Alva's Education Foundation (R), Moodbidri:
ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY
(Affiliated to Visvesvaraya Technological University, Belagavi, Approved by AICTE, New Delhi)
Shobhavana Campus, Mijar-574225,Moodbidri, D.K., Karnataka
Phone: 08258-262725, Fax: 08258-262726

DEPARTMENT OF CHEMISTRY

SEMESTER—I

Academic year-2023-2024, Odd Semester

Course Code: BCHES102	Course Name: Applied Chemistry for Computer Science & Engineering stream.

Course Teacher: Dr. Ravi Kumar C, Dr. Prakasha Shetty, Dr. Samshuddin S, Dr. Sakshi S Kamath

Course Outcomes: After studying this course, students will be able to,

CO Numbers	Course Outcomes	Blooms Level	Target Level
BCHES102.1	**Enumerate** the working principle of different types of sensors and its engineering applications, understand working & applications of batteries and quantum dot sensitized solar cells.	L2	2
BCHES2102.2	**Understand** the basic chemistry principles behind memory devices & display systems to describe methods of engineering processes.	L2	2
BCHES102.3	**Solve** the problems in Chemistry with respect to electrode system and corrosion.	L3	2
BCHES102.4	**Describe** the synthesis, properties and applications of polymers and green fuel.	L2	2
BCHES102.5	**Analyse** the need of e-waste management by the stake holders towards green environment.	L4	2
BCHES102.6	**Quantitative** analysis of various engineering materials.	L4	2

CO-PO Mapping Matrix:

CO Numbers	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
BCHES102.1	**2**	**1**	-	-	-	-	**1**	-	-	-	-	-
BCHES102.2	**2**	-	-	-	-	-	-	-	-	-	-	-
BCHES102.3	**2**	**1**	-	-	-	**1**	**1**	-	-	-	-	-
BCHES102.4	**1**	-	-	-	-	**1**	**2**	-	-	-	-	-
BCHES102.5	**2**	-	-	-	-	**2**	**2**	-	-	-	-	-
BCHES102.6	**1**	-	-	-	-	**1**	**1**	-	-	-	-	-
SUM	10	2	-	-	-	5	7	-	-	-	-	-
AVERAGE	1.66	1.00	-	-	-	1.25	1.40	-	-	-	-	-

Justification of Course Outcome and Program Outcome mapping:

CO	POs	Level	Justification
BCHES102.1	1	2	Moderately mapped as the students will be able to understand the principle of sensors and its Engineering applications
	2	1	Slightly mapped as the students will be able to identify basic principles of sensors
	7	1	Slightly mapped as the students will be able to understand the impact of the sensors in societal environmental issues
BCHES102.2	1	2	Moderately mapped as the students will be able to acquire knowledge on principles of materials for memory & display systems
BCHES102.3	1	2	Module 3 deals with study of corrosion, its types and control measures. Hence it is mapped moderately to PO1 as it involves solution to certain engineering problems.
	2	1	Using the principles of chemistry behind electrode systems, students

			can understand the concept for problem analysis. Hence, it is slightly mapped to PO2.
	6	1	Students can apply the knowledge gained in this module to overcome the problems in the society, hence CO3 is mapped slightly to PO6.
	7	1	CO3 is slightly mapped to PO7 as students learn the concepts and think in the perspective of sustainable society.
BCHES102.4	1	1	Students apply the basic knowledge of chemistry gained in this module related to polymer and its application will help them in solving complex problems to some extent. Hence, it is slightly mapped to PO1.
	6	1	The green fuel generation studied in Module 4 will help students to think about the betterment of the society, Hence it is slightly mapped with PO6.
	7	2	CO4 s mapped moderately to PO7 because after studying this module student will get idea about environment sustainability as it involves green fuel synthesis.
BCHES102.5	1	2	Need to address e-waste management matches moderately as an outcome for the PO1 -Applying knowledge of Science towards providing solutions engineering problems
	6	2	Involvement of all the stakeholders in dealing with e-waste effectively matches moderately with the Engineer and the Society
	7	2	As this CO deals with Recycling and Recovery: different approaches of recycling of e-waste, matches moderately with Environment and the Sustainability
BCHES102.6	1	1	Various quantitative analysis done in Practical align partially with PO1 dealing with applying knowledge of Science towards providing solutions engineering problems
	6	1	Experiments performed in lab align partially with PO6 outcomes in which Engineer and the society whereby reasoning can be applied to assess health issues and responsibility towards the same
	7	1	Experiments performed demonstrate partially the knowledge of, and need for sustainable development and bringing out environment concerns

Course Teacher

Criteria 8 Coordinator

IQAC Member

Signature with date

HoD & IQAC Chairman

Signature with date

H. O. D.
Dept. Of Chemistry
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

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DEPARTMENT OF CHEMISTRY

SEMESTER—II

Academic year-2023-2024, Even Semester

Course Code: BCHES202	Course Name: Applied Chemistry for Computer Science & Engineering stream.

Course Teacher: Dr. Ravi Kumar C, Dr. Prakasha Shetty, Dr. Samshuddin S, Dr. Sakshi S Kamath

Course Outcomes: After studying this course, students will be able to,

CO Numbers	Course Outcomes	Blooms Level	Target Level
BCHES202.1	**Enumerate** the working principle of different types of sensors and its engineering applications, understand working & applications of batteries and quantum dot sensitized solar cells.	L2	2
BCHES202.2	**Understand** the basic chemistry principles behind memory devices & display systems to describe methods of engineering processes.	L2	2
BCHES202.3	**Solve** the problems in Chemistry with respect to electrode system and corrosion.	L3	2
BCHES202.4	**Describe** the synthesis, properties and applications of polymers and green fuel.	L2	2
BCHES202.5	**Analyse** the need of e-waste management by the stake holders towards green environment.	L4	2
BCHES202.6	**Quantitative** analysis of various engineering materials.	L4	2

CO-PO Mapping Matrix:

CO Numbers	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
BCHES202.1	**2**	**1**	-	-	-	-	**1**	-	-	-	-	-
BCHES202.2	**2**	-	-	-	-	-	-	-	-	-	-	-
BCHES202.3	**2**	**1**	-	-	-	**1**	**1**	-	-	-	-	-
BCHES202.4	**1**	-	-	-	-	**1**	**2**	-	-	-	-	-
BCHES202.5	**2**	-	-	-	-	**2**	**2**	-	-	-	-	-
BCHES202.6	**1**	-	-	-	-	**1**	**1**	-	-	-	-	-
SUM	10	2	-	-	-	5	7	-	-	-	-	-
AVERAGE	1.66	1.00	-	-	-	1.25	1.40	-	-	-	-	-

Justification of Course Outcome and Program Outcome mapping:

CO	POs	Level	Justification
BCHES202.1	1	2	Moderately mapped as the students will be able to understand the principle of sensors and its Engineering applications
	2	1	Slightly mapped as the students will be able to identify basic principles of sensors
	7	1	Slightly mapped as the students will be able to understand the impact of the sensors in societal environmental issues
BCHES202.2	1	2	Moderately mapped as the students will be able to acquire knowledge on principles of materials for memory & display systems
BCHES202.3	1	2	Module 3 deals with study of corrosion, its types and control measures. Hence it is mapped moderately to PO1 as it involves solution to certain engineering problems.
	2	1	Using the principles of chemistry behind electrode systems, students

			can understand the concept for problem analysis. Hence, it is slightly mapped to PO2.
	6	1	Students can apply the knowledge gained in this module to overcome the problems in the society, hence CO3 is mapped slightly to PO6.
	7	1	CO3 is slightly mapped to PO7 as students learn the concepts and think in the perspective of sustainable society.
BCHES202.4	1	1	Students apply the basic knowledge of chemistry gained in this module related to polymer and its application will help them in solving complex problems to some extent. Hence, it is slightly mapped to PO1.
	6	1	The green fuel generation studied in Module 4 will help students to think about the betterment of the society, Hence it is slightly mapped with PO6.
	7	2	CO4 s mapped moderately to PO7 because after studying this module student will get idea about environment sustainability as it involves green fuel synthesis.
BCHES202.5	1	2	Need to address e-waste management matches moderately as an outcome for the PO1 -Applying knowledge of Science towards providing solutions engineering problems
	6	2	Involvement of all the stakeholders in dealing with e-waste effectively matches moderately with the Engineer and the Society
	7	2	As this CO deals with Recycling and Recovery: different approaches of recycling of e-waste, matches moderately with Environment and the Sustainability
BCHES202.6	1	1	Various quantitative analysis done in Practical align partially with PO1 dealing with applying knowledge of Science towards providing solutions engineering problems
	6	1	Experiments performed in lab align partially with PO6 outcomes in which Engineer and the society whereby reasoning can be applied to assess health issues and responsibility towards the same
	7	1	Experiments performed demonstrate partially the knowledge of, and need for sustainable development and bringing out environment concerns

Course Teacher

Criteria 8 Coordinator

IQAC Member

Signature with date

HoD & IQAC Chairman

Signature with date

H. O. D.
Dept. of Chemistry
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

Academic Year- 2023-24		**SEMESTER-- II**	
Course Code: BMATM201	Course Name: Mathematics for ME stream - 2		
Course Teacher:	Dr. Prameela Kolake	IA Marks:	50
		Exam Marks:	50
Total Numbers of Lecture Hours:	Number of Lecture Hours/Week: 4 hrs	Exam Hours:	3 hrs

Course Outcomes: After studying this course, students will be able to,

CO No.	**Course Outcomes**	**Blooms Level**	**Target Level**
1	Apply the knowledge of multiple integrals to compute area and volume.	L1, L2, L3	2
2	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.	L1, L2, L3	2
3	Demonstrate partial differential equations and their solutions for physical interpretations.	L1, L2, L3	2
4	Apply the knowledge numerical methods in solving physical and engineering phenomena.	L1, L2, L3	2
5	Get familiarize with modern mathematical tools namely SCILAB/PYTHON/MATLAB.	L1, L2, L3	2

IQAC Chairperson
H. O. D.
Dept. Of Mathematics
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

CO-PO/PSO MAPPING MATRIX:

CO Numbers	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
BMATM201.1	2	2	1	1	1							1
BMATM201.2	2	2	1	1	1							1
BMATM201.3	2	2	1	1	1							1
BMATM201.4	2	2	1	1	1							1
BMATM201.5	2	2	1	1	1							1
SUM	10	10	5	5	5							5
AVG	2	2	1	1	1							1

Justification of Course Outcome and Program Outcome mapping

CO	POs	Level	Justification
BMATM201.1	PO 1	2	Students will be able to solve complex Engineering problems with the knowledge of basic mathematics.
BMATM201.2		2	
BMATM201.3		2	
BMATM201.4		2	
BMATM201.5		2	
BMATM201.1	PO 2	2	Students will be able to identify, formulate, analyse and draw conclusions for Engineering problems.
BMATM201.2		2	
BMATM201.3		2	
BMATM201.4		2	
BMATM201.5		2	
BMATM201.1	PO 3	1	The basic concepts vector differentiation and integration, the Numerical method , and the solution of partial differential equations can be used to design the solution ution of complex engineering problems for the specified needs with the appropriate consideration for the society and environment with the help of python tool
BMATM201.2		1	
BMATM201.3		1	
BMATM201.4		1	
BMATM201.5		1	
BMATM201.1	PO 4	1	The basic concepts vector differentiation and integration, partial differential equation and the Numerical method are used for research-based knowledge in analysis and interpretation of the data theoretically to provide the valid conclusion and interpret the result with real life with the help of python tool
BMATM201.2		1	
BMATM201.3		1	
BMATM201.4		1	
BMATM201.3		1	

