Bachelor of Science
B.Sc. Physics Semester I

Course Code	US01MAPHY01	Title of the Course	Mechanics and Optics
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	1. To understand the theoretical concepts of material behaviour with particular emphasis on their elastic property. 2. To understand the basic concepts of types of waves with special reference to Ultrasonic waves and its applications. The unit also introduces understanding of oscillations with special emphasis on properties of simple harmonic motion observed in case studies of different types of pendulums. 3. In this course, students will be introduced to fundamental concepts of waves and classical optics with application to interference and diffraction. Also introduced various optical instruments and their resolving power. 4. To provide exposure to various properties of Laser, production techniques of Laser and its applications.

Course Content		
Unit	**Description**	**Weightage* (%)**
1.	**ELASTICITY:** Introduction, Definitions of Load, Stress and Strain, Hooke's Law & Stress-strain diagram, Three types of elasticity:(i) Young's modulus (ii) Bulk Modulus and (iii) Modulus of Rigidity, Work done per unit volume in elongation strain, Deformation of a cube- (Bulk modulus, Modulus of rigidity, Young modulus), Relation connecting the elastic constants, Poisson's ratio, Relation for K and η in terms of Poisson's ratio, Limiting values of σ, Determination of Poisson's ratio for rubber, Twisting couple on a cylinder (or wire), Torsional pendulum, Determination of η-Statical method (Horizontal twisting apparatus for a rod), Dynamical method (Maxwell's vibrating needle method), Bending of beams, Bending moment, The cantilever-when the weight of beam is ineffective, Depression of a beam supported at the ends-when the beam is loaded at the centre, Related Numerical [D.S. Mathur:8.1,8.2, 8.3, 8.8, 8.11, 8.12, 8.13, 8.14, 8.15, 8.16, 8.17, 8.18, 8.20, 8.22, 8.26, 8.27,8.29,8.30,8.33]	**25%**

2.	**ULTRASONIC WAVE AND OSCILLATIONS:** **Ultrasonic Wave:** Introduction to Ultrasonic waves, Production of ultrasonic waves (1) Magnetostriction method (2) Piezo-electric method, Detection of Ultrasonic, Properties of Ultrasonic, Wavelength of Ultrasonic waves, Applications of ultrasonic waves, Related Numerical **Oscillations:** Compound pendulum, Centre of oscillation, Interchangeability of centers of suspension and oscillation, Centre of percussion, Other points collinear with C.G. about which the time period is the same, Conditions for maximum and minimum time periods, Bar pendulum, Determination of k, Kater's reversible pendulum, Related Numerical [R K Gaur and S L Gupta: 42.1, 42.2, 42.3, 42.4, 42.5, 42.6] [D S Mathur: 6. 4, 6.5, 6.6, 6.7, 6.8, 6.9]	**25%**
3	**OPTICS:** **Interferometry:** Introduction to interference, Applications of phenomenon of interference (List only), Jamin's refractometer or interferometer, Rayleigh's refractometer, Michelson's interferometer, Types of fringes, white light fringes, Uses, Measurement of wavelength of light from a monochromatic source, Measurement of refractive index of a thin plate, Related Numerical **Resolving power of optical instruments:** Resolving power, Rayleigh's criterion; limit of resolution, limit of resolution of the eye, Resolving power Telescope, Resolving power of light microscope, Resolving power of a diffraction Grating, Resolving power of prism spectroscope, Related Numerical [D N Vasudeva: 14.1, 14.2, 14.3, 14.4, 14.4(a), 14.4(b), 17.1, 17.1(a), 17.2, 17.5, 17.9, 17.11]	**25%**
4	**LASER:** Introduction, Properties of LASER, Stimulated absorption, Spontaneous emission and Stimulated emission, Relation between Einstein's A and B coefficients, Population Inversion, Pumping, Main component of LASER, ND: YAG LASER, CO2 LASER, Application of LASER in material processing, Holography and Other application of Laser, Related Numerical [K Rajagopal: 5.1, 5.2, 5.3, 5.3.1, 5.3.2, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.11, 5.12, 5.13]	**25%**

