341 to satisfy the correlate requirement may not also use MAT341 to satisfy an option requirement for the major*

Suggested First-Year Course Sequence

Fall

| | |
|---|----------------|
| First Year Seminar (FYS) course | 1 course unit |
| MAT 099/Orientation to Mathematics and Statistics | 0 course units |
| MAT 127/Calculus A (if not exempted)* | 1 course unit |
| CSC 220/Computer Science I | 1 course unit |
| Foreign Language (if not exempted)** | 1 course unit |

Spring

| | |
|---|---------------|
| MAT 128/Calculus B | 1 course unit |
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| FYS 1XX/First Year Seminar or other College Core course | 1 course unit |
| Foreign Language (if not exempted) *** | 1 course unit |

**It is recommended that students exempted from this course take Calculus B.*

*** It is recommended that students exempted from these courses take other College Core courses.*

****It is recommended that students exempted from these courses take other College Core courses. Note: Chinese 151 and 152, Japanese 151 and 152 are intensive courses and carry two course units of credit each. Students should take this into account when planning a normal four-course semester.*

Mathematics Major: Data Science and Statistics

Requirements for the Major: Please see above for program retention and graduation requirements. Data Science and statistics graduates need to have a strong underpinning in mathematics in addition to acquiring all the necessary statistical knowledge and skills. The Data Science and Statistics Specialization requires 14.5 course units in the major and a 0-course-unit orientation. The 14.5 course units consist of the following:

Required Courses: 9.5 required course units and a 0-course-unit orientation

| | |
|--|----------------|
| MAT 099/Orientation to Mathematics and Statistics | 0 course units |
| MAT 128/ Calculus B | 1 course unit |
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| MAT 205/Linear Algebra: Theory and Applications | 1 course unit |
| MAT 229/Multivariable Calculus | 1 course unit |
| MAT 275/Sophomore Seminar | .5 course unit |
| MAT 316/Probability | 1 course unit |
| STA 215/Statistical Inference | 1 course unit |
| STA 305/Regression Analysis | 1 course unit |
| STA 410/Mathematical Statistics | 1 course unit |
| STA 498/Capstone | 1 course unit |

One Data Science option chosen from the following courses 1 course unit

- STA 306/Applied Multivariate Analysis
- STA 307/Data Mining and Predictive Modeling
- STA 404/Computational and Bayesian Statistics

One Data Science/Statistics option courses which can be chosen from any STA courses at the 300/400-level 1 course unit

Three additional options courses which can be chosen from any MAT/STA courses at the 300/400-level 3 course units

One non-MAT/STA course from the approved list in PAWS may be counted towards this 3 unit requirement

Additional Required Correlates (*normally three course units*)

CSC220/Computer Science I 1 course unit

One natural science course from the list approved by the Mathematics and Statistics department. The course must have a lab component 1 course unit

One additional natural science course from the list approved by the Mathematics and Statistics department OR CSC230 OR MAT341**. 1 course unit

*** Students who use MAT341 to satisfy the correlate requirement may not also use MAT341 to satisfy an option requirement for the major*

Suggested First-Year Course Sequence

Fall

| | |
|---|----------------|
| First Year Seminar (FYS) course | 1 course unit |
| MAT 099/Orientation to Mathematics and Statistics | 0 course units |
| MAT 127/Calculus A (if not exempted)* | 1 course unit |
| Foreign Language (if not exempted)** | 1 course unit |
| STA 215/Statistical Inference | 1 course unit |

Spring

| | |
|--|---------------|
| MAT 128/Calculus B | 1 course unit |
| CSC220 or other College Core courses | 1 course unit |
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| Foreign Language (if not exempted)*** | 1 course unit |
| College Core course (Arts and Humanities or Social Sciences and History) | 1 course unit |

**It is recommended that students exempted from this course take Calculus B.*

*** It is recommended that students exempted from these courses take CSC220 or other College Core courses.*

****It is recommended that students exempted from these courses take CSC220 or other College Core courses. Note: Chinese 151 and 152, Japanese 151 and 152 (offered annually) are intensive courses and carry two course units of credit each. Students should take this into account when planning a normal four-course semester.*

Mathematics Secondary Education

Requirements for the Major: Please see above for program retention and graduation requirements. An overview of the entire secondary-level teacher-preparation sequence and requirements can be found in the section of this bulletin for the Department of Educational Administration and Secondary Education.

