Syllabus for Embedded and Real time Systems (PGQP53)

OVERVIEW OF MICROCONTROLLERS

Microprocessor Vs Microcontroller, Embedded Systems, Embedded Microcontrollers, 8051 Architecture- Registers, Pin diagram, I/O ports functions, Internal Memory organization. External Memory (ROM & RAM) interfacing.

INTRODUCTION TO EMBEDDED SYSTEMS

Embedded systems over view, Design challenges, Processor technology, IC technology, and design technology. Embedded Vs General computing system, Classification of Embedded systems, Major applications and purpose of ES. Core of an Embedded System including all types of processor/controller.

INTRODUCTION TO REAL-TIME SYSTEMS

Historical background, Elements of a Computer Control System, RTS- Definition, Classification of Real-time Systems, Time Constraints, Classification of Programs.

Computer Hardware Requirements for Real-Time Applications: Introduction, General Purpose Computer, Single Chip Microcomputers and Microcontrollers, Specialized Processors, Process-Related Interfaces, Data Transfer Techniques, Communications, Standard Interface.

EMBEDDED COMPUTING AND ARM PROCESSORS

Complex systems and microprocessors– Embedded system design process –Design example: Model train controller- Instruction sets preliminaries – ARM Processor – CPU: programming input and output- supervisor mode, exceptions and traps – Co-processors- Memory system mechanisms – CPU performance- CPU power consumption.

EMBEDDED COMPUTING PLATFORM DESIGN

The CPU Bus-Memory devices and systems–Designing with computing platforms – consumer electronics architecture – platform-level performance analysis – Components for embedded programs.