Course Specification
(Postgraduate)

Course Title:	**Topics in Fluid Mechanics**
Course Code:	**202602-3**
Program:	**Master of Applied Mathematics**
Department:	**Mathematics and Statistics**
College:	**Science**
Institution:	**Taif university**
Version:	1
Last Revision Date:	**20/10/2023**

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A. General information about the course:

1. Course Identification:

1. Credit hours: (3)				
2. Course type				
A.	☐University	☐College	☐Department	☐Track
B.	☐ Required		☒ Elective	
3. Level/year at which this course is offered: Level 3/ Second Year				
4. Course general Description:				
This is a 3credit postgraduate course introducing advanced topics in Fluid Mechanics. The course comprises approximately comprising 45 hours of lectures. The role of the course is to introduce Models for Non-Newtonian Fluids with different applications and Theory of stability in fluids. It is assumed that students entering this course have previously taken courses in Fluid Mechanics.				
5. Pre-requirements for this course (if any)**:**				
None				
6. Pre-requirements for this course (if any)**:**				
None				
7. Course Main Objective(s):				
The main purpose for this course is the student choose any of the advanced topics and quantitative techniques for the study of Fluid Mechanics and its applications that serve the direction of his research.				

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	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**	NA
3.	**Field**	NA
4.	**Tutorial**	NA
5.	**Others (specify)……**	NA
	Total	**45**

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Recognize the difference between the laminar flows and magneto fluids**	K1	Lectures, group discussion `	Exams, Quizzes, Assignments
1.2	**Identify fluid dynamics of heat and mass transfer.**	K2	Lectures, group discussion	Exams, Quizzes, Assignments
2.0	**Skills**			
2.1	**Apply the learned material of the course in Models for Non-Newtonian Fluids with different application.**	S1	Lectures, group discussion	Exams, Quizzes, Assignments, report
2.2	**Demonstrate the Laminar flows and magneto fluids in different coordinates.**	S2	Lectures, group discussion	Exams, Quizzes, Assignments, report
3.0	**Values, autonomy, and responsibility**			
3.1	**Participate effectively within groups and independently.**	V1	Lectures, group discussion	Exams, Quizzes, Assignments, report
3.2	**Give theorems and develop lemmas using different techniques.**	V2	Lectures, group discussion	Exams, Quizzes, Assignments, report

C. Course Content:

No	List of Topics	Contact Hours
1.	The student chooses any of the following topics that serve the direction of his research.	9
2.	Laminar flows and magneto fluids in different coordinates	9
3.	Fluid dynamics of heat and mass transfer	9
4.	Models for Non-Newtonian Fluids with different applications	9
5.	Compressible fluids and aerodynamics	6
6.	Models for Non-Newtonian Fluids with different application.	3
	Total	45

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes and HomeWorks	Continues	10 %
2.	Midterm exam	8^{th} -9^{th}	20 %
3.	Final exam	16^{th}	70%

*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	• G. Astarita and G. Marrucci, Principles of Non-Newtonian Fluid Mechanics, McGraw Hill Book Company Ltd. (1974). • J. Betten, Creep Mechanics, Springer Berlin Heidelberg (2008).
Supportive References	Munson, Yong, Okiishi.Fundamental of Fluid Mechanics(4thEdition)- (2002).
Electronic Materials	https://en.wikipedia.org/wiki/Fluid_mechanics
Other Learning Materials	SDL, Calculous programming (Mathematica, Mathcad, Mathlab)

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Properly equipped classroom

Items	Resources
Technology equipment (Projector, smart board, software)	- Classroom equipped with desktop computers. - Projectors and related items. - Numerical packages. - Compilers
Other equipment (Depending on the nature of the specialty)	Wi-Fi internet connections

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students**	**Indirect**
Effectiveness of students assessment	**Students**	**Indirect**
Quality of learning resources	**Students**	**Indirect**
The extent to which CLOs have been achieved	**Peer reviewer**	**Direct**
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	**Department of Mathematics and Statistics**
REFERENCE NO.	
DATE	**20/10/2023**