Students planning to teach high school or middle school mathematics should consult with advisors in both mathematics and secondary education in planning their academic program. These plans should take into account requirements for: the major, College Core, professional courses, and state certification. To be retained in the program, a student must earn at least a 2.75 cumulative grade point average (CGPA) before enrolling in the full year of Clinical Practice, as well as have a Praxis Core Basic Skills Test passing score (or equivalent). The student must establish a minimum 3.0 CGPA, obtain at least a B- in MTT 390, and must have completed STA 216, MAT 301, MAT 351, and MAT 305 and all but at most 3 of their math major requirements prior to Clinical Practice II.

Teacher-education candidates must have a 3.0 or higher cumulative grade point average to be recommended by TCNJ for a New Jersey issued teaching license. They also must meet the state hygiene/physiology requirement, the state Harassment, Intimidation, and Bullying Prevention (HIB) training certificate requirement, and pass the appropriate Praxis Subject examination. Teacher-education candidates will receive a “certificate of eligibility with advanced standing” which requires a candidate to be provisionally certified for their first year of teaching. After successfully completing State required mentoring teaching, the candidate will be eligible for a permanent certificate.

Mathematics/Statistics Course Requirements: All Mathematics: Secondary Education students are required to take a minimum of eleven mathematics/statistics course units, and a 0-course-unit orientation. The eleven course units will consist of nine required course units and two MAT/STA options:

| | |
|--|----------------|
| MAT 099/Orientation to Mathematics and Statistics | 0 course units |
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| MAT 205/Linear Algebra: Theory and Applications | 1 course unit |
| MAT 229/Multivariable Calculus | 1 course unit |
| MAT 255/Perspectives on the Development of Mathematics | 1 course unit |
| MAT 301/Number Theory | 1 course unit |
| MAT 305/Abstract Algebra | 1 course unit |
| MAT 351/Geometry | 1 course unit |
| STA 216/Statistical Inference and Probability | 1 course unit |
| MAT 497/Topics in Secondary Mathematics from an Advanced Viewpoint | 1 course unit |

and two MAT/STA options: 2 course units

- one chosen from (MAT310, MAT316 or MAT326)
- one can be any MAT/STA course at the 300/400 level

Content Methods and Professional Sequence Courses: All Mathematics: Secondary Education students are required to take the following methods and professional courses:

| | |
|---|---------------|
| SED 224/Adolescent Learning and Development | 1 course unit |
| EFN 299/School and Communities | 1 course unit |

| | |
|---|------------------|
| SPE 103/Social and Legal Foundations of Special Education | 1 course unit |
| MTT 380/Methods of Teaching Mathematics I | 1 course unit |
| SED 399/Pedagogy in Secondary Schools | 1.5 course units |
| RAL 328/Reading in Secondary Education | 0.5 course unit |
| MTT 390/Methods of Teaching Mathematics II | 1 course unit |
| MTT 490/Clinical Practice II: Student Teaching | 2 course units |
| SED 498/Collaborative Capstone for Professional Inquiry | 1 course unit |

Additional Required Correlates

| | |
|---|---------------|
| CSC 220/Computer Science I: Computational Problem Solving | 1 course unit |
| One science course (BIO 201, CHE 201, or PHY 201) | 1 course unit |

Quantitative Reasoning Requirements

| | |
|--------------------|---------------|
| MAT 127/Calculus A | 1 course unit |
| MAT 128/Calculus B | 1 course unit |

Suggested First-Year Course Sequence for 4-year program

Fall

| | |
|---|---------------|
| FYS 1XX/First Year Seminar (CC) | 1 course unit |
| MAT 099/Orientation to Mathematics and Statistics | 0 course unit |
| MAT 127/Calculus A* | 1 course unit |
| CSC 220/Computer Science I | 1 course unit |
| Second Language | 1 course unit |

Spring

| | |
|--|---------------|
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| MAT 128/Calculus B | 1 course unit |
| College Core course | 1 course unit |
| Second Language | 1 course unit |
| SED 099/Secondary Education College Seminar | 0 course unit |

**It is recommended that students exempted from this course take Calculus B*

Suggested First-Year Course Sequence for 5-year Special Secondary Education

Fall

| | |
|---|---------------|
| FYS 1XX/First Year Seminar (CC) | 1 course unit |
| MAT 099/Orientation to Mathematics and Statistics | 0 course unit |
| MAT 127/Calculus A* | 1 course unit |
| CSC 220/Computer Science I | 1 course unit |
| SPE 103/Social & Legal Foundations of Special Education | 1 course unit |

Spring

| | |
|--|---------------|
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| MAT 128/Calculus B | 1 course unit |
| College Core course | 1 course unit |
| EFN 299/Schools, Communities, and Culture | 1 course unit |
| SED 099/Secondary Education College Seminar | 0 course unit |

**It is recommended that students exempted from this course take Calculus B*

*Suggested First-Year Course Sequence for 5-year Urban Secondary Education***Fall**

| | |
|---|---------------|
| FYS 1XX/First Year Seminar (CC) | 1 course unit |
| MAT 099/Orientation to Mathematics and Statistics | 0 course unit |
| MAT 127/Calculus A* | 1 course unit |
| CSC 220/Computer Science I | 1 course unit |
| SPA 101 | 1 course unit |

Spring

| | |
|--|---------------|
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| MAT 128/Calculus B | 1 course unit |
| College Core course | 1 course unit |
| EFN 299/Schools, Communities, and Culture | 1 course unit |
| SED 099/Secondary Education College Seminar | 0 course unit |

**It is recommended that students exempted from this course take Calculus B*

Mathematics Major: Math Teaching-Teacher Preparation for Elementary, Early Childhood, Urban, Deaf and Hard of Hearing, and Special Education majors

Requirements for the Major: Please see above for program retention and graduation requirements. Students should consult with advisors in both mathematics and in the School of Education in planning their academic program. These plans should take into account requirements for the majors, College Core, professional courses, and state certification. To be retained in the program, a student must earn at least a 2.75 cumulative grade point average (CGPA) before enrolling in Clinical Practice I, as well as have a Praxis Core Basic Skills Test passing score (or equivalent). The student must establish a minimum 3.0 CGPA, and must have completed all education prerequisites in order to be allowed to enroll in Clinical Practice II.

Candidates for a teacher education certificate must have a 3.0 or higher cumulative grade point average to successfully complete their teacher education program. They also must meet the state hygiene/physiology requirement, the state Harassment, Intimidation, and Bullying Prevention (HIB) training certificate requirement, and pass the appropriate Praxis examination. Teacher-education candidates will receive a “certificate of eligibility with advanced standing” which requires a candidate to be provisionally certified for their first year of teaching. After one year of successful teaching, the candidate is eligible for a permanent certificate.

Mathematics/Statistics Course Requirements for the Major

All Mathematics Teaching/Elementary, Early Childhood, Urban Deaf and Hard of Hearing, and Special Education students will be required to take a **minimum** of eleven mathematics/statistics course units, and a 0 course unit orientation. Eleven course units will consist of **ten required** course units, and a MAT/STA option:

| | |
|--|----------------|
| MAT 099/Orientation to Mathematics and Statistics | 0 course units |
| MAT 105/Mathematical Structures & Algorithms for Educators | 1 course unit |

| | |
|--|---------------|
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |
| MAT 205/Linear Algebra: Theory and Applications | 1 course unit |
| MAT 229/Multivariable Calculus | 1 course unit |
| MAT 255/Perspectives on the Development of Mathematics | 1 course unit |
| MAT 301/Number Theory | 1 course unit |
| MAT 305/Abstract Algebra | 1 course unit |
| MAT 310/Real Analysis | 1 course unit |
| MAT 351/Geometry | 1 course unit |
| STA 216/Statistical Inference and Probability | 1 course unit |
| One MAT/STA option which can be any MAT/STA course at the 300/400 level | 1 course unit |

Quantitative Reasoning Requirements

| | |
|--------------------|---------------|
| MAT 127/Calculus A | 1 course unit |
| MAT 128/Calculus B | 1 course unit |

*Suggested First-Year Mathematics Course Sequence**

Fall

| | |
|--|---------------|
| MAT 099/Orientation to Mathematics and Statistics | 0 course unit |
| MAT 127/Calculus A | 1 course unit |
| MAT 105/Mathematical Structures & Algorithms for Educators | 1 course unit |

Spring

| | |
|--|---------------|
| MAT 128/Calculus B | 1 course unit |
| MAT 200/Proof Writing through Discrete Mathematics | 1 course unit |

**Consult individual major in the School of Education for remaining courses.*

Minors in the Department of Mathematics and Statistics

The Department offers minors in Mathematics, Statistics, or Actuarial and Financial Risk Studies. The minor requirements will be defined by the Bulletin description at the time of application. Students must maintain the same mathematics and statistics cumulative average as required for graduation in the major.