Teaching-Learning Methodology	Direct Teaching through Chalk-Walk and Talk ICT enabled teaching Question-Answer Class discussion led by teacher/students Case Studies Literature review Problem solving activities Debate Collaborative and Co-operative Learning Think Pair Share Jigsaw Inquiry Based Learning Panel Discussion Project Based Learning Flipped Classroom Blended Learning designs Concept Mapping

Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: On the successful completion of the course, the students will be able to understand

	elastic nature of material, types of elastic modulus and different methods to determine elastic modulus.
	principle, production, properties and uses of Ultrasonic waves. Determination of acceleration of gravity with different types of pendulums.
	basic concepts of interference and its applications in various interferometry apparatus. How to derive resolving power of various optical instruments and how it can be modified.
	the structure and properties of lasers, their performance and applications in engineering and medical fields.

Suggested References:	
Sr. No.	**References**
1.	Elements of Properties of Matter D S Matur S Chand & Co., New Delhi (Reprint 2018)
2.	Engineering Physics R K Gaur and S L Gupta Dhanpat Rai Publications (P) Ltd., New Delhi (Reprint 2016)
3.	A Textbook of Optics D N Vasudeva Atma Ram & Sons, Delhi (20th Edition)
4.	Engineering Physics K Rajagopal PHI Learning, New Delhi (Third Printing 2009)

On-line resources to be used if available as reference material
On-line Resources:
https://phys.libretexts.org/
http://hyperphysics.phy-astr.gsu.edu/
https://www.feynmanlectures.caltech.edu/II_38.html
https://nptel.ac.in/courses/115/106/115106119/
https://physicstoday.scitation.org/doi/10.1063/1.1580055
https://www.youtube.com/watch?v=UA1qG7Fjc2A
https://www.explainthatstuff.com/howinterferometerswork.html
https://ocw.mit.edu/resources/res-6-005-understanding-lasers-and-fiberoptics-spring-2008/laser-fundamentals-i/ https://nptel.ac.in/courses/104/104/104104085/

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Bachelor of Science
B.Sc. Physics Practical Semester I

Course Code	US01MAPHY02	Title of the Course	Physics Practical
Total Credits of the Course	04	Hours per Week	08

Course Objectives:	1. To gain practical knowledge by applying the experimental methods to correlate with the Physics theory. 2. To learn the usage of electrical and optical systems for various measurements. 3. Apply the analytical techniques and graphical analysis to the experimental data. 4. To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

Course Content	
Description	Weightage (%)
SECTION: A 1. Use of Vernier Calipers, Micrometer Screw Gauge, Travelling Microscope 2. η by statical method 3. M.I. of Disc using Torsional pendulum 4. Y by cantilever 5. Poisson's ratio for rubber 6. Melde's experiment [P/L = Constants] (A & B Position) 7. Determination of 'g' using Bar pendulum 8. Newton's Ring 9. λ by spectral line 10. Resolving power of prism 11. Errors in observation	50%
SECTION: B 1. Various types of graph plotting 2. Frequency of A.C by Sonometer 3. Characteristics of PN junction diode (Forward & Reversed bias) 4. Half wave rectifier (Evaluation of A.C. components) 5. Full wave rectifier (Evaluation of A.C. components) 6. Vibration magnetometer (Determination of M_1 & M_2) 7. Zener diode characteristics 8. Study of Transformer 9. Decay of Capacitor 10. Least square fitting for given linear data	50%

Note:

[1] To provide flexibility, up to the maximum of **20%** of total experiments can be replaced/added by college to this list prepared by the Board of Studies.

[2] A minimum of **80%** experiments must be performed in practical course.

