

**Montclair State University  
Department of Mathematical Sciences**
**BS Mathematics with Concentration: Discrete Applied Mathematics – Requirements (MADA)**

<b>I. Major Requirements</b>	<b>43 sh</b>	<b>II. Collateral Requirements</b>	<b>14-15 sh</b>
<b>A. Mathematics Core (19 sh)</b>		<b>A. Computer Science (6 sh)</b>	
MATH 122 Calculus I	4	CSIT 111 Fundamentals of Programming I	3
MATH 221 Calculus II	4	CSIT 112 Fundamentals of Programming II	3
MATH 222 Calculus III	4	<b>B. One of the following six sequences: (8-9 sh)</b>	
MATH 335 Linear Algebra	4	PHYS 191-192 University Physics I and II	8
MATH 340 Probability	3	CHEM 120-121 General Chemistry I and II	8
		BIOL 112-113 Principles of Biology I and II	8
<b>B. Mathematics Concentration (15 sh)</b>		GEOS 112 and 114 Phys. and Hist. Geology	8
MATH 320 Transition to Adv Math	3	ECON 101-102 Prin. of Econ: Macro & Micro, and MGMT 231 Management Processes	9
MATH 464 Operations Research I	3	ACCT 201 Fund. of Financial Accounting, ACCT 202 Fund. of Managerial Accounting, and MGMT 231 Management Processes	9
MATH 465 Operations Research II	3		
MATH 469 Mathematical Modeling	3		
MATH 485 App Combinatorics/Graph Theory	3		
		<b>III. GenEd Requirement</b>	<b>29-33 sh</b>
<b>C. Mathematics Electives (9 sh)</b>		A. New Student Experience <i>MATH 102</i>	1
<b>Select 9 or more sh, not already counted in above from MATH 320-349, 351-469, 480-499, and STAT 330-499.</b>		C. Communications	9
MATH 323 Complex Variables	3	ENWR 105 College Writing	3
MATH 360 Mathematical Modeling in Biology	3	ENWR 106 College Writing	3
MATH 368 Fluid Mechanics	3	CMST 101 Fundamentals of Speech	3
MATH 398 Vector Calculus	3	D. Fine and Performing Arts	3
MATH 420 Differential Equations	4	F. Humanities	6
MATH 421 Partial Differential Equations	3	World Literature/General Humanities Philosophy/Religion	
MATH 425 Advanced Calculus I	3	G. CSIT 111 Fundamentals of Programming (0)	
MATH 426 Advanced Calculus II	3	H. Math <i>MATH 122, 221 (0)</i>	
MATH 431 Foundations of Modern Algebra	3	I. Natural/Physical Science	0-4
MATH 433 Theory of Numbers	3	<i>PHYS 191</i>	
MATH 436 Elements of Logic	3	J. Physical Education	1
MATH 450 Foundations of Geometry	3	K. Social Science	
MATH 451 Topology	3	American/European History	3
MATH 460 Intro to Applied Math	3	Non-Western Culture	3
MATH 463 Numerical Analysis	3	Social Science	0-3
MATH 466 Mathematics of Finance I	3	<i>ECON 101 (included in Collateral Req.)</i>	
MATH 467 Mathematics of Finance II	3	L. GenEd Elective <i>Second Collateral course (0)</i>	
MATH 487 Intro to Math Cryptography	3		
MATH 490 Honors Seminar	3		
MATH 495 Topics for Undergraduates	1-3	<b>IV. World Languages and Cultures</b>	<b>3-9 sh</b>
MATH 497/8 Undergraduate Research I/II	1-3	A. World Languages	3-6
STAT 330 Fund. of Modern Statistics I	3	B. World Cultures	0-3
STAT 441 Statistical Computing	3		
STAT 442 Fund. of Modern Statistics II	3	<b>V. Free Electives</b>	<b>20-31 sh</b>
STAT 443 Intro. to Mathematical Statistics	3		
STAT 481 Intro. to Statistical Data Mining	3		
STAT 487 Statistical Genomics	3		
STAT 495 Topics in Statistical Science	1-3		
STAT 497 Undergrad Res. in Stat Science	1-3	<b>Minimum total required for graduation</b>	<b>120 s.h.</b>

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## Suggested Sequence for Four-Year Plan

### BS Mathematics with Concentration: Discrete Applied Mathematics

The following sequence assumes exemption from all basic skills requirements as a result of meeting or exceeding the required scores on the MSU Basic Skills Placement Test.

#### First Year

##### First Semester (15 or 16 credits)

ENWR 105 College Writing I: Intellectual Prose (3)  
MATH 122 Calculus I (4) \*  
CSIT 111 Fundamentals of Programming I (3)\*\*  
Collateral Course (3 or 4)  
MATH 102 New Student Experience for  
Mathematical Sciences (1)  
Physical Education Requirement (1)

##### Second semester (16 or 17 credits)

ENWR 106 College Writing II: Writing and  
Literary Studies (3)  
MATH 221 Calculus II (4)  
CSIT 112 Fundamentals of Programming II (3)  
Collateral Course (3 or 4)  
CMST 101 Fundamentals of Speech (3)

#### Second Year

##### Third Semester (16 credits)

Language requirement (3)  
MATH 222 Calculus III (4)  
MATH 320 Transition to Adv Math (3)  
Collateral Course or Free Elective Course (3)  
Free Elective (3)

