Code # EN07

**New/Special Course Proposal-Bulletin Change Transmittal Form**

**Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

**Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to [mmcginnis@astate.edu](mailto:mmcginnis@astate.edu)

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| --- |
| **New Course or**  **Special Course (Check one box)**  *Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.* |

|  |  |
| --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **Department Chair:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **General Education Committee Chair (If applicable)** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Graduate Curriculum Committee Chair** |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Vice Chancellor for Academic Affairs** |

1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)

ME 3573

2. 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).

Fluid Mechanics

3. 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 problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.

Lecture only

4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?

Standard Letter

5. Is this course dual listed (undergraduate/graduate)?

No Undergrad only

6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)

No

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

Fundamentals of fluid properties, fluid statics, and fluid motion for both incompressible and compressible fluid mediumare presented from a mechanical engineering perspective. The course includes introductory analysis of basic turbomachinery operation and for viscous and inviscid flows.

8. Indicate all prerequisites and 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).

a. Are there any prerequisites?

C or better in MATH 3254 and ENGR 2403

b. Why?

These courses are needed to provide background engineering science and mathematical skills

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

Fall

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

Brad Edgar; bedgar@astate.edu;972-3304

11. Proposed Starting Term/Year

Fall 2014

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

If yes, what program?

No

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

If yes, what course?

Enter text...

Has this course number been used in the past? No

*Submit Course Deletion Proposal-Bulletin Change Transmittal Form.*

14. Does this course affect another program? No

If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.

Enter text...

15. Justification should include:

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

This is a junior-level fluid mechanics course that differentiates from a former general fluids course that served the general engineering program. The recent accreditation of the BSME program necessitated a more rigorous treatment of externally forced flows that include compressibility effects and analysis of turbomachinery

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 represents a more appropriate coverage of the non-linear equations and effects that describe the fluid flow phenomena for mechanical engineering applications

c. Student population served.

Mechanical Engineers

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

The level of mathematical maturity of Calculus III and basic engineering mechanics which serve as prerequisite foe thelecture course are needed for successful completion of the course.

16. 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.)

1. Introduction

2. Fluid Statics

3. Kinematics and Decomposition

4. Integral Analysis

5. Differential Analysis

6. Potential Flow

7. Dimensional Analysis and Similarity

8. Pipe Flow

9. Boundary Layers

10. Drag and Lift

11. Open Channel Flow

12. Compressible Flow

13. Turbulence

14. Turbomachinary

17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)

Standard exams, quizzes, and homework

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

Enter text...

19. Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)

No

20. What is the primary intended learning goal for students enrolled in this course?

Students will gain ability to apply the engineering science skills to analyze and compute the required forces, resistance, reactions, and power requirements for the transport of fluids, in both gas and liquid phases

21. Reading and writing requirements:

a. Name of book, author, edition, company and year

Fundamentals of Fluid Mechanics, 7th Edition, Munson/Young/Okiishi/Huebsch, Wiley, 2012, ISBN 978-1118116135

b. Number of pages of reading required per week: 25

c. Number of pages of writing required over the course of the semester: Enter text...

22. High-Impact Activities (Check all that apply)

Collaborative assignments

Research with a faculty member

Diversity/Global learning experience

Service learning or community learning

Study abroad

Internship

Capstone or senior culminating experience

Other Explain: Enter text...

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

**Outcome #1:** (For example, what will students who meet this goal know or be able to do as a result of this course?)

Analyze the buoyancy and center of pressure for submerged objects

Learning Activity:(For example, what instructional processes do you plan to use to help students reach this outcome?)

Worked Examples and video examples

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?)

Graded homework and exam questions

*(Repeat if needed for additional outcomes 2 and 3)*

**Outcome #2:**

For internal flows, students will have the ability to determine the power requirements to transport fluids to required locations by means of pumps, compressors, or fans.

Learning Activity:

Worked examples, case studies, and video examples

Assessment Tool:

Graded homework, exam questions, and design projects

**Outcome #3**:

For external flow, students will be able to determine the lift and drag forces from an aerodynamic perspective

Learning Activity:

Worked examples, case studies, and video examples

Assessment Tool:

Graded homework and exam questions

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

* 1. Global Awareness

Minimally  
Indirectly  
Directly

* 1. Thinking Critically

Minimally  
Indirectly  
Directly

* 1. Using Technology

Minimally  
Indirectly  
Directly

**From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.**

**To copy from the bulletin:**

1. Minimize this form.
2. Go to <http://registrar.astate.edu/bulletin.htm> and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.
4. Find the page(s) you wish to copy, click on the “select” button and highlight the pages you want to copy.
5. Right-click on the highlighted area.
6. Click on “copy”.
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose “paste”.
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

**Insert after ME 3571 Fluid Mechanics Laboratory ME 3573** Fundamentals of fluid properties, fluid statics, and fluid motion for both incompressible and compressible fluid media are presented from a mechanical engineering perspective. The course includes introductory analysis of basic turbomachinery operation and for viscous and inviscid flows.

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