[3] To maintain uniformity in assessment of practical examination the below mentioned marks distribution pattern is followed:

Sr. No.	Work done	Weightage as per 100 Marks
1.	Writing Principle / Statement/ Formula with explanation ofsymbols and units	16 Marks
2.	Diagram/Circuit Diagram / Expected Graph	16 Marks
3.	Setting up of the experiment + Tabular Columns + taking readings	28 Marks
4.	Calculations (explicitly shown) + Graph	20 Marks
5.	Accuracy of results with units	08 Marks
6.	Round the year Performance/ Records (to be valued at the time of practical Examination through oral viva)	12 Marks
		100 Marks

Note:

- Weightage of both the sections A and B are 50%. Students are required to obtain 40% of total marks.
- Wherever explicit setting up of experiments does not exist like in the case of spectral charts or pre–acquired data is involved, the marks for setting up of experiment may be provided foradditional graphs and formulae.

Teaching-Learning Methodology	Direct Teaching through Demonstration, Chalk-Walk and Talk ICT enabled teaching Question-Answer Group discussion led by teacher/students Problem solving activities Collaborative and Co-operative Learning Think Pair Share Jigsaw Inquiry Based Learning Panel Discussion Viva voce Blended Learning designs

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: On the successful completion of the course, the students will be able to

1. Apply the various procedures and techniques for the experiments
2. Use different measuring devices and meters to record the data with precision
3. Apply the mathematical concepts/equations to obtain quantitative results
4. Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

Suggested References:

Sr. No.	References
1.	Advanced Practical Physics for students B L Worsnop and H T Flint Methuen and Co. Ltd., London (1951)
2.	B.Sc. Practical Physics C L Arora S. Chand & Co. Ltd., New Delhi (2018)
3.	Advanced Practical Physics M S Chauhan and S P Singh Pragati Prakashan, Meerut (1984)
4.	Advanced Practical Physics S L Gupta and V Kumar Pragati Prakashan, Meerut (1998)
5.	B.Sc. Practical Physics Harnam Singh and Dr. P.S. Hemne S. Chand & Co. Ltd., New Delhi (2000)
6.	Practical Physics (4^{th} Edition) G. L. Squires Cambridge University Press (2014)
7.	An Advanced Course in Practical Physics D. Chatopdhyay, P.C. Rakshit New Central Book Agency Pvt. Ltd (1990)
8.	Practical Physics (With Viva-Voce) Dr. S L Gupta and V Kumar Pragati Prakashan, Meerut (2014)

On-line resources to be used if available as reference material
On-line Resources:
https://www.electronics-tutorials.ws/
https://www.electronicshub.org/tutorials/
www.allaboutcircuits.com
https://nptel.ac.in/courses/115/105/115105110
https://nptel.ac.in/courses/115/105/115105121
https://nptel.ac.in/courses/115/105/115105120

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Bachelor of Science
B.Sc. Physics Semester I

Course Code	US01MIPHY01	Title of the Course	Optics and LASER applications
Total Credits of the Course	02	Hours per Week	02

Course Objectives:	1. In this course, students will be introduced to fundamental concepts of waves and classical optics with application to interference and diffraction. Also introduced various optical instruments and their resolving power. 2. To provide exposure to various properties of Laser, production techniques of Laser and its applications.

Course Content		
Unit	**Description**	**Weightage* (%)**
1	**OPTICS:** **Interferometry:** Introduction to interference, Applications of phenomenon of interference (List only), Jamin's refractometer or interferometer, Rayleigh's refractometer, Michelson's interferometer, Types of fringes, white light fringes, Uses, Measurement of wavelength of light from a monochromatic source, Measurement of refractive index of a thin plate, Related Numerical **Resolving power of optical instruments:** Resolving power, Rayleigh's criterion; limit of resolution, limit of resolution of the eye, Resolving power Telescope, Resolving power of light microscope, Resolving power of a diffraction Grating, Resolving power of prism spectroscope, Related Numerical [D N Vasudeva: 14.1, 14.2, 14.3, 14.4, 14.4(a), 14.4(b), 17.1, 17.1(a), 17.2, 17.5, 17.9, 17.11]	**50%**
2	**LASER:** Introduction, Properties of LASER, Stimulated absorption, Spontaneous emission and Stimulated emission, Relation between Einstein's A and B coefficients, Population Inversion, Pumping, Main component of LASER, ND: YAG LASER, CO2 LASER, Application of LASER in material processing, Holography and Other application of Laser, Related Numerical [K Rajagopal: 5.1, 5.2, 5.3, 5.3.1, 5.3.2, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9,	**50%**

