| Branch | Electrical and Electronics Engineering | | Semester | 4 |
|---|---|---|---|---|

| Course Code | 404 | Course Name | Microprocessor, Microcontroller and Peripheral Devices | |
|---|---|---|---|---|

| **Course Outcome 1** | Explain 8085 Microprocessor, its architecture and memory mapping. | Teach Hrs | Marks |
|---|---|---|---|
| **Learning Outcome 1** | Demonstrate the architecture of 8085 Microprocessor. **(Psychomotor)** | 4 | 10 |

| **Contents** | 8085 Microprocessor: Architecture, Pin Diagram with function of each pin. | | |
|---|---|---|---|
| **Method of Assessment** | *Internal: Laboratory observation and viva voce* | | |

| **Learning Outcome 2** | Define function of various blocks, buses and cycles of 8085. **(Cognitive)** | 8 | 10 |
|---|---|---|---|
| **Contents** | Block Diagram and its description- Register Array, ALU, Timing and Control Signals Address, Description of Address bus, data bus and control bus. Machine cycle & BUS Timing | | |
| **Method of Assessment** | *External : End Semester Theory Exam - Pen paper test* | | |

| **Learning Outcome 3** | Compare different memory mapping techniques and interrupts of 8085.**(Cognitive)** | 8 | 10 |
|---|---|---|---|
| **Contents** | Memory Interfacing, IO Interfacing, Block Diagram of Memory and I/O Interfacing, 8085 Interfacing Pins. Addressing modes of 8085. Interrupts and its types. Memory Mapped I/O & I/O mapped I/O | | |
| **Method of Assessment** | *External : End Semester Theory Exam - Pen paper test* | | |

| Branch | Electrical and Electronics Engineering | | Semester | 4 |
|---|---|---|---|---|

| Course Code | 404 | Course Name | Microprocessor, Microcontroller and Peripheral Devices |
|---|---|---|---|

| Course Outcome 2 | Identify the microcontroller 8051 and its architecture. | Teach Hrs | Marks |
|---|---|---|---|
| **Learning Outcome 4** | Model the architecture of Microcontroller 8051. **(Psychomotor)** | 4 | 10 |
| Contents | Introduction to micro- controller, Comparison between microprocessor and micro-controller, 8051 Microcontroller and its architecture, Pin diagram and its description | | |
| Method of Assessment | *Internal: Laboratory observation and viva voce* | | |
| Learning Outcome 5 | Explain block diagram and registers of Microcontroller 8051. **(Cognitive)** | 8 | 10 |
| Contents | Block diagram Futures of 8051 I/O ports Pins and their functions Registers 8051 data type, On-chip ROM memory and RAM Memory organization, register banks, stack and stack pointer, SFR registers, Registers - A, B, SP, DPTR, PC and SFRs. | | |
| Method of Assessment | *External : End Semester Theory Exam - Pen paper test* | | |
| Learning Outcome 6 | Describe I/O ports and Machine cycles in 8051 Microcontroller. **(Cognitive)** | 5 | 10 |
| Contents | I/O ports structure and operation bit address. General Format and functions of each bit of PSW SFRs, machine cycle, Time delay calculations. Machine Cycles. Calculation of Time delay for different cycles of microcontroller. | | |
| **Method of Assessment** | *Internal: Mid Semester Exam-I, Pen paper test & Assignment* | | |

| Branch | Electrical and Electronics Engineering | | Semester | 4 |
|---|---|---|---|---|

| Course Code | 404 | Course Name | Microprocessor, Microcontroller and Peripheral Devices |
|---|---|---|---|

| Course Outcome 3 | Develop the program using Assembly Language of 8085. | Teach Hrs | Marks |
|---|---|---|---|
| **Learning Outcome 7** | Identify different instructions formats and sets of Microprocessor 8085. **(Cognitive)** | 8 | 10 |

| **Contents** | Instruction Format<br>Instructions Set and their classification.<br>Data Transfer operation |
|---|---|

| **Method of Assessment** | *External : End Semester Theory Exam - Pen paper test* |
|---|---|

| **Learning Outcome 8** | Utilize the arithmetic, logic and branch operation in programming of 8085. **(Cognitive)** | 8 | 10 |
|---|---|---|---|
| **Contents** | Arithmetic operation<br>Logic operation<br>Branch Operation<br>Stack, Subroutine and related instruction | | |

| **Method of Assessment** | *External : End Semester Theory Exam - Pen paper test* |
|---|---|

| **Learning Outcome 9** | Execute simple programs in 8085.**(Psychomotor)** | 5 | 10 |
|---|---|---|---|
| **Contents** | Write assemble and execute a simple program in 8085 on Arithmetic operation<br>Logical operation<br>Branch Operation<br>Stack, Subroutine and related instruction | | |

| **Method of Assessment** | *External: Laboratory observation and viva voce* |
|---|---|

| Branch | Electrical and Electronics Engineering | | | Semester | 4 |
|---|---|---|---|---|---|

| Course Code | 404 | Course Name | Microprocessor, Microcontroller and Peripheral Devices |
|---|---|---|---|

| Course Outcome 4 | Write and execute assembly language programs for 8051 Microcontroller. | Teach Hrs | Marks |
|---|---|---|---|
| Learning Outcome 10 | Classify addressing modes and instruction set of 8051 with example**(Cognitive)** | 8 | 10 |
| **Contents** | Addressing Modes : Immediate, Register, Direct, Indirect, Indexed, Relative and bit addressing Instruction set : Data Transfer, Arithmetic, Logical, Branching, and Machine Control | | |
| Method of Assessment | *External : End Semester Theory Exam - Pen paper test* | | |
| Learning Outcome 11 | Analyze particular programming concept on 8051 Microcontroller as per requirement. **(Cognitive)** | 4 | 10 |
| **Contents** | Arithmetic, logical instruction, Looping, Counting, sorting and  Indexing. | | |
| Method of Assessment | *Internal: Mid Semester Exam-I, Pen paper test & Assignment* | | |
| Learning Outcome 12 | Develop programs to perform the operations on 8051 microcontroller.**(Psychomotor)** | 4 | 10 |
| **Contents** | Programs on arithmetic and logic instructions, Looping, Counting, sorting and  Indexing. Data manipulation, Masking,  Stack operation. | | |
| Method of Assessment | *External: Laboratory observation and viva voce* | | |

| RGPV (DIPLOMA WING) BHOPAL | OBE CURRICULUM FOR THE COURSE | FORMAT-3 | Sheet No. 5/5 |
|---|---|---|---|
| **Branch** | **Electrical and Electronics Engineering** | **Semester** | **4** |

| **Course Code** | **404** | **Course Name** | **Microprocessor, Microcontroller and Peripheral Devices** | | |
|---|---|---|---|---|---|
| **Course Outcome 5** | | Describe Peripherals and its interfacing with 8085 | | Teach Hrs. | Marks |
| **Learning Outcome 13** | | Illustrate Pin diagram and block diagram of various peripherals. **(Cognitive)** | | 8 | 10 |
| **Contents** | | Peripherals:<br>PIN DIAGRAM,BLOCK DIAGRAM, INTERFACING WITH 8085<br>8255 programmable peripheral interface<br>8279 programmable key board interface<br>8259 programmable interrupt controllers<br>8257 DMA controller. | | | |
| **Method of Assessment** | | *External : End Semester Theory Exam - Pen paper test* | | | |
| **Learning Outcome 14** | | Demonstrate the interfacing of various peripherals with 8085. **(Cognitive)** | | 4 | 10 |
| **Contents** | | Interfacing of 8255, 8279, 8259 and 8257 with 8085 | | | |
| **Method of Assessment** | | *Internal: Mid Semester Exam-II, Pen paper test & Assignment* | | | |
| **Learning Outcome 15** | | Develop assembly language program to use peripherals with 8085.**(Psychomotor)** | | 4 | 10 |
| **Contents** | | Develop assembly language program to use peripherals with 8085. | | | |
| **Method of Assessment** | | *Internal: Laboratory observation and viva voce* | | | |

**Suggested List of Experiments*:**

| S.N. | Experiment | CO |
|------|-----------|-----|
| 1 | Identify the components of the microprocessor 8085 trainer. | CO403.1 |
| 2 | Study of Pin diagram and architecture of 8085. | CO403.1 |
| 3 | Study of Pin diagram and architecture of  8051. | CO403.2 |
| 4 | Develop/Execute a simple program to move data from one register to the other. | CO403.3 |
| 5 | Develop/Execute program immediate data between differentregisters | CO403.3 |
| 6 | Develop/Execute a programon arithmetic orperations. | CO403.3 |
| 7 | Develop/Execute an Assembly language program to convertHexadecimal to ASCII code conversion. | CO403.3 |
| 8 | Develop/Execute Assembly language program to check whether given no is odd or even | CO403.3 |
| 9 | Develop/Execute a program to add two numbers(binary, decimal and decimal) | CO403.3 |
| 10 | Develop/Execute a program to convert data from one code to another code(binary grey) | CO403.3 |
| 11 | Develop/Execute an Assembly language programs based on 8 bitLogical instructions. | CO403.3 |
| 12 | Develop/Execute an Assembly language program to sumintegers from 0 to 9. | CO403.3 |
| 13 | Develop a programto count negative values in given block ofdata. | CO403.3 |
| 14 | Develop/Execute a Subroutine to find the square of given integer. | CO403.3 |
| 15 | Develop/Execute an Assembly language program to sort givenarray of ten bytes in descending order. | CO403.3 |
| 16 | Write a program of 8051 in assembly language programming for addition of two 8 bit numbers. | CO403.4 |
| 17 | Write a program of 8051 in assembly language programming for subtraction of two 8 bit numbers | CO403.4 |
| 18 | Write a program of 8051 in assembly language programming for multiplication of two 8 bit numbers | CO403.4 |
| 19 | Write a program of 8051 in assembly language programming for division of two 8 bit numbers | CO403.4 |
| 20 | Write and execute on kit assembly program to interface 8255 programmable peripheralinterface. | