

NIRMA UNIVERSITY
SCHOOL OF TECHNOLOGY, INSTITUTE OF TECHNOLOGY
M. Tech. in Electronics & Communication Engineering (Embedded System)
M.Tech Semester - I

| L | T | Practical component | | | | C |
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| Course Code | 6EC204 |
| Course Title | Embedded Systems Programming |

Course Learning Outcomes (CLOs):

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

1. Comprehend the requirements of Embedded Systems Software
2. Utilize the Software Architectures for Embedded System programming
3. Program Embedded Systems
4. Solve issues related to Run-time Environment and Memory management in Embedded Systems

Syllabus:

Teaching Hours:45

UNIT I: Software Architectures

11

Requirements of Embedded Software, Basics of Interrupts, shared data problem, latency, scheduling policy, Round Robin, Round robin with interrupt, function queue scheduling.

UNIT II: Programming Languages

11

Desired Language Characteristics, Introduction to Object Oriented Programming concepts, C for Programming embedded systems, Object Oriented Programming for Embedded Systems in C++, Use of Java for Embedded Systems, Run-time Exception handling

UNIT III: Programming and Run-time Environment

06

Mixing C and assembly, Compiling, Assembling, Linking, Debugging, Basic Compilation Techniques

UNIT IV: Profiling

08

Analysis and Optimization of Execution Time, Analysis and Optimization of Energy and Power, Analysis and Optimization of Program Size, Program Validation and Testing

UNIT V: I/O Programming & Memory management

05

Synchronization, transfer rate, latency, Polled waiting loops, interrupt driven I/O, DMA, Storage class, scope and lifetime of variables, static and dynamic allocation, shared memory, recursive/reentrant function

UNIT VI: Embedded System Software

04

Introduction to Boot Loader, Embedded File Systems, Embedded Database and Data Structure

Self Study:

The self study contents will be declared at the commencement of semester. Around 10% of the question will be asked from self study contents.

Laboratory work:

Laboratory work will be based on above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings:

1. Embedded Software Premier David Simon (Pearson)
2. Embedded Real-time Systems Programming Sri Ram Iyer and Pankaj Gupta (TMH)
3. Fundamentals of Embedded Software: where c and assembly meet Daniel W lewis (Prentice hall)
4. Introduction to Embedded Systems by Shibu K V (TMH)
5. Computers as Components Principles of Embedded Computing Design by Wayne Wolf, 2nd Edition, (Morgan Kauffman)