Statistics and Analytics (STAN)

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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 the following seven concentrations. Students should also be aware of Graduate School requirements with regard to master’s degrees (http://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreecontent).

Requirements for Concentration in Biological Analytics

Undergraduate Deficiencies
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2554</td>
<td>Calculus I (ACTS Equivalency = MATH 2405)</td>
<td></td>
</tr>
<tr>
<td>MATH 3083</td>
<td>Linear Algebra</td>
<td></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>
<th>Hours</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>
<td>3</td>
</tr>
<tr>
<td>BIOL 5153</td>
<td>Practical Programming for Biologists</td>
<td>3</td>
</tr>
<tr>
<td>ISYS 5723</td>
<td>Advanced Multivariate Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Choose from one of the following options:</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

- 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 Concentration in Business Analytics

Undergraduate Deficiencies
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2554</td>
<td>Calculus I (ACTS Equivalency = MATH 2405)</td>
<td></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>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISYS 511V</td>
<td>IT Toolkit &amp; Skills Seminar</td>
<td>3</td>
</tr>
<tr>
<td>ISYS 5833</td>
<td>Data Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>ISYS 5843</td>
<td>Seminar in Business Intelligence and Knowledge Management</td>
<td>3</td>
</tr>
<tr>
<td>Choose one of the following options:</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

- 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 a Concentration in Computational Analytics

Undergraduate Deficiencies
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2554</td>
<td>Calculus I (ACTS Equivalency = MATH 2405)</td>
<td></td>
</tr>
<tr>
<td>MATH 3083</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>CSCE 4133</td>
<td>Algorithms</td>
<td></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>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 4523</td>
<td>Database Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>Two of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>CSCE 4613</td>
<td>Artificial Intelligence</td>
<td></td>
</tr>
<tr>
<td>Choose one of the following options:</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

- 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 Concentration in Educational Statistics and Psychometrics

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

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 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
- INEG 5803 Simulation
- One of the following:
  - ISYS 5843 Seminar in Business Intelligence and Knowledge Management
  - 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 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**
- ISYS 5723 Advanced Multivariate Analysis
- ECON 4753 Forecasting
- ECON 6623 Econometrics II
- ECON 6633 Econometrics III

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 Concentration in Statistics

**Undergraduate Deficiencies**
- MATH 2564 Calculus II (ACTS Equivalency = MATH 2505)
- MATH 3083 Linear Algebra
- CSCE 2014 Programming Foundations II

**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**
- STAT 5103 Introduction to Probability Theory
- STAT 5113 Statistical Inference
- STAT 5333 Analysis of Categorical Responses
- STAT 639V Topics in Statistics

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 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.

Choose one of the following:

- STAT 4003 Statistical Methods
- STAT 4001L and Statistics Methods Laboratory
- ESRM 6403 Educational Statistics and Data Processing
- ISYS 5503 Decision Support and Analytics
- PLSC 5913 Research Methods in Political Science
- PSYC 5133 Inferential Statistics for Psychology
- SOCI 5013 Advanced Social Research

Choose one of the following:

- STAT 5313 Regression Analysis

**Total Hours** 30
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>INEG 5393</td>
<td>Applied Regression Analysis for Engineers</td>
</tr>
<tr>
<td>ISYS 5623</td>
<td>Multivariate Analysis</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>
<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>
<th>Course Code</th>
<th>Course 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