

# Progress Toward Completion of the Mathematics Major

## Operations Research Concentration

Arts and Sciences students may be admitted to the math major after successfully completing a semester of multivariable calculus, a semester of linear algebra, and a 3- or 4-credit computer programming course. Applications are available in 310A Malott Hall.

Student's Name	Net ID	Faculty Advisor
_____	_____	_____
<b>Courses needed to complete the major</b>		
_____		initials _____
_____		date _____

Math majors must complete **9 courses** for the major, as described in items 1–3 below, with a **minimum grade of C–**. MATH courses numbered 5000–5999 do not count. No course may be used to satisfy more than one requirement.

\_\_\_\_\_ At least two of the MATH courses taken must be at the 4000 level (or above).

### 1. Two Courses in Algebra. ( \_\_\_ transfer credit applied, see reverse)

- \_\_\_\_\_ MATH 3320 Introduction to Number Theory
- \_\_\_\_\_ MATH 3340\* Abstract Algebra
- \_\_\_\_\_ MATH 4310\* Linear Algebra
- \_\_\_\_\_ MATH 4330\* Honors Linear Algebra
- \_\_\_\_\_ MATH 4340\* Honors Introduction to Algebra
- \_\_\_\_\_ MATH 4370 Computational Algebra
- \_\_\_\_\_ MATH 4500 Matrix Groups
- \_\_\_\_\_ MATH 4560 Geometry of Discrete Groups
- \_\_\_\_\_ MATH 3360\* Applicable Algebra
- \_\_\_\_\_ MATH 4315\* Linear Algebra with Supplements

### 2. Two Courses in Analysis. ( \_\_\_ transfer credit applied, see reverse)

- \_\_\_\_\_ MATH 3110\* Introduction to Analysis
- \_\_\_\_\_ MATH 3210 Manifolds & Differential Forms
- \_\_\_\_\_ MATH 3230\* Introduction to Differential Equations
- \_\_\_\_\_ MATH 4130\* Honors Intro Analysis I
- \_\_\_\_\_ MATH 4140 Honors Intro Analysis II
- \_\_\_\_\_ MATH 4180\* Complex Analysis
- \_\_\_\_\_ MATH 4200\* Differential Equations and Dynamical Systems
- \_\_\_\_\_ MATH 4210\* Nonlinear Dynamics and Chaos [also MAE 5790]
- \_\_\_\_\_ MATH 4220\* Applied Complex Analysis
- \_\_\_\_\_ MATH 4250 Numerical Analysis and Differential Equations [also CS 4210]
- \_\_\_\_\_ MATH 4260 Numerical Analysis: Linear & Nonlinear Equations [also CS 4220; co-meets w/CS 5223]
- \_\_\_\_\_ MATH 4280\* Introduction to Partial Differential Equations

**\*Forbidden Overlaps:** Due to an overlap in content, students will receive credit for only one course in each group:

- (1) MATH 3110, 4130; (2) MATH 3230, 4280; (3) MATH 3340, 3360; (4) MATH 3340, 4340; (5) MATH 4180, 4220; (6) MATH 4200, 4210;
- (7) MATH 4310, 4315, 4330; (8) MATH 4710, ECON 3130, BTRY 3080; (9) MATH 4720, ECON 3130, BTRY 4090; (10) MATH 4810, 4860.

**3. Concentration in Operations Research.** ( \_\_\_ transfer credit applied, see below)

Five additional courses from (xiv) and (xv) below.

(xiv) At least one MATH course numbered 3000 or above:

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(xv) At least three courses in ORIE in which the primary focus involves mathematical techniques:

- \_\_\_ ORIE 3300 Optimization I [co-meets w/ORIE 5300]
  - \_\_\_ ORIE 3310 Optimization II [co-meets w/ORIE 5310]
  - \_\_\_ ORIE 3500 Engineering Probability and Statistics II [co-meets w/ORIE 5500]
  - \_\_\_ ORIE 3510 Introduction to Engineering Stochastic Processes I  
[also STSCI 3510; co-meets w/ORIE 5510]
  - \_\_\_ ORIE 4150 Economic Analysis of Engineering Systems
  - \_\_\_ ORIE 4300 Optimization Modeling
  - \_\_\_ ORIE 4320 Nonlinear Optimization
  - \_\_\_ ORIE 4330 Discrete Models
  - \_\_\_ ORIE 4350 Introduction to Game Theory
  - \_\_\_ ORIE 4360 A Mathematical Examination of Fair Representation
  - \_\_\_ ORIE 4520 Introduction to Engineering Stochastic Processes II
  - \_\_\_ ORIE 4600 Introduction to Financial Engineering
  - \_\_\_ ORIE 4630 Operations Research Tools for Financial Engineering
  - \_\_\_ ORIE 4710 Applied Linear Statistical Models (half course)
  - \_\_\_ ORIE 4712 Regression (half course)
  - \_\_\_ ORIE 4740 Statistical Data Mining I
  - \_\_\_ ORIE 5600 Financial Engineering with Stochastic Calculus I
  - \_\_\_ ORIE 5610 Financial Engineering with Stochastic Calculus II
  - \_\_\_ ORIE 5640 Statistics for Financial Engineering [also STSCI 5640]
- \_\_\_\_\_ (approved by faculty advisor)

**Transfer Credit / Study Abroad Courses Applied to the Major**

Course Number & Title	Institution	Requirement
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