Statistics and Analytics (STAN)

Mark Arnold
Program Director
301 Science Engineering Building
479-575-3351
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Degree Conferred:
M.S. (STANMS)

Graduate Certificate Offered:
Graduate Certificate in Statistics and Analytics (STANGC) (Nondegree)

Program Description: The Graduate Certificate and M.S. degree in Statistics and Analytics are cross-college interdisciplinary programs that build on the university's current strengths in the Colleges of Arts and Sciences; Business; Education and Health Professions; and Engineering. Students may choose one of six concentrations: Statistics; Biological Analytics; Business Analytics; Operations Analytics; Computational Analytics; Educational Statistics & Psychometrics; or Quantitative Social Sciences.

Primary Areas of Faculty Research: Statistics and statistical analysis and design methodologies in business analytics, operations analytics, computational analytics, educational statistics and social science research.

Admission to the Master's Program: In addition to the requirements of the Graduate School, applicants for admission to the M.S. program in Statistics and Analytics must submit a) three letters of recommendation from persons familiar with the applicant's previous academic and professional performance and b) official test scores as specified for the applicant's area of interest.

Requirements for the Master of Science (M.S.) Degree
Requirements for the master's degree are fulfilled through one of seven concentrations. Students should also be aware of Graduate School requirements with regard to master's degrees (http://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreestext).

Requirements for Concentration in Business Analytics
Undergraduate Deficiencies
- MATH 2554 Calculus I (ACTS Equivalency = MATH 2405)
- MATH 3083 Linear Algebra

Core
Requirements include one course from each of these areas as approved by the student's advisory committee: Statistical Methods, Regression Analysis, Multivariate Analysis, Experimental Design

Required Courses
- ISYS 511V IT Toolkit & Skills Seminar
- ISYS 5833 Data Management Systems
- ISYS 5843 Seminar in Business Intelligence and Knowledge Management

Choose one of the following options:
- 9 hours of electives
- 3 hours of electives and 6 hours of thesis credit and submission of an acceptable thesis.

Written comprehensive exam (non-thesis) or defense of the thesis.
Total Hours 30

Requirements for the Master of Science (M.S.) Degree
Requirements for the master's degree are fulfilled through one of seven concentrations. Students should also be aware of Graduate School requirements with regard to master's degrees (http://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreestext).

Requirements for a Concentration in Computational Analytics
Undergraduate Deficiencies
- MATH 2554 Calculus I (ACTS Equivalency = MATH 2405)
- MATH 3083 Linear Algebra
- CSCE 4133 Algorithms

Core
Requirements include one course from each of these areas as approved by the student's advisory committee: Statistical Methods, Regression Analysis, Multivariate Analysis, Experimental Design.

Required Courses
- CSCE 4523 Database Management Systems
- Two of the following:
  - CSCE 4613 Artificial Intelligence
  - CSCE 5013 Advanced Special Topics in Computer Science or Computer Engineering (taken as introduction to cluster computing)
  - BIOL 5153 Practical Programming for Biologists
  - ISYS 5723 Advanced Multivariate Analysis

Choose from one of the following options:
- 9 additional hours of electives
- 3 hours of electives, 6 hours of thesis credit, and submission of an acceptable thesis

Written comprehensive exam (non-thesis) or defense of the thesis.
Total Hours 30
Choose one of the following options:  
- 9 hours of electives  
- 3 hours of electives, 6 hours of thesis credit and submission of an acceptable thesis  
Written comprehensive exam (non-thesis) or defense of the thesis  
CSCE 5063  Machine Learning  
CSCE 5073  Data Mining  

Total Hours  30

Requirements for a Concentration in Computational Analytics

Undergraduate Deficiencies  
MATH 2554  Calculus I (ACTS Equivalency = MATH 2405)  
MATH 3083  Linear Algebra  
CSCE 4133  Algorithms

Core  
Requirements include one course from each of these areas as approved by the student's advisory committee: Statistical Methods, Regression Analysis, Multivariate Analysis, Experimental Design.

Required Courses  
CSCE 4523  Database Management Systems  3

Two of the following:  
CSCE 4613  Artificial Intelligence  
Choose one of the following options:  
- 9 hours of electives  
- 3 hours of electives, 6 hours of thesis credit and submission of an acceptable thesis  
Written comprehensive exam (non-thesis) or defense of the thesis  
CSCE 5063  Machine Learning  
CSCE 5073  Data Mining  

Total Hours  30

Requirements for the Master of Science (M.S.) Degree

Requirements for the master's degree are fulfilled through one of seven concentrations. Students should also be aware of Graduate School requirements with regard to master's degrees (http://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreestext).

