Statistics and Analytics (STAN)

Mark Arnold  
Program Director  
301 Science Engineering Building  
479-575-3351  
Email: arnold@uark.edu  

Statistics and Analytics Website (https://statistics-analytics.uark.edu/)

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 Biological 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  
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

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)

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 5103  Data Analytics Fundamentals  
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 5523  Database Management Systems

Two of the following:  
6
Statistics and Analytics (STAN)

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 Concentration in Educational Statistics and Psychometrics

Undergraduate Deficiencies

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MATH 2554</td>
<td>Calculus I (ACTS Equivalency = MATH 2405)</td>
</tr>
<tr>
<td>MATH 3083</td>
<td>Linear Algebra</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

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>ESRM 5013</td>
<td>Research Methods in Education</td>
</tr>
<tr>
<td>ESRM 6653</td>
<td>Measurement and Evaluation</td>
</tr>
<tr>
<td>ESRM 6753</td>
<td>Item Response Theory</td>
</tr>
</tbody>
</table>

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 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 Quantitative Social Science

Undergraduate Deficiencies

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MATH 2554</td>
<td>Calculus I (ACTS Equivalency = MATH 2405)</td>
</tr>
<tr>
<td>MATH 3083</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>STAT 3013</td>
<td>Introduction to Probability</td>
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</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.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISYS 5723</td>
<td>Advanced Multivariate Analysis</td>
</tr>
<tr>
<td>ECON 5753</td>
<td>Forecasting</td>
</tr>
<tr>
<td>ECON 6623</td>
<td>Econometrics II</td>
</tr>
<tr>
<td>ECON 6633</td>
<td>Econometrics III</td>
</tr>
</tbody>
</table>

Choose one of the following options:

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/degreerequirements/#mastersdegreestext).

Requirements for Concentration in Operations Analytics

Undergraduate Deficiencies

<table>
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<tbody>
<tr>
<td>MATH 2554</td>
<td>Calculus I (ACTS Equivalency = MATH 2405)</td>
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<tr>
<td>MATH 3083</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>STAT 3013</td>
<td>Introduction to Probability</td>
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</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

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>INEG 5613</td>
<td>Introduction to Optimization Theory</td>
</tr>
<tr>
<td>INEG 5803</td>
<td>Simulation</td>
</tr>
<tr>
<td>ISYS 5843</td>
<td>Seminar in Business Intelligence and Knowledge Management</td>
</tr>
<tr>
<td>CSCE 5073</td>
<td>Data Mining</td>
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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 Concentration in Statistics

Undergraduate Deficiencies

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MATH 2564</td>
<td>Calculus II (ACTS Equivalency = MATH 2505)</td>
</tr>
<tr>
<td>MATH 3083</td>
<td>Linear Algebra</td>
</tr>
</tbody>
</table>

Required Courses

<table>
<thead>
<tr>
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<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISYS 5723</td>
<td>Advanced Multivariate Analysis</td>
</tr>
<tr>
<td>ECON 5753</td>
<td>Forecasting</td>
</tr>
<tr>
<td>ECON 6623</td>
<td>Econometrics II</td>
</tr>
<tr>
<td>ECON 6633</td>
<td>Econometrics III</td>
</tr>
</tbody>
</table>

Choose one of the following options:

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 Graduate Certificate in Statistics and Analytics (STAN)

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

Choose one of the following: 3-4

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course 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>1</td>
</tr>
<tr>
<td>ESRM 6403</td>
<td>Educational Statistics and Data Processing</td>
<td>3</td>
</tr>
<tr>
<td>ISYS 5503</td>
<td>Decision Support and Analytics</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 5913</td>
<td>Research Methods in Political Science</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 5133</td>
<td>Inferential Statistics for Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 5013</td>
<td>Advanced Social Research</td>
<td>3</td>
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</tbody>
</table>

Choose one of the following: 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>STAT 5313</td>
<td>Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INEG 5393</td>
<td>Applied Regression Analysis for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 5943</td>
<td>Advanced Research Methods in Political Science</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 5143</td>
<td>Advanced Descriptive Statistics for Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 5313</td>
<td>Applied Data Analysis</td>
<td>3</td>
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</table>

Choose one of the following: 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>STAT 5353</td>
<td>Methods of Multivariate Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ISYS 5723</td>
<td>Advanced Multivariate Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ESRM 6453</td>
<td>Applied Multivariate Statistics</td>
<td>3</td>
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Choose one of the following: 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>STAT 4373</td>
<td>Experimental Design</td>
<td>3</td>
</tr>
<tr>
<td>INEG 5333</td>
<td>Design of Industrial Experiments</td>
<td>3</td>
</tr>
<tr>
<td>ESRM 6413</td>
<td>Experimental Design in Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Hours 30

Graduate Faculty

**Aloysius, John**, Ph.D. (Temple University), B.S. (University of Colombo, Sri Lanka), Professor, Department of Supply Chain Management, Oren Harris Chair in Logistics, 1995, 2017.

**Arnold, Mark E.**, Ph.D., B.S. (Northern Illinois University), A.S. (Rock Valley College), Associate Professor, Department of Mathematical Sciences, 1993, 1999.

**Beaulieu, Jeremy M.**, Ph.D. (Yale University), M.S., B.S. (California Polytechnic State University), Associate Professor, Department of Biological Sciences, 2016, 2021.

**Bridges, Ana Julia**, Ph.D. (University of Rhode Island), M.S. (Illinois State University), B.S. (University of Illinois-Urbana-Champaign), Professor, Department of Psychological Science, 2007, 2019.

**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.E., B.S.I.E. (Virginia Polytechnic Institute and State University), University Professor, Department of Industrial Engineering, 2000, 2019.

**Chakraborty, Avishek**, Ph.D. (Duke University), M.S., B.S. (Indian Statistical Institute), Associate Professor, Department of Mathematical Sciences, 2014, 2021.

**Chimka, Justin Robert**, Ph.D., M.S.I.E., B.S.I.E. (University of Pittsburgh), Associate Professor, Department of Industrial Engineering, 2002, 2009.

**Cothren, Jackson David**, Ph.D., M.S. (The Ohio State University), B.S. (United States Air Force Academy), Professor, Department of Geosciences, 2004, 2020.

**Covington, Matthew D.**, Ph.D. (University of California-Santa Cruz), B.A. (University of Arkansas), Associate Professor, Department of Geosciences, 2012, 2018.

**Cronan, Timothy P.**, Ph.D. (Louisiana Tech University), M.S. (South Dakota State University), B.S. (University of Southwestern Louisiana), Professor, Department of Information Systems, M.D. Matthews Endowed Chair in Information Systems, 1979.

**Douglas, Marius R.**, Ph.D., M.S., B.S. (University of Zurich), Professor, Department of Biological Sciences, Bruker Life Sciences Chair, 2012.

**Douglas, Michael Edward**, Ph.D. (University of Georgia), M.S., B.S. (University of Louisville), Professor, Department of Biological Sciences, 21st Century Chair in Global Change Biology, 2011.

**Feng, Song**, Ph.D., M.S. (Chinese Academy of Sciences), B.S. (Yunnan University), Associate Professor, Department of Geosciences, 2013, 2018.


** Fitzpatrick, Kevin M.**, Ph.D. (State University of New York at Albany), M.A. (University of South Carolina at Columbia), B.A. (Susquehanna University), University Professor, Department of Sociology and Criminology, Bernice Jones Chair in Community, 2005, 2014.

**Freeze, Ron**, Ph.D. (Arizona State University), M.B.A. (University of Missouri–Kansas City), B.S. (General Motors Institute), Clinical Professor, Department of Information Systems, 2015, 2021.

**Gaduh, Arya**, Ph.D. (University of Southern California), M.Phil. (Cambridge University), B.A. (University of California-Berkeley), Associate Professor, Department of Economics, 2013, 2019.

