Department of Computer Science and Information Technology
Department of Mathematics and Statistics

Master of Science (M.S.), Professional Science Master’s (PSM)

Information Sheet

The Department of Computer Science and Information Technology and the Department of Mathematics and Statistics offer a Master of Science (M.S.) degree in Computer Science and Quantitative Methods, and a Professional Science Master’s (PSM) degree, also in Computer Science and Quantitative Methods. There are nine areas of study (concentrations) available.

- **M.S. in Computer Science and Quantitative Methods (MS CSqm)**
  - Data Management and Analysis Concentration (available online)
  - Predictive Analytics Concentration (available online)
  - Information Assurance and Security Concentration - emphasizes on cybersecurity technical administration.
  - Mathematical Finance Concentration
  - Mathematics Instruction Concentration (M.S. Only, available hybrid and online)

- **PSM in Computer Science and Quantitative Methods (PSM CSqm)**
  - Data Management and Analysis Concentration (available online)
  - Predictive Analytics Concentration (available online)
  - Information Assurance and Security Concentration - emphasizes on cybersecurity technical administration.
  - Mathematical Finance Concentration

Our departments offer both online and on-campus M.S. and PSM degrees ideal for professionals in a wide variety of science and mathematics career fields. These master’s degree programs are designed to allow students to pursue advanced training in science or mathematics while developing workplace skills valued by employers. We aim to produce well-rounded science professionals who have a deep knowledge of their subject but also have the ability to communicate effectively and manage projects.

Advisors are available to assist prospective students in choosing a concentration and planning a program that will lead to graduation. Information on all the programs in the Department is available at the Department’s Web site, [www.apsu.edu/csci](http://www.apsu.edu/csci)

For more information, please contact one of the following:

**Dr. Jiang Li**, Professor and Graduate Coordinator
– for Data Management and Analysis Concentration
Department of Computer Science & Information Technology
Maynard 211, Austin Peay State University, P.O. Box 4414, Clarksville, Tennessee 37044, USA
(931) 221-7828; email: gradpsm@apsu.edu

**Dr. Matthew Jones**, Professor and Graduate Coordinator
– for Predictive Analytics Concentration
– for Mathematical Finance Concentration
Department of Mathematics and Statistics
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(931) 221-7814; email: gradpsm@apsu.edu

**Dr. Joseph V. Elarde**, Associate Professor
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(931) 221-7313; email: gradpsm@apsu.edu

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Last updated: February 18, 2019
Master of Science (M.S.) Degree in Computer Science and Quantitative Methods
Professional Science Master’s (PSM) Degree in Computer Science and Quantitative Methods

Graduation Checklist, M.S. & PSM
___ Complete the General Core.
___ Complete the Major Field Core.
___ Complete the Concentration Courses.
___ Maintain a GPA of 3.0 or better.
___ Complete all credit hours below (with a GPA of 3.0 or better).

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Master of Science (M.S.) Degree in Computer Science and Quantitative Methods
Data Management and Analysis Concentration

A. General Core (9 Credit hours)
   COMM 5110 - Leadership and Communication 3
   LDSP 5100 - Leadership for the Scientist-Manager 3
   STAT 5050 - Probabilistic and Statistical Reasoning 3

B. Major Concentration (24-27 Credit hours)
   CSCI 5010 - Database Management Concepts 3
   CSCI 5015 - Data Science in Python 3
   CSCI 5020 - Data Management Applications 3
   CSCI 5040 - Big Data Modeling and Management 3
   CSCI 5060 - Database-Driven Web Development 3
   CSCI 5080 - Data Mining Applications 3
   CSCI 5095 - Data Mining Project 3
   Select one (1) course from the list below (3-6 hours) - may be repeated
   CSCI 5910 - Master’s Systems Development Project 3/6
   CSCI 5920 - Master’s Research Project/Thesis 3/6

Total Hours for degree completion 33-36

M.S. CSQM - Data Management and Analysis Concentration Prerequisite Chart

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Master of Science (M.S.) Degree in Computer Science and Quantitative Methods

Predictive Analytics Concentration

A. General Core (9 Credit hours)
   - COMM 5110 - Leadership and Communication 3
   - LDSP 5100 - Leadership for the Scientist-Manager 3
   - STAT 5050 - Probabilistic and Statistical Reasoning 3

B. Major Field Core (9 or 12 credit hours)
   - STAT 5200 - SAS Programming 3
   - CSCI 5005 - Introduction to Web Programming (may be waived) 3
   - CSCI 5010 - Database Management Concepts 3
   - CSCI 5080 - Data Mining Applications 3

C. Major Concentration (15 or 18 credit hours)
   - MATH 5170 - Finite Mathematics (may be waived) 3
   - STAT 5120 - Regression Analysis 3
   - STAT 5125 - The Generalized Linear Model 3
   - STAT 5140 - Time Series Analysis 3
   - STAT 5290 - Predictive Analytics 3
   - STAT 5900 - Professional Science Internship 3

Total hours for degree completion 33-39

M.S. CSQM - Predictive Analytics Concentration Prerequisite Chart

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Master of Science (M.S.) Degree in Computer Science and Quantitative Methods
Information Assurance and Security Concentration

A. General Core
   (9 Credit hours)
   - COMM 5110 - Leadership and Communication 3
   - LDSP 5100 - Leadership for the Scientist-Manager 3
   - STAT 5050 - Probabilistic and Statistical Reasoning 3

B. Major Field Core
   (24 or 27 credit hours)
   - CSCI 5200 - Principles of Information Security 3
   - CSCI 5600 - Computer Ethics 3
   - CSCI 5603 - Cryptography 3
   Select four (4) courses from the list below
   - CSCI 5520 - Network Security 3
   - CSCI 5601 - Computer Forensics and Incident Response 3
   - CSCI 5602 - Securing Cyberspace (Web, DB, and Platforms) 3
   - CSCI 5607 - IAS/Security Policy and Governance 3
   - CSCI 5619 - Ethical Hacking and Offensive Security 3
   - CSCI 5624 - System Vulnerability Analysis and Auditing 3
   - CSCI 5625 - Intrusion Detection and Prevention 3
   - CSCI 5628 - IAS/Defensive Programming 3
   - CSCI 5630 - IAS/Secure Software Engineering 3
   - CSCI 5670 - Network Applications 3
   Select one (1) course from the list below (3-6 hours)
   - CSCI 5910 - Master’s Systems Development Project 3/6
   - CSCI 5920 - Master’s Research Project/Thesis 3/6

Total hours for degree completion 33-36
Master of Science (M.S.) Degree in Computer Science and Quantitative Methods
Mathematical Finance Concentration

A. General Core (9 Credit hours)
   COMM 5110 - Leadership and Communication  3
   LDSP 5100 - Leadership for the Scientist-Manager  3
   STAT 5050 - Probabilistic and Statistical Reasoning  3

B. Major Field Core (15 credit hours)
   MATH 5130 - Financial Mathematics  3
   MATH 5140 - Financial Derivatives  3
   MATH 5220 - Computational Methods in Finance  3
   MATH 5260 - Stochastic Processes  3
   STAT 5900 – Master’s Internship Project  3

C. Electives (6 credit hours)
   Select two (2) courses from the list below
   CSCI 5080 - Data Mining Applications  3
   MATH 5460 - Applied Mathematics  3
   MATH 5670 - Numerical Analysis  3
   STAT 5125 - The Generalized Linear Model  3
   STAT 5200 - SAS Programming  3

Total hours for degree completion 30

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Last updated: February 18, 2019
# Master of Science (M.S.) Degree in Computer Science and Quantitative Methods

## Mathematics Instruction Concentration

### A. General Core

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 5110</td>
<td>Leadership and Communication</td>
<td>3</td>
</tr>
<tr>
<td>LDSP 5100</td>
<td>Leadership for the Scientist-Manager</td>
<td>3</td>
</tr>
<tr>
<td>STAT 5050</td>
<td>Probabilistic and Statistical Reasoning</td>
<td>3</td>
</tr>
</tbody>
</table>

### B. Major Field Core

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5350</td>
<td>Calculus from an Advanced Perspective</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5520</td>
<td>Algebra from an Advanced Perspective</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5640</td>
<td>Geometry from an Advanced Perspective</td>
<td>3</td>
</tr>
</tbody>
</table>

### C. Emphasis Option I

(Non-College Instruction Path, Research Project required)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5090</td>
<td>Scientific Writing in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5940</td>
<td>Research in Mathematics</td>
<td>3</td>
</tr>
</tbody>
</table>

Select two (2) courses from the list below:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5070</td>
<td>Methods, Materials and Strategies in Teaching Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5080</td>
<td>Mathematics in a Technological World</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5120</td>
<td>Contemporary Approaches to Problem Solving and Proof</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5170</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
</tbody>
</table>

### D. Emphasis Option II

(General Education College Instruction Path, Comprehensive Exam Required)

