Course Specification

(Bachelor)

Course Title:	**Mathematical Physics-1**
Course Code:	**PHYS26292**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**University of Bisha**
Version:	**3**
Last Revision Date:	25 July 2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:	3

2. Course type					
A.	University ☐	College ☐	Department☒	Track☐	Others☐
B.	Required ☒	Elective☐			
3. Level/year at which this course is offered:				4th Level / 2nd year	
4. Course general Description					
This course covers a selection of advanced topics related to mathematical physics. Based on prior knowledge in mathematical science, the following topics are considered: the vector algebra, the fundamentals of matrices algebra, and the complex numbers.					
5. Pre-requirements for this course:					
NA					
6. Co- requirements for this course:					
NA					
7. Course Main Objective(s)					
Recognize the fundamentals of vector algebra, matrices algebra, and complex numbers.					

2. Teaching mode

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	3	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 CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize the vector algebra.	K.1	Lectures Solve problems	Written test Reports Homework Quizzes
1.2	Define the fundamentals of matrices algebra.	K.1		
1.3	Describe the concepts of the complex numbers.	K.1		
2.0	Skills			
2.1	Solve problem related to the vector algebra.	S.4	Lectures Solve problems.	Written test Reports Homework Quizzes
2.2	Apply the fundamentals of matrices algebra.	S.4		
2.3	Solve problem related to the concepts of the complex numbers.	S.4		
3.0	Values, autonomy, and responsibility			
3.1	Exhibit self-learning skills independently.	V.2	Self-learning	Reports Presentation

C. Course Content

No	List of Topics	Contact Hours
1.	**Vector** Vectors in 2-Space Vectors in 3-Space	4.5
2.	**Vector** Dot Product Cross Product	4.5

3.	**Vector** Lines and Planes in 3-Space Vector Spaces	4.5
4.	**Matrices** Introduction to Matrix Algebra Systems of Linear Algebraic Equations. Rank of a Matrix.	4.5
5.	**Matrices** Determinants. Properties of Determinants.	4.5
6.	**Matrices** Inverse of a Matrix. Systems of Linear Algebraic Equations.	4.5
7.	**Matrices** Cramer's Rule. The Eigen value Problem.	4.5
8.	**Functions of a complex variables** Complex Numbers. Powers and Roots.	4.5
9.	**Functions of a complex variables** Sets in the complex plane. Functions of a complex variable.	4.5
10.	**Functions of a complex variables** Cauchy-Riemann equation. Exponential and Logarithmic functions.	4.5
Total		45

Table: The matrix of consistency between the content and the learning outcomes of the course.

		Course Learning Outcomes					
	1.1	1.2	1.3	2.1	2.2	2.3	3.1
Topic 1	✓			✓			✓
Topic 2	✓			✓			✓
Topic 3	✓			✓			✓
Topic 4		✓			✓		✓
Topic 5		✓			✓		✓
Topic 6		✓			✓		✓
Topic 7		✓			✓		✓
Topic 8			✓			✓	✓
Topic 9			✓			✓	✓
Topic 10			✓			✓	✓

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework, quizzes, reports, and presentation.	1: 15	10 %
2.	First term exam	7: 8	20 %
3.	Second term exam	12:13	20 %
4.	Final exam	End of Semester	50 %

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	- Advanced Engineering Mathematics, 6th edition, Dennis G. Zill & Warren S. Wright, Jones & Bartlett Learning, LLC, an Ascend Learning Campany, (2018).
Supportive References	- Mathematical Methods for Physics and Engineering, K. F. Riley, M. P. Hobson and S. J. Bence, (3rd Ed.), Cambridge University Press, (2006). - Essential Mathematical Methods for Physicists, H. J. Weber and G.B. Arfken, Academic Press, (2003). - Complex Variables and their applications, A.D. Osborne, (1999).
Electronic Materials	- -Blackboard. - -PowerPoint presentations. - Digital library of University of Bisha https://ub.deepknowledge.io/Bisha
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities	Classrooms, Physics lab.
Technology equipment	Data show or smart board.
Other equipment	NA

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Extent of achievement of course learning outcomes.	Teachers, students.	Direct (Final exams), Indirect (Questionnaire).

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching.	Teachers, students.	Indirect (Questionnaire)
Effectiveness of assessment.	Teachers, students.	Indirect (Questionnaire)
Quality of learning resources	Teachers, students.	Indirect (Questionnaire)
Quality of facilities available	Teachers, students.	Indirect (Questionnaire)
Fairness of evaluation	Peer reviewer.	Direct (Final exams reevaluation).

G. Specification Approval Data

COUNCIL /COMMITTEE	College of Science Council
REFERENCE NO.	20
DATE	**17 August 2023**