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

**New Course Proposal Form**

**[] Undergraduate Curriculum Council**

**[X] 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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| David Newman 4/8/2020 **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| NA Enter date… **Department Chair:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Head of Unit (If applicable)** |
| David Newman 4/8/2020 **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| Bud Kennedy 4/8/2020 **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 Nu**mber)**

**Aaron Shew,** [**ashew@astate.edu**](mailto:ashew@astate.edu) **, 615-971-9938**

2. Proposed Starting Term and Bulletin Year

**Fall 2020**

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*. )

**AGEC 5253**

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).

**Agricultural and Environmental Data Science**

**Ag Env Data Science**

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

**Agricultural and environmental data gathering, wrangling, analysis, and visualization with emphasis on introductory programming skills.**

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. **NO** Are there any prerequisites?
   1. If yes, which ones?

Enter text...

* 1. Why or why not?

**This course deals primarily with an introduction to programming for College of Agriculture students. Basic spreadsheet analysis and manipulation is required. Graduate standing is sufficient.**

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**

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 Only**

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)?

**AGEC 4253 Agricultural and Environmental Data Science**

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.)

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| Date | Topics / Objectives / Highlights |
| Week 1 | Course Overview & Introductions; Software installation |
| 2 | Getting to know R and R Studio |
| 3 | Data gathering, types of data, and data structures in R |
| 4 | Data wrangling |
| 5 | Descriptive statistics |
| 6 | ANOVA |
| 7 | A/B testing |
| 8 | Linear regression |
| 9 | Time series analysis |
| 10 | Spatial data in R |
| 11 | Vector spatial analysis |
| 12 | Raster spatial analysis |
| 13 | Weather data analysis |
| 14 | Satellite imagery analysis |
| 15 | Machine learning |
| 16 | Final project paper and presentation |

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

**This course requires a computer with admin privileges and a computer lab for teaching.**

19. Department staffing and classroom/lab resources

**A conventional classroom a computer lab will be required.**

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)

**Currently, there are no data science or basic introductions to programming within the context of agricultural and environmental problem solving. This course will provide an overview of the essentials of programming and data structures and types typical in agricultural and environmental sciences. Students will receive hands-on training in how to program in a scripting language such as R or Python, and they should expect to know how to obtain, manipulate, analyze, and visualize common data sets used in agricultural and environmental sciences.**

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.

**One of our program-level student learning outcomes (PLO 1) is for students to be able to “apply economic, management, marketing and financial tools to make decisions in agricultural firms.” The entire crux of this course will be to equip students with data collection, management, analysis, and visualization skills to best manage agricultural and environemental decisions and to assess profitability and sustainability over the long run. One of the core SLOs – “Students will demonstrate critical thinking skills to analyze and synthesize relevant problems in agriculture”, which will also be a key contribution to student learning in this course.**

c. Student population served.

**Students majoring in any of the agricultural disciplines and environmental sciences. Predominantly senior-level undergraduates and first year MS students.**

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

**This course is proposed as being upper-level because it will challenge students to think more critically, do more out-of-class research, be more quantitative in their analysis, and be more confident in their ability to solve problems. Students need to have a firm grasp on lower-level concepts in agricultural and/or environmental sciences in order to receive the most from this course.**

**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?

**The Program Learning Outcome for the Graduate Agribusiness Program partially fulfilled by this course are:**

**PLO 3:** **Students will develop advanced skills in critical thinking and analysis applied to solve relevant problems.**

**The course will follow existing assessment processes established for the agribusiness program. This course is an elective.**

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 3 (from question #23)** | **Students will develop advanced skills in critical thinking and analysis applied to solve relevant problems.** |
| Assessment Measure | **Oral Exit Exam OR Thesis** |
| Assessment  Timetable | **Student’s final semester** |
| Who is responsible for assessing and reporting on the results? | **Major Adviser** |

**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** | **Gain basic to intermediate data science skills in a statistical programming language** |
| Which learning activities are responsible for this outcome? | **Lectures, videos, and hands-on programming projects and problems sets** |
| Assessment Measure | **Culminating Course Project** |

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| **Outcome 2** | **Understand types, stuctures, and manipulation of agricultural and environmental data** |
| Which learning activities are responsible for this outcome? | **Lectures, videos, and hands-on programming projects and problems sets** |
| Assessment Measure | **Culminating Course Project** |

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| **Outcome 3** | **Understand and calculate descriptive statistics for agricultural and environmental data** |
| Which learning activities are responsible for this outcome? | **Lectures, videos, and hands-on programming projects and problems sets** |
| Assessment Measure | **Culminating Course Project** |

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| **Outcome 4** | **Model and interpret agricultural and environmental data with spatial and temporal attributes** |
| Which learning activities are responsible for this outcome? | **Lectures, videos, and hands-on programming projects and problems sets** |
| Assessment Measure | **Culminating Course Project** |

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| **Outcome 5** | **Visualize agricultural and environmental data in a meaningful, communicative way** |
| Which learning activities are responsible for this outcome? | **Lectures, videos, and hands-on programming projects and problems sets** |
| Assessment Measure | **Culminating Course Project** |

**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.* |

**\*change affects page 289 in the graduate course bulletin for 2019-2020**

**AGEC 5083. Agricultural Policy and Current Issues** Economic developments in agriculture; role of the government in agriculture and policies affecting rural people are considered. Text and current information are utilized. Prerequisite: AGEC 1003 or ECON 2313 or ECON 2323.

**AGEC 5253. Agricultural and Environmental Data Science Agricultural and environmental data gathering, wrangling, analysis, and visualization with emphasis on introductory programming skills. Fall. AGEC 3013 OR Approval from Instructor.**

**AGEC 6003.** **Advanced Agricultural and Food Marketing** Recent developments in food, crop and livestock marketing. A study of costs and efficiencies associated with various agricultural and food marketing channels. Application of firm theory to agricultural and food marketing.