

PROFESSIONAL APPLIED AND COMPUTATIONAL MATHEMATICS (M.S.)

Master of Science Program

Program Code: MS-AS
Major Code: ACM
HEGIS 1701

Mathematics Department

Science and Mathematics Complex 159, (716) 878-5621
mathematics.buffalostate.edu/ (<http://mathematics.buffalostate.edu/>)

Professional Applied and Computational Mathematics (PACM) is an innovative Professional Science Master's (PSM) degree program. This program, a collaboration between Buffalo State and a group of partners from Buffalo and the Western New York area, brings together a diverse interdisciplinary group of active faculty from academia and adjunct faculty and advisory board members from business, industry, non-profit organizations, and government agencies. The goal of the program is to train graduate students for careers in many emerging fields that now demand a new type of workforce with solid and in-depth background in applied and computational mathematics, as well as with effective business and communication skills.

The PACM program consists of 27 credits of academic training in data analysis, mathematical modeling, business communication and management, as well as 3 credits of research internship. The core courses are broken up into 1-credit modules that will be updated as needed to keep the program current. Also this format allows for more flexible scheduling, including night or weekend classes, and summer or J-Term sessions.

The development of the program was funded by the Alfred P. Sloan Foundation.

The program is recognized as a Professional Science Master's degree by the Council of Graduate Schools (CGS).

Admission Requirements

- Bachelor's degree with a minimum cumulative GPA of 3.0 (4.0 scale) in the last 60 credit hours.
- If minimum requirements are not met, the graduate faculty may grant an applicant conditional admission to the program as a premajor if the applicant has a minimum cumulative GPA of 2.5 (4.0 scale) in the last 60 credit hours. If accepted to the premajor, the applicant must obtain a 3.0 or higher in the first semester and then reapply to the major (no additional application fees are required).

- The following mathematics courses completed: Single and Multivariable Calculus; Differential Equations; Linear Algebra; Discrete Mathematics; Calculus-based Probability; Calculus-based Statistics.
- Students must demonstrate knowledge of a standard programming language such as C++, Java, Fortran, Maple, or Mathematica.
- An interview with PACM faculty. In addition, all applicants should review the Admission to Graduate School (<http://ecatalog.buffalostate.edu/graduate/admission-graduate-program/>) section.

Program Requirements

Code	Title	Credit Hours
Required Analytical Mathematical Modeling (9 credit hours)		
ACM 610	CONTINUOUS FOUNDATIONS OF APPLIED MATHEMATICS FROM A PROBLEM SOLVING PERSPECTIVE	
ACM 611	DISCRETE FOUNDATIONS OF APPLIED MATHEMATICS FROM A PROBLEM SOLVING PERSPECTIVE	
ACM 612	COMPUTATIONAL FOUNDATIONS OF APPLIED MATHEMATICS FROM A PROBLEM SOLVING PERSPECTIVE	
ACM 620	OPTIMIZATION OF DISCRETE MODELS	
ACM 621	EMPIRICAL MODEL BUILDING	
ACM 622	MODELING CHANGE WITH DYNAMICAL SYSTEMS	
ACM 630	NUMERICAL LINEAR ALGEBRA	
ACM 631	EIGENVALUE PROBLEMS	
ACM 632	NUMERICAL CALCULUS	
Required Statistical Data Analysis (9-11 credit hours)		
ACM 640	LINEAR REGRESSION AND CORRELATION	
ACM 641	DESIGN AND ANALYSIS OF EXPERIMENTS	
ACM 642	NONPARAMETRIC STATISTICS	
ACM 650	RANDOM WALKS AND BROWNIAN MOTION	

ACM 651	MARKOV CHAINS
ACM 652	CONTINUOUS-TIME STOCHASTIC PROCESSES
ACM 653	MARKOV CHAIN MODELS IN CREDIT RISK MANAGEMENT
ACM 660	LOGISTIC REGRESSION
ACM 661	SURVIVAL ANALYSIS
ACM 662	TIME SERIES ANALYSIS AND FORECASTING

**Required Business Intelligence and Data
Analytics (9 credit hours)**

Select one from each area: 9

Business Communication

PSM 602	COMMUNICATION STRATEGIES FOR MATH AND SCIENCE PROFESSIONALS
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Project Management

PSM 601	PROJECT MANAGEMENT FOR MATH AND SCIENCE PROFESSIONALS
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Other Topics

CIS 512	INTRODUCTION TO DATA SCIENCE AND ANALYTICS
DSA 501	DATA ORIENTED COMPUTING AND ANALYTICS
DSA 650	DATA STRATEGY AND GOVERNANCE
GEG 584	GEOSPATIAL PROGRAMMING
INT 602	OPERATIONS MANAGEMENT (ADVANCED SYSTEMS ANALYSIS)
SPF 688	LEADERSHIP IN ORGANIZATIONS
SPF 715	MANAGEMENT PRACTICES AND TECHNIQUES

Internship (3 credit hours)

ACM 690	INTERNSHIP IN APPLIED AND COMPUTATIONAL MATHEMATICS
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Total requirements 30 cr