SOPHIA COLLEGE FOR WOMEN, (AUTONOMOUS)

Affiliated to

UNIVERSITY OF MUMBAI

Programme: Physic (Minor)

Programme Code: SPHYMN

F.Y. B.Sc. 2023 -2024 (NEP)

Credits: 4 (3 Theory + 01 Practical)

Syllabus for the Academic Year 2023-2024 based on National Education Policy 2020 with effect from the year 2023-2024

Programme Outline: FY BSc (Semester – I)

Course Code	Unit No.	Name of the Unit	Credits
SPHY111MN		Everyday Physics	3
	1	World of Physics and Measurements	
	2	Mechanics	
	3	Optics	
SPHY111MNP		Everyday Physics - Practical	1
OE102A		Electricity from Biosystem	2
	1	Bioelectricity in animals	
	2	Bioelectricity in plants	
OE102B		Laser & it's Applications	2
	1	Introduction & Principle	
	2	Applications of Laser	
IKS108		Nanotechnology in Ancient India	
	1	Introduction of nanotechnology	
	2	Abiotic & Biotic nanoparticles of ancient time	
SVSC109		Basic Instrumentation Techniques for Research	2
	1	Measurement and Experimentation	
	2	Practical	
SVSC110		Digital electronics & its applications	2
	1	Introduction: Number system, Boolean Algebra	
	2	Practical	

Programme Outline: FY BSc (Semester – II)

Course Code	UnitNo	Name of the Unit	Credits
SPHY112MN		Fundamentals of Electronics, Electricity and Applied Physics	3
	1	Transistor Biasing, General amplifier characteristics	
	2	Electrostatics & Magnetostatics	
	3	Material science: Types, properties & applications	
SPHY112MNP		Practical	1
OE202A		Electricity from Biosystem	2
	1	Introduction	
	2	Bioelectricity in plants	
OE202B		Laser & it's Applications	2

	1	Introduction	
	2	Applications of Laser	
SSEC209		Instrumentation & Circuit Design	2
	1	Introduction to CRO, Power supply, 555 Timer IC	
	2	Practical	
SSEC210		Semiconductor Devices and Amplifier	2
	1	Semiconductor Diodes, Bipolar Junction transistors	
	2	Practical	

Preamble:

The systematic and planned curricula from these courses shall motivate and encourage learners to understand basic concepts of Physics. Physics, a First-Year program, embarks on a journey of discovery through the fundamental principles of physics. Throughout this program, we will explore the diverse and fascinating realms of classical mechanics, optics, thermodynamics, modern physics, and electronics. From the laws of motion to the mysteries of quantum theory, our aim is to cultivate a deep understanding of the natural world and its underlying principles. Through experimentation, analysis, and critical thinking, we will strive to unravel the complexities of the universe and lay the groundwork for further exploration and innovation. Join us as we embark on this exciting intellectual adventure, where curiosity and inquiry are the guiding lights on our path to knowledge and understanding.

PROGRAMME OBJECTIVES

PO 1	This program aims to provide students with a deep understanding of fundamental and modern physics concepts, preparing them for advanced studies and careers in scientific research and technology.
PO 2	This program seeks to contribute to the advancement of knowledge of materials science, and energy production.
PO 3	This program aims to foster collaboration between physicists, chemists, and biologists, among researchers and students from diverse scientific backgrounds.

PROGRAMME SPECIFIC OUTCOMES

PSO 1	Students will develop a comprehensive understanding of classical mechanics, including Newton's Laws and fluid dynamics, as well as modern physics concepts such as the behavior of real gases, thermodynamics, and the interaction of gamma rays with matter.
PSO 2	The learners will also gain knowledge of modern physics theories such as quantum mechanics and the origin of the quantum theory, providing them with a strong foundation in both classical and contemporary physics principles.
PSO 3	Through interdisciplinary approaches, the learners will be empowered to address complex challenges related to energy, the environment, and public health.

