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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**

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| **[ ]New Course, [ ]Experimental Course (1-time offering), or [X]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 9/29/2021  **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| Amanda Lambertus 9/30/2021  **Department Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Head of Unit (if applicable)** |
| John Hershberger 10/1/2021 Enter date…  **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **Director of Assessment (new courses only)** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Graduate Curriculum Committee Chair** |
| Lynn Boyd 10/4/2021 **College Dean** | Alan Utter 11/29/2021  **Vice Chancellor for Academic Affairs** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **General Education Committee Chair (if applicable)** |  |

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

Jeongho Ahn

Email: [jahn@astate.edu](mailto:jahn@astate.edu)

Phone: 870-972-3090

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.”*

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|  | **Current (Course Modifications Only)** | **Proposed (New or Modified)**  *(Indicate “N/A” if no modification)* |
| **Prefix** | **MATH** | **N/A** |
| **Number\*** | **5533** | **N/A** |
| **Title** | **Numerical Methods** | **Introduction to Numerical Analysis**  **Short Title: Intro to Numerical Analysis** |
| **Description\*\*** | **Algebraic, transcendental, ordinary and partial differential equations, finite differences, and integral equations. Numerical integration, error analysis, and/or other topics of numerical analysis utilizing high speed computer techniques. Prerequisites, MATH 2214 and a high level programming language.** | **Error analysis, Taylor polynomial approximations, interpolation, numerical methods to solve nonlinear systems, numerical integration, numerical methods for ordinary and partial differential equations,** **and/or numerical algorithms utilizing high speed computer techniques.** **Prerequisites, MATH 2214 and CS 2114. Spring, even.** |

***\**** (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]**

(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?

**MATH 2214 and CS 2114**

* 1. Why or why not?

**The contents covered in MATH 2214 (Cal II) as well as the programming skills are needed for 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]**

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

**Spring, even.**

1. **Proposed course type [Modification requested? 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.

Enter text...

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

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

Enter text...

1. **Yes** Is this course dual-listed? **undergraduate/graduate**
2. **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.)*

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

a. If yes, what program?

Enter text...

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)?

a. If yes, which course?

Enter text...

**Course Details**

1. **Proposed outline** **[Modification requested? 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.)

Enter text...

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

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

Enter text...

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

Enter text...

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

**No**

1. **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.*

**Justification**

**Modification Justification (Course Modifications Only)**

1. Justification for Modification(s)
2. **For the course title**, **the new one is more academically oriented.**
3. **For the course description, the new one is clearer to explain what the course covers.**

**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)

Enter text...

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.

Enter text...

c. Student population served.

Enter text...

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

Enter text...

**Assessment**

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

1. **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?

Enter text...

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)** | Type outcome here. What do you want students to think, know, or do when they have completed the course? |
| Assessment Measure | Please include direct and indirect assessment measure for outcome. |
| Assessment  Timetable | What semesters, and how often, is the outcome assessed? |
| Who is responsible for assessing and reporting on the results? | Who (person, position title, or internal committee) is responsible for assessing, evaluating, and analyzing results, and developing action plans? |

*(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?

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| **Outcome 1** | Type outcome here. What do you want students to think, know, or do when they have completed the course? |
| Which learning activities are responsible for this outcome? | List learning activities. |
| Assessment Measure | What will be your assessment measure for this outcome? |

*(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.** |

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Page 424 Before:

**MATH 5513. Applied Mathematics** A study of topics from ordinary and partial differential equations, vector analysis, and functions of a complex variable, with physical applications. Prerequisite, MATH 3254.

**MATH 5533. Numerical Methods** Algebraic, transcendental, ordinary and partial differential equations, finite differences, and integral equations. Numerical integration, error analysis, and/or other topics of numerical analysis utilizing high speed computer techniques. Prerequisites, MATH 2214 and a high level programming language.

**MATH 5553. Advanced Calculus I** The calculus of one and of several variables. Limits, continuity, sequences, differentiation, partial differentiation, integration, and infinite series. Prerequisite, MATH 3254.

**MATH 5563. Advanced Calculus** II A continuation of MATH 5553. Prerequisite, MATH 4553.

Page 424 After:

**MATH 5513. Applied Mathematics** Asymptotical methods, with applications in approximating integrals, series, differential and difference equations. Prerequisite, MATH 3254.

**MATH 5533. Introduction to Numerical Analysis** Error analysis, Taylor polynomial approximations, interpolation, numerical methods to solve nonlinear systems, numerical integration, numerical methods for ordinary and partial differential equations, and/or numerical algorithms utilizing high speed computer techniques.Prerequisites, MATH 2214 and CS 2114. Spring, even.

**MATH 5553. Advanced Calculus I** The calculus of one and of several variables. Limits, continuity, sequences, differentiation, partial differentiation, integration, and infinite series. Prerequisite, MATH 3254.

**MATH 5563. Advanced Calculus II** A continuation of MATH 5553. Prerequisite, MATH 4553.