1. Basic Information

Program Title	All academic programs		
Department offering the Program			
Department Responsible for the Course	Engineering Mathematics and Physics		
Course Code	BAS022		
Year/ Level	Preparatory Year -2nd Semester		
Specialization	Faculty requirement		
Teaching Hours	Lectures	Tutorial	Practical
	3	1	1

2. Course aims:

No.	aim
1	Describe phenomena and theories of the electric and magnetic field and properties of visible light and its engineering application.

3. Learning Outcomes (LOs):

A1.1	Explain the concepts of charges, electric fields, electric flux, electric potential and capacitors.
A1.2	Illustrate Gauss's law and its application.
A1.3	Define the magnetic field, Boit-Savart's law, the magnetic Gauss's Law, Faraday's Law and Magnetic Induction.
A1.4	Illustrate the Nature of light, Interference, Diffraction and Polarization.
A1.5	Discuss the idea of early quantum theory and Special Relativity.
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	The Charge and the electric field – Coulomb's law	1
2	The electric flux and Gauss's law	2, 3
3	The electric potential	7
4	The capacitors and dielectrics	8
5	The magnetic field -Boit- Savart's law	11
6	The magnetic flux Gauss's Law – Faraday's Law- Magnetic Induction.	12
7	Nature of light **Experiment**: Determine the refractive index of the prism's material	4

8	Interference of light	5, 6
9	Diffraction	9
10	Polarization **Experiment**: Verification of Malus' law.	10
11	Early quantum theory	13
12	Special Relativity	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, A1.4
2	Oral Examination	A1.1, A1.2, A1.3, A1.4, A1.5, A8.1
3	Practical Examination	A2.1, A8.1
4	Semester work (Formative - quizzes – presentation)	A1.1, A1.2, A1.3, A1.4, A1.5, A5.1, A8.1
5	Final Term Examination (written)	A1.1, A1.2, A1.3, A1.4, A1.5

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	The Charge and the electric field – Coulomb's law	1	A1.1
2	The electric flux and Gauss's law	1	A1.1, A1.2
3	The electric potential	1	A1.1, A1.2, A2.1, A8.1, A5.1
4	The capacitors and dielectrics	1	A1.1, A1.2, A2.1

5	The magnetic field -Boit- Savart's law	1	A1.3, A5.1
6	The magnetic flux Gauss's Law – Faraday's Law- Magnetic Induction.	1	A1.3
7	Nature of light **Experiment**: Determine the refractive index of the prism's material	1	A1.4, A2.1, A8.1
8	Interference of light	1	A1.4, A2.1
9	Diffraction	1	A1.4, A5.1
10	Polarization **Experiment**: Verification of Malus' law.	1	A1.4, A2.1, A8.1
11	Early quantum theory	1	A1.5
12	Special Relativity	1	A1.5

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

Head of Department: Prof. Mohamed Mohamed El gamal

Date of Approval:

Course: Physics 2	
Program LOs	**Course LOs**
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	A1.1 Explain the concepts of charges, electric fields, electric flux, electric potential and capacitors. A1.2 Illustrate Gauss's law and its application. A1.3 Define the magnetic field, Boit-Savart's law, the magnetic Gauss's Law, Faraday's Law and Magnetic Induction. A1.4 Illustrate the Nature of light, Interference, Diffraction and Polarization. A1.5 Discuss the idea of early quantum theory and Special Relativity.
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.