SEMESTER I

NAME OF THE COURSE	Everyday Physics	
CLASS	F Y BSc	
COURSE CODE	SPHY111MN	
NUMBER OF CREDITS	3	
NUMBER OF LECTURES PER WEEK	3	
TOTAL NUMBER OF LECTURES PER SEMESTER	45	
EVALUATION METHOD	INTERNAL ASSESSMENT	SEMESTER END EXAMINATION
TOTAL MARKS	50	50
PASSING MARKS	40/100	

COURSE OBJECTIVES

CO 1.	To introduce students to the foundational concepts of physics, focusing on the World of Physics and Measurements, Mechanics, and Optics.
CO 2.	To develop students' understanding of fundamental physical principles and their application in solving real-world problems.
CO 3.	To foster critical thinking, analytical skills, and scientific inquiry through hands-on experiments, demonstrations, and problem-solving exercises.

COURSE LEARNING OUTCOMES:

CLO 1.	The Learner will demonstrate a comprehensive understanding of the principles of physics, including the concepts of measurement, motion, forces, and optics.
CLO 2.	The Learner will be able demonstrate a comprehensive understanding of the principles of physics, including the concepts of measurement, motion, forces, and optics.
CLO 3.	The Learner will develop practical skills in experimental design, and laboratory techniques through hands-on experiments and demonstrations in the areas of mechanics and optics.

UNIT 1	World of Physics and Measurements (15 LECTURES)
1.1	Laws of nature
1.2	Units and Measurements
UNIT 2	Mechanics (15 LECTURES)
2.1	Newton's law
2.2	Fluid dynamics
2.3	Elasticity
UNIT 3	Optics (15 LECTURES)
3.1	Lens
3.2	Aberration
3.3	Interference

REFERENCES:

1. Applied Fluid Mechanics: Mott Robert, Pearson Benjamin Cummir, VIth Edition. Pearson Education /Prentice Hall International, New Delhi.

2. How Things Work The physics of everyday life by Louis A Bloomfield, Wiley publication.

3. Concepts of Physics – (Part–I) by H. C. Verma, 2002 Ed. Bharati Bhavan Publishers.https://bookwindow.in/product.php/concepts-of-physics-i-h-c-verma (Kindle Edition)

4. Brijlal, Subramanyam and Avadhanulu a Textbook of Optics, 25th revised ed. (2012) S. Chand https://www.ebooknetworking.net/ebooks/optics-by-n-subramaniam.html

NAME OF THE COURSE	Everyday Physics Practical
CLASS	F Y BSc
COURSE CODE	SPHY111MNP
NUMBER OF CREDITS	1
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	15
EVALUATION METHOD	SEMESTER END EXAMINATION
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES

CO 1.	To provide students with hands-on experience in conducting experiments related to various principles of physics, including torsional oscillations, pendulum motion, flywheel dynamics, spectrometry, and material properties.
CO 2	To develop students' practical skills in using laboratory instruments and techniques for measurement and analysis in the context of experimental physics.
CO 3.	To deepens students' understanding of theoretical concepts by applying them to real-world experimental setups and data analysis.
COURSE LEARNING OUTCOMES:	
CLO 1.	Students will be able to conduct experiments to determine the modulus of rigidity, moment of inertia, and Young's modulus of materials using torsional oscillations, bifilar pendulum, and vibration methods, respectively.
CLO 2.	Students will gain proficiency in experimental techniques for measuring physical properties such as viscosity, surface tension, and refractive index using appropriate experimental setups and methods.
CLO 3.	Students will develop analytical skills in interpreting experimental results, including the calculation of uncertainties, error analysis, and comparison with theoretical predictions, enhancing their understanding of the principles of physics and their practical applications.