Per TCNJ college policy, only one course taken as a part of the student’s major may also be counted toward the student’s minor; however, correlate courses for the major may be applied freely to the minor. Multiple minors may overlap by only one course.

Mathematics Minor

For a mathematics minor, a student must pass five MAT courses that are either MAT 128 or at the 200-level or above (except MAT 255, MAT 265, MAT 270). At least two of the courses must be at the 3xx/4xx level. Students must earn a 2.0 overall GPA in courses that count for the minor. All courses must have a grade of C- or higher, with the exception that a single grade of D or D+ is permitted in a 3xx/4xx level course. A minimum of four course units for the mathematics minor must be earned at The College of New Jersey.

Statistics Minor

For a statistics minor, a student must complete five courses as detailed below:

Required Courses: (2 course units)

| | |
|---|---------------|
| STA 215/Statistics or Statistical Inference | 1 course unit |
| STA 305/Regression Analysis | 1 course unit |

Any three courses from the following list:

| | |
|--|---------------|
| Any STA course at the 300 or 400 level | 1 course unit |
| MAT 316/Probability | 1 course unit |

(3 course units)

TOTAL: 5 COURSE UNITS

A minimum of three course units for the statistics minor must be earned at The College of New Jersey. Only courses with earned grades of C- or higher taken at TCNJ can be used to fulfill the requirements for the minor. Transfer courses require a grade of C or higher. Students intending to take Independent Study or Independent Research courses should first seek permission from the Statistics Program Coordinator.

Actuarial and Financial Risk Studies Minor

For the Actuarial and Financial Risk Studies Minor, a student must complete the prerequisites of MAT 125 or 127, MAT 128, MAT 200 and STA 215, and complete five required courses from the following two groups. The choice of courses depends on the major (see details following the two groups). The groups are:

GROUP A:

| | |
|--|---------------|
| MAT 229/Multivariable Calculus | 1 course unit |
| MAT 265/ Introduction to Financial Mathematics (offered only occasionally) | 1 course unit |
| STA 305/Regression Analysis OR ECO 231/Applied Business Statistics | 1 course unit |
| MAT 316/Probability | 1 course unit |
| STA 410/Mathematical Statistics | 1 course unit |
| <i>Gives VEE Statistics credit</i> | |

GROUP B:

| | |
|---|---------------------|
| ECO 102/Principles of Macroeconomics | 1 course unit |
| MAT 265/Introduction to Financial Mathematics (offered only occasionally) | 1 course unit |
| FIN 201/Fundamental Financial Methods AND IST 201/Information Systems: Concepts and Applications | 1 course unit total |
| <i>Both of these are half-courses.</i> | |
| FIN 310/Introduction to Investments and Financial Analysis | 1 course unit |
| FIN 360/Financial Modeling OR FIN 410/Portfolio Management and Derivative Securities | |
| <i>Only one of these two courses can count towards the minor.</i> | |

For Statistics Specialization: Students will select one course from Group A, which are all required in the Statistics specialization, and double-count this course towards the Minor. They will then take four courses listed in Group B.

For Business Majors: Students will choose one course from Group B (which will be the double-counting course), and the four courses from Group A.

For Mathematics Majors: Students may choose 5 courses from Groups A and B but it is highly recommended that MAT 316 and STA 410/MAT 318 are among those selected. Mathematics majors may not take ECO231 for the minor.

For Other Majors: Selections from Groups A and B as advised.

Note: While only ECO 102 is listed in Group B, it is recommended that all students take ECO 101/*Principles of Microeconomics* as an elective in order to obtain VEE-Economics credit. A grade of B- or higher is required for all VEE credits.