

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

**New Arts, Commerce, and Science College
Ahmednagar (Autonomous)**

(Affiliated to Savitribai Phule Pune University, Pune)



**National Education Policy (NEP)
Choice Based Credit System (CBCS)**

**Programme Framework and Syllabus for
Skill Enhancement Courses: Computer Science**

Implemented from

Academic Year 2024-25

New Arts, Commerce and Science College, Ahmednagar (Autonomous)

Introduction of Skill Enhancement Courses (SEC):

The syllabus has been designed such that the knowledge of fundamental concepts, advanced technologies and specific skills will be developed among students. To understand advanced electronics technologies students should first understand the basic concepts of electronics. In the first year of the B.Sc. and B.Sc. (Honours) computer science course, the basic concepts of analog electronics with the required theoretical understanding have been covered. During the second year of the B.Sc. and B.Sc. (Honours), students will learn about basic learning aspects of digital electronics and in addition to that the fundamentals of microcontroller which has large application areas will covered.

In Computer Science the knowledge of basic electronics is an important which will further used to the design, implementation and analysis of electronic circuits and systems. Electronics technology has revolutionized various fields including communication, consumer appliances, medical, defense and so on. The advances in electronics technology make systems smaller, smarter and powerful. The designing-based approach has been used mostly in the syllabus that trains students to apply the acquired knowledge to design and analyze circuits for specific applications.

Skill Enhancement Courses: Framework and Course Distribution: Subject: Computer Science

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	II	5.0	SEC-01	SEC-CS 01T/P	Analog Electronics	02
2.	II	III	5.5	SEC-02	SEC-CS 02T/P	Digital Electronics	02
3.	II	IV	6.0	SEC-03	SEC-CS 03T/P	Microcontrollers	02
Total							06

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Skill Enhancement Courses: Computer Science

Title of the Course: Analog Electronics								
Year: I				Semester: II				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
SEC-01	SEC-CS 01T/P	02	00	02	30	15	35	50

Learning Objectives:

1. To study passive and active electronic components.
2. To study the semiconductor devices.
3. To analyze different electronic circuits.
4. To study and understand the applications of electronic devices.

Course Outcomes (COs)

After completion of the course, the students will be able to –

1. Understand difference between passive and active components.
2. Understand different sensors.
3. Develop an understanding of the basic operation and characteristics of different type of diodes and familiarity with its working and applications.
4. To become familiar with construction, working and characteristics of BJT, FET and MOSFET.

Detailed Syllabus:

Unit I: Passive Components (10)

Introduction of Electronics, Concept of Analog electronics, Classification of electronic components, Passive electronic components: resistors, capacitors, inductors, transformer, switches, cables and connectors, fuses (only basic concept, basic working and application is expected), series and parallel combination of resistors, capacitors and inductors.

Unit II: Semiconductor Diodes and Circuits (10)

Basics of Semiconductor, intrinsic and extrinsic semiconductor, P and N type semiconductors, formation of PN junction diode, forward and reverse bias characteristics, Types of diodes-

Zener diode, Light Emitting Diode, Photo Diode, Varactor diode, Solar Cell (construction, working principle, characteristics, applications).

Rectifiers- half wave and full wave circuits, Zener diode as a voltage regulator, Opto-coupler concept. Basic block diagram of power supply.

Unit III: BJT, FET, MOSFET and its applications (15)

Bipolar Junction Transistor (BJT) types, symbol, construction, working principle, transistor configurations - CB, CC (only concept), CE configuration: input and output characteristics, the definition of α , β and γ , the concept of biasing, Need of biasing, fixed bias, potential divider bias, DC load line and Q point, Classification based on Q point, transistor as a CE amplifier, concept of gain and bandwidth,.

Symbol, types, construction, working principle, I-V characteristics of Junction Field Effect Transistor (JFET), Metal Oxide Semiconductor FET (MOSFET). Comparison of JFET and MOSFET.

Applications: - Transistor as a switch, JFET as voltage variable resistor, MOSFET as a switch.

Unit IV: Operational Amplifier and its Applications (06)

Block diagram, symbol, and characteristics of ideal and practical op-amp. The concept of virtual ground, Differential and common mode gain, CMRR. Applications: inverting amplifier, non-inverting amplifier, voltage follower, comparator, adder, subtractor, integrator and differentiator.

Unit IV: Sensors (04)

Sensors: Definition, active and passive sensors. Temperature sensor (thermistor, LM-35), optical sensor (LDR), Passive Infrared sensor (PIR), PIR Sensor intruder detection system, ultrasonic sensor.

Suggested Readings/Material:

1. Electronic Devices and Circuit Theory - Robert L. Boylestad and Louis Nashelsky.
2. Electronic Devices and Circuits I – T.L.Floyd- PHI.
3. Integrated Electronics – Millman and Halkias.
4. Electronic Devices and Circuits – Bogart.
5. Principles of Electronics - V.K. Mehta, S.Chand and Co.
6. A text book of electrical technology - B.L.Theraja, S.Chand.