

OPERATIONS RESEARCH CONCENTRATION

Mathematics, Bachelor of Science with a Concentration in Operations Research Requirements

Code	Title	Credits
GENERAL EDUCATION REQUIREMENTS - 46 Hours Required		
Minimum of "C-" required		
Fundamental Academic Skills		15
ENGL 1150	ENGLISH COMPOSITION I	
ENGL 1160	ENGLISH COMPOSITION II	
Writing in the Discipline Course		
CMST 1110 or CMST 2120	PUBLIC SPEAKING FUNDS ARGUMENTATION AND DEBATE	
MATH 1120 or MATH 1100 or MATH 1130 or MATH 1140 or MATH 1300 or STAT 1100 or STAT 1530	INTRODUCTION TO MATHEMATICAL AND COMPUTATIONAL THINKING DATA LITERACY AND VISUALIZATION QUANTITATIVE LITERACY QUANTITATIVE REASONING FOR HEALTHCARE PROFESSIONALS COLLEGE ALGEBRA WITH SUPPORT DATA LITERACY AND VISUALIZATION ELEMENTARY STATISTICS	
Distribution Requirements		31
Natural Science - From two disciplines and at least one lab - 7 hrs		
Social Science - From two disciplines - 9 hrs		
Humanities and Fine Arts - From two disciplines- 9 hrs		
Global Diversity - 3 hrs		
US Diversity - 3 hrs		
MAJOR REQUIREMENTS		
**Course will satisfy UNO's General Education requirement		
^Course requires pre-requisite(s)		
Mathematics Major with a Concentration in Operations Research - 46 Hours Required		
Required Coursework		25
MATH 1950	CALCULUS I (^)	
MATH 1960	CALCULUS II	
MATH 1970	CALCULUS III	
MATH 2050	APPLIED LINEAR ALGEBRA	
MATH 2230	INTRODUCTION TO ABSTRACT MATH	
MATH 2350	DIFFERENTIAL EQUATIONS	
MATH 3230	INTRODUCTION TO ANALYSIS	
Select one of the following-		3
CIST 1400	INTRODUCTION TO COMPUTER SCIENCE I	
MATH 2200	MATHEMATICAL COMPUTING I	
MATH 3250	INTRODUCTION TO NUMERICAL METHODS	
Select all of the following Operations Research Concentration courses		15

MATH 3200 or CSCI 1620	MATHEMATICAL COMPUTING II (Requires MATH 2200 or CIST 1400) INTRODUCTION TO COMPUTER SCIENCE II	
MATH 4300 or CSCI 4300	DETERMINISTIC OPERATIONS RESEARCH MODELS DETERMINISTIC OPERATIONS RESEARCH MODELS	
MATH 4310 or CSCI 4310	PROBABILISTIC OPERATIONS RESEARCH MODELS PROBABILISTIC OPERATIONS RESEARCH MODELS	
MATH 4320	COMPUTATIONAL OPERATIONS RESEARCH	
MATH 4740 or STAT 3800	INTRODUCTION TO PROBABILITY AND STATISTICS I APPLIED ENGINEERING PROBABILITY AND STATISTICS	
Select one the following Operations Research Concentration courses		3
MATH/CSCI 4150	GRAPH THEORY & APPLICATIONS	
MATH/STAT 4450	INTRODUCTION TO MACHINE LEARNING AND DATA MINING	
MATH 4750	INTRODUCTION TO PROBABILITY AND STATISTICS II	
MATH 4900	INDEPENDENT STUDIES	
STAT 4410	INTRODUCTION TO DATA SCIENCE	
STAT 4420	EXPLORATORY DATA VISUALIZATION AND QUANTIFICATION	
STAT 4430	LINEAR MODELS	
STAT 4440	TIME SERIES ANALYSIS	
College Breadth (choose one option)		15-30+
Option 1: Complete any UNO minor or undergraduate certificate - 15+ hours		
Option 2: Additional General Education Requirements - 19+ hours		
Additional quantitative literacy - 3 hours		
Additional Social Science Gen. Ed. from 3rd Discipline - 3 hours		
Additional Humanities Gen. Ed. from 3rd Discipline - 3 hours		
HIST 1000 and HIST 1010 - 6 hours		
Additional Nat. and Physical Science w/ Lab - 4-5 hours		
Option 3: CAS comprehensive major (50+ hours) OR any second UNO major (30+ hours)		
Bachelor Science Cognate Requirement		15
The Bachelor of Science Degree requires at least 15 hours of related Cognate coursework that must be approved by the Mathematics Academic Advisor/Coordinator. Students can also choose a UNO Minor to satisfy their cognate requirement; however, this Cognate minor cannot double-count as the Option 1 minor for the College of Arts & Sciences College Breadth Requirement. A Computer Science Minor cannot satisfy the Cognate requirement for Mathematics. No more than 6 credits of cognate coursework may double-count within the general education requirements.		
ELECTIVES		
Elective hours as required to reach a total of 120 hours		

Mathematics, Bachelor of Science with a Concentration in Operations Research Four Year Plan

Freshman

Fall		Credits
CMST 1110 or CMST 2120	PUBLIC SPEAKING FUNDS or ARGUMENTATION AND DEBATE	3
ENGL 1150	ENGLISH COMPOSITION I (*)	3
MATH 1950	CALCULUS I (**)	5
Humanities/Fine Arts Course with Global Diversity		3
*ENGL 1150: Requires placement.		
**MATH 1950: Requires Math Exam or ACT or SAT scores.		
Credits		14

Spring

ENGL 1160	ENGLISH COMPOSITION II	3
MATH 1960	CALCULUS II	4
Humanities/Fine Arts Course		3
Natural/Physical Science with Lab		4
Elective		1
Credits		15

Sophomore

Fall		Credits
MATH 1970	CALCULUS III	4
MATH 2050	APPLIED LINEAR ALGEBRA (*)	3
HIST 1000 or Minor/2nd Major Course**		3
Social Science		3
Social Science with U.S. Diversity		3
*MATH 2050: Requires MATH 1960		
**A&S College Requirement Options.		
Credits		16

Spring

MATH 2230	INTRODUCTION TO ABSTRACT MATH (*)	3
MATH 2350	DIFFERENTIAL EQUATIONS (**)	3
Advanced Writing Requirement***		3
Social Science^		3
Humanities/Fine Arts Course#		3
*MATH 2230: Requires MATH 1960		
**MATH 2350: Requires MATH 1960. MATH 2050 Recommended but not required.		
***Advanced Writing Requirement can be: CIST 3000 Advanced Composition for IS&T, ENGL 3050 Writing for the Workplace, ENGL 3980 Technical Writing Across the Discipline, or PHIL 3000 Philosophy Writing Seminar.		
^Social Science must be in 2nd discipline.		
#HFA Must be in 2nd discipline		
Credits		15

Junior

Fall		Credits
MATH 3230	INTRODUCTION TO ANALYSIS (*)	3
MATH 4300 or CSCI 4300	DETERMINISTIC OPERATIONS RESEARCH MODELS (**) or DETERMINISTIC OPERATIONS RESEARCH MODELS	3
MATH 4740	INTRODUCTION TO PROBABILITY AND STATISTICS I (***)	3

Coding Course 1^	3
Additional Social Science for A&S or Minor/2nd Major Course#	3
*MATH 3230: Requires MATH 2230	
**MATH/CSCI 4300: Requires MATH 2050	
***MATH 4740: Requires MATH 2230	
^See Academic Catalog for list of Coding Course Options.	
#A&S College Requirement Options. Additional SS Must be in a 3rd discipline	

Credits **15**

Spring

MATH 3200	MATHEMATICAL COMPUTING II (*)	3
MATH 4310 or CSCI 4310	PROBABILISTIC OPERATIONS RESEARCH MODELS (**) or PROBABILISTIC OPERATIONS RESEARCH MODELS	3
Natural/Physical Science***		3
Cognate		3
Additional Humanities/Fine Arts Course for A&S or Minor/2nd Major Course^		3
*MATH 3200: Requires MATH 2200. CSCI 1620: Requires CIST 1400.		
**MATH/CSCI 4310: Requires MATH 2050 and MATH 4740		
***N&PS must be in 2nd discipline		
^A&S College Requirement Options. Additional HFA must be in 3rd discipline.		

Credits **15**

Senior

Fall		Credits
HIST 1010 or Minor/2nd Major Course*		3
Operations Research Elective or Cognate**		3
Cognate		3
Cognate		3
Elective***		3
*A&S College Requirement Options		
**Must take one Operations Research Elective. Fall options: MATH 4750 Probability & Statistics II, MATH 4900 Independent Studies, STAT 4410 Intro to Data Science, STAT 4430 Linear Models		
***Students need at least 120 credits and a minimum of 27 upper level credits throughout the entire degree, with at least 18 credits of upper level coursework taken within the major/concentration. May need to select 3000/4000 level free electives and/or cognate courses to reach the 27 credit minimum.		

Credits **15**

Spring

MATH 4320	COMPUTATIONAL OPERATIONS RESEARCH (*)	3
Operations Research Elective or Cognate**		3
Cognate		3
Elective at 3000-4000 Level/Minor/2nd Major Course***		3
Elective at 3000-4000 Level/Minor/2nd Major Course***		3
*MATH 4320: Requires MATH 3200 (or instructor permission) and MATH 4300.		
**Must take one Operations Research Elective. Fall options: MATH 4750 Probability & Statistics II, MATH 4900 Independent Studies, STAT 4420 Data Visualization, STAT 4440 Time Series Analysis, STAT 4450 Machine Learning & Data Mining.		

***Students need at least 120 credits and a minimum of 27 upper level credits throughout the entire degree, with at least 18 credits of upper level coursework taken within the major/concentration. May need to select 3000/4000 level free electives and/or cognate courses to reach the 27 credit minimum.

Credits	15
Total Credits	120

This roadmap is a suggested plan of study and does not replace meeting with an advisor. Please note that students may need to adjust the actual sequence of courses based on course availability. Please consult an advisor in your major program for further guidance.

This plan is not a contract and curriculum is subject to change

Additional Information About this Plan:

University Degree Requirements: The minimum number of hours for a UNO undergraduate degree is 120 credit hours. Please review the requirements for your specific program to determine all requirements for the program. In order to graduate on-time (four years for an undergraduate degree), you need to take 30 hours each year.

Placement Exams: For Math, English, Foreign Language, a placement exam may be required. More information on these exams can be found at <https://www.unomaha.edu/enrollment-management/testing-center/placement-exams/information.php>

**Transfer credit or placement exam scores may change suggested plan of study