Requirements for Concentration in Operations Analytics

Undergraduate Deficiencies  
MATH 2554  Calculus I (ACTS Equivalency = MATH 2405)  
MATH 3083  Linear Algebra  
STAT 3013  Introduction to Probability

Core  
Requirements include one course from each of these areas as approved by the student's advisory committee: Statistical Methods, Regression Analysis, Multivariate Analysis, Experimental Design

Required Courses  
INEG 5613  Introduction to Optimization Theory  3
INEG 5803  Simulation  3
One of the following:  
ISYS 5843  Seminar in Business Intelligence and Knowledge Management  3
CSCE 5073  Data Mining

Choose one of the following options:  
- 9 hours of electives  
- 3 hours of electives, 6 hours of thesis credit and submission of an acceptable thesis  
Written comprehensive exam (non-thesis) or defense of the thesis  

Total Hours  30

Requirements for the Master of Science (M.S.) Degree

Requirements for the master's degree are fulfilled through one of seven concentrations. Students should also be aware of Graduate School requirements with regard to master's degrees (http://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreestext).

Requirements for a Concentration in Quantitative Social Science

Undergraduate Deficiencies  
MATH 2554  Calculus I (ACTS Equivalency = MATH 2405)  
MATH 3083  Linear Algebra  
STAT 3013  Introduction to Probability

Core  
Requirements include one course from each of these areas as approved by the student's advisory committee: Statistical Methods, Regression Analysis, Multivariate Analysis, Experimental Design

Required Courses  
ESRM 5653  Educational Assessment  3
ESRM 6653  Measurement and Evaluation  3
ESRM 6753  Item Response Theory  3
ESRM 699V  Seminar (as approved by the student's advisory committee)  3

Choose one of the following options:  
- 9 hours of electives as approved by the student's advisory committee  
- 3 hours of electives, 6 hours of thesis credit, and submission of an acceptable thesis  
Written comprehensive exam (non-thesis) or defense of the thesis  

Total Hours  33
Requirements include one course from each of these areas as approved by the student’s advisory committee: Statistical Methods, Regression Analysis, Multivariate Analysis, Experimental Design.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISYS 5723</td>
<td>Advanced Multivariate Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECON 4753</td>
<td>Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 6623</td>
<td>Econometrics II</td>
<td>3</td>
</tr>
<tr>
<td>ECON 6633</td>
<td>Econometrics III</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Choose one of the following:</td>
<td>6</td>
</tr>
</tbody>
</table>

6 hours of electives to include two of the following: cost benefit analysis; GIS and spatial analysis; multilevel modeling; social network analysis

6 hours of thesis credit and submission of an acceptable thesis

Written comprehensive exam (non-thesis) or defense of the thesis

Total Hours 30

Requirements for the Master of Science (M.S.) Degree

Requirements for the master's degree are fulfilled through one of seven concentrations. Students should also be aware of Graduate School requirements with regard to master's degrees (http://catalog.uark.edu/graduatecatalog/deggerequirements/#mastersdegreetext).

Requirements for Concentration in Statistics

Undergraduate Deficiencies

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 2014</td>
<td>Programming Foundations II</td>
</tr>
</tbody>
</table>

Core

Requirements include one course from each of these areas as approved by the student’s advisory committee: Statistical Methods, Regression Analysis, Multivariate Analysis, Experimental Design

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 5103</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 5113</td>
<td>Statistical Inference</td>
<td>3</td>
</tr>
<tr>
<td>STAT 5333</td>
<td>Analysis of Categorical Responses</td>
<td>3</td>
</tr>
<tr>
<td>STAT 639V</td>
<td>Topics in Statistics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Choose one of the following:</td>
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</tbody>
</table>

6 hours of electives

6 hours of thesis credit and submission of acceptable thesis

Written comprehensive exam (non-thesis) or defense of the thesis

Total Hours 30

Graduate Certificate in Statistics and Analytics (STAN)

Requirements for the Graduate Certificate in Statistics and Analytics:

The Graduate Certificate requires 12 hours of courses as specified below.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 5003</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>&amp; STAT 5001L</td>
<td>and Statistics Methods Laboratory</td>
<td></td>
</tr>
<tr>
<td>ESRM 6403</td>
<td>Educational Statistics and Data Processing</td>
<td></td>
</tr>
<tr>
<td>ISYS 5503</td>
<td>Decision Support and Analytics</td>
<td></td>
</tr>
<tr>
<td>PLSC 5913</td>
<td>Research Methods in Political Science</td>
<td></td>
</tr>
<tr>
<td>PSYC 5133</td>
<td>Inferential Statistics for Psychology</td>
<td></td>
</tr>
<tr>
<td>SOCI 5013</td>
<td>Advanced Social Research</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose one of the following:</td>
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</tr>
<tr>
<td>STAT 5313</td>
<td>Regression Analysis</td>
<td></td>
</tr>
<tr>
<td>INEG 5393</td>
<td>Applied Regression Analysis for Engineers</td>
<td></td>
</tr>
<tr>
<td>PLSC 5943</td>
<td>Advanced Research Methods in Political Science</td>
<td></td>
</tr>
<tr>
<td>PSYC 5143</td>
<td>Advanced Descriptive Statistics for Psychology</td>
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</tr>
<tr>
<td>SOCI 5313</td>
<td>Applied Data Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose one of the following:</td>
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<tr>
<td>STAT 5353</td>
<td>Methods of Multivariate Analysis</td>
<td></td>
</tr>
<tr>
<td>ISYS 5723</td>
<td>Advanced Multivariate Analysis</td>
<td></td>
</tr>
<tr>
<td>ESRM 6453</td>
<td>Applied Multivariate Statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose one of the following:</td>
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<tr>
<td>STAT 4373</td>
<td>Experimental Design</td>
<td></td>
</tr>
<tr>
<td>INEG 5333</td>
<td>Design of Industrial Experiments</td>
<td></td>
</tr>
<tr>
<td>ESRM 6413</td>
<td>Experimental Design in Education</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours 12

Graduate Faculty

Aloysius, John, Ph.D. (Temple University), B.S. (University of Colombo, Sri Lanka), Professor, Department of Supply Chain Management, 1995.

Beaulieu, Jeremy M., Ph.D. (Yale University), M.S., B.S. (California Polytechnic State University), Assistant Professor, Department of Biological Sciences, 2016.

Bridges, Ana Julia, Ph.D. (University of Rhode Island), M.S. (Illinois State University), B.S. (University of Illinois-Urbana-Champaign), Associate Professor, Department of Psychological Science, 2007.

Cao, Chunhua, Ph.D. (University of South Florida-Tampa), Teaching Assistant Professor, Department of Rehabilitation, Human Resource and Communication Disorders, 2019.

Cassady, Richard, Ph.D., M.S.I.S.E., B.S.I.S.E. (Virginia Polytechnic Institute and State University), University Professor, Department of Industrial Engineering, 2000.

Chakraborty, Avishek, Ph.D (Duke University), M.S., B.S. (Indian Statistical Institute), Assistant Professor, Department of Mathematical Sciences, 2014.

Chimka, Justin Robert, Ph.D., M.S.I.E., B.S.I.E. (University of Pittsburgh), Associate Professor, Department of Industrial Engineering, 2002.

Datta, Jyotishka, Ph.D. (Purdue University), M.Stat., B.Stat. (Indian Statistical Institute, Kolkata, India), Assistant Professor, Department of Mathematical Sciences, 2016.

Ferrier, Gary D., Ph.D. (University of North Carolina–Chapel Hill), B.A. (University of Wisconsin-Madison), University Professor, Department of Economics, 1993.

Freeze, Ron, Ph.D. (Arizona State University), M.B.A. (University of Missouri–Kansas City), B.S. (General Motors Institute), Clinical Associate Professor, Department of Information Systems, 2015.

Gaduh, Arya, Ph.D. (University of Southern California), M.Phil. (Cambridge University), B.A. (University of California-Berkeley), Associate Professor, Department of Economics, 2013.

Gauch, Susan E., Ph.D. (University of North Carolina at Chapel Hill), M.Sc., B.Sc. (Queen’s University, Canada), Professor, Department of Computer Science and Computer Engineering, 2007.

Gbur, Edward E., Ph.D., M.S. (The Ohio State University), B.S. (Saint Francis University), Professor, Department of Crop, Soil and Environmental Sciences, 1987.
Gu, Jingping, Ph.D. (Texas A&M University), M.A. (Peking University), B.A. (Renmin University of China, Beijing), Associate Professor, Department of Economics, 2008.
Mauromoustakos, Andy, Ph.D., M.S. (Oklahoma State University), B.S. (Oral Roberts University), Professor, Department of Crop, Soil and Environmental Sciences, 1989.
Wu, Xintao, Ph.D. (George Mason University), M.E. (Chinese Academy of Space Technology), B.S. (University of Science and Technology of China), Professor, Department of Computer Science and Computer Engineering, 2014.