Select four (4) courses from the list below

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5110</td>
<td>Number Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5120</td>
<td>Contemporary Approaches to Problem Solving and Proof</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5170</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5210</td>
<td>Topology</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5260</td>
<td>Stochastic Processes</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5460</td>
<td>Applied Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 5670</td>
<td>Numerical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 5200</td>
<td>SAS Programming</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5005</td>
<td>Introduction to Web Programming</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total hours for degree completion 30**
Professional Science Master’s (PSM) Degree in Computer Science and Quantitative Methods

Data Management and Analysis Concentration

A. General Core (9 Credit hours)
   - COMM 5110 - Leadership and Communication     3
   - LDSP 5100 - Leadership for the Scientist-Manager    3
   - STAT 5050 - Probabilistic and Statistical Reasoning   3

B. Major Field Core (same as Predictive Analytics Con.) (9 or 12 Credit hours)
   - CSCI 5005 - Introduction to Web Programming (may be waived)  3
   - CSCI 5010 - Database Management Concepts            3
   - CSCI 5080 - Data Mining Applications      3
   - STAT 5200 - SAS Programming                  3

C. Required Concentration Courses (12 Credit hours)
   - CSCI 5020 - Data Management Applications
   - CSCI 5060 - Database-Driven Web Development
   - CSCI 5095 - Data Mining Project
   - CSCI 5900 - Master’s Internship Project

Total Hours for degree completion 30-33

PSM CSQM - Data Management and Analysis Concentration Prerequisite Chart

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Professional Science Master’s (PSM) Degree in Computer Science and Quantitative Methods
Predictive Analytics Concentration

A. General Core (9 Credit hours)
   - COMM 5110 - Leadership and Communication  3
   - LDSP 5100 - Leadership for the Scientist-Manager  3
   - STAT 5050 - Probabilistic and Statistical Reasoning  3

B. Major Field Core (same as Data Management and Analysis Con.) (9 or 12 Credit hours)
   - CSCI 5005 - Introduction to Web Programming (may be waived)  3
   - CSCI 5010 - Database Management Concepts  3
   - CSCI 5080 - Data Mining Applications  3
   - STAT 5200 - SAS Programming  3

C. Required Concentration Courses (15 or 18 Credit hours)
   - MATH 5170 - Finite Math (may be waived)  3
   - STAT 5120 - Regression Analysis  3
   - STAT 5125 - The Generalized Linear Model  3
   - STAT 5140 - Time Series Analysis  3
   - STAT 5290 - Predictive Analytics  3
   - STAT 5900 - Master’s Internship Project  3

Total Hours for degree completion 33-39

PSM CSQM - Predictive Analytics Concentration Prerequisite Chart

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Professional Science Master’s (PSM) Degree in Computer Science and Quantitative Methods

Information Assurance and Security Concentration

A. General Core (9 Credit hours)
   - COMM 5110 - Leadership and Communication 3
   - LDSP 5100 - Leadership for the Scientist-Manager 3
   - STAT 5050 - Probabilistic and Statistical Reasoning 3

B. Major Field Core (9 or 12 Credit hours)
   - CSCI 5005 - Introduction to Web Programming (may be waived) 3
   - CSCI 5200 - Principles of Information Security 3
   - CSCI 5520 - Network Security 3
   - CSCI 5625 - Intrusion Detection and Prevention 3

C. Cybersecurity Technical Administration Emphasis
   C.1 Select three (3) courses from the list below (9 Credit hours)
      - CSCI 5601 - Computer Forensics and Incident Response 3
      - CSCI 5602 - Securing Cyberspace (Web, DB, and Platforms) 3
      - CSCI 5607 - IAS/Security Policy and Governance 3
      - CSCI 5624 - System Vulnerability Analysis and Auditing 3

   C.2 Internship (3 Credit hours)
      - CSCI 5900 - Master’s Internship Project 3

Total Hours for degree completion 30-33

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Professional Science Master’s (PSM) Degree in Computer Science and Quantitative Methods  
**Mathematical Finance Concentration**

A. **General Core**  
- COMM 5110 - Leadership and Communication  
- LDSP 5100 - Leadership for the Scientist-Manager  
- STAT 5050 - Probabilistic and Statistical Reasoning  

B. **Major Field Core**  
- MATH 5130 - Financial Mathematics  
- MATH 5140 - Financial Derivatives  
- MATH 5220 - Computational Methods in Finance  
- MATH 5260 - Stochastic Processes  
- STAT 5900 - Master’s Internship Project  

C. **Electives**  
Select two (2) courses from the list below  
- MATH 5460 - Applied Mathematics  
- MATH 5670 - Numerical Analysis  
- STAT 5125 - The Generalized Linear Model  
- STAT 5200 - SAS Programming  
- CSCI 5080 - Data Mining Applications  

**Total Hours for degree completion 30**