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| For Academic Affairs and Research Use Only |
| Proposal Number |  |
| CIP Code:  |  |
| Degree Code: |  |

**New or Modified Course Proposal Form**

**[ ] Undergraduate Curriculum Council**

**[X] Graduate Council**

|  |
| --- |
| **[X]New Course, [ ]Experimental Course (1-time offering), or [ ]Modified Course (Check one box)** |

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

|  |  |
| --- | --- |
|  Hong Zhou 1/31/2022**Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**COPE Chair (if applicable)** |
| Amanda Lambertus 2/7/2022**Department Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Head of Unit (if applicable)**   |
| John Hershberger 2/21/2022**College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Undergraduate Curriculum Council Chair** |
| Mary Elizabeth Spence 2/23/2022**Office of Assessment (new courses only)** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Graduate Curriculum Committee Chair** |
| Lynn Boyd 3/1/2022**College Dean** | Alan Utter 3/31/2022**Vice Chancellor for Academic Affairs** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**General Education Committee Chair (if applicable)**   |  |

1. **Contact Person (Name, Email Address, Phone Number)**

Hong Zhou, hzhou@astate.edu, 870-680-8120

1. **Proposed starting term and Bulletin year for new course or modification to take effect**

Fall 2022

**Instructions:**

*Please complete all sections unless otherwise noted. For course modifications, sections with a “Modification requested?” prompt need not be completed if the answer is “No.”*

|  |  |  |
| --- | --- | --- |
|  | **Current (Course Modifications Only)** | **Proposed (New or Modified)** *(Indicate “N/A” if no modification)* |
| **Prefix** |  | **STAT** |
| **Number\*** |  | **6683** |
| **Title** (include a short title that’s 30 characters or fewer) |  | **Survival Analysis** |
| **Description\*\*** |  | **Introduction to the theory and methods of survival analysis, including modeling time-to-event data, methods for the treatment of censoring, and the Cox proportional hazard models and their applications.**  Prerequisites: STAT 3233. |

 ***\**** Confirm with the Registrar’s Office that number chosen has not been used before and is available for use. For variable credit courses, indicate variable range. *Proposed number for experimental course is 9*.

\*\*Forty words or fewer (excepting prerequisites and other restrictions) as it should appear in the Bulletin.

1. **Proposed prerequisites and major restrictions** **[Modification requested? Yes/No]**

(Indicate all prerequisites. If this course is restricted to a specific major, which major. If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).

1. YES Are there any prerequisites?
	1. If yes, which ones?

STAT 3233

* 1. Why or why not?

 Students need a fundamental understanding of statistics prior to taking this course.

1. NO Is this course restricted to a specific major?
	1. If yes, which major? Enter text...
2. **Proposed course frequency [Modification requested? Yes/No]**

(e.g. Fall, Spring, Summer; if irregularly offered, please indicate, “irregular.”) *Not applicable to Graduate courses.*

1. **Proposed course type [Modification requested? Yes/No]**

Will this course be lecture only, lab only, lecture and lab, activity (e.g., physical education), dissertation/thesis, capstone, independent study, internship/practicum, seminar, special topics, or studio? Please choose one.

Lecture

1. **Proposed grade type [Modification requested? Yes/No]**

What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental, or other [please elaborate])

Standard letter

1. No Is this course dual-listed (undergraduate/graduate)? No
2. NO Is this course cross-listed? No

*(If it is, all course entries must be identical including course descriptions. Submit appropriate documentation for requested changes. It is important to check the course description of an existing course when adding a new cross-listed course.)*

**a.** – If yes, please list the prefix and course number of the cross-listed course.

 Enter text...

 **b.** – **Yes / No** Can the cross-listed course be used to satisfy the prerequisite or degree requirements this course satisfies?

 Enter text...

1. YES Is this course in support of a new program? Yes

a. If yes, what program?

 MS Statistics and Graduate Certificate in Statistics

1. NO Will this course be a one-to-one equivalent to a deleted course or previous version of this course (please check with the Registrar if unsure)? No

a. If yes, which course?

Enter text...

**Course Details**

1. **Proposed outline** **[Modification requested? Yes/No]**

(The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

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| --- | --- |
| Week 1 | Introduction to Survival Data |
| Week 2 | Right-censored, left-censored, interval-censored |
| Week 3 | Survival Functions and Survival Data |
| Week 4 | Interpret Hazard function |
| Week 5 | Parametric Models for Survival Data, Likelihood Methods  |
| Week 6 | Exponential and Weibull survival functions |
| Week 7 | Life-Table Method |
| Week 8 | Kaplan-Meier Survival Function (curves) |
| Week 9 | Graph and interpret two or more Kaplan-Meier curves |
| Week 10 | Log-Rank Test differences of survival function for two groups |
| Week 11 | Log-Rank Test differences of survival function for several groups |
| Week 12 | Cox Proportional Hazards (PH) Model  |
| Week 13 | Use Cox PH Model to computer hazard ratio  |
| Weeks 14 and 15 | Cox PH Model to adjust survival curves |

1. **Proposed special features** **[Modification requested? Yes/No] No**

(e.g. labs, exhibits, site visitations, etc.) Students will gain valuable skills using software to analyze statistics using survival analysis.

1. **Department staffing and classroom/lab resources**

No

1. Will this require additional faculty, supplies, etc.?

 No

1. **Yes / No** Does this course require course fees? No

 *If yes: please attach the New Program Tuition and Fees form, which is available from the UCC website.*

**Justification**

**Modification Justification (Course Modifications Only)**

1. Justification for Modification(s)

N/A

**New Course Justification (New Courses Only)**

1. Justification for course. Must include:

 a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)

 Students will gain knowledge and skills to deal with survival data in various scenarios, such as Kaplan-Meier survival curves, Log-Rank test, and Cox Proportional Hazards Model. Many graduates in MS Statistics go to medical and pharmaceutical companies. So the main propose to offer Survival Analysis is to expose students to survival analysis in statistics in order for them to gain the basic knowledge and skills.

b. How does the course fit with the mission of the department? If course is mandated by an accrediting or certifying agency, include the directive.

 This course fits well with our department’s goals of seeking to provide a quality education to both graduates, undergraduate students in our programs and in variety majors. We strive to prepare students for a variety of future endeavors and careers in business, industry, government, research, and academia. This course will further provide students with hands-on software skills to deal with survival data in their future professional careers or in further graduate courses.

c. Student population served.

Primarily, the target student population is the MS Statistics Graduate students. However, the course has many applications and others who wish to gain additional knowledge and skills in statistics would be eligible to enroll in the course.

d. Rationale for the level of the course (lower, upper, or graduate).

A solid foundation in statistics is required in order to take this course. This course is in the support of MS and Graduate Certificate in Statistics. Survival Analysis courses are typically offered at the graduate level.

**Assessment**

**Assessment Plan Modifications (Course Modifications Only)**

1. **Yes / No** Do the proposed modifications result in a change to the assessment plan?

 *If yes, please complete the Assessment section of the proposal*

**Relationship with Current Program-Level Assessment Process (Course modifications skip this section unless the answer to #18 is “Yes”)**

1. What is/are the intended program-level learning outcome/s for students enrolled in this course? Where will this course fit into an already existing program assessment process?

This course will serve as an elective option for the M.S. in Statistics. It is connected to Program-Level Outcomes 1, 3-4 (see below).

1. Considering the indicated program-level learning outcome/s (from question #19), please fill out the following table to show how and where this course fits into the program’s continuous improvement assessment process.

*For further assistance, please see the ‘Expanded Instructions’ document available on the UCC - Forms website for guidance, or contact the Office of Assessment at 870-972-2989.*

|  |  |
| --- | --- |
| **Program-Level Outcome 1 (from question #19)** | M.S. Statistics graduates will explain and use advanced statistical theory and content knowledge. |
| Assessment Measure | Comprehensive examinations at end of degree program; Student exit interview and program evaluation survey. |
| Assessment Timetable | Data collected and reviewed every year |
| Who is responsible for assessing and reporting on the results? | Department Chair, Graduate Studies Director, Comprehensive Examination Committee |
| **Program-Level Outcome 3 (from question #19)** | M.S. Statistics graduates will draw appropriate conclusions from the analysis and apply statistical methods to real world problem, assess their appropriateness. |
| Assessment Measure | Comprehensive examinations at end of degree program; Student exit interview and program evaluation survey. |
| Assessment Timetable | Data collected and reviewed every year |
| Who is responsible for assessing and reporting on the results? | Department Chair, Graduate Studies Director, Comprehensive Examination Committee |
| **Program-Level Outcome 4 (from question #19)** | M.S. Statistics graduates will be familiar with professional statistical software and other appropriate tools for data exploration, cleaning, validation, analysis, communication. |
| Assessment Measure | Comprehensive examinations at end of degree program; Student exit interview and program evaluation survey. |
| Assessment Timetable | Data collected and reviewed every year |
| Who is responsible for assessing and reporting on the results? | Department Chair, Graduate Studies Director, Comprehensive Examination Committee |

 *(Repeat if this new course will support additional program-level outcomes)*

 **Course-Level Outcomes**

1. What are the course-level outcomes for students enrolled in this course and the associated assessment measures?

|  |  |
| --- | --- |
| **Outcome 1** | Students will be able to learn basic skills of SAS software. |
| Which learning activities are responsible for this outcome? | Lab and homework |
| Assessment Measure  | Exams and projects |
| **Outcome 2** | Students will be able to understand and learn the basic statistical methods to analyze survival data, such as Kaplan-Meier survival curves, Log-Rank test, and Cox Proportional Hazards Model. |
| Which learning activities are responsible for this outcome? | Lab and homework |
| Assessment Measure  | Exams and projects  |

*(Repeat if needed for additional outcomes)*

**Bulletin Changes**

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| **Instructions**  |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Please include a before (with changed areas highlighted) and after of all affected sections.** **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.**  |

2021-22 Graduate Bulletin, Page 304 Before:

**Statistics**

**Master of Science**

|  |  |
| --- | --- |
| **University Requirements:** |  |
| See Graduate Degree Policies for additional information (p. 47) |  |
| **Program Requirements:**Minimum 21 hours of 6000-level coursework excluding thesis. | **Sem. Hrs.** |
| STAT 6653, Data Analysis I **AND**STAT 6663, Data Analysis II | 6 |
| STAT 6703, Statistical Analysis I **AND**STAT 6713, Statistical Analysis II | 6 |
| **Select one of the following programming courses:**STAT 5483, Statistical Methods Using RSTAT 6623, Statistical Methods with SAS Programming STAT 6833, Biostatistics | 3 |
| **Electives (select four of the following):** STAT 5463. Probability and Statistics II STAT 5483, Statistical Methods Using R STAT 6433, Time Series AnalysisSTAT 6613, Nonparametric StatisticsSTAT 6623, Statistical Methods with SAS Programming STAT 6643, Multivariate AnalysisSTAT 6673, Design of Experiments STAT 6723, ProbabilitySTAT 6833, Biostatistics | 12 |
| Approved electives in related area | 6 |
| **Sub-total** | **33** |
| **Total Required Hours:** | **33** |

2021-22 Graduate Bulletin, Page 304 After:

**Statistics**

**Master of Science**

|  |  |
| --- | --- |
| **University Requirements:** |  |
| See Graduate Degree Policies for additional information (p. 47) |  |
| **Program Requirements:**Minimum 21 hours of 6000-level coursework excluding thesis. | **Sem. Hrs.** |
| STAT 6653, Data Analysis I **AND**STAT 6663, Data Analysis II | 6 |
| STAT 6703, Statistical Analysis I **AND**STAT 6713, Statistical Analysis II | 6 |
| **Select one of the following programming courses:**STAT 5483, Statistical Methods Using RSTAT 6623, Statistical Methods with SAS Programming STAT 6833, Biostatistics | 3 |
| **Electives (select four of the following):** STAT 5463. Probability and Statistics IISTAT 5483, Statistical Methods Using R STAT 6433, Time Series AnalysisSTAT 6613, Nonparametric StatisticsSTAT 6623, Statistical Methods with SAS Programming STAT 6643, Multivariate AnalysisSTAT 6673, Design of Experiments STAT 6683, Survival AnalysisSTAT 6723, ProbabilitySTAT 6833, Biostatistics | 12 |
| Approved electives in related area | 6 |
| **Sub-total** | **33** |
| **Total Required Hours:** | **33** |

2021-22 Graduate Bulletin, Page 305 Before:

**Statistics**

**Graduate Certificate**

|  |  |
| --- | --- |
| **University Requirements:** |  |
| See Graduate Degree Policies for additional information (p. 47) |  |
| **Core Courses:** | **Sem. Hrs.** |
| STAT 6613, Nonparametric Statistics | 3 |
| **Select one of the following sequences:** STAT 6653, Data Analysis I **AND** STAT 6663, Data Analysis II**OR**STAT 6703, Statistical Analysis I **AND**STAT 6713, Statistical Analysis II | 6 |
| **Sub-total** | **9** |
| **Electives:** |  |
| **Select one:**STAT 5483, Statistical Methods Using RSTAT 6623, Statistical Methods with SAS Programming | 3 |
| **Select one:**STAT 6433, Time Series Analysis STAT 6643, Multivariate Analysis STAT 6673, Design of Experiments STAT 6833, Biostatistics | 3 |
| **Total Required Hours:** | **15** |

2021-22 Graduate Bulletin, Page 305 After:

**Statistics**

**Graduate Certificate**

|  |  |
| --- | --- |
| **University Requirements:** |  |
| See Graduate Degree Policies for additional information (p. 47) |  |
| **Core Courses:** | **Sem. Hrs.** |
| STAT 6613, Nonparametric Statistics | 3 |
| **Select one of the following sequences:** STAT 6653, Data Analysis I **AND** STAT 6663, Data Analysis II**OR**STAT 6703, Statistical Analysis I **AND**STAT 6713, Statistical Analysis II | 6 |
| **Sub-total** | **9** |
| **Electives:** |  |
| **Select one:**STAT 5483, Statistical Methods Using RSTAT 6623, Statistical Methods with SAS Programming | 3 |
| **Select one:**STAT 6433, Time Series AnalysisSTAT 6643, Multivariate Analysis STAT 6673, Design of Experiments STAT 6683, Survival AnalysisSTAT 6833, Biostatistics | 3 |
| **Total Required Hours:** | **15** |

2021-22 Graduate Bulletin, Page 425 Before:

STAT 6673. Design of Experiments Replication, randomization, and blocking, analysis of variance, full and factorial experiments at two and three levels, effect aliasing, design resolution and minimum aberration criteria, nonregular designs and complex aliasing, introduction to response surface methodology. Prerequisite, STAT 3233 or equivalent.

STAT 6703. Statistical Analysis I Applications of elementary statistics. Advanced principles including statistical study, data gathering, variance and covariance. Prerequisite : STAT 4453 or equivalent.

2021-22 Graduate Bulletin, Page 425 After:

**STAT 6673. Design of Experiments** Replication, randomization, and blocking, analysis of variance, full and factorial experiments at two and three levels, effect aliasing, design resolution and minimum aberration criteria, nonregular designs and complex aliasing, introduction to response surface methodology. Prerequisite, STAT 3233 or equivalent.

**STAT 6683. Survival Analysis** **Introduction to the theory and methods of survival analysis, including modeling time-to-event data, methods for the treatment of censoring, and the Cox proportional hazard models and their applications.** Prerequisites: STAT 3233.

**STAT 6703. Statistical Analysis I** Applications of elementary statistics. Advanced principles including statistical study, data gathering, variance and covariance. Prerequisite : STAT 4453 or equivalent.