	5.11, 5.12, 5.13]	

Teaching-Learning Methodology	Direct Teaching through Chalk-Walk and Talk ICT enabled teaching Question-Answer Class discussion led by teacher/students Case Studies Literature review Problem solving activities Debate Collaborative and Co-operative Learning Think Pair Share Jigsaw Inquiry Based Learning Panel Discussion Project Based Learning Flipped Classroom Blended Learning designs Concept Mapping

Evaluation Pattern		
Sr. No.	**Details of the Evaluation**	**Weightage**
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: On the successful completion of the course, the students will be able to understand	
	basic concepts of interference and its applications in various interferometry apparatus. How to derive resolving power of various optical instruments and how it can be modified.
	the structure and properties of lasers, their performance and applications in engineering and medical fields.

Suggested References:	
Sr. No.	**References**
1.	A Textbook of Optics D N Vasudeva Atma Ram & Sons, Delhi (20th Edition)
2.	Engineering Physics K Rajagopal PHI Learning, New Delhi (Third Printing 2009)

On-line resources to be used if available as reference material
On-line Resources:
https://phys.libretexts.org/
https://www.youtube.com/watch?v=UA1qG7Fjc2A
https://www.explainthatstuff.com/howinterferometerswork.html
https://ocw.mit.edu/resources/res-6-005-understanding-lasers-and-fiberoptics-spring-2008/laser-fundamentals-i/ https://nptel.ac.in/courses/104/104/104104085/

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Bachelor of Science
B.Sc. Physics Practical Semester I

Course Code	US01MIPHY02	Title of the Course	Physics Practical
Total Credits of the Course	02	Hours per Week	04

Course Objectives:	1. To gain practical knowledge by applying the experimental methods to correlate with the Physics theory. 2. To learn the usage of electrical and optical systems for various measurements. 3. Apply the analytical techniques and graphical analysis to the experimental data. 4. To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

Course Content	
Description	Weightage (%)
1. Use of Vernier Calipers, Micrometer Screw Gauge, Traveling Microscope 2. Various types of graph plotting 3. Spectrometer: To determine the angle of prism 4. Study of Transformer 5. Errors in observation 6. Melde's experiment [P/L = Constants] (A & B Position) 7. Frequency of A.C by Sonometer 8. M.I. of Disc using Torsional pendulum 9. Vibration magnetometer (Determination of M_1 & M_2) 10. Poisson's ratio for rubber 11. Determination of 'g' using Bar pendulum 12. Characteristics of PN junction diode (Forward & Reversed bias) 13. Least square fitting for given linear data	100%

Note:

[1] To provide flexibility, up to the maximum of **20%** of total experiments can be replaced/added by college to this list prepared by the Board of Studies.

[2] A minimum of **80%** experiments must be performed in practical course.

[3] To maintain uniformity in assessment of practical examination the below mentioned marks distribution pattern is followed:

Sr. No.	Work done	Weightage as per 50 Marks
1.	Writing Principle / Statement/ Formula with explanation of symbols and units	08 Marks
2.	Diagram/Circuit Diagram / Expected Graph	08 Marks
3.	Setting up of the experiment + Tabular Columns + taking readings	14 Marks
4.	Calculations (explicitly shown) + Graph	10 Marks
5.	Accuracy of results with units	04 Marks
6.	Round the year Performance/ Records (to be valued at the time of practical Examination through oral viva)	06 Marks
	Total for Practical	**50 Marks**

Note:
Wherever explicit setting up of experiments does not exist like in the case of spectral charts or pre–acquired data is involved, the marks for setting up of experiment may be provided for additional graphs and formulae.

Teaching-Learning Methodology	Direct Teaching through Demonstration, Chalk-Walk and Talk ICT enabled teaching Question-Answer Group discussion led by teacher/students Problem solving activities Collaborative and Co-operative Learning Think Pair Share Jigsaw Inquiry Based Learning Panel Discussion Viva voce Blended Learning designs

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: On the successful completion of the course, the students will be able to

1. Apply the various procedures and techniques for the experiments
2. Use different measuring devices and meters to record the data with precision
3. Apply the mathematical concepts/equations to obtain quantitative results
4. Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

Suggested References:	
Sr. No.	References
1.	Advanced Practical Physics for students B L Worsnop and H T Flint Methuen and Co. Ltd., London (1951)
2.	B.Sc. Practical Physics C L Arora S. Chand & Co. Ltd., New Delhi (2018)
3.	Advanced Practical Physics M S Chauhan and S P Singh Pragati Prakashan, Meerut (1984)
4.	Advanced Practical Physics S L Gupta and V Kumar Pragati Prakashan, Meerut (1998)
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7.	An Advanced Course in Practical Physics D. Chatopdhyay, P.C. Rakshit New Central Book Agency Pvt. Ltd (1990)
8.	Practical Physics (With Viva-Voce) Dr. S L Gupta and V Kumar Pragati Prakashan, Meerut (2014)

On-line resources to be used if available as reference material
On-line Resources:
https://www.electronics-tutorials.ws/
https://www.electronicshub.org/tutorials/
www.allaboutcircuits.com
https://nptel.ac.in/courses/115/105/115105110
https://nptel.ac.in/courses/115/105/115105121
https://nptel.ac.in/courses/115/105/115105120

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Bachelor of Science
B.Sc. Physics Semester I

Course Code	US01IDPHY01	Title of the Course	LASER and Optical Instruments
Total Credits of the Course	02	Hours per Week	02

Course Objectives:	1. To provide exposure to various properties of Laser, production techniques of Laser and its applications. 2. In this course, students will be introduced to fundamental concepts of waves and classical optics with application to interference and diffraction. Also introduced various optical instruments and their resolving power.

Course Content

Unit	Description	Weightage* (%)
1.	**LASER:** Introduction, Properties of LASER, Stimulated absorption, Spontaneous emission and Stimulated emission, Relation between Einstein's A and B coefficients, Population Inversion, Pumping, Main component of LASER, ND: YAG LASER, CO2 LASER, Application of LASER in material processing, Holography and Other application of Laser [K Rajagopal: 5.1, 5.2, 5.3, 5.3.1, 5.3.2, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.11, 5.12, 5.13]	**50%**
2.	**OPTICS:** **Interferometry:** Introduction to interference, Applications of phenomenon of interference (List only), Jamin's refractometer or interferometer, Rayleigh's refractometer, Michelson's interferometer, Types of fringes, white light fringes, Uses, Measurement of wavelength of light from a monochromatic source, Measurement of refractive index of a thin plate **Resolving power of optical instruments:** Resolving power, Rayleigh's criterion; limit of resolution, limit of resolution of the eye, Resolving power Telescope, Resolving power of light microscope, Resolving power of a diffraction Grating, Resolving power of prism spectroscope [D N Vasudeva: 14.1, 14.2, 14.3, 14.4, 14.4(a), 14.4(b), 17.1, 17.1(a), 17.2, 17.5, 17.9, 17.11]	**50%**

Teaching-Learning Methodology	Direct Teaching through Chalk-Walk and Talk ICT enabled teaching Question-Answer Class discussion led by teacher/students Case Studies Literature review Problem solving activities Debate Collaborative and Co-operative Learning Think Pair Share Jigsaw Inquiry Based Learning Panel Discussion Project Based Learning Flipped Classroom Blended Learning designs Concept Mapping

Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: On the successful completion of the course, the students will be able to understand

	the structure and properties of lasers, their performance and applications in engineering and medical fields.
	basic concepts of interference and its applications in various interferometry apparatus. How to derive resolving power of various optical instruments and how it can be modified.

Suggested References:

Sr. No.	References

1.	Engineering Physics K Rajagopal PHI Learning, New Delhi (Third Printing 2009)
2.	A Textbook of Optics D N Vasudeva Atma Ram & Sons, Delhi (20th Edition)

On-line resources to be used if available as reference material
On-line Resources:
https://phys.libretexts.org/
https://ocw.mit.edu/resources/res-6-005-understanding-lasers-and-fiberoptics-spring-2008/laser-fundamentals-i/ https://nptel.ac.in/courses/104/104/104104085/
https://www.youtube.com/watch?v=UA1qG7Fjc2A
https://www.explainthatstuff.com/howinterferometerswork.html

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Bachelor of Science
B.Sc. Physics Practical Semester I

Course Code	US01IDPHY02	Title of the Course	Physics Practical
Total Credits of the Course	02	Hours per Week	04

Course Objectives:	1. To gain practical knowledge by applying the experimental methods to correlate with the Physics theory. 2. To learn the usage of electrical and optical systems for various measurements. 3. Apply the analytical techniques and graphical analysis to the experimental data. 4. To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

Course Content	
Description	Weightage (%)
1. Poisson's ratio for rubber 2. Frequency of A.C by Sonometer 3. Various types of graph plotting 4. Study of Transformer 5. M.I. of Disc using Torsional pendulum 6. Characteristics of PN junction diode (Forward & Reversed bias) 7. Errors in observation 8. Melde's experiment [P/L = Constants] (A & B Position) 9. Use of Vernier Calipers, Micrometer Screw Gauge, Traveling Microscope 10. Spectrometer: To determine the angle of prism 11. Vibration magnetometer (Determination of M_1 & M_2) 12. Determination of 'g' using Bar pendulum 13. Least square fitting for given linear data	100%

Note:

[1] To provide flexibility, up to the maximum of **20%** of total experiments can be replaced/added by college to this list prepared by the Board of Studies.

[2] A minimum of **80%** experiments must be performed in practical course.

[3] To maintain uniformity in assessment of practical examination the below mentioned marks distribution pattern is followed:

Sr. No.	Work done	Weightage as per 50 Marks
1.	Writing Principle / Statement/ Formula with explanation of symbols and units	08 Marks
2.	Diagram/Circuit Diagram / Expected Graph	08 Marks
3.	Setting up of the experiment + Tabular Columns + taking readings	14 Marks
4.	Calculations (explicitly shown) + Graph	10 Marks
5.	Accuracy of results with units	04 Marks
6.	Round the year Performance/ Records (to be valued at the time of practical Examination through oral viva)	06 Marks
	Total for Practical	**50 Marks**

Note:
Wherever explicit setting up of experiments does not exist like in the case of spectral charts or pre–acquired data is involved, the marks for setting up of experiment may be provided for additional graphs and formulae.

Teaching-Learning Methodology	Direct Teaching through Demonstration, Chalk-Walk and Talk ICT enabled teaching Question-Answer Group discussion led by teacher/students Problem solving activities Collaborative and Co-operative Learning Think Pair Share Jigsaw Inquiry Based Learning Panel Discussion Viva voce Blended Learning designs

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: On the successful completion of the course, the students will be able to

1. Apply the various procedures and techniques for the experiments
2. Use different measuring devices and meters to record the data with precision
3. Apply the mathematical concepts/equations to obtain quantitative results
4. Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

Suggested References:	
Sr. No.	References
1.	Advanced Practical Physics for students B L Worsnop and H T Flint Methuen and Co. Ltd., London (1951)
2.	B.Sc. Practical Physics C L Arora S. Chand & Co. Ltd., New Delhi (2018)
3.	Advanced Practical Physics M S Chauhan and S P Singh Pragati Prakashan, Meerut (1984)
4.	Advanced Practical Physics S L Gupta and V Kumar Pragati Prakashan, Meerut (1998)
5.	B.Sc. Practical Physics Harnam Singh and Dr. P.S. Hemne S. Chand & Co. Ltd., New Delhi (2000)
6.	Practical Physics (4^{th} Edition) G. L. Squires Cambridge University Press (2014)
7.	An Advanced Course in Practical Physics D. Chatopdhyay, P.C. Rakshit New Central Book Agency Pvt. Ltd (1990)
8.	Practical Physics (With Viva-Voce) Dr. S L Gupta and V Kumar Pragati Prakashan, Meerut (2014)

On-line resources to be used if available as reference material
On-line Resources:
https://www.electronics-tutorials.ws/
https://www.electronicshub.org/tutorials/
www.allaboutcircuits.com
https://nptel.ac.in/courses/115/105/115105110
https://nptel.ac.in/courses/115/105/115105121
https://nptel.ac.in/courses/115/105/115105120

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Bachelor of Science
B.Sc. Physics Semester I

Course Code	**US01SEPHY01**	**Title of the Course**	**Electrical and Electronic components and measurement-I**
Total Credits of the Course	**02**	**Hours per Week**	**02**

Course Objectives:	1. To acquire basic understanding of electrical and electronic passive components. 2. To develop fundamental knowledge of electronic component measurement. 3. To understand behaviour of electrical and electronic circuits.

Course Content		
Unit	**Description**	**Weightage* (%)**
1.	**Passive components:** **Wires and solder:** Basics of wire, insulation, wire sizes, color-coding of wires, cables, types of solder. **Resistors:** The Ohm, Ohm's law, Resistor characteristics, The resistor color code, Combining resistors, Carbon resistors, Metal-film resistors, Wire wound resistors, Rheostats, Potentiometers. [Delton T. Horn: Ch. 1 and 2]	**50%**
2.	**Passive components:** **Capacitors:** How capacitance work, The farad, Capacitive reactance, RC time constant, capacitor markings, classification of capacitors, **Coils and transformers:** The electromagnetic effect, what is inductance, Inductive reactance, combining inductances, Coefficient of coupling, Transformer action, center taps, autotransformers. [Delton T. Horn: Ch. 3 and 4]	**50%**

Teaching-Learning Methodology	Direct Teaching through Chalk-Walk and Talk ICT enabled teaching Question-Answer Class discussion led by teacher/students Case Studies Literature review Problem solving activities

	Debate Collaborative and Co-operative Learning Think Pair Share Jigsaw Inquiry Based Learning Panel Discussion Project Based Learning Flipped Classroom Blended Learning designs Concept Mapping Hands on training

Evaluation Pattern		
Sr. No.	**Details of the Evaluation**	**Weightage**
1.	University Examination	100%

Course Outcomes: On the successful completion of the course, the students will be able to understand	
	Proper selection and use of different wires for the electrical and electronic circuits.
	construction and working of electrical components like resistors, capacitors, coils and transformers.
	measurement of various passive components used in advanced electrical and electronic circuits.

Suggested References:	
Sr. No.	**References**
1.	Basic electronic components by Vishwajit K. Barbudhe, Shraddha Zanjat and Bhavana S. Karmore, Notion Press, 2020
2.	Electronic components A complete reference for project builders by Delton T. Horn, TAB books, Division of McGraw-Hill Inc.

3.	Basic Electronics & Linear Circuits by Bhargava & Gupta, McGraw Hill Education, New Delhi.
4.	A text book of Electrical Technology by B. L. Theraja, S. Chand Publication.
5.	Basic electronics by V.K. Mehta, S. Chand Publication.

On-line resources to be used if available as reference material
On-line Resources:
http://www.animations.physics.unsw.edu.au//jw/AC.html
https://en.wikipedia.org/wiki/Electronic_component
https://www.allaboutcircuits.com/
https://learn.adafruit.com/

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