##### Fourth Semester (16 credits)

Language requirement (3)  
MATH 335 Linear Algebra (4)  
MATH 340 Probability (3)  
Math Elective (3)  
Free Elective (3)

#### Third Year

##### Fifth Semester (15 credits)

MATH 464 Operations Research I (3)  
MATH 469 Mathematical Modeling (3)  
Free Elective (3)  
General Education courses (6)

##### Sixth Semester (15 credits)

MATH 465 Operations Research II (3)  
MATH 485 Applied Combinatorics and Graph Theory (3)  
General Education courses (9)

#### Fourth Year

##### Seventh Semester (15 credits)

Math Elective Courses (6)  
General Education Course (3)  
Free Elective Courses (6)

##### Eight Semester (10-12 credits)

General Education courses (3)  
Free Elective Courses (7-9)

\* Students who do not have a strong (4 year) background in high school mathematics, including exponential, logarithmic, and trigonometric functions are advised to take MATH 112 Precalculus Mathematics or MATH 111 Applied Precalculus before Calculus I.

\*\* Prerequisite MATH 112 Precalculus Mathematics, or MATH 111 Applied Precalculus, or equivalent

## ADDITIONAL CURRICULAR SUGGESTIONS

--- Students who have taken high school courses in Calculus or Computer Science may receive advanced standing with credit based upon either the Advanced Placement Exams or departmental exams. Consult the Undergraduate Advisor for further details.

--- Students are urged to take as many additional courses as possible in the areas of computer science, statistics, business administration, economics and natural sciences. This will insure maximum flexibility in employment opportunities and professional growth.

--- Students may elect to do independent study in advanced areas of mathematics under MATH 495 "Topics in Mathematics for Undergraduates" and statistics under STAT 495 "Topics in Statistics for Undergraduates."

--- Students interested in the honors program in mathematics should contact the department chairperson.

### NOTES

This worksheet, the Montclair State University undergraduate catalog, and the semester schedule of courses booklets contain the important advising and academic information necessary for an accurate understanding of the degree requirements. Students with questions are urged to consult undergraduate advisor.

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**FAILURE TO BE AWARE OF AND FOLLOW UNIVERSITY ACADEMIC AND ADMINISTRATIVE POLICIES AS OUTLINED HERE AND IN THE UNIVERSITY UNDERGRADUATE CATALOG AND SEMESTER SCHEDULE OF COURSES BOOKLETS MAY RESULT IN LOSS OF CREDIT AND/OR DELAYED GRADUATION.**

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RESTRICTIONS - The following courses MAY NOT BE TAKEN FOR GRADUATION CREDIT BY MATHEMATICS MAJORS: MATH 100, MATH 103, MATH 106, MATH 109, MATH 114, MATH 116, MATH 270, INFO 270, INFO 273.

PASS/FAIL LIMITATIONS - Those courses that meet the major, collateral, teacher certification, or general education requirements may not be taken pass/fail.

WORLD CULTURES REQUIREMENT - All students are required to take one course that satisfies the university world cultures requirement. Refer to the current university undergraduate catalog for a complete listing of acceptable courses.

PREREQUISITES - It is the student's responsibility to ensure that courses are taken in the academically correct order. A current list of prerequisites for these and other courses may be found in the current university undergraduate catalog or through the office of the offering department.

BASIC SKILLS - Students placed into basic skills courses as a result of the MSU Placement Test are required to enroll in those courses the first semester and continue in sequence each semester until required work is completed. All basic skills course work is counted in the cumulative grade-point-average, but only ENGL 100 "Basic Composition" may be used toward the 120 credits degree requirement.

FINAL EVALUATION - Students who are eligible for graduation must file an "Application for Final Evaluation" in the Office of the Registrar according to the following deadlines: October 1 for May graduation, March 1 for August graduation, June 1 for January graduation.

RESIDENCE REQUIREMENTS - A minimum of 32 credits must be taken at MSU. This must include at least 18 credits of mathematical sciences courses in the major, of which at least 12 credits must be at the junior (300-399) or senior level (400-499). The last 24 credits must be taken at MSU and cannot be acquired through transfer.

FREE ELECTIVES - Free electives are defined as credits not applicable to general education or major requirements.

\*IN ALL CASES, THE MINIMUM NUMBER OF CREDITS REQUIRED TO GRADUATE IS 120 \*      2/3/10

BS MATHEMATICS with concentration in DISCRETE APPLIED MATHEMATICS

1. A brief description of the proposed alteration(s).
  - a. Change the range for Mathematics Electives from  
  
C. Mathematics Electives  
Select 15 or more sh, not already counted in above from MATH 398 – 469, 480 to 499 and STAT 330 - 499  
  
to  
  
C. Mathematics Electives  
Select 15 or more sh, not already counted in above from MATH 320 to 349, 351 to 469, 480 to 499 and STAT 330– 499
  - b. Replace MATH 280 as required course in B. Mathematics Concentration with MATH 320.
2. A narrative describing the rationale for the alteration(s)
  - a. Elective Mathematics courses should be either 300 or 400 level courses. As we develop new courses some will be at the 300 level and some will be at the 400 level. Students should be able to take elective courses at either level. At present the list of allowable courses only includes courses numbered at least 398, but allowing courses numbered at least 320 will give up more flexibility. We would like the option of not having to change our curriculum guide each time we propose a new course.
  - b. The level of MATH 280 has been raised to include more of an emphasis on proofs. As a result of the change in emphases the course number has been changed to MATH 320.