

**AIM:**

To understand hardware and the software aspects of embedded systems.

**OBJECTIVES:**

- To understand the architecture of embedded processors, microcontrollers, and peripheral devices.
- To appreciate the nuances of programming micro-controllers in assembly for embedded systems.
- To understand the challenges in developing operating systems for embedded systems.
- To learn about programming these systems in high-level languages such as C.

**UNIT I EMBEDDED COMPUTING 9**

Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming.

**UNIT II MEMORY AND INPUT / OUTPUT MANAGEMENT 9**

Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupt handling.

**UNIT III PROCESSES AND OPERATING SYSTEMS 9**

Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Performance issues.

**UNIT IV EMBEDDED C PROGRAMMING 9**

Programming embedded systems in C – C-looping structures – Register allocation – Function calls – Pointer aliasing – structure arrangement – bit fields – unaligned data and endianness – inline functions and inline assembly – portability issues.

**UNIT V EMBEDDED SYSTEM DEVELOPMENT 9**

Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design issues – Design methodologies – Case studies – Complete design of example embedded systems.

**TOTAL= 45 PERIODS**

**TEXT BOOKS:**

1. Wayne Wolf, "Computers as Components: Principles of Embedded Computer System Design", Elsevier, 2006.
2. Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems", Pearson Education, Second edition, 2007 (unit 1)
3. Andrew N. Sloss, D. Symes, C. Wright, "Arm system developers guide", Morgan Kaufman/ Elsevier, 2006. (unit 4)

**REFERENCES:**

1. Michael J. Pont, "Embedded C", Pearson Education, 2007.
2. Steve Heath, "Embedded System Design", Elsevier, 2005.