**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, 1998.

**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, 2014.

**Harris, Casey Taggart**, Ph.D., M.A. (Pennsylvania State University), B.S. (Texas A&M University), Associate Professor, Department of Sociology and Criminology, 2011, 2017.
Johnson, Jon, Ph.D. (Indiana University at Bloomington), M.B.A., B.S. (University of Arkansas), Professor, Department of Strategic, Entrepreneurship and Venture Innovation, Walton College Professorship in Sustainability, 1996, 2007.

Levine, William H., Ph.D., M.S. (State University of New York at Binghamton), B.S. (DePaul University), Associate Professor, Department of Psychological Science, 2001, 2007.

Lo, Wen-Juo, Ph.D., M.A. (Arizona State University), B.S. (SooChow University), Associate Professor, Department of Rehabilitation, Human Resource and Communication Disorders, 2008, 2014.

Mauromoustakos, Andy, Ph.D., M.S. (Oklahoma State University), B.S. (Oral Roberts University), Professor, Department of Crop, Soil and Environmental Sciences, 1989, 2002.

Mitchell, Joshua Lee, Ph.D. (Southern Illinois University), M.P.A., B.S. (Murray State University), Associate Professor, Department of Political Science, 2010, 2019.

Mullins, Jeff, Ph.D., M.A., B.S. (University of Arkansas), Assistant Professor, Department of Information Systems, 2006, 2018.

Naithani, Kusum, Ph.D. (University of Wyoming), M.Sc. (G.B. Pant University of Agriculture and Technology-India), B.Sc. (University of Lucknow-India), Associate Professor, Department of Biological Sciences, 2014, 2021.

Parnell, Gregory S., Ph.D. (Stanford University), M.S. (University of Southern California), M.E.I.S.E. (University of Florida), B.S. (University of New York at Buffalo), Professor of Practice, Department of Industrial Engineering, 2013.

Petriss, Giovanni, Ph.D., M.S. (Duke University), B.S. (Università degli Studi di Milano, Italy), Professor, Department of Mathematical Sciences, 1999, 2015.


Rainwater, Chase E., Ph.D. (University of Florida), B.S.I.E. (University of Arkansas), Professor, Department of Industrial Engineering, 2009, 2021.

Rossetti, Manuel D., Ph.D., P.E., M.S.I.E. (The Ohio State University), B.S.I.E. (University of Cincinnati), University Professor, Department of Industrial Engineering, 1999, 2022.


Song, Geoboo, Ph.D. (University of Oklahoma), B.A. (Korea University), B.A. (Hanyang University), Associate Professor, Department of Political Science, 2012, 2019.

Stenken, Julie A., Ph.D. (University of Kansas), B.S. (University of Akron), Professor, Department of Chemistry and Biochemistry, 21st Century Chair of Proteomics, 2007.

Sykes, Tracy Ann, Ph.D. (University of Arkansas), B.S. (University of Maryland-College Park), Associate Professor, Department of Information Systems, 2011, 2016.

Turner, Ronna L., Ph.D. (University of Illinois-Urbana-Champaign), M.S.E. (Missouri State University), B.S.E. (Southwest Missouri State University), Professor, Department of Curriculum and Instruction, 1997, 2018.

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, Charles D. Morgan/Acxiom Graduate Research Chair, 2014, 2019.

Yang, Song, Ph.D., M.S. (University of Minnesota-Twin Cities), M.A. (Nankai University, China), B.A. (Branch College of Nankai, China), Professor, Department of Sociology and Criminology, 2002, 2016.

Zhang, Qingyang, Ph.D. (Northwestern University), M.S. (Loyola University–Chicago), B.S. (Beijing Normal University), Assistant Professor, Department of Mathematical Sciences, 2015.

Zhang, Shengfan, Ph.D., M.I.E. (North Carolina State University), B.M. (Fudan University, Shanghai), Associate Professor, Department of Industrial Engineering, John L. Imhoff Chair in Industrial Engineering, 2011, 2020.