Course Specification
(Bachelor)

Course Title:	Physics of Fluids
Course Code:	: PHYS 0313
Program:	Physics
Department:	Physics
College:	Science
Institution:	Majmah university
Version:	1
Last Revision Date:	28/12/2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:3 (3,0,0)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (6/3)					
4. Course General Description:					
This course delves into the fundamental principles governing the behavior of fluids, both at rest and in motion. It covers a wide range of topics, from the basic concepts of fluid statics and dynamics to advanced concepts such as fluid turbulence and computational fluid dynamics. The course is designed to provide students with a solid foundation in fluid mechanics, enabling them to analyze and solve a variety of engineering problems.					
5. Pre-requirements for this course (if any):					
PHYS 0312					
6. Co-requisites for this course (if any):					
nill					
7. Course Main Objective(s):					
Provide an introduction to the physics of fluids by teaching the theory of fluid dynamics, reviewing some of its applications (e.g. convection) and teaching the basics of computational fluid dynamics.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Understand the basic principles and laws governing the physics of fluids (e.g. momentum/Euler equations, Bernoulli's equation)	**K1**	Lectures Lecture Exercises Quizzes Problem-solving	Quiz Mid Term Exams Final Exam
1.2	Knowing the difference between types of fluid flow.	**K1**		
...				
2.0	**Skills**			
2.1	Use mathematical equations to calculate the different parameter of fluid mechanics	**S1**	- Problem solving - Class discussion	Quiz Mid Term Exam
2.2	Analyze and interpret complex processes like convection in the framework of fluid dynamics theory, making reasonable approximations	**S2**		

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.3	Apply the laws of fluid dynamics to specific topics found in nature and space	**S2**	Lecture Exercises Quizzes Problem-solving	
...				
3.0	**Values, autonomy, and responsibility**			
3.1	Work effectively in groups as well as individuals.	**V2**	Lecture Exercises Quizzes Problem-solving Group presentation	Homework Presentation
3.2	Present a short report in written form and orally using appropriate scientific language	**V2**		
3.3	Learn how to search for information through library and internet	**V1**		

C. Course Content

No	List of Topics	Contact Hours
1.	Fluid definitions, properties, thermodynamics of liquid-gas phase change	**4**
2.	The principles of fluid statics: Pascal's law and Archimedes' principal Pressure under static conditions and forces due to static pressure	**6**
3	The Basic Equations for Fluid Motion: The Continuity Equation: Lagrangian and Euler's Equation - The Motion Equation for Ideal and non-ideal fluids - The Stream Function The Energy Equation: Kinetic Energy of the Fluid -The Energy Equation for a Dissipative Fluid	**12**
4	Thermodynamics of Fluids and Equations of State Stokes Law and Falling Sphere Viscometer	**8**
5	Bernoulli's equation and applications	**7**
6	Fluid flow and its types: Real and Ideal flow, Compressive flow, Stable and turbulent flow, Viscous flow	**8**
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**QUIZES**	**3+9**	**10**
2.	Mid term1	**7**	**15**
3.	**Mid term 2**	**12**	**15**
4.	**E-exam**	**13**	**10**
5	**Homework & Presntation**	**2 to12**	**10**
6.	**Final Exam**	**end**	**40**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	*1-Fluid mechanics - Frank M. White, 2015 McGraw Hill; 8th edition.* *2-Foundations of aerodynamics: bases of aerodynamic design- Martin Kuethe; Chuen-Yen Chow .*
Supportive References	*An Introduction to Fluid Dynamics, G. K. Batchelor, 2000, Cambridge University Press; 2nd edition.*
Electronic Materials	•*Saudi Digital Library (SDL)*
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	smart board
Other equipment (depending on the nature of the specialty)	Library with text book for search and revision, Wi-Fi internet connections

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Internal Reviewer committee**	**direct**
Effectiveness of	**students**	**Indirect**

Assessment Areas/Issues	Assessor	Assessment Methods
Students assessment		
Quality of learning resources	Peer Reviewer	direct
The extent to which CLOs have been achieved	Internal Reviewer committee	direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	DEPARTMENT COUNCIL
REFERENCE NO.	1
DATE	28/12/2024