Statistics and Analytics (STAN)

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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/graduategomatceedreerequirements/#mastersdegreestext).

Requirements for Concentration in Biological Analytics

Undergraduate Deficiencies

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 5013</td>
<td>Advanced Special Topics in Computer Science or Computer Engineering (taken as introduction to cluster computing)</td>
</tr>
<tr>
<td>BIOL 5153</td>
<td>Practical Programming for Biologists</td>
</tr>
</tbody>
</table>

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/graduategomatceedreerequirements/#mastersdegreestext).

Requirements for Concentration in Business Analytics

Undergraduate Deficiencies

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2554</td>
<td>Calculus I (ACTS Equivalency = MATH 2405)</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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISYS 511V</td>
<td>IT Toolkit &amp; Skills Seminar</td>
</tr>
<tr>
<td>ISYS 5833</td>
<td>Data Management Systems</td>
</tr>
<tr>
<td>ISYS 5843</td>
<td>Seminar in Business Intelligence and Knowledge Management</td>
</tr>
</tbody>
</table>

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/graduategomatceedreerequirements/#mastersdegreestext).

Requirements for a Concentration in Computational Analytics

Undergraduate Deficiencies

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</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>CSCE 4133</td>
<td>Algorithms</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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 4523</td>
<td>Database Management Systems</td>
</tr>
</tbody>
</table>

Two of the following:

3 hours of electives

6 hours of thesis credit

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**
- MATH 2554  Calculus I (ACTS Equivalency = MATH 2405)
- MATH 3083  Linear Algebra

**Core Requirements**
- ESRM 5013  Research Methods in Education  3
- ESRM 6653  Measurement and Evaluation  3
- ESRM 6753  Item Response Theory  3
- Choose one of the following options:  9
  - 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**  30

#### 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**
- ESRM 5013  Research Methods in Education  3
- ESRM 6653  Measurement and Evaluation  3
- ESRM 6753  Item Response Theory  3
- Choose one of the following options:  9
  - 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**  30

#### Requirements for 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**
- ESRM 5013  Research Methods in Education  3
- ESRM 6653  Measurement and Evaluation  3
- ESRM 6753  Item Response Theory  3
- Choose one of the following options:  9
  - 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**  30

**Required Courses**
- ISYS 5723  Advanced Multivariate Analysis  3
- ECON 4753  Forecasting  3
- ECON 6623  Econometrics II  3
- ECON 6633  Econometrics III  3
- Choose one of the following options:  6
  - 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**  30

#### Requirements for Concentration in Statistics

**Undergraduate Deficiencies**
- MATH 2564  Calculus II (ACTS Equivalency = MATH 2505)
- MATH 3083  Linear Algebra

**Core Requirements**
- ESRM 5013  Research Methods in Education  3
- ESRM 6653  Measurement and Evaluation  3
- ESRM 6753  Item Response Theory  3
- Choose one of the following options:  9
  - 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**  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).
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>
<th>Credits</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 5443</td>
<td>Computational Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

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

Choose one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 5003 &amp; STAT 5001L</td>
<td>Statistical Methods and Statistics Methods Laboratory</td>
</tr>
<tr>
<td>ESRM 6403</td>
<td>Educational Statistics and Data Processing</td>
</tr>
<tr>
<td>ISYS 5503</td>
<td>Decision Support and Analytics</td>
</tr>
<tr>
<td>PLSC 5913</td>
<td>Research Methods in Political Science</td>
</tr>
<tr>
<td>PSYC 5133</td>
<td>Inferential Statistics for Psychology</td>
</tr>
<tr>
<td>SOCI 5013</td>
<td>Advanced Social Research</td>
</tr>
</tbody>
</table>

Choose one of the following:
- 3

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

Choose one of the following:
- 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 5353</td>
<td>Methods of Multivariate Analysis</td>
</tr>
<tr>
<td>ISYS 5723</td>
<td>Advanced Multivariate Analysis</td>
</tr>
<tr>
<td>ESRM 6453</td>
<td>Applied Multivariate Statistics</td>
</tr>
</tbody>
</table>

Choose one of the following:
- 3

<table>
<thead>
<tr>
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<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 4373</td>
<td>Experimental Design</td>
</tr>
<tr>
<td>INEG 5333</td>
<td>Design of Industrial Experiments</td>
</tr>
<tr>
<td>ESRM 6413</td>
<td>Experimental Design in Education</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, Oren Harris Chair in Logistics, 1995, 2017.
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), 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.S.E., B.S.I.S.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.
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.
Mauromoustakos, Andy, Ph.D., M.S. (Oklahoma State University), B.S. (Oral Roberts University), Professor, Department of Crop, Soil and Environmental Sciences, 1989, 2002.
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.