BMATM201.1	PO 5	1	The Modern IT tool Python is used to create and select appropriate techniques, resources and modern engineering tools involved in the concepts of vector differentiation and integration, partial differential equation and the Numerical method.
BMATM201.2		1	
BMATM201.3		1	
BMATM201.4		1	
BMATM201.5		1	
BMATM201.1	PO 12	1	Using the knowledge of the basic concepts in Mathematics, an engineering graduate can understand and learn the changes in technology anytime.
BMATM201.2		1	
BMATM201.3		1	
BMATM201.4		1	
BMATM201.5		1	

Course Teacher

IQAC Member

IQAC Chairman/HOD
H. O. D.
Dept. Of Mathematics
Alva's Institute of Engg. & Technology
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DEPARTMENT OF PHYSICS

SEMESTER -1

Academic Year 2023-24, Even Semester

Course Code: BPHYM22; Course Name: Applied Physics for ME Stream

Course Teacher: Dr. Ramaprasad A.T

Course outcome: At the end of the course the student will be able to:

CO Numbers	Course Outcomes	Bloom s Level	Target Level
BPHYM22.1	Describe the principles of LASERS and Optical fibers and their relevant applications.	L2	2
BPHYM22.2	Discuss the basic principles of the Quantum Mechanics and its application in Quantum Computing.	L2	2
BPHYM22.3	Summarize the essential properties of superconductors and its applications in qubits.	L3	2
BPHYM22.4	Illustrate the application of physics in design and data analysis.	L4	2
BPHYM22.5	Practice working in groups to conduct experiments in physics and perform precise and honest measurements.	L4	2

CO-PO Mapping Matrix												
CO Numbers	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
BPHYM22.1	3	2			2							2
BPHYM22.2	3	2										2
BPHYM22.3	3	2										2
BPHYM22.4	3	2										2
BPHYM22.5	3	2	1		2			3	3			2
SUM	15	12	1		3			3	3			10
AVERAGE	3	2.4	1		1.5			3	3			2

Justification of Course Outcome and Program Outcome

CO	Pos	Level	
BPHYM22.1	1	3	Understanding principles of lasers and optical fibers provides students with knowledge of applied physics, which is crucial for complex engineering problems.
	2	2	Knowledge of lasers and optical fibers enables students to analyze complex engineering problems and solutions, especially in fields like telecommunications.
	5	2	This CO aligns with modern tool usage in engineering, as lasers and optical fibers are widely used in contemporary engineering applications.
	12	2	As technology evolves, this CO emphasizes the need for ongoing learning and adaptability, especially in the context of optical technologies.

BPHYM22.2	1	3	This CO introduces students to fundamental principles of quantum mechanics, which is essential for understanding and working in the field of quantum computing.
	2	3	Understanding quantum mechanics allows students to analyze complex engineering problems, especially those related to quantum technologies.
	12	2	As quantum computing is a rapidly evolving field, this CO promotes the need for lifelong learning in the context of technological change.
BPHYM22.3	1	3	Understanding superconductors and their applications in qubits is essential knowledge for engineers working in emerging technologies like quantum computing.
	2	2	Knowledge of superconductors and qubits enables students to analyze complex engineering problems associated with quantum technologies.
	12	2	This CO emphasizes the need for ongoing learning, as quantum technologies are continually advancing.
BPHYM22.4	1	3	The CO focuses on applying physics in design and data analysis, which is fundamental knowledge for engineers working on various projects and products.
	2	2	This CO equips students with skills to analyze complex engineering problems, especially in the context of data analysis and design.
	12	2	The integration of physics in design and data analysis highlights the importance of continuous learning as technologies evolve.
BPHYM22.5	1	3	Collaborative experimentation and precise measurements are fundamental to engineering knowledge and practice.
	2	2	The ability to work in groups and conduct precise measurements is essential for analyzing and solving complex engineering problems.
	3	1	Collaborative work aligns with the development of solutions, considering public health, safety, and environmental factors.
	5	2	Collaborative experiments and precise measurements are part of modern engineering tool usage.
	8	3	The emphasis on honest measurements aligns with ethical principles and professional responsibilities.
	9	3	The CO promotes effective individual and team work, essential in multidisciplinary engineering settings.
	12	2	The CO encourages a mindset of continuous learning and adaptability as engineering practices evolve.

Course Teacher **HOD**

DEPARTMENT OF PHYSICS

SEMESTER -2

Academic Year 2023-24, Even Semester

Course Code: BPHYE202; Course Name: Applied Physics for EEE Stream

Course Teacher: Dr. Jayarama A

Course outcome:At the end of the course the student will be able to:

CO Numbers	Course Outcomes	Bloom s Level	Target Level
BPHYE202.1	Describe the fundamental principles of the Quantum Mechanics and the essentials of Photonics	L2	2
BPHYE202.2	Elucidate the concepts of conductors, dielectrics and superconductivity	L2	2
BPHYE202.3	Discuss the fundamentals of vector calculus and their applications in Maxwell's Equations and EM Waves.	L3	2
BPHYE202.4	Summarize the properties of semiconductors and the working principles of semiconductor devices	L4	2
BPHYE202.5	Practice working in groups to conduct experiments in physics and Perform precise and honest measurements.	L4	2

CO-PO Mapping Matrix												
CO Numbers	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
BPHYE202.1	3	2										2
BPHYE202.2	3	2										2
BPHYE202.3	3	2										2
BPHYE202.4	3	2			1							2
BPHYE202.5	3	2	1		2			3	3			2
SUM	15	10	1		3			3	3			10
AVERAGE	3	2	1		1.5			3	3			2

Justification of Course Outcome and Program Outcome

CO	Pos	Level	
BPHYE202.1	1	3	The course covers the fundamental principles of Quantum Mechanics and Photonics, which are essential components of engineering knowledge. Students will learn the mathematical and scientific principles behind these topics, enabling them to apply this knowledge to solve complex engineering problems.
	2	2	The course involves the analysis of complex topics in Quantum Mechanics, including Heisenberg's Uncertainty

			Principle, wave functions, and the Schrödinger wave equation. Students will learn to apply these principles to analyze and solve problems in quantum mechanics, demonstrating their ability to analyze complex engineering problems using scientific principles
	12	2	Quantum Mechanics and Photonics are rapidly evolving fields. By studying these subjects, students are preparing themselves for lifelong learning in these areas. They will understand the importance of staying updated with the latest developments in quantum mechanics and photonics, aligning with the need for lifelong learning.
BPHYE202.2	1	3	The course covers the fundamental concepts of conductors, dielectrics, and superconductivity, which are important components of engineering knowledge. Students will learn the underlying science and mathematics of these topics, allowing them to apply this knowledge to solve engineering problems related to electrical properties of materials.
	2	2	The course involves the analysis of electrical properties of solids, including the quantum free electron theory of metals and dielectric properties. Students will learn to analyze complex problems related to electrical conductivity, dielectric behavior, and superconductivity, demonstrating their problem analysis skills.
	12	2	The course introduces students to the concept of superconductivity, including high-temperature superconductivity and applications like SQUID and MAGLEV. This exposure to emerging technologies and concepts prepares students for lifelong learning in the field of materials science and engineering.
BPHYE202.3	1	3	The course focuses on vector calculus, Maxwell's Equations, and electromagnetic (EM) waves, which are fundamental topics in electrical engineering. Students will gain knowledge in mathematics and science that is essential for understanding and applying these concepts to solve complex engineering problems related to electromagnetism.
	2	2	The course delves into the analysis of electromagnetic waves and their behavior as described by Maxwell's Equations. Students will learn how to analyze complex problems related to EM waves, applying mathematical and scientific principles to reach conclusions. This aligns with the problem analysis skills required by PO2.
	12	2	The course covers advanced topics in optics, including lasers and optical fibers. As technology in this field evolves, students will be prepared to engage in lifelong learning to stay updated with emerging optical technologies and their applications, aligning with the need for lifelong learning emphasized by PO12
BPHYE202.4	1	3	While the course primarily focuses on Maxwell's Equations and electromagnetic waves, it provides a foundation in electromagnetism and mathematical principles. This knowledge can be applied in understanding semiconductor physics and device operation, allowing students to address

			complex engineering problems related to semiconductor devices.
	2	2	Understanding the principles of Maxwell's Equations and electromagnetic waves involves problem analysis skills. Students learn to analyze complex electromagnetic problems, which can be extended to the analysis of semiconductor devices, where electromagnetism plays a crucial role.
	12	2	The course introduces students to advanced concepts in electromagnetism. As technology evolves, including advancements in semiconductor devices, students will need to engage in lifelong learning to stay updated. The course fosters a mindset for lifelong learning in the context of technological changes, as emphasized by PO12.
BPHYE202.5	1	3	Working in groups to conduct experiments and performing precise measurements is an essential part of applying engineering knowledge. It demonstrates the practical application of scientific and mathematical principles in experimental settings.
	2	2	Conducting experiments and making precise measurements require a thorough understanding of scientific principles and the ability to analyze data. This aligns with the problem analysis skills emphasized by PO2
	3	1	While the CO does not directly target traditional engineering design, the skills developed through conducting experiments and making precise measurements can indirectly contribute to the ability to design and develop solutions for complex engineering problems.
	5	2	Precise measurements often require the use of modern tools and instruments. Students will apply measurement instruments as part of their experiments, aligning with the use of modern tools emphasized by PO5.
	8	3	The emphasis on "honest measurements" in the CO reflects ethical principles. It underscores the importance of honesty and integrity in conducting experiments and reporting results, aligning with PO8.
	9	3	The CO specifically mentions "working in groups to conduct experiments." This highlights the importance of teamwork and collaboration in the context of experimental work, aligning with PO9.
	12	2	The CO encourages students to develop practical skills related to experimentation and measurement, which can serve as a foundation for lifelong learning in the field of physics and engineering, aligning with PO12.

Course Teacher **HOD**

DEPARTMENT OF PHYSICS

SEMESTER -1

Academic Year 2023-24, Even Semester

Course Code: BPHYC22; Course Name: Applied Physics for ME Stream

Course Teacher: Dr. Ramaprasad A.T

Course outcome: At the end of the course the student will be able to:

CO Numbers	Course Outcomes	Bloom s Level	Target Level
BPHYC22.1	Elucidate the concepts in oscillations, waves, elasticity and material failures	L2	2
BPHYC22.2	Summarize concepts of acoustics in buildings and explain the concepts in radiation and photometry	L2	2
BPHYC22.3	Discuss the principles photonic devices and their application relevant to civil engineering.	L3	2
BPHYC22.4	Describe the various natural hazards and safety precautions.	L4	2
BPHYC22.5	Practice working in groups to conduct experiments in physics and perform precise and honest measurements	L4	2

CO-PO Mapping Matrix												
CO Numbers	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
BPHYC22.1	3	2			2							2
BPHYC22.2	3	2										2
BPHYC22.3	3	2										2
BPHYC22.4	3	3				1						2
BPHYC22.5	3	2	1		2			3	3			2
SUM	15	12	1		3	1		3	3			10
AVERAGE	3	2.4	1		1.5	1		3	3			2

Justification of Course Outcome and Program Outcome

CO	Pos	Level	
BPHYC22.1	1	3	This CO provides students with fundamental knowledge in the areas of oscillations, waves, elasticity, and material failures, which is essential for addressing complex engineering and societal problems.
	2	2	Knowledge of these concepts equips students to analyze and formulate solutions for complex engineering and material-related problems.
	5	2	Understanding oscillations and elasticity is crucial for using modern engineering and IT tools in structural analysis and design.
	12	2	This CO emphasizes the need for continuous learning and adaptability in the context of technological changes, especially in fields like material science and engineering.
BPHYC22.2	1	3	Understanding acoustics, radiation, and photometry concepts is essential for addressing engineering problems related to noise control, lighting, and building design.

	2	2	This CO enables students to analyze complex engineering problems associated with sound, lighting, and building acoustics.
	12	2	The need for lifelong learning is underscored as standards and technologies in building design continue to evolve.
BPHYC22.3	1	3	Knowledge of photonic devices is crucial for engineers in civil engineering who work with modern building technologies.
	2	2	This CO enables students to analyze problems related to optical systems used in civil engineering, such as sensors and measurements.
	12	2	As photonic technologies evolve, this CO highlights the importance of continuous learning and adaptation.
BPHYC22.4	1	3	This CO equips students with knowledge of natural hazards and safety measures, which is essential for addressing engineering problems related to disaster risk reduction.
	2	3	Knowledge of natural hazards allows students to analyze problems and formulate solutions for disaster preparedness.
	6	1	This CO introduces students to societal and safety issues, helping them understand the responsibilities relevant to professional engineering practices.
	12	2	The evolving nature of disaster management emphasizes the need for continuous learning and staying updated with safety protocols.
BPHYC22.5	1	3	Collaborative experimentation and precise measurements are fundamental aspects of engineering knowledge.
	2	2	The ability to work in groups and conduct precise measurements is essential for problem analysis and formulation.
	3	1	Collaborative work aligns with the development of solutions, considering public health, safety, and environmental factors.
	5	2	Collaborative experiments and measurements are part of modern engineering tool usage.
	8	3	The emphasis on honest measurements aligns with ethical principles and professional responsibilities.
	9	3	The CO promotes effective individual and team work, essential in multidisciplinary engineering settings.
	12	2	The CO encourages a mindset of continuous learning and adaptability as engineering practices evolve.

Course Teacher **HOD**

DEPARTMENT OF PHYSICS

SEMESTER -1

Academic Year 2023-24, Even Semester

Course Code: BPHYS22; Course Name: Applied Physics for CSE Stream

Course Teacher: Dr. Shashi Kumar Kumaraswamy

Course outcome: At the end of the course the student will be able to:

CO Numbers	Course Outcomes	Bloom s Level	Target Level
BPHYS22.1	Describe the principles of LASERS and Optical fibers and their relevant applications.	L2	2
BPHYS22.2	Discuss the basic principles of the Quantum Mechanics and its application in Quantum Computing.	L2	2
BPHYS22.3	Summarize the essential properties of superconductors and its applications in qubits.	L3	2
BPHYS22.4	Illustrate the application of physics in design and data analysis.	L4	2
BPHYS22.5	Practice working in groups to conduct experiments in physics and perform precise and honest measurements.	L4	2

CO-PO Mapping Matrix												
CO Numbers	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
BPHYS22.1	3	2										2
BPHYS22.2	3	3										2
BPHYS22.3	3	3										2
BPHYS22.4	3	2	1		1							2
BPHYS22.5	3	2	1		2			3	3			2
SUM	15	12	1		3			3	3			10
AVERAGE	3	2.4	1		1.5			3	3			2

Justification of Course Outcome and Program Outcome

CO	Pos	Level	
BPHYS22.1	1	3	The course provides knowledge about the principles of lasers and optical fibers. Understanding these principles is crucial in modern engineering applications, such as fiber optic communication and laser-based technologies.
	2	2	Students will learn to analyze complex problems related to the applications of lasers and optical fibers. They will apply scientific and engineering principles to reach conclusions about the operation and use of these technologies.
	12	2	Given the rapid advancement in laser and optical fiber technologies, students will be prepared for lifelong learning in these areas. They will understand the importance of staying updated with the latest developments in laser and optical fiber applications.

BPHYS22.2	1	3	Quantum Mechanics forms the foundation of quantum computing, a rapidly advancing field in engineering. By understanding the basic principles of quantum mechanics, students acquire the essential knowledge required to apply quantum computing concepts and technologies to solve complex engineering problems.
	2	3	Quantum Mechanics, as taught in the course, requires students to analyze complex quantum phenomena and principles. This analytical approach to understanding quantum mechanics enables students to analyze and formulate solutions to complex engineering problems, especially those related to quantum computing.
	12	2	The course's focus on Quantum Mechanics and its applications in quantum computing introduces students to a rapidly evolving field. It encourages them to recognize the need for lifelong learning to keep up with technological advancements and changes in the realm of quantum computing, aligning with the principles of lifelong learning emphasized by PO12.
BPHYS22.3	1	3	Understanding superconductors and their properties, as well as their applications in qubits, requires a solid foundation in the principles of physics and materials science. This knowledge is essential for applying quantum computing concepts and solving complex engineering problems, aligning with PO1.
	2	3	Quantum computing, which involves qubits and superconductors, presents complex problems in the field of engineering. Students will need to analyze and formulate solutions to these problems, especially when dealing with quantum computing applications. This aligns with the problem analysis skills emphasized by PO2.
	12	2	The course focuses on quantum computing, a rapidly evolving field with ongoing technological changes. Students will recognize the need for lifelong learning to stay updated with advancements in quantum computing, which aligns with the principles of lifelong learning emphasized by PO12.
BPHYS22.4	1	3	The course focuses on the electrical properties of materials, including topics like electrical conductivity, superconductivity, and quantum tunnelling. These concepts are essential for engineers to apply physics in designing electronic components and systems, thus aligning with PO1.
	2	2	Students will learn how to analyze complex problems related to electrical properties and superconductivity, which are crucial in various engineering applications. They will acquire problem analysis skills needed to reach substantiated conclusions about the design and application of materials and components, aligning with PO2.
	3	1	The course provides foundational knowledge about the properties of materials and superconductors, which is a key element in designing electronic components and systems. While it is not the primary focus of the CO, understanding these concepts can contribute to the ability to design

			solutions for complex engineering problems, aligning with PO3.
	5	1	The course introduces students to modern tools and techniques used in analyzing and understanding the electrical properties of materials. This knowledge is relevant for applying modern tools in engineering activities, aligning with PO5.
	12	2	The course, by covering topics related to superconductivity and quantum computing applications, exposes students to rapidly evolving fields. This encourages them to recognize the need for lifelong learning to stay updated with technological advancements, aligning with PO12.
BPHYS22.5	1	3	While the primary focus of the CO is on experimental work, understanding physics concepts and performing precise measurements are foundational elements of engineering knowledge. The CO enables students to apply physics principles and accurate measurement techniques to solve complex engineering problems, aligning with PO1.
	2	2	Conducting experiments and making precise measurements require a deep understanding of physics principles and the ability to analyze and interpret experimental data. Students will develop problem analysis skills through experimentation and data analysis, aligning with PO2.
	3	1	Although the primary focus of the CO is on experimental work, it indirectly supports the ability to design solutions. The practical skills developed through conducting experiments can contribute to the ability to design solutions for engineering problems, albeit with a slight connection to PO3.
	5	2	Conducting experiments and precise measurements often involve the use of modern tools and equipment. Students learn to use these tools effectively, which aligns with PO5 by enabling them to apply modern tools in their engineering activities.
	8	3	The emphasis on honesty in measurements aligns with ethical principles and the commitment to professional ethics, promoting integrity in engineering practices.
	9	3	The CO explicitly focuses on working in groups, which aligns with PO9 by promoting both individual and team effectiveness in diverse engineering settings.
	12	2	The course, by focusing on hands-on experiments and data analysis, encourages students to adopt a mindset of continuous learning. As technology evolves, these skills can be applied in new contexts, aligning with the principles of lifelong learning emphasized by PO12.

Course Teacher **HOD**