REQUEST FOR A COURSE CHANGE
University of Central Oklahoma

Course Subject (Prefix), Number, and Title:

<table>
<thead>
<tr>
<th>Course Subject</th>
<th>Number</th>
<th>Course Title (maximum of 30 spaces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing:</td>
<td>ENGR</td>
<td>Fluid Dynamics</td>
</tr>
<tr>
<td>Proposed:</td>
<td>ENGR</td>
<td>Intro. to Comp. Fluid Dynamics</td>
</tr>
</tbody>
</table>

Proposed Title: (full course title if longer than 30 characters)

**Introduction to Computational Fluid Dynamics**

Proposed change(s) to this course: Mark all that apply.

- [ ] Credit Hour
- [ ] Level
- [ ] X Title
- [ ] X Description
- [ ] Prerequisite
- [ ] Enrollment
- [ ] Restriction

- [ ] Other:

CIP Code: If changing, what is the new code?

For more information regarding CIP codes contact your department chair or visit: http://www.ucou.edu/academic-affairs/ir/program_inventory.asp.

Course description:

As it appears in the current catalog (required)
The fundamental equations and solution methods of fluid dynamics are presented with particular attention to solving the Navier-Stokes equation. Topics covered will include mass conservation, momentum and energy equations, potential flow, incompressible and compressible flows, viscous flow, similarity and dimensional analysis, boundary layer theory, vorticity, and turbulent flow.

As it will appear in the next catalog or indicate no change. (Please use standard American English including full sentences.)

This course covers the fundamentals and analysis of Navier-Stokes equation and its solution methods using computational fluid dynamics. Topics include fundamentals of mass conservation, momentum and energy equations, potential flow, incompressible and compressible flows, viscous flows, and basic concept and application of finite volume methods in designing fluidic systems.

Engineering and Physics

Department submitting the proposal

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Person to contact with questions

email address

Approved by:

Department Chairperson

Date

College Curriculum Committee Chair

Date

(Only notify department chair when proposal is forwarded to dean.)

College Dean

Date

Academic Affairs Curriculum or Graduate Council

Date

(Only notify department chair when proposal is forwarded to AA.)

JCGS Dean (for Graduate Proposals)

Date

Office of Academic Affairs

Date

Effective Term (assigned by AA)
1. Does this course have an undergraduate/graduate counterpart?  
   ___ Yes  ___ No

2. Is this proposal part of a larger submission package including a program change?  
   ___ Yes  ___ No

3. Does this course affect a teacher preparation program? (All courses required for any teacher preparation program must have approval from the Council on Teacher Education (CTE) before approval from AACC or Graduate Council.)  
   ___ Yes  ___ No  If yes, send copy of proposal to the Education Curriculum Committee Chair, Dr. Darla Fent
   CTE Approval (Stamp or initial)

4. Is this course currently listed in the University Core?  
   If you wish this course be listed in the University Core, submit University Core course proposal.  
   ___ Yes  ___ No

5. Is this course a prerequisite for any other course(s)?  
   If this change affects the prerequisite, complete course change proposal to delete or change prerequisite.  
   ___ Yes  ___ No

6. Is this course a requirement in any major or minor?  
   If this change impacts the requirement of any major or minor, complete program change proposal.  
   ___ Yes  ___ No

7. Does this course affect majors or minors outside the department?  
   If yes, provide name(s) of department chair(s) contacted, the dates, and the results of the discussion.  
   ___ Yes  ___ No

8. List all majors or minors which include this changed course as a requirement or elective.  
   (list major or minor by title not major code)  
   Engineering Physics - Biomedical Engineering, Engineering Physics - Mechanical Engineering

9. Prerequisite courses:  
   Will the prerequisite courses change?  ___ Yes  ___ No  If yes, fill out below, if no leave blank.

   NOTE: Adding a "new course" as a prerequisite to an existing course will likely cause enrollment problems.  
   As listed at the end of the course description in the current catalog. (Required)
   Existing:  
   Proposed:
   Example 1: MATH 1213 and (MATH 2165 or MATH 2185) and CHEM 1213  
   Example 2: (ACCT 2113 and 2213) and (MGMT 3013 or 3613)  
   Example 3: 8 hours of biology including BIO 1404

10. Co-requisite(s): Prerequisite courses that may be taken in the same semester.  
    Will the co-requisite(s) change?  ___ Yes  ___ No  If yes, fill out below, if no leave blank.

    As listed at the end of the course description in the current catalog. (Required)
    Existing:  
    Proposed:

11. Concurrent enrollment: Courses that must be taken the same semester. Example: lab courses.  
    Will the concurrent enrollment change?  ___ Yes  ___ No  If yes, fill out below, if no leave blank.

    As listed at the end of the course description in the current catalog. (Required)
    Existing:  
    Proposed:
12. Does this course currently have enrollment restrictions? If adding or changing enrollment restrictions answer questions 13-15. If not changing or add enrollment restrictions leave questions 13-15 blank.

___ Yes  ___ No

13. Specify which major(s) may or may not take this course.
Will the major(s) restriction change?  ___ Yes  ___ No
If yes, fill out below, if no leave blank.

Specifying a major, excludes all other majors from enrolling.

**Existing** (as appears in current catalog)
Check one: May ___ May not ___
Major Code: __________________

**Proposed** (if changing)
Check one: May ___ May not ___
Major Code: __________________

14. Which of the following student classification(s) may enroll in this course?
Will the classification restriction change?  ___ Yes  ___ No
If yes, fill out below, if no leave blank.

**Existing** (as appears in current catalog)
Check all that apply:
Graduate (2) 19 + hours ___
Graduate (1) 0-18 hours ___
Post ___
Baccalaureate ___
Senior ___
Junior ___
Sophomore ___
Freshman ___

**Proposed** (if changing)
Check all that apply:
Graduate (2) 19 + hours ___
Graduate (1) 0-18 hours ___
Post ___
Baccalaureate ___
Senior ___
Junior ___
Sophomore ___
Freshman ___

15. Specify other restrictions for this course, if any.
Will other restrictions change?  ___ Yes  ___ No
If yes, fill out below, if no leave blank.

**Existing** (as appears in current catalog)
Admission to Graduate Programs ___
Admission to Nursing Program ___
Admission to Teacher Education ___
Other: ___

**Proposed** (if changing)
Admission to Graduate Programs ___
Admission to Nursing Program ___
Admission to Teacher Education ___
Other: ___

16. Course objectives for this course: (Please refer to instructional objectives documents at: https://spaces.uco.edu/display/aaccproposals?/CO+AACC-main+page#UCOAACC-mainpage-faq-helpful-hints )
If previously approved objectives will be used without any changes, check here ______

**Existing:**
1. Analyze complex fluid systems using the Navier-Stokes equation.
2. Design fluid systems to achieve well-defined engineering objectives.
3. Derive the basic equations and state the underlying concepts of fluid dynamics
4. Demonstrate the importance of the Reynolds number and other non-dimensional parameters
5. Be able to visualize simple flow patterns and sketch them
6. Be able to solve problems involving viscous flow.
7. Understand the solution methodologies of fluid mechanics, and be able relate them to design methods for common aerodynamic and hydraulic systems.
8. Present technical talks in the field of fluid dynamics

**Proposed:**

As they will appear in the updated syllabus.

**Upon completion of this course, students should be able to**
1. Analyze complex fluid systems using the Navier-Stokes equation;
2. Design fluid systems to achieve well-defined engineering objectives;
3. Derive the basic equations and state the underlying concepts of fluid dynamics;
4. Demonstrate the understanding of the solution methodologies of fluid mechanics, and be able relate them to design methods for common aerodynamic and hydraulic systems;
5. Present technical talks in the field of fluid dynamics;
6. Apply basic computational fluid dynamics principles in solving fluid dynamic problems;
7. Demonstrate the understanding of the basics of finite volume methods and its application in analyzing thermo-fluid systems;
8. Demonstrate the ability to perform mathematical modeling and simulation using computer software;
9. Develop algorithms and necessary codes to simulate fluid dynamic problems;
10. Evaluate and select appropriate solution scheme for computational fluid dynamic problems.

17. Please provide a concise, yet comprehensive, statement that explains the specific reasons for requesting the change(s). Include any documentation or assessment information available supporting this specific request.

The course content has been broadened and upgraded to accommodate computational aspects of fluid dynamics and relevant details of computer simulation. Mathematical modeling and computer simulation aspects of fluid dynamics have become important to design thermal and fluidic systems in modern engineering designs. This will be the first exposure of students to the advanced topics. The upgraded content will provide students necessary skills and backgrounds to be successful in future careers.

18. Clearly explain how the characteristics of this course meet or exceed those outlined in Course Level Characteristics. Complete this question only if requesting a course level change. (Copy and paste table from "Course Level Characteristics" document for the appropriate course level of proposed course. Document may be found on: https://spaces.uco.edu/display/aaccproposals/UCO+AACC-main+page#UCCOAACC-mainpage-faq-helpful-hints).

N/A