**A T M E** College of Engineering

| **Course with Code:** Microcontrollers– BCS402 | | | | **Faculty:** Dr. Vinod Kumar P | | | **Semester & Section:** 4th | |
|---|---|---|---|---|---|---|---|---|
| **Class No.** | **Date planned (DD/MM)** | **Topics to be covered** | **TLP Planned** | **Class No.** | **Date of Conduction (DD/MM)** | **Topics Covered** | **TLP Executed** | **Remarks if any deviation** |
| **MODULE-1** | | | | | | | | |
| 1 | | Introduction to the course, Bridge Course: Microprocessors versus Microcontrollers | Chalk & Talk | 1 | | | | |
| 2 | | Bridge Course: Embedded systems | Chalk & Talk, PPT | 2 | | | | |
| 3 | | ARM Embedded Systems: The RISC design philosophy, The ARM Design Philosophy | Chalk & Talk | 3 | | | | |
| 4 | | Embedded System Hardware | PPT | 4 | | | | |
| 5 | | EmbeddedSystem Software. | PPT | 5 | | | | |
| 6 | | ARM Processor Fundamentals: Registers | Chalk & Talk, PPT | 6 | | | | |
| 7 | | Current Program Status Register | Chalk & Talk, PPT | 7 | | | | |
| 8 | | Pipeline | Chalk & Talk, PPT | 8 | | | | |
| 9 | | Exceptions, Interrupts, and the Vector Table | Chalk & Talk, PPT | 9 | | | | |
| 10 | | Core Extensions, Revision & Quiz | Chalk & Talk, MS Forms | 10 | | | | |

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| MODULE-2 | | | | | | | | |
| 11 | | Introduction to the ARM Instruction Set: DataProcessing Instructions | Chalk & Talk, PPT | 1 | | | | |
| 12 | | Data Processing Instructions | Chalk & Talk, PPT | 2 | | | | |
| 13 | | Branch Instructions | Chalk & Talk, PPT | 3 | | | | |
| 14 | | Software Interrupt Instructions | Chalk & Talk, PPT | 4 | | | | |
| 15 | | Program Status Register Instructions | Chalk & Talk, PPT | 5 | | | | |
| 16 | | Coprocessor Instructions | Chalk & Talk, PPT | 6 | | | | |
| 17 | | Loading Constants | Chalk & Talk, PPT | 7 | | | | |
| 18 | | Revision, Quiz | Chalk & Talk, PPT, MS forms | 8 | | | | |

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| MODULE-3 | | | | | | | | |
| 19 | | C Compilers and Optimization: Basic C DataTypes | Chalk & Talk, PPT | 1 | | | | |
| 20 | | C Looping Structures | Chalk & Talk, PPT | 2 | | | | |
| 21 | | Register Allocation | Chalk & Talk, PPT | 3 | | | | |
| 22 | | Function Calls | Chalk & Talk, PPT | 4 | | | | |
| 23 | | Pointer Aliasing | Chalk & Talk, PPT | 5 | | | | |
| 24 | | Floating Point | Chalk & Talk, PPT | 6 | | | | |
| 25 | | Portability Issues | Chalk & Talk, PPT | 7 | | | | |
| 26 | | Revision, Quiz | Chalk & Talk, PPT, MS Forms | 8 | | | | |

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| MODULE-4 | | | | | | | | |
| 27 | | Exception and Interrupt Handling: Exception handling, ARM processor exceptions and modes, Vector Table | Chalk & Talk, PPT | 1 | | | | |
| 28 | | Exception priorities, Link register offsets | Chalk & Talk, PPT | 2 | | | | |
| 29 | | Interrupts, Assigning interrupts, Interrupt latency | Chalk & Talk, PPT | 3 | | | | |
| 30 | | IRQ and FIQ exceptions, Basic interrupt stack design and implementation. | Chalk & Talk, PPT | 4 | | | | |
| 31 | | Firmware: Firmware and bootloader | PPT | 5 | | | | |
| 32 | | ARM firmware suite, Red Hat redboot | PPT | 6 | | | | |
| 33 | | Example: Sandstone, Sandstone Directory Layout, Sandstone Code Structure | PPT | 7 | | | | |
| 34 | | Revision & Quiz | Chalk & Talk, PPT, MS forms | 8 | | | | |

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| **MODULE-5** | | | | | | | | |
| 35 | | CACHES: The Memory Hierarchy and Cache Memory, Caches and Memory Management Units | Chalk & Talk, PPT | 1 | | | | |
| 36 | | CACHE Architecture: Basic Architecture of a Cache Memory, Basic Operation of a Cache Controller, The Relationship between Cache and Main Memory | Chalk & Talk, PPT | 2 | | | | |
| 37 | | Set Associativity | Chalk & Talk, PPT | 3 | | | | |
| 38 | | Write Buffers, Measuring Cache Efficiency | Chalk & Talk, PPT | 4 | | | | |
| 39 | | CACHE POLICY: Write Policy—Writeback or Writethrough | Chalk & Talk, PPT | 5 | | | | |
| 40 | | Cache Line Replacement Policies | Chalk & Talk, PPT | 6 | | | | |
| 41 | | Allocation Policy on a Cache Miss. Coprocessor 15 and caches | Chalk & Talk, PPT | 7 | | | | |
| 42 | | Revision & Quiz | Chalk & Talk, PPT, MS Forms | 8 | | | | |

|  | Activity | Planned | Actual | Remarks |
|---|---|---|---|---|
| 1 | Theory Classes | 40 | | |
| 2 | Assignments/ Quizzes/ Self-study | 5 | | |
| 3 | Tutorials/ Extra classes | 2 | | |
| 4 | Internal Assessments | 3 | | |
| 5 | ICT based Teaching (% of usage in Curriculum) | 70% | | |

| Planning | Execution |
|---|---|
| **Faculty Signature:** | **Faculty Signature:** |
| **HoD Signature:** | **HoD Signature:** |