



Course Specifications: Physics 1 MTH011

1. Basic Information

Program Title	Biomedical Engineering
Department offering the Program	Biomedical Engineering
Department Responsible for the Course	Engineering Mathematics and Physics
Course Code	MTH011
Year/ Level	Level 000
Specialization	Minor
Prerequisites	None
Authorization data of course specification	

Teaching Hours	Lectures	Tutorial	Practical
	2	2	3

2. Course aims:

No.	aim
1	Describe phenomena of mechanical properties of metals & waves and heat & thermodynamics physics related to engineering application.
4	Apply basic knowledge of physics to conduct experiments that help in the design of digital biomedical systems.

3. Intended Learning Outcomes (ILOs):

a. Knowledge and Understanding:

No.	Knowledge and Understanding
A ₁	Identify the dimension of physical quantities, mechanical properties of metals, types of oscillation, types of waves, types of fluid flow, and 1 st & 2 nd of thermodynamics
A ₃	List the characteristics of engineering materials and their behavior related to the biomedical engineering field
A ₅	State the methodologies of solving physical engineering problems, data collection and interpretation
A ₁₂	Recall the modern physics topics

b. Intellectual Skills

No.	Intellectual Skills
B ₁	Select appropriate dimension analysis to obtain the relation between physical quantities
B ₅	Asses the performance of metals, and mechanisms of heat transfer.

c. Professional Skills

No.	Professional Skills
C ₆	Employ a wide range of analytical tools, measuring instruments, and laboratory equipment to obtain data
C ₁₃	Apply, synthesize, and select physics theory for solving biomedical engineering problems.

d. General Skills

No.	General Skills
D ₁	Collaborate within team work in laboratory.
D ₃	Communicate effectively.

4. Course Contents:

No.	Topics	Weeks
1	Units and dimensional analysis	1-2
2	Mechanical properties of metal Experiment: Determine the Young's modulus of materials.	3-4
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.	5-6
4	Wave motion	7
5	Sound Experiments: 1- Determine the speed of sound by using open air column and	9



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	tuning forks.	
6	Fluid mechanics	10
7	Heat and internal energy, temperature and thermometers. Experiments: Determine the melting point of wax.	11
8	Thermal expansion and heat transfer	12
9	The kinetic theory of gases	13
10	First and second law of thermodynamics	14

5. Teaching and Learning Methods:

No.	Teaching Method
1	Lectures
2	Discussion Sessions
4	Practical

6. Teaching and Learning Methods of Disable Students:

No.	Teaching Method	Reason
1	Additional Tutorials	To Answer their questions

7. Student Evaluation:

7.1 Student Evaluation Methods:

No.	Evaluation Method	ILOs
1	Mid Term Examination	A ₁ ,A ₃ ,A ₅ ,B ₁
2	Oral Examination	A ₁ ,A ₁₂ , B ₁ , B ₅
3	Practical Examination	A ₅ ,B ₁ , B ₅ , C ₆ , C ₁₃
4	Semester work	A ₁ ,A ₃ ,A ₅ ,A ₁₂ ,B ₁ ,B ₅ , C ₆ , C ₁₃ ,D ₁ ,D ₃
5	Final Term Examination	A ₁ ,A ₃ ,A ₅ ,A ₁₂ ,B ₁ ,B ₅

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination	8
2	Oral Examination	13
3	Practical Examination	13
4	Semester work	Every week
5	Final Term Examination	15

7.3 Weighting of Evaluations:

No.	Evaluation Method	Weights
1	Mid Term Examination	20 %
2	Oral Examination	5 %
3	Practical Examination	5 %
4	Semester work	20 %
5	Final Term Examination	50 %
Total		100%

8. List of References

No.	Reference List
1	Physics for Scientists and Engineers, R.A. Serway and J.W. Jewett, 6th Edition, Thomson Brooks/Cole 2013.
2	University physics with modern physics, Bauer Westfall, McGraw-Hill, 2011 .
3	College physics, Giambattista, Recharadson, McGraw-Hill, 2010.

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom



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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	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
1	Units and dimensional analysis	1	A ₁	B ₁		
2	Mechanical properties of metal	1	A ₃	B ₁ , B ₅	C ₆ , C ₁₃	D ₁ , D ₃
3	Oscillations	1	A ₅	B ₁	C ₆ , C ₁₃	D ₁ , D ₃
4	Wave motion	1	A ₅	B ₅		D ₃
5	Sound	1	A ₅		C ₆ , C ₁₃	D ₁ , D ₃
6	Fluid mechanics	1,4	A ₁ , A ₅	B ₅		
7	Heat and internal energy, temperature and thermometers	1,4	A ₁ , A ₁₂	B ₁	C ₆ , C ₁₃	D ₁ , D ₃
8	Thermal expansion and heat transfer	4	A ₁	B ₁		D ₃
9	The kinetic theory of gases	4	A ₁	B ₁		D ₃
10	First and second law of thermodynamics	4	A ₁	B ₅		

Course Coordinator: Prof. Dr.

Head of Department: Assoc. Prof. Hossam Eldeen Moustafa

Date of Approval: