CONSUMER ELECTRONICS

23ECOE321

(COURSE HANDBOOK)

Open Elective course offered by Department of ECE

Course In-charges:

Mr. Prakash L S

Ms. Poornima K

1. GENERAL INFORMATION

Welcome to the course **Consumer Electronics**. This course provides an in-depth understanding of the principles, working, and applications of commonly used consumer electronic devices. Consumer electronics play a vital role in modern society, influencing communication, entertainment, home automation, and lifestyle enhancement.

The course is structured into **five comprehensive modules** that progressively cover audio systems, television and video systems, telecommunication devices, home appliances, and emerging consumer technologies. Emphasis is placed on understanding device operation, system-level functionality, and real-world applications of electronic principles.

Through this course, students will gain the ability to analyze the working of consumer devices, relate theoretical concepts to practical systems, and appreciate emerging trends in the consumer electronics industry. The handbook serves as a guide to the course structure, learning outcomes, assessment pattern, and learning resources.

1.1 Course Learning Objectives

This course is designed to:

- Familiarize students with the characteristics of sound signals, audio amplifiers, microphones, loudspeakers, and television fundamentals.
- Emphasize the working principles of various consumer electronic devices.
- Introduce the evolution and operating principles of modern consumer electronics.
- Impart the ability to apply electronic principles and devices to real-world consumer applications.

1.2 Course Outcomes

At the end of the course, the students will be able to:

- **CO1:** Outline the fundamental principles and operations of various consumer electronic devices.
- **CO2:** Analyze the functionality of key components in audio and video systems.
- **CO3:** Illustrate the operations of telecommunication devices and home appliances.

- **CO4:** Interpret emerging trends and technologies in the consumer electronics industry.

1.3 Text Books and Suggested Sources

All the below mentioned books are available in the central Library.

Textbooks

1. S. P. Bali, *Consumer Electronics*, 1st Edition, Pearson Education India, 2004.
2. B. R. Gupta and V. Singhal, *Consumer Electronics*, S. K. Kataria & Sons, 2013.

Reference Books

1. Dr. Sanjay Sharma, *Basic Electronics*, S. K. Kataria & Sons, 2022.
2. Anand Kumar, *Fundamentals of Digital Circuits*, 4th Edition, PHI, 2016.

2. THE COURSE

2.1 Course Description

The **Consumer Electronics** course is offered as an open elective course in Semester VI of the B.E. program. The course spans **42 hours** over the semester and carries **3 credits**. Assessment consists of **Continuous Internal Evaluation (CIE) for 50 marks** and a **Semester End Examination (SEE) for 50 marks**. The course focuses on both traditional and modern consumer electronic systems, preparing students to understand, analyze, and adapt to rapidly evolving technologies in the electronics industry.

2.2 Initiating Contact with Faculty and Peers

Students are encouraged to maintain open communication with the course instructor for academic clarification and guidance. Queries should be addressed during class hours, office hours, or via official email communication. Collaborative learning through peer discussion is strongly encouraged to enhance conceptual understanding.

2.3 Learning Resources

Learning resources extend beyond textbooks and include:

- VTU Consortium digital library
- E-learning and digital library can be accessed via the college website https://mite.ac.in/ (Campus Life section > Library > VTU Consortium/e-learning platforms/additional sources).

These resources can be accessed through the institute library and official academic portals.

2.4 Course Faculty

1. **Mr Prakash L S**
   Assistant Professor
   Department of Electronics and Communication Engineering
   Contact: 9844625723, Email: prakashls@mite.ac.in

2. **Ms Poornima K**
   Assistant Professor
   Department of Electronics and Communication Engineering
   Contact: 9986298328, Email: poornima@mite.ac.in

2.5 Topics and Reading Materials (Module-wise)

Module 1: Audio Systems

No. of Hours: 08

Topics:

- Sound fundamentals: intensity, loudness, pitch, frequency response, fidelity, sensitivity, selectivity
- Audio amplifiers: mono, stereo, quadraphonic systems, Hi-Fi amplifiers, audio equalizers
- Microphones: condenser, crystal, electret, carbon, laser microphones
- Loudspeakers: principles and types
- Public Address (PA) systems: block diagram and operation

Essential Reading:

- *S. P. Bali, Consumer Electronics*, Chapters **1, 2, 4, 7 and 26**, covering sound fundamentals, audio amplifiers, microphones, loudspeakers, and public address systems as prescribed in the syllabus.
- *B. R. Gupta and V. Singhal, Consumer Electronics*, Chapters **1, 4, 5, 6 and 7**, for detailed explanation of audio systems and electro-acoustic transducers.

Additional Reading:

- Dr. Sanjay Sharma, *Basic Electronics*, relevant sections on audio signal characteristics and amplifier fundamentals, to strengthen conceptual understanding.

Module 2: Television and Video Systems

No. of Hours: 09

Topics:

- Television fundamentals: scanning, synchronization, color systems
- Display technologies: CRT, LCD, LED, Plasma, Digital TV, HDTV
- Video recording and playback: VCRs, DVD players, digital recording devices

Essential Reading:

- *B. R. Gupta and V. Singhal, Consumer Electronics*, Chapters **13, 14 and 17**, aligned with television fundamentals, display technologies, and video recording and playback systems as per the syllabus.

Additional Reading:

- *S. P. Bali, Consumer Electronics*, selected sections on television systems and modern display technologies for conceptual reinforcement.

Module 3: Telecommunication Devices

No. of Hours: 08

Topics:

- Telephone systems: landline and mobile communication basics
- Facsimile machines, printers, scanners: operation and applications

- Set-top boxes and Smart TVs: functionality and integration
- Modems and routers: role in data communication

Essential Reading:

- *B. R. Gupta and V. Singhal, Consumer Electronics*, **Chapter 36**, focusing on telephone systems, facsimile machines, set-top boxes, smart televisions, modems, and routers as specified in the syllabus.

Additional Reading:

- Dr. Sanjay Sharma, *Basic Electronics*, relevant chapters on communication basics and interfacing devices to enhance application-oriented understanding.

Module 4: Home Appliances

No. of Hours: 08

Topics:

- Kitchen appliances: microwave ovens, induction stoves, refrigerators
- Cleaning appliances: washing machines, vacuum cleaners
- Air conditioning systems: air conditioners and air coolers
- Miscellaneous devices: digital watch, calculator

Essential Reading:

- *B. R. Gupta and V. Singhal, Consumer Electronics*, Chapters **50, 51 and 52**, covering kitchen appliances, cleaning appliances, air conditioning systems, and miscellaneous consumer devices as outlined in the syllabus.

Additional Reading:

- *S. P. Bali, Consumer Electronics*, selected sections on household appliances for supplementary understanding of operating principles.

Module 5: Personal Entertainment Devices & Emerging Technologies

No. of Hours: 09

Topics:

- Portable audio players: evolution from tape recorders to MP3 players
- Digital cameras and camcorders: working principles and features

- Gaming consoles: overview and functionality
- Smart home devices: IoT-enabled consumer electronics
- Wearable technology: smart watches, fitness trackers, health monitoring devices
- Virtual and Augmented Reality: basics and applications

Essential Reading:

- *S. P. Bali, Consumer Electronics*, Chapters **1–9**, addressing portable audio players, digital cameras, camcorders, gaming consoles, and evolution of consumer entertainment devices.
- *Dr. Sanjay Sharma, Basic Electronics*, Chapters **10 and 11**, supporting emerging technologies and electronic principles relevant to modern consumer electronics.

Additional Reading:

- A. Anand Kumar, *Fundamentals of Digital Circuits*, relevant sections for understanding digital processing in smart devices, wearables, and IoT-enabled consumer electronics.

3. ASSESSMENT

The assessment scheme consists of **Continuous Internal Evaluation (CIE)** each carrying **50 marks** and **Semester End Examination (SEE)**.

Continuous Internal Evaluation (CIE) – 50 Marks

- Internal Tests (2): 30 Marks
- Assignments (2): 20 Marks

Semester End Examination (SEE) – 50 Marks

- Written examination of 3 hours duration

3.1 Rubrics for Activity based assessment (0–50 Marks)

Assessment Evaluation:

- Each student is required to complete **two assignments**.
- Each assignment is **evaluated for 50 marks**, which will be **scaled down to 10 marks** for CIE.
- Total Assignment Marks = 10 + 10 = **20 Marks**

Example assignments are (Not limited to)

- Case study on audio system specifications and applications
- Comparative analysis of microphones and loudspeakers
- Presentation on Smart TV ecosystems
- Seminar on emerging consumer electronics trends
- Case study on IoT-based smart home systems

Rubrics for Activity based assessment (50 Marks)

Criteria	41–50 (Excellent)	31–40 (Very Good)	21–30 (Good)	11–20 (Fair)	0–10 (Poor)
Conceptual Understanding (10)	Demonstrates complete and in-depth understanding of concepts	Very good understanding with minor gaps	Adequate understanding of basic concepts	Limited understanding	No understanding of concepts
Technical Accuracy (10)	All technical details are accurate and relevant	Minor technical errors	Some inaccuracies	Many technical errors	Incorrect
Analysis & Application (10)	Excellent analysis with strong real-world relevance	Good analysis and application	Moderate analysis	Weak application	No application
Organization & Presentation (10)	Well-structured, clear, neat, and professional	Well organized with minor issues	Average organization	Poor presentation	No logical structure
Originality & Effort (10)	Highly original work with significant effort	Good effort and originality	Moderate effort	Minimal effort	Copied / no effort

Scaling Method:
Marks obtained out of **50** will be **proportionally scaled down to 10 marks**.

Total CIE Marks = 30 (Internal Tests) + 20 (Assignments) = 50 Marks

4. WEB RESOURCES

- IIT Madras - B.S. in Electronic Systems:
  https://www.youtube.com/watch?v=n5FU7TTcs9Y&t=11s
- Android Mobile Application Development:
  https://onlinecourses.swayam2.ac.in/nou24_ge66/preview
- Microelectronics: Devices to Circuits
  https://onlinecourses.nptel.ac.in/noc24_ee139/preview