

As Per NEP 2020

University of Mumbai



Syllabus for Physics Minor (Scheme III) Vertical 2

Faculty of Science & Technology		
Board of Studies in Physics		
Third Year Programme in Minor B.Sc. (Physics)		
Semester	V	Credits
Title of Paper	Applied Electronics	2
Total Credits		2
From the Academic Year	2026 - 2027	

SEM – V

Syllabus

B. Sc. Physics

(Semester- V)

Name of the Course: T. Y. B. Sc. Physics Minor Course 11
MN - 11: Applied Electronics (2 Credits)

Sr. No.	Heading	Particulars
1.	Description the course: (Including but not limited to)	Introduction, relevance, Usefulness, Application, interest, connection with other courses, demand in the industry, job prospects etc.
2.	Vertical:	Major/ Minor /Open Electives /Skill Enhancement / Ability Enhancement/Indian Knowledge System
3.	Type:	Theory
4.	Credits:	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5.	Hours	30 Hours
6.	Marks Allotted:	50 Marks
7.	Course Objectives (CO): The students are expected to:	
	CO 1	Learn the construction, working, and characteristics of BJTs and its application as switches.
	CO 2	Learn AM, FM, and different types of modulation techniques.
	CO 3	Learn the functioning and characteristics of FET called JFET and its switching applications.
	CO 4	Learn the operational amplifiers (OPAMP) in basic linear circuit configurations such as amplifiers, adders, and subtractors. Evaluate different op-amp applications like integrators, differentiators, and comparators in signal processing tasks.
8.	Course Outcomes (OC): After successful completion of this course, the students will be able to:	
	OC 1	Understand the construction, working, and characteristics of BJTs and its application as switches.
	OC 2	Understanding the fundamental principles of each modulation technique, recognizing their applications in various communication systems.
	OC 3	Understand the functioning and characteristics of FET called JFET and its switching applications.
	OC 4	Understand the operational amplifiers (OPAMP) in basic linear circuit configurations such as amplifiers, adders, and subtractors. Evaluate different op-amp applications like integrators, differentiators, and comparators in signal processing tasks.
9.	Modules / Units: - There will be One module / Unit Per Credit	
	Module / Unit I: Transistors and Radio Communication (15 Lectures)	
	Chapter 1: Bipolar Junction Transistor (BJT) Introduction, Types of transistors, Construction and working of transistor, Transistor as amplifier, Characteristics of transistor (CB, CE & CC), Gain in transistor, Transistor as switch. Note: Covered Sufficient number of problems on above given topics.	

	Chapter 2: Radio communication 1) Amplitude Modulation: Need of modulation, concept of modulation, AM waveform, mathematical expression of AM, concept of sideband, demodulation principles. AM Receiver: TRF and super heterodyne receiver. 2) Frequency Modulation: Definition, mathematical representation, frequency spectrum, bandwidth and modulation index. 3) Concept of ASK, PSK, FSK, PAM, PWM, PPM, PCM	
	Module / Unit II: FET and Op-Amp: (15 Lectures)	
	Chapter 1: Field Effect Transistors (FET) Introduction, Types of FET, Construction and working of JFET, Difference between JFET and BJT, Characteristics of JFET, Important terms, JFET as switch Chapter 2: Operational Amplifiers Introduction, Schematic symbol of operational amplifier, Features of Operational Amplifier, Op-amp as inverting amplifier, Op-amp as non-inverting amplifier, Applications of Op-amp: as voltage follower, as adder, as subtractor, Op-amp as integrator, Op-amp as differentiator, Op-amp as comparator Note: Covered Sufficient number of problems on above given topics.	
10.	References: 1. VM: Principles of Electronics – V. K. Mehta and Rohit Mehta. (S. Chand – Multicolor revised edition) 2. Kennedy: Electronics Communication Systems by Kennedy 3. MB: Electronic Principles, Malvino & Bates -7th Edition TMH Publication. 4. AM: Electronic Devices and Circuits, Allen Mottershead -PHI Publication. 5. KVR: Functional Electronics, K.V. Ramanan-TMH Publication 6. LEF: Communication Electronics: Principles and applications by Louis E Frenzel, 3rd edition TMH Publications. 7. VT: Telecommunication Switching Systems and Network by Vishwanathan and Thiagarajan, PHI publication. 8. DJ: Electronics Communication Systems by Denis Roddy and John Coolen, PHI publication	
11.	Individual Passing in Internal and External Examination	
12.	Internal Continuous Assessment (40%) (20 Marks)	External Assessment, (60%) (30 Marks)
	Continuous Evaluation through: Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc. (at least 3)	Evaluation: through Exam at the End of the Semester / Term.
13.	Duration of the Term End Examination: One Hour Format of Question Paper for Physics Major Term End Examination for 30 Marks:	
	Unit - I (15 Marks)	Q.1 A) Attempt any Two 10 Marks i) Theory ii) Theory iii) Theory iv) Theory

		B) Attempt any One i) Problem / Theory ii) Problem	05 Marks
	Unit – II (15 Marks)	Q.2 A) Attempt any Two i) Theory ii) Theory iii) Theory iv) Theory	10 Marks
		B) Attempt any One i) Problem / Theory ii) Problem	05 Marks

Semester GPA/ Programme CGPA Semester / Programme	% of Marks	Alpha-Sign / Letter Grade Result	Grading Point
9.00 - 10.00	90.0 - 100	O (Outstanding)	10
8.00 - < 9.00	80.0 - < 90.0	A+ (Excellent)	9
7.00 - < 8.00	70.0 - < 80.0	A (Very Good)	8
6.00 - < 7.00	60.0 - < 70.0	B+ (Good)	7
5.50 - < 6.00	55.0 - < 60.0	B (Above Average)	6
5.00 - < 5.50	50.0 - < 55.0	C (Average)	5
4.00 - < 5.00	40.0 - < 50.0	P (Pass)	4
Below 4.00	Below 40.0	F (Fail)	0
Ab (Absent)	-	Ab (Absent)	0

Sd/-
Sign of the
Prof. (Dr.) T. N. Ghorude
Chairman
BOS in Physics

Sd/-
Sign of the
Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science &
Technology

Sd/-
Sign of the Offg. Dean
Prof. Shivram S. Garje
Faculty of Science &
Technology