Sr. No.	Course Content
1	Torsional Oscillation: To determine modulus of rigidity η of a material of wire by torsional oscillations/Biological Fibre.
2	Bifilar Pendulum: To determine moment of inertia of a bifilar pendulum
3	Flywheel: To determine moment of inertia of flywheel
4	Spectrometer: To determine the angle of Prism.
5	Y by vibrations: To determine Y Young's Modulus of a wire material by method of vibrations- Flat spiral spring
6	To determine Coefficient of Viscosity (η) of a given liquid by Poisseuli's Method/ Biological Fluid
7	Surface Tension/ Angle of contact: To determine the surface tension of water by capillary rise method.
8	Combination of Lenses to determine the equivalent focal length of a lens system by magnification method.
9	Spectrometer: To determine the refractive index μ of the material of the prism
10	Newton's Rings: To determine the radius of curvature of a given convex lens using Newton's rings.
11	Wedge Shaped Film: To determine the thickness of wire by obtaining fringes in wedge shaped air film.

ASSESSMENT

I. Semester End Examination (SEE): 50 marks

There will be no internal assessment for practical. A candidate will be allowed to appear for the semester end practical examination only if the candidate submits a certified journal at the time of practical examination of the semester or a certificate from the Head of the Department /Institute to the effect that the candidate has completed the practical course of that semester of F.Y.B.Sc. Physics as per the minimum requirement. The duration of the practical examination will be two hours per experiment. There will be two experiments through which the candidate will be examined in practical. The questions on slips for the same should be framed in such a way that candidate will be able to complete the task and should be evaluated for its skill and understanding of physics.

NAME OF THE COURSE	Electricity from Biosystem
CLASS	F Y BSc
COURSE CODE	OE102A
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	CONTINUOUS ASSESSMENT 50 20

COURSE OBJECTIVES

CO 1.	Students understand the electrical phenomenon in nature.
CO 2.	Students understand the concepts of sensors and energy harvesting technology.

COURSE LEARNING OUTCOMES:

CLO 1.	1. Sensitize regarding green technology for generation of elasticity.
UNIT 1	Bio - electricity in animals (15 LECTURES)
1.1	Introduction
1.2	Biological phenomenon in animals
UNIT 2	Bio - electricity in plants (15 LECTURES)
2.1	Biological phenomenon in plants

REFERENCES:

1. Bio electricity by Prof. Mainak Das, IIT Kanpur
https://www.digimat.in/nptel/courses/video/102104043/L01.html
2. Introductory Biochemistry by Carol Higginbotham
https://openoregon.pressbooks.pub/biochemistry/chapter/5-1-basics-of-energy-biology-libretexts/
3. Principles of Biosystem Engineering by Evangelyn C. Alocilja
https://www.egr.msu.edu/~alocilja/Teaching/Principles%20of%20BE%20Book%208-12-2013.pdf

NAME OF THE COURSE	Laser & it's Applications
CLASS	F Y BSc
COURSE CODE	OE102B
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	SEMESTER END EXAMINATION 50 20

COURSE OBJECTIVES:

CO 1.	Acquire knowledge of the theory of Laser Physics
CO 2.	Students understand the different types of lasers and its application.

COURSE LEARNING OUTCOMES:

CLO 1.	Demonstrate and explain fundamental concepts in laser physics
CLO 2.	Demonstrate the properties and application of Laser.
UNIT 1	Introduction &Principle of Laser (15 LECTURES)
1.1	Introduction to Laser
1.2	Types of Lasers - principle, construction, working
UNIT 2	Application of Laser (15 LECTURES)
2.1	Holography & sensors

REFERENCES:

1. Laser Principles, Types and Application by KR Nambiar, New Age International.
2. Modern Spectroscopy by J Michael Hollas, Fourth Edition, John Wiley and Sons.
3. Lasers Theory and Applications by K. Thyagarajan and A.K. Ghatak, Mcmillan (1981)
4. Laser Fundamentals, by William T. Silfvast, Cambridge University Press, 2008.
5. Principles of Lasers, by Orazio Svelto; Springer, 2009.
6. Laser Spectroscopy and Instrumentation by W. Demtroder.
7. Industrial Applications of Lasers, by K. Koebner (ed.), Wiley (1984).

NAME OF THE COURSE	NANOTECHNOLOGY IN ANCIENT INDIA
CLASS	F Y BSc
COURSE CODE	IKS108
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	SEMESTER END EXAMINATION 50 20

COURSE OBJECTIVES:

CO 1.	Understand the interpretation of nanotechnology in ancient India
CO 2.	Gain knowledge of nano technology practices in ancient India

COURSE LEARNING OUTCOMES:

CLO 1.	Demonstrate & explain the properties of Nanoparticles.
UNIT 1	Introduction to Nanoparticles (15 LECTURES)
1.1	Nature as the first fabricator of nanoparticles
UNIT 2	Nanoparticles in ancient time (15 LECTURES)
2.1	Abiotic and biotic nanoparticles of ancient time

References:

1. History of Nanotechnology: From Prehistoric to Modern Times (Advances in Nanotechnology & Applications) Edited by Madhuri Sharon, Scrivener Publishing Wiley
2. Nanotechnology: Understanding Small Systems" by Ben Rogers, Sumita Pennathur, and Jesse Adams
3. Nanotechnology: A Gentle Introduction to the Next Big Idea" by Mark A. Ratner and Daniel Ratner
4. Nanotechnology: An Introduction" by Jeremy Ramsden
5. The Lost River: On The Trail of the Sarasvati" by Michel Danino

NAME OF THE COURSE	Basic Instrumentation Techniques for Research
CLASS	F Y BSc
COURSE CODE	SVSC109
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	SEMESTER END EXAMINATION 50 20

COURSE OBJECTIVES:

CO 1.	Develop entry-level skills in instrumentation
CO 2.	Learn maintenance and calibration of instruments.

COURSE LEARNING OUTCOMES:

CLO 1.	Demonstrate the knowledge of operation of an instrument.
CLO 2.	Demonstrate the knowledge of fundamentals, terms, and units of physical quantities.
UNIT 1	Theory (15 LECTURES)
1.1	Measurement and Experimentation
UNIT 2	Practical (15 LECTURES)
2.1	Practical

References:

1. A TextBook of Electrical Technology Vol. I & II by B.L. Theraja & A.K.Theraja
2. Basic Electrical Engineering by V.N. Mittle (TMH). 3. Electrical Technology by Edwar Hughes (Pearson Education, New Delhi).
3. Basic Electrical Engineering by Chakraborty (Mgraw Hill).
4. Basic Electrical Engineering by V.K. Mehata, Rohit Mehata
5. Fundamental of Physics by Halliday & Resnick, Willey publication
6. Engineering Practical Physics by S. Panigrahi, B. Mallick, S. Publisher

NAME OF THE COURSE	Digital electronics & its applications
CLASS	F Y BSc
COURSE CODE	SVSC110
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	SEMESTER END EXAMINATION 50 20

COURSE OBJECTIVES:

CO 1.	The course objective is to make students of all the branches of Engineering to understand the efficacy of electronic principles which are pervasive in engineering applications

COURSE LEARNING OUTCOMES:

CLO 1.	Appreciate the significance of electronics in different applications
CLO 2.	Compile the different building blocks in digital electronics using logic gates and implement simple logic function using basic universal gates

UNIT 1	Theory (15 LECTURES)
1.1	Introduction to Number systems, Boolean Algebra
UNIT 2	Practical (15 LECTURES)
2.1	Practical

References:

1. David A. Bell, “Electronic Devices and Circuits”, Oxford University Press, 5th Edition, 2008.
2. D.P. Kothari, I. J. Nagrath, “Basic Electronics”, McGraw Hill Education (India) Private Limited, 2014.
3. Digital Electronics: Principles, Devices and Applications by Anil K. Maini publisher John Wiley & Sons, Ltd, 2007. https://www.shahucollegelatur.org.in/Department/Studymaterial/sci/it/BCA/FY/digielec.pdf
4. Practical Digital Electronics for Technicians by Will Kimber
5. Digital Electronics: Principles, Devices and Applications by Anil K. Maini publisher John Wiley & Sons, Ltd, 2007. https://www.shahucollegelatur.org.in/Department/Studymaterial/sci/it/BCA/FY/digielec.pdf

SEMESTER II

NAME OF THE COURSE	Fundamentals of Electronics, Electricity and Applied Physics	
CLASS	F Y BSc	
COURSE CODE	SPHY122MN	
NUMBER OF CREDITS	3	
NUMBER OF LECTURES PER WEEK	3	
TOTAL NUMBER OF LECTURES PER SEMESTER	45	
EVALUATION METHOD	INTERNAL ASSESSMENT	SEMESTER END EXAMINATION
TOTAL MARKS	50	50
PASSING MARKS	40/100	

COURSE OBJECTIVES

CO 1.	Provide the fundamental skills to understand the basics of semiconductor components like diodes, transistors, relations between current amplification factors, the importance of biasing, and feedback circuit
CO 2.	Analyze the relation between conductors, insulators, and in-depth knowledge of material science
CO 3.	Learn the basic laws of electrostatics and magnetostatics

COURSE LEARNING OUTCOMES:

CLO 1.	Understand different biasing techniques to operate the transistor and analyze its stability.
CLO 2.	Applying basic laws of electrostatics and magnetostatics to demonstrate quantitative problem-solving skills.
CLO 3.	Understand the basics of crystallography, electrical properties of metals, band theory of solids, types of materials, and superconductivity.

UNIT 1	Analog Electronics (15 LECTURES)
1.1	Transistor Biasing
1.2	General amplifier characteristics
UNIT 2	Electricity (15 LECTURES)
2.1	Electrostatics
2.2	Magnetostatic
UNIT 3	Applied Physics (15 LECTURES)
3.1	Introduction to Materials
3.2	Types of Materials
3.3	Properties & Applications of materials

REFERENCES:

1. D. Chattopadhyay, P C Rakshit, Electricity and Magnetism 7th Ed. New Central Book agency.
2. B.L. Theraja and A.K. Theraja, A Textbook of Electrical Technology Vol. I , S. Chand Publication
3. Boylestad and Nashelsky, Electronic devices and Circuit Theory: 7thedition, Prentice Hall of India.
4. V K Mehta and R Mehta Electronics Principals, Multi coloured Revised 11th Ed. reprint in 2012 S Chand.
5. David J. Griffiths: Introduction to Electrodynamics, Prentice Hall India (EEE) 3rdEd.
6. A B Bhattacharya, Electronics Principles and Applications, Central publisher.
7. A P Malvino, Digital Principles and Applications: Tata McGraw Hill Tokhiem, Digital electronics, 4thed, McGraw Hill International Edition.

NAME OF THE COURSE	Fundamentals of Electronics, Electricity and Applied Physics Practical
CLASS	F Y BSc
COURSE CODE	SPHY122MNP
NUMBER OF CREDITS	1
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	15
EVALUATION METHOD	SEMESTER END EXAMINATION
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES

CO 1.	To have knowledge of basic principles and applications of Electronics.
CO 2	To understand the working & properties of Zener diode, transistor and LDR.
CO 3.	To understand the De-Morgans theorems, binary arithmetic, logics, and Boolean functions. To understand rectifiers and filter circuits.
COURSE LEARNING OUTCOMES:	
CLO 1.	The knowledge of basic principles and applications of Electronics.
CLO 2.	Understand the working & properties of Zener diode, transistor and LDR
CLO 3.	Understand the De-Morgans theorems, binary arithmetic, logics, and Boolean functions. Understand rectifiers and filters circuits.
Sr. No.	Course Content
1	Flywheel: To determine the moment of inertia of a flywheel
2	To study Zener Diode as voltage Regulator
3	LR Circuit: To determine the value of given inductance and phase angle
4	CR Circuit: To determine value of given capacitor and Phase angle
5	Frequency of AC Mains: To determine frequency of AC mains.
6	LCR series Resonance: To determine resonance frequency of LCR series circuit.
7	To study NAND and NOR gates as Universal Building Blocks
8	To study EX-OR Gate, half adder and full adder and verify their truth tables.
9	To verify De Morgan’s Theorems
10	Thevenin’s Theorem: To verify Thevenin's theorem for DC circuits
11	Norton’s Theorem: To verify Norton's Theorem for DC circuits
12	LDR Characteristics: To study the dependence of LDR resistance on intensity of light

NAME OF THE COURSE	Electricity from Biosystem
CLASS	F Y BSc
COURSE CODE	OE202A
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	CONTINUOUS ASSESSMENT 50 20

COURSE OBJECTIVES

CO 1.	Students understand the electrical phenomenon in nature.
CO 2.	Students understand the concepts of sensors and energy harvesting technology.

COURSE LEARNING OUTCOMES:

CLO 1.	1. Sensitize regarding green technology for generation of elasticity.
UNIT 1	Bio – electricity in animals (15 LECTURES)
1.1	Introduction
1.2	Biological phenomenon in animals
UNIT 2	Bio – electricity in plants (15 LECTURES)
2.1	Bio electricity in plants

REFERENCES:

1. Bio electricity by Prof. Mainak Das, IIT Kanpur
https://www.digimat.in/nptel/courses/video/102104043/L01.html
2. Introductory Biochemistry by Carol Higginbotham
https://openoregon.pressbooks.pub/biochemistry/chapter/5-1-basics-of-energy-biology-libretexts/
3. Principles of Biosystem Engineering by Evangelyn C. Alocilja
https://www.egr.msu.edu/~alocilja/Teaching/Principles%20of%20BE%20Book%208-12-2013.pdf

NAME OF THE COURSE	Laser & it's Applications
CLASS	F Y BSc
COURSE CODE	OE202B
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	SEMESTER END EXAMINATION 50 20

COURSE OBJECTIVES

CO 1.	Acquire knowledge of the theory of Laser Physics
CO 2.	Students understand the different types of lasers and its application.

COURSE LEARNING OUTCOMES:

CLO 1.	Demonstrate and explain fundamental concepts in laser physics
CLO 2.	Demonstrate the properties and application of Laser.
UNIT 1	Introduction & Principle of Laser (15 LECTURES)
1.1	Introduction to Laser
1.2	Types of Lasers - principle, construction, working
UNIT 2	Applications of Laser (15 LECTURES)
2.1	Holography & sensors

REFERENCES:

1. Laser Principles, Types and Application by KR Nambiar, New Age International.
2. Modern Spectroscopy by J Michael Hollas, Fourth Edition, John Wiley and Sons.
3. Lasers Theory and Applications by K. Thyagarajan and A.K. Ghatak, Mcmillan (1981)
4. Laser Fundamentals, by William T. Silfvast, Cambridge University Press, 2008.
5. Principles of Lasers, by Orazio Svelto; Springer, 2009.
6. Laser Spectroscopy and Instrumentation by W. Demtroder.
7. Industrial Applications of Lasers, by K. Koebner (ed.), Wiley (1984).

NAME OF THE COURSE	Instrumentation & Circuit Design
CLASS	F Y BSc
COURSE CODE	SSEC209
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	SEMESTER END EXAMINATION 50 20

COURSE OBJECTIVES:

CO 1.	To study the basic principle and operation of the Cathode Ray Oscilloscope (CRO).
CO 2.	To analyze and interpret various waveforms of CRO.
CO 3.	To understand the block diagram of electronic circuits of CRO

COURSE LEARNING OUTCOMES:

CLO 1.	Students will generate, analyze, and interpret various waveforms of the electrical circuits using CRO
CLO 2.	Students will familiar with the basic operation of the CRO
CLO 3.	Students will design and develop their own experiments / electric circuits
UNIT 1	Theory (15 LECTURES)
1.1	CRO, Power supply, 555Timmer IC
UNIT 2	Practical (15 LECTURES)
2.1	Practical

References:

1. Integrated Electronics, J. Millman and C.C. Halkias, 1991, Tata Mc-Graw Hill.
2. Electronic devices and circuits, S. Salivahanan and N. Suresh Kumar, 2012, Tata
3. Mc-Graw Hill.
4. Microelectronic Circuits, M.H. Rashid, 2ndEdn.,2011, Cengage Learning.
5. Modern Electronic Instrumentation & Measurement Tech., Helfrick &Cooper,1990,
6. Digital Principles & Applications, A.P. Malvino, D. P. Leach & Saha, 7th Ed.,2011,
7. Tata McGraw Hill
8. Fundamentals of Digital Circuits, A. Anand Kumar, 2nd Edition, 2009, PHI Learning
9. Pvt. Ltd.
10. OP-AMP and Linear Digital Circuits, R.A. Gayakwad, 2000, PHI Learning Pvt. Ltd

NAME OF THE COURSE	Semiconductor Devices and Amplifier
CLASS	F Y BSc
COURSE CODE	SSEC210
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	SEMESTER END EXAMINATION 50 20

COURSE OBJECTIVES:

CO 1.	To study the basic principle, working, and operation of semiconductor devices.
CO 2.	To understand the function and applications of bipolar junction transistors.

COURSE LEARNING OUTCOMES:

CLO 1.	The students will be able to develop a typical model based on a bipolar junction transistor.
CLO 2.	The student will gain a robust conceptual understanding of the functionality of bipolar junction transistor circuits
CLO 3.	Students will be able to interpret various applications of diodes.

UNIT 1	Theory (15 LECTURES)
1.1	Semiconductor didoes, Bipolar Junction transistors
UNIT 2	Practical (15 LECTURES)
2.1	Practical

References:

1. Electronic devices and circuits, S. Salivahanan and N. Suresh Kumar, 2012, Tata Mc-Graw Hill
2. Modern Electronic Instrumentation & Me Modern Electronic Instrumentation & Measurement Tech., Helfrick&Cooper,1990, PHI Learning •
3. Digital Principles & Applications, A.P. Malvino, D. P. Leach & Saha, 7th Ed.,2011, Tata McGraw Hill •
4. Fundamentals of Digital Circuits, A. Anand Kumar, 2nd Edition, 2009, PHI Learning Pvt. Ltd. asurement Tech., Helfrick & Cooper,1990, PHI Learning
5. Digital Principles & Applications, A.P. Malvino, D.P. & Saha, 7th Ed.,2011, Tata McGraw Hill
6. Fundamentals of Digital Circuits, A. Anand Kumar, 2nd Edition, 2009, PHI Learning Pvt. Ltd.

Summative Assessment (SA) (50 marks)

Duration: 2 hours

1. The Question Paper will cover all four units of the syllabus.
2. There will be three mandatory questions:
   - Question I: Attempt any two out of four (30 marks)
   - Question II: Attempt any one out of three (10 marks)
   - Question III: Attempt any two out of four (10 marks)
3. In each question, each option will be from a different unit.

For 2 Credit Papers (OE, IKS, VSC, SEC)
Continuous Assessment (50 marks)

1. A minimum of two activities will be given in each semester.
2. Each will be for 20 marks.
3. The nature of the activities will be decided by the Examiner and may include Assignment/ MCQs/ Short notes and/or any other type of /combination of objective or descriptive type activity.
4. Learners will be informed about the marks they have got before the Summative Assessment.
5. 10 marks will be given for Class participation.