Bachelor of Science in Applied Math

Program Overview

The U.S. Bureau of Labor Statistics projects demand for mathematicians and computational scientists to experience much faster than average growth, with career opportunities increasing between 26 and 30 percent from 2018 to 2028. Manchester University's new Applied Mathematics major is designed for students wishing to enter industry in a wide variety of fields, including advanced manufacturing, transportation, logistics, telecommunications, cybersecurity, image processing, and orthopedics. Our graduates are creative problem-solvers and proficient mathematical modelers in a wide variety of real-world contexts. Applications include scheduling, medical imaging, computer simulation, network planning and routing, optimization, and traffic flow. In recent years our graduates have taken positions at major corporations such as General Motors, Raytheon, Bridgestone, and CNO Financial Group.

Successful students will be those who enjoy working on challenging questions, think creatively when facing ill-defined problems, and appropriately apply mathematical concepts and techniques in a variety of settings. Manchester students have opportunities to broaden their skills through complementary programs in Software Engineering, Computer Science and Data Science, also offered by the Marvin L. Bittinger Department of Mathematics and Computer Science.

Degree Requirements

To earn this degree, students must have a GPA of 2.0 or higher in the Major as well as an overall GPA of 2.0, complete a minimum of 120 credit hours, and fulfill the course requirements of the program listed below.

*This is a sample plan; specific courses may vary from year to year. Academic advisors will work with each student to develop their individual schedule.

	Major-Specific Required Courses		CREDITS
✓			
	DATA 210^	Statistical Analysis	4
	MATH 121^	Calculus I	4
	MATH 122	Calculus II	4
	MATH 130	Discrete Mathematics	4
	MATH 233	Scientific Computing	3
	MATH 245	Ordinary Differential Equations	3
	MATH 251	Linear Algebra I	4
	MATH 315	Probability and Simulation	3
	MATH 330	Operations Research Models	3

	Choose 1 of the following:		CREDITS
	CPTR 105	Computer Programming	3
	CPTR 111	Foundations of Computer Science I	4

	Choose 1 of the following:		CREDITS
	MATH 475	Internship in Mathematics	3
	MATH 499	Senior Project	3

	Six hours of approved electives selected from:		CREDITS
	CHEM 341	Physical Chemistry I	3
	CPTR 310	Algorithms & Data Structures	3
	CPTR 430	Machine Learning	3
	DATA 242	Data Analytics	3
	MATH 231	Multivariable Calculus	4
	MATH 340	Linear Algebra II	3
	MATH 380/480	Special Problems	3
	MATH 385/485	Seminar	3

Total Program Credits: 120+

MAJOR	*Options
CORE	^CORE equivalent
ELECTIVE/MINOR	
EXPERIENTIAL	

	CORE		CREDITS
✓		Foundation	
	LA-FWS	First-Year Writing Seminar	3
	LA-FCS	First-Year Communication Seminar	3
	LA-FQR	Quantitative Reasoning	3-4
	LA-FSS	First Year Success Seminar	1
	LA-FCG	Cultural and Global Understanding	3-5
		Exploration	
	LA-EAH	Arts and Humanities	3
	LA-ENS	Natural Sciences	3-6
	LA-ESS	Social Sciences	3-4
		Transformation	
	LA-TFR	Faith, Reason, and Ethics	3
	LA-TBI	Big Issues - 2 courses	6-7
	LA-TCE	Creative Expression	1-3

	Additional credits to bring total to 120+ credits		CREDITS
✓		Electives	
		Experiential Learning	

Example Course Sequence:

The following is a sample of a semester-by-semester approach to completing this program in 4 years.

YEAR 1			
FIRST SEMESTER			
COURSE		**CREDITS**	**PREREQUISITES**
CPTR 111*	Foundations of Computer Science I	4	
MATH 121^	Calculus I	4	MATH 120 or placement
LA-FWS	First-Year Writing Seminar	3	
LA-FCS	First-Year Communication Seminar	3	
LA-FSS	First Year Success Seminar	1	
JAN TERM			
COURSE		**CREDITS**	
SECOND SEMESTER			
COURSE		**CREDITS**	
MATH 122	Calculus II	4	MATH 121
MATH 130	Discrete Mathematics	4	MATH 121
LA-EAH	Arts and Humanities	3	
LA-ENS	Natural Sciences	3	
		29	

YEAR 2			
THIRD SEMESTER			
COURSE		**CREDITS**	**PREREQUISITES**
MATH 233	Scientific Computing	3	MATH 121
DATA 210^	Statistical Analysis	4	MATH 105 or placement
LA-ESS	Social Sciences	3	
ELECTIVE/MINOR		3	
ELECTIVE/MINOR		3	
JAN TERM			
COURSE		**CREDITS**	
ELECTIVE/MINOR		3	
FOURTH SEMESTER			
COURSE		**CREDITS**	
DATA 242	Data Analytics*	3	DATA 210 or MATH 115 or MATH 240 or PSYC 241
MATH 245	Ordinary Differential Equations	3	MATH 122
LA-FCG	Cultural and Global Understanding	3	
ELECTIVE/MINOR		3	
		31	

4-Year Sample Schedule Cont.

YEAR 3			
FIFTH SEMESTER			
COURSE		CREDITS	PREREQUISITES
MATH 251	Linear Algebra I	4	MATH 121, 130 or 202
LA-TFR	Faith, Reason, and Ethics	3	
LA-TCE	Creative Expression	3	
ELECTIVE/MINOR		3	
ELECTIVE/MINOR		3	
JAN TERM			
COURSE		CREDITS	
EXPERIENTIAL		3	
SIXTH SEMESTER			
COURSE		CREDITS	
MATH 315	Probability and Simulation	3	DATA 210 or PSYC 241; CPTR 105 or CPTR 111
MATH 340*	Linear Algebra II	3	MATH 251
LA-TBI	Big Issues	3	
ELECTIVE/MINOR		3	
		31	

YEAR 4			
SEVENTH SEMESTER			
COURSE		CREDITS	PREREQUISITES
MATH 330	Operations Research Models	3	MATH 103 or 202 or 251
LA-TBI	Big Issues	3	
ELECTIVE/MINOR		3	
EXPERIENTIAL		3	
ELECTIVE/MINOR		3	
JAN TERM			
COURSE		CREDITS	
EXPERIENTIAL		3	
EIGHTH SEMESTER			
COURSE		CREDITS	
MATH 475*	Internship in Mathematics	3	MATH 130 and MATH 122
ELECTIVE/MINOR		3	
ELECTIVE/MINOR		3	
EXPERIENTIAL		3	
		30	
	TOTAL CREDITS	121	