148 Proposal # (Academic Affairs use only) 038R Proposal # (College use only)

REQUEST FOR A COURSE CHANGE

University of Central Oklahoma

Course Subject (Prefix), Number, and Title:

	Course Subject	Number	Course Title (maximum of 30 spaces)
Existing:	ENGR	5443	Fluid Dynamics
Proposed:	ENGR	5443	Intro. to Comp. Fluid Dynamics

Remember when abbreviating titles, this is how they will appear on student transcripts and schedules

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.uco.edu/academic-affairs/ir/program_inventory.asp.

Course description:

As it appears in the current catalog. (required)

Existing: 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.)
Course descriptions only. Do not include prerequisites or enrollment restrictions, these should be added under questions 9-15.

Proposed: **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

Mohammad Robi Hossan	mhossan@uco.edu	5295
Person to contact with questions	email address	Ext. number

Approved by:

Department Chairperson — Date: 9/25/2020

College Curriculum Committee Chair — Digitally signed by Britney Hopkins, Date: 2020.09.28 18:29:20 -05'00' — Date

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

College Dean — Date: 9/29/2020 — Date

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

Academic Affairs Curriculum or Graduate Council Date

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?
   X Yes ___ No

2. Is this proposal part of a larger submission package including a program change?
   ___ Yes X 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 X 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?
   ___ Yes X No If you wish this course be listed in the University Core, submit University Core course proposal.

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

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

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

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 X 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 X 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 X 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?

___ Yes _X_ No

If adding or changing enrollment restrictions answer questions 13-15. If not changing or add enrollment restrictions leave questions 13-15 blank.

13. Specify which major(s) may or may not take this course.

Will the major(s) restriction change? ____ Yes _X_ 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 _X_ No If yes, fill out below, if no leave blank.

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

15. Specify other restrictions for this course, if any.

Will other restrictions change? ____ Yes _X_ No If yes, fill out below, if no leave blank.

Existing (as appears in current catalog)		**Proposed** (if changing)	
Admission to Graduate Programs	____	Admission to Graduate Programs	____
Admission to Nursing Program	____	Admission to Nursing Program	____
Admission to Teacher Education	____	Admission to Teacher Education	____
Other:	____	Other:	____

16. Course objectives for this course: (Please refer to instructional objectives documents at: https://spaces.uco.edu/display/aaccproposals/UCO+AACC-main+page#UCOAACC-mainpage-faq-helpful-hints.)

If previously approved objectives will be used without any changes, check here ☐

As they appear in the course syllabus.

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

As they will appear in the updated syllabus.

Proposed: 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#UCOAACC-mainpage-faq-helpful-hints .

N/A