1. Basic Information

Program Title	All academic programs		
Department offering the Program			
Department Responsible for the Course	Engineering Mathematics and Physics		
Course Code	BAS021		
Year/ Level	Preparatory Year -1st Semester		
Specialization	Faculty requirement		
Teaching Hours	Lectures	Tutorial	Practical
	3	1	1

2. Course aims:

No.	aim
1	Study phenomena and theories of mechanical properties of metals & waves and heat & thermodynamics physics related to engineering application.

3. Learning Outcomes (LOs):

A1.1	Demonstrate the dimension of physical quantities, mechanical properties of metals, types of oscillation, types of waves, types of fluid flow.
A1.2	Explain the quantity of heat, mechanism of heat transfer, and 1st & 2nd of thermodynamics.
A1.3	Identify the relation between stress-strain curve and mechanical properties of metals.
A2.1	Analyze the results given from experiment.
A5.1	Practice research methods with contemporary issues and application of physics.
A8.1	Communicate verbally with the colleagues in the lab and others.

4. Course Contents:

No.	Topics	Week
1	Units and dimensional analysis	1
2	Mechanical properties of metal **Experiment:** Determine the Young's modulus of materials.	2, 3
3	Oscillations. **Experiments:** 1- Determine the gravity of acceleration by using the simple pendulum. 2- Determine the spring constant and the verification of Hook's law.	7, 8
4	Wave motion	9
5	Sound Experiments: 1- Determine the speed of sound by using open air column and tuning forks.	10,11

6	Fluid mechanics	12
7	Heat and internal energy, temperature and thermometers. **Experiments:** Determine the melting point of wax.	4
8	Thermal expansion and heat transfer	5, 6
9	The kinetic theory of gases	13
10	First and second law of thermodynamics	14

5. Teaching and Learning Methods:

No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Flipped classroom
3	Practical (Virtual lab.)
4	Research assignment

6. Teaching and Learning Methods 0f Disable Students:

No.	Teaching Method
1	Additional Tutorials
2	Online lectures and assignments

7. Student assessment:

7.1 Student Assessment Methods:

No.	Assessment Method	LOs
1	Mid Term Examination (written)	A1.1, A1.2
2	Oral Examination	A1.1, A1.2, A1.3, A8.1
3	Practical Examination	A2.1, A8.1
4	Semester work (Formative - quizzes – presentation)	A1.1, A1.2, A1.3, A5.1, A8.1
5	Final Term Examination (written)	A1.1, A1.2, A1.3

7.2 Assessment Schedule:

No.	Assessment Method	Weeks
1	Mid Term Examination (written)	7
2	Oral Examination	14
3	Practical Examination	14

4	Semester work (Formative - quizzes – presentation)	Every week
5	Final Term Examination (written)	15

7.3 Weighting of Assessments:

No.	Assessment Method	Weights
1	Mid Term Examination (written)	13
2	Oral Examination	6
3	Practical Examination	7
4	Semester work (Formative - quizzes – presentation)	7
5	Final Term Examination (written)	67
Total		100%

8. List of References

No.	Reference List
1	R.A. Serway and J.W. Jewett, "Physics for Scientists and Engineers", 6th Edition, Thomson Brooks/Cole 2014.

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	Lab Facilities
3	White Board
4	Data Show System
5	Visualizer
6	Presenter
7	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Topic	aim	LO's
1	Units and dimensional analysis	1	A1.1
2	Mechanical properties of metal	1	A1.1, A1.3, A2.1
3	Oscillations	1	A1.1, A1.2, A2.1, A8.1, A5.1
4	Wave motion	1	A1.1, A1.2, A5.1

5	Sound	1	A1.3, A2.1
6	Fluid mechanics	1	A1.1
7	Heat and internal energy, temperature and thermometers	1	A1.3, A2.1, A8.1
8	Thermal expansion and heat transfer	1	A1.3, A2.1
9	The kinetic theory of gases	1	A1.3, A5.1
10	First and second law of thermodynamics	1	A1.3, A2.1, A8.1

Course Coordinator: Assoc.Prof. Mervat Mohamed Abo- Elkhier

Head of Department: Prof. Mohamed Mohamed El gamal

Date of Approval:

Course: Physics 1	
Program LOs	**Course LOs**
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	A1.1 Demonstrate the dimension of physical quantities, mechanical properties of metals, types of oscillation, types of waves, types of fluid flow. A1.2 Explain the quantity of heat, mechanism of heat transfer, and 1st & 2nd of thermodynamics. A1.3 Identify the relation between stress-strain curve and mechanical properties of metals.
A2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	A2.1 Analyze the results given from experiments. .
A5. Practice research techniques and methods of investigation as an inherent part of learning.	A5.1 Practice research methods with contemporary issues and application of physics.
A8. Communicate effectively–graphically, verbally and in writing–with a range of audiences using contemporary tools.	A8.1 Communicate verbally with the colleagues in the lab and others.