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| For Academic Affairs and Research Use Only |
| Proposal Number | SM27 |
| CIP Code:  |  |
| Degree Code: |  |

**New or Modified Course Proposal Form**

**[X] Undergraduate Curriculum Council**

**[ ] Graduate Council**

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| **[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.

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|  Hong Zhou 10/25/2021**Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**COPE Chair (if applicable)** |
| Amanda Lambertus 10/25/2021**Department Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Head of Unit (if applicable)**   |
| John Hershberger 10/28/2021 Enter date…**College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Undergraduate Curriculum Council Chair** |
| Mary Elizabeth Spence 10/6/2021 Enter date…**Director of Assessment (new courses only)** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Graduate Curriculum Committee Chair** |
| Lynn Boyd 10/29/2021**College Dean** | Alan Utter 11/16/2021**Vice Chancellor for Academic Affairs** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**General Education Committee Chair (if applicable)**   |  |

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

Ferebee Tunno, ftunno@astate.edu, x8135

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

Spring 2023

**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.”*

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|  | **Current (Course Modifications Only)** | **Proposed (New or Modified)** *(Indicate “N/A” if no modification)* |
| **Prefix** |  | **STAT** |
| **Number\*** |  | **4443** |
| **Title** |  | **Stochastic Processes** |
| **Description\*\*** |  | **An introduction to stochastic processes featuring random walks, Markov chains, Poisson processes, martingales, time series, and Brownian motion. Prerequisite: STAT 3233, Spring.** |

 ***\**** (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 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 / No** Are there any prerequisites? YES
	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. **Yes / No** Is this course restricted to a specific major? NO
	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.*

Spring

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 only.

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. **Yes / No** Is this course dual-listed (undergraduate/graduate)? No
2. **Yes / 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 / No** Is this course in support of a new program? Yes
2. If yes, what program?

 B.S. Actuarial Science

1. **Yes / 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.)

Weeks 1-3: Random variables and probability.

Weeks 4-6: Discrete and continuous distributions.

Weeks 7-9: Random walks and Markov chains.

Weeks 10-11: Poisson processes.

Weeks 12-13: Martingales

Week 14: Time series analysis.

Week 15: Brownian motion.

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

(e.g. labs, exhibits, site visitations, etc.)

None

1. **Department staffing and classroom/lab resources**
2. Will this require additional faculty, supplies, etc.?

 No

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

 *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 the tools needed to pass an actuarial exam.

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 will further prepare our students for math-oriented careers after college.

c. Student population served.

BS Actuarial Science majors and other students wishing to gain additional knowledge in the field of Statistics.

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

The prerequisite for the course is STAT 3233, making the course an upper level.

**Assessment**

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

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

 *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 a junior/senior elective option for the B.S. in Mathematics and a required course in the BS Actuarial Science program. It is connected to Program-Level Outcomes 1 and 3 (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.*

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| **Program-Level Outcome 1 (from question #19)** | Identify and utilize the appropriate mathematical and statistical tools to model and solve a variety of problems in actuarial science. |
| Assessment Measure | FM and P exams will be used as the direct measureExit survey of the program is the indirect measure |
| Assessment Timetable | Data collected and reviewed every semester. |
| Who is responsible for assessing and reporting on the results? | Program Director |

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| **Program-Level Outcome 3 (from question #19)** | Demonstrate understanding of the concepts, corresponding theories, and applications related to the areas of mathematics, statistics, finance, economics, and accounting. |
| Assessment Measure | FM and P exams will be used as the direct measureExit survey of the program is the indirect measure |
| Assessment Timetable | Data collected and reviewed every semester. |
| Who is responsible for assessing and reporting on the results? | Program Director |

 **Course-Level Outcomes**

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

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| **Outcome 1** | Students will be able to use stochastic processes to model and understand such phenomena in the real world (e.g., daily temperatures and daily stock closing prices).  |
| Which learning activities are responsible for this outcome? | Daily in-class worksheets and regular homework assignments. |
| Assessment Measure  | 5 exams over the course of the semester. |

**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.**  |

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**STAT 3233 Applied Statistics I** For students in a variety of disciplines including the sciences, allied health fields, and education. Descriptive statistics for quantitative and qualitative data, normal distributions, correlation, linear regression, sample surveys, randomized comparative experiments, sampling distributions, estimation and hypothesis testing for means and proportions. Prerequisite, MATH 1023 or equivalent. Fall, Spring, Summer.

**STAT 3243. Regression Analysis and Analysis of Variance (ANOVA**)

 Theory and practice of regression analysis and ANOVA. Introduction of simple and multiple linear regression, inferences about model parameters, regression diagnostics, variable selection, and model adequacy checking and regression approaches to ANOVA. Prerequisite, STAT 3233. Spring

***STAT 4443 Stochastic Processes An introduction to stochastic processes featuring random walks, Markov chains, Poisson processes, martingales, time series, and Brownian motion. Prerequisite, STAT 3233, Spring***

**STAT 4453 Probability & Statistics I** Set theory, random variables, probability laws and distributions, independence, conditioning, moment generating functions and the Central Limit Theorem. Prerequisite, MATH 3254. Fall.