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| For Academic Affairs and Research Use Only | |
| Proposal Number | SM29 |
| CIP Code: |  |
| Degree Code: |  |

**New or Modified Course Proposal Form**

**[X] Undergraduate Curriculum Council**

**[ ] Graduate Council**

|  |
| --- |
| **[ ]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.

|  |  |
| --- | --- |
| 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 11/16/2021  **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.”*

|  |  |  |
| --- | --- | --- |
|  | **Current (Course Modifications Only)** | **Proposed (New or Modified)**  *(Indicate “N/A” if no modification)* |
| **Prefix** | **MATH** | **N/A** |
| **Number\*** | **4533** | **N/A** |
| **Title** | **Numerical Methods** | **Introduction to Numerical Analysis**  **Short Title: Intro to Numerical Analysis** |
| **Description\*\*** | **Error analysis, numerical methods to solve nonlinear systems, numerical integration, ordinary and partial differential equations, and finite differences. Prerequisites, MATH 2214 and CS 2114.** **Spring, even.** | **Error analysis, Taylor polynomial approximations, interpolation, numerical methods to solve nonlinear systems, numerical integration, numerical methods for ordinary and partial differential equations.** **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? 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?
   1. If yes, which ones?

Enter text...

* 1. Why or why not?

Enter text...

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

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

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.*

|  |  |
| --- | --- |
| **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?

|  |  |
| --- | --- |
| **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.** |

2021-22 UG-Bulletin

Page 542 Before:

**MATH 4513. Applied Mathematics** Topics in the elementary theory of differential equa-  
tions, including existence theorems and applications. Prerequisite, MATH 3254. Fall, Spring.

**MATH 4533. Numerical Methods** Error analysis, numerical methods to solve nonlinear   
systems, numerical integration, ordinary and partial differential equations, and finite differences. Prerequisites, MATH 2214 and CS 2114. Spring, even.

**MATH 4553. Advanced Calculus I** The theoretical treatment of calculus of one real vari-  
able. Limits, continuity, sequences, differentiation and integration. Prerequisite, MATH 3254. Fall.

Page 542 After:

**MATH 4513. Applied Mathematics** Asymptotical methods, with applications in approximating integrals, series, differential equations, and difference equations. Prerequisite, MATH 3254. Fall, Spring.

**MATH 4533. 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.Prerequisites, MATH 2214 and CS 2114. Spring, even.

**MATH 4553. Advanced Calculus I** The theoretical treatment of calculus of one real vari-  
able. Limits, continuity, sequences, differentiation and integration. Prerequisite, MATH 3254. Fall.

**Page 210 Before:**

**Major in Mechanical Engineering (cont.)**

**Bachelor of Science in Mechanical Engineering**

A complete 8-semester degree plan is available at [https://www.astate.edu/info/academics/degree](http://www.astate.edu/info/academics/degree)

|  |  |
| --- | --- |
| Professional Development Elective  *This elective may be selected outside the Engineering Programs, subject only to the follow- ing list or advisor’s approval. It must make a rational contribution to the student’s personal and professional education goals. Pre-approved Professional Development Electives:*  MATH 3243, Linear Algebra  MATH 3273, Applied Complex Analysis  MATH 3303, Modern Algebra I  MATH 3323, Mathematical Modeling  MATH 3343, College Geometry  MATH 4423, Modern Algebra II  MATH 4513, Applied Mathematics  MATH 4533, ~~Numerical Methods~~  MATH 4553, Advanced Calculus I  MATH 4563, Advanced Calculus II  ME 3523, Introduction to Robotics Laboratory  ME 4523, Introduction to Finite Element Analysis  ME 4593, Design of Heating, Ventilating, and Air-Conditioning Systems  STAT 4453, Probability and Statistics I  STAT 4463, Probability and Statistics II  TECH 3433, AutoCAD 3D Modeling  TECH 3453, Advanced Technology Design Solid Works | 3 |
| **Sub-total** | **67** |
| **Additional Support Course:** | **Sem. Hrs.** |
| MATH 4403, Differential Equations | **3** |
| **Total Required Hours:** | **128** |

**Page 210 After:**

**Major in Mechanical Engineering (cont.)**

**Bachelor of Science in Mechanical Engineering**

A complete 8-semester degree plan is available at [https://www.astate.edu/info/academics/degree](http://www.astate.edu/info/academics/degree)

|  |  |
| --- | --- |
| Professional Development Elective  *This elective may be selected outside the Engineering Programs, subject only to the follow- ing list or advisor’s approval. It must make a rational contribution to the student’s personal and professional education goals. Pre-approved Professional Development Electives:*  MATH 3243, Linear Algebra  MATH 3273, Applied Complex Analysis  MATH 3303, Modern Algebra I  MATH 3323, Mathematical Modeling  MATH 3343, College Geometry  MATH 4423, Modern Algebra II  MATH 4513, Applied Mathematics  MATH 4533, Introduction to Numerical Analysis  MATH 4553, Advanced Calculus I  MATH 4563, Advanced Calculus II  ME 3523, Introduction to Robotics Laboratory  ME 4523, Introduction to Finite Element Analysis  ME 4593, Design of Heating, Ventilating, and Air-Conditioning Systems  STAT 4453, Probability and Statistics I  STAT 4463, Probability and Statistics II  TECH 3433, AutoCAD 3D Modeling  TECH 3453, Advanced Technology Design Solid Works | 3 |
| **Sub-total** | **67** |
| **Additional Support Course:** | **Sem. Hrs.** |
| MATH 4403, Differential Equations | **3** |
| **Total Required Hours:** | **128** |

**Page 441 Before:**

Major in Mathematics

**Bachelor of Science**

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

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| --- | --- |
| **University Requirements:** |  |
| See University General Requirements for Baccalaureate degrees (p. 47) |  |
| **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. 84)  **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 History to 1500*  *HIST 1023, World History since 1500* | **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 4413, Partial Differential Equations 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 4483, Statistical Methods Using R STAT 4463. Probability and Statistics II  *If not taken to satisfy Major Requirements* | 12 |
| **Sub-total** | **52** |
| **Electives:** | **Sem. Hrs.** |
| Electives (Eight hours must be upper-level) | **29** |
| **Total Required Hours:** | **120** |

**Page 441 After:**

Major in Mathematics

**Bachelor of Science**

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

|  |  |
| --- | --- |
| **University Requirements:** |  |
| See University General Requirements for Baccalaureate degrees (p. 47) |  |
| **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. 84)  **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 History to 1500*  *HIST 1023, World History since 1500* | **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 4413, Partial Differential Equations MATH 4423, Modern Algebra II  *If not taken to satisfy Major Requirements*  MATH 4513, Applied Mathematics MATH 4533, Introduction to Numerical Analysis  MATH 4563, Advanced Calculus II  *If not taken to satisfy Major Requirements* STAT 4483, Statistical Methods Using R STAT 4463. Probability and Statistics II  *If not taken to satisfy Major Requirements* | 12 |
| **Sub-total** | **52** |
| **Electives:** | **Sem. Hrs.** |
| Electives (Eight hours must be upper-level) | **29** |
| **Total Required Hours:** | **120** |

**Page 445 Before:**

Department of Mathematics and Statistics Minors

Minor in Mathematics

|  |  |
| --- | --- |
| **Required Courses:***.* | **Sem. Hrs.** |
| MATH 2204, Calculus I | 4 |
| MATH 2214, Calculus II | 4 |
| MATH 3254, Calculus III | 4 |
| **Mathematics or Statistics Electives (select three of the following):**  MATH 3243, Linear Algebra  MATH 3273, Applied Complex Analysis MATH 3303, Modern Algebra I  MATH 3323, Mathematical Modeling MATH 3343, College Geometry MATH 4403, Differential Equations  MATH 4413, Partial Differential Equations MATH 4423, Modern Algebra II  MATH 4513, Applied Mathematics MATH 4533, ~~Numerical Methods~~ MATH 4553, Advanced Calculus I MATH 4563, Advanced Calculus II STAT 4453, Probability and Statistics I STAT 4463. Probability and Statistics II | 9 |
| **Total Required Hours:** | **21** |

**Page 445 Afert:**

Department of Mathematics and Statistics Minors

Minor in Mathematics

|  |  |
| --- | --- |
| **Required Courses:***.* | **Sem. Hrs.** |
| MATH 2204, Calculus I | 4 |
| MATH 2214, Calculus II | 4 |
| MATH 3254, Calculus III | 4 |
| **Mathematics or Statistics Electives (select three of the following):**  MATH 3243, Linear Algebra  MATH 3273, Applied Complex Analysis MATH 3303, Modern Algebra I  MATH 3323, Mathematical Modeling MATH 3343, College Geometry MATH 4403, Differential Equations  MATH 4413, Partial Differential Equations MATH 4423, Modern Algebra II  MATH 4513, Applied Mathematics MATH 4533, Introduction to Numerical Analysis  MATH 4553, Advanced Calculus I MATH 4563, Advanced Calculus II STAT 4453, Probability and Statistics I STAT 4463. Probability and Statistics II | 9 |
| **Total Required Hours:** | **21** |