H.N.G. University, Patan
M.C.A (5 Years Integrated Programme) SEMESTER - IX
902: Embedded Systems

Unit: 1 **[20%]**

A First Look at Embedded Systems:
Examples of Embedded Systems, Typical Hardware. Hardware Fundamentals for the Software Engineer. - Terminology, Gates, Other Basic Considerations, Timing Diagrams, Memory

Unit: 2 **[30%]**

Advanced Hardware Fundamentals:
Microprocessors, Buses, Direct Memory Access, Interrupts, Other Common Parts, Built-Ins on the Microprocessor, Conventions Used on Schematics. Interrupts. - Microprocessor Architecture, Interrupt Basics, The Shared-Data Problem, Interrupt Latency. Survey of Software Architectures. - Round-Robin, Round-Robin with Interrupts, Function-Queue-Scheduling Architecture, Real-Time Operating System Architecture, Selecting an Architecture

Unit: 3 **[20%]**

Introduction to Real-Time Operating Systems:
Tasks and Task States, Tasks and Data, Semaphores and Shared Data. More Operating System Services. - Message Queues, Mailboxes, and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment

Unit: 4 **[30%]**

Basic Design Using a Real-Time Operating System:
Overview, Principles, Encapsulating Semaphores and Queues, Hard Real-Time Scheduling Considerations. Saving Memory Space, Saving Power

Embedded Software Development Tools:
Host and Target Machines, Linker/Locators for Embedded Software,Getting Embedded Software into the Target System

Debugging Techniques:
Testing on Your Host Machine, Instruction Set Simulators, The assert Macro, Using Laboratory Tools

Text Books:

1. An Embedded Software Primer By David E. Simon (Pearson Education)
2. Fundamentals of Embedded Software By Daniel W. Lewis Pearson Education)

Reference Books:

1. Embedded System Design By Frank Vahid / Tony Givargis (Wiley)
Embedded Linux By Craig Hollabaugh (Pearson Education)