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

**New Course Proposal Form**

**[X] Undergraduate Curriculum Council**

**[ ] Graduate Council**

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

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

Email completed proposals to [curriculum@astate.edu](mailto:curriculum@astate.edu) for inclusion in curriculum committee agenda.

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| --- | --- |
| Suzanne Melescue 2/4/2019 **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| Amanda Lambertus 2/7/019 **Department Chair:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Head of Unit (If applicable)** |
| David F. Gilmore 2/22/2019 **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| Anne A. Grippo 2/22/2019 **College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Graduate Curriculum Committee Chair** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **General Education Committee Chair (If applicable)** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Vice Chancellor for Academic Affairs** |

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

Ferebee Tunno; [ftunno@astate.edu](mailto:ftunno@astate.edu); x8135

2. Proposed Starting Term and Bulletin Year

Fall 2019

3. Proposed Course Prefix and Number (Confirm that number chosen has not been used before. For variable credit courses, indicate variable range. *Proposed number for experimental course is 9*. )

STAT 4483

4. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).

Statistical Methods Using R

5. Brief course description (40 words or fewer) as it should appear in the bulletin.

Introduction to ~~the basics of~~ the statistical software package R and how to use it to run hypothesis tests involving means, variances, and proportions, linear regression, ANOVA, and nonparametric statistics.

6. Prerequisites and major restrictions. (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 4473 (Applied Statistics II) or STAT 4463 (Probability & Statistics II).

* 1. Why or why not?

Students need to have already been exposed to all of the topics listed above in the course description.

1. No Is this course restricted to a specific major?
   1. If yes, which major? Enter text...

7. Course frequency(e.g. Fall, Spring, Summer). *Not applicable to Graduate courses.*

Fall, odd

8. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.

Lecture and lab

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

Standard Letter

10. Yes Is this course dual listed (undergraduate/graduate)? With STAT 5483

11. No Is this course cross listed?

*(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.)*

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

Enter text...

**11.2** – **Yes / No** Are these courses offered for equivalent credit?

Please explain. Enter text...

12. No Is this course in support of a new program?

a. If yes, what program?

Enter text...

13. No Does this course replace a course being deleted?

a. If yes, what course?

Enter text...

14. No Will this course be equivalent to a deleted course?

a. If yes, which course?

Enter text...

15. Yes Has it been confirmed that this course number is available for use?

*If no: Contact Registrar’s Office for assistance.*

16. No Does this course affect another program?

If yes, provide confirmation of acceptance/approval of changes from the Dean, Department Head, and/or Program Director whose area this affects.

Enter text...

**Course Details**

17. Outline (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 1-2: Coding basics and production of various graphs. Weeks 3-5: Hypothesis testing involving means, variances, and proportions (includes brief review of theory). Weeks 6-8: Linear Regression (includes brief review of theory). Weeks 9-11: ANOVA (includes brief review of theory). Weeks 12-14: Nonparametric statistics (includes brief review of theory).

18. Special features (e.g. labs, exhibits, site visitations, etc.)

Class will take place in CSM 203, CSM 216, or CSM 217, all of which already have computers.

19. Department staffing and classroom/lab resources

Students will use the computers already present in CSM 203, CSM 216, or CSM 217.

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

No

20. No Does this course require course fees?

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

**Course Justification**

21. Justification for course being included in program. Must include:

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

Proficiency in at least one major statistical package (R, SAS, Minitab, etc.) is an essential pre-requisite to doing statistical research in both academia and industry. After taking this course, students will have immense knowledge (both breadth and depth) of how to use the statistical software package R for statistical analysis. This course will add more variety to the already existing set of undergraduate level statistics courses our department offers.

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

This course fits in well with our department’s mission of providing a “robust mathematical experience where students gain valuable skills in problem solving, critical thinking, and effective communication of mathematical concepts and models.” In particular, it serves both our undergraduate and graduate students and prepares them “for a variety of future endeavors and careers in business, industry, government, research, and academia.” (Quotations taken from department webpage.)

c. Student population served.

Undergraduate students seeking a B.S. in Mathematics.

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

Advanced undergraduate students can handle the rigor of this course, provided they have successfully completed either STAT 4473 (Applied Statistics II) or STAT 4463 (Probability & Statistics II).

**Assessment**

**Relationship with Current Program-Level Assessment Process**

22. 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 as well as a required course for the graduate certificate in Statistics that is in the works. It is connected to Program-Level Outcomes 1 and 3 (see below).

23. Considering the indicated program-level learning outcome/s (from question #23), 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 #23)** | BS Mathematics students will demonstrate sufficient mathematical knowledge to begin graduate studies in mathematics or to apply their mathematical knowledge to a career related to mathematical sciences. |
| Assessment Measure | Exit survey (developed by the faculty). |
| Assessment  Timetable | Data collected and reviewed every semester. |
| Who is responsible for assessing and reporting on the results? | Department Chair, Math/Stat Assessment Committee, and Math/Stat Curriculum Committee. |
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| **Program-Level Outcome 3 (from question #23)** | BS Mathematics students will formulate, represent, analyze, and interpret mathematical models derived from real-world contexts or mathematical problems. |
| Assessment Measure | Exit survey (developed by the faculty). |
| Assessment  Timetable | Data collected and reviewed every semester. |
| Who is responsible for assessing and reporting on the results? | Department Chair, Math/Stat Assessment Committee, and Math/Stat Curriculum Committee. |

**Course-Level Outcomes**

24. 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 both read and create R code to accomplish various statistical tasks. |
| Which learning activities are responsible for this outcome? | Daily in-class worksheets and regular homework assignments. |
| Assessment Measure | 4-5 exams over the course of the semester. |
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| **Outcome 2** | Students will have an in-depth understanding of hypothesis testing involving means, variances, and proportions, linear regression, ANOVA, and nonparametric statistics. |
| Which learning activities are responsible for this outcome? | Daily in-class worksheets and regular homework assignments. |
| Assessment Measure | 4-5 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. Follow the following guidelines for indicating necessary changes.**  **\*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.**  - Deleted courses/credit hours should be marked with a red strike-through (~~red strikethrough~~)  - New credit hours and text changes should be listed in blue using enlarged font (blue using enlarged font).  - Any new courses should be listed in blue bold italics using enlarged font (***blue bold italics using enlarged font***)  *You can easily apply any of these changes by selecting the example text in the instructions above, double-clicking the ‘format painter’ icon 🡪 , and selecting the text you would like to apply the change to.*  *Please visit* [*https://youtu.be/yjdL2n4lZm4*](https://youtu.be/yjdL2n4lZm4) *for more detailed instructions.* |

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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 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.

**STAT 4463 Probability & Statistics II** Point and interval estimation, hypothesis testing, ANOVA, correlation, regression, and nonparametric methods. Prerequisite, STAT 4453. Spring.

**STAT 4473 Applied Statistics II** A second course in applied statistics covering topics in statistical inference for comparing population means and proportions, power, and sample size analyses, analysis of variance, ANOVA, and multiple comparisons procedures, nonparametric statistical procedures, chi square analyses, and inference for regression. Prerequisite, STAT 3233 or equivalent. Spring.

***STAT 4483 Statistical Methods Using R*** *Introduction to ~~the basics of~~ the statistical software package R and how to use it to run hypothesis tests involving means, variances, and proportions, linear regression, ANOVA, and nonparametric statistics. Prerequisite, STAT 4463 or STAT 4473. Fall, odd.*

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**Major in Mathematics**

**Bachelor of Science**

A complete 8-semester degree plan is available at https://www.astate.edu/info/academics/degrees/

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| **University Requirements:** |  |
| See University General Requirements for Baccalaureate degrees (p. 44) |  |
| **First Year Making Connections Course:** | **Sem. Hrs.** |
| MATH 1093, Making Connections - Mathematics | **3** |
| **General Education Requirements:** | **Sem. Hrs.** |
| See General Education Curriculum for Baccalaureate degrees (p. 89)  **Students with this major must take the following:**  *MATH 2204, Calculus I PHYS 2034, University Physics I Twelve hours in Social Sciences (Required Departmental Gen. Ed. Option), including one of the following:*  *ANTH 2233, Introduction to Cultural Anthropology GEOG 2613, Introduction to Geography HIST 1013, World Civilization to 1660 HIST 1023, World Civilization since 1660* | **36** |
| **Major Requirements:** | **Sem. Hrs.** |
| CS 2114, Structured Programming | 4 |
| MATH 2183, Discrete Structures | 3 |
| MATH 2214, Calculus II | 4 |
| MATH 3254, Calculus III | 4 |
| MATH 3243, Linear Algebra | 3 |
| MATH 3303, Modern Algebra I | 3 |
| MATH 4403, Differential Equations | 3 |
| MATH 4553, Advanced Calculus I | 3 |
| PHYS 2044, University Physics II | 4 |
| STAT 3233, Applied Statistics I | 3 |
| STAT 4453, Probability and Statistics I | 3 |
| **Select one of the following:**  MATH 4423, Modern Algebra II MATH 4563, Advanced Calculus II STAT 4463, Probability and Statistics II | 3 |
| **Mathematics or Statistics Electives (select four of the following):**  MATH 3273, Applied Complex Analysis  MATH 3323, Mathematical Modeling  MATH 3343, College Geometry MATH 3353, History of Mathematics  MATH 4423, Modern Algebra II   *If not taken to satisfy Major Requirements* MATH 4513, Applied Mathematics  MATH 4533, Numerical Methods  MATH 4563, Advanced Calculus II   *If not taken to satisfy Major Requirements* STAT 4463. Probability and Statistics II   *If not taken to satisfy Major Requirements* ***STAT 4483 Statistical Methods Using R*** | 12 |
| **Sub-total** | **52** |
| **Electives:** | **Sem. Hrs.** |
| Electives (Eight hours must be upper-level) | **29** |
| **Total Required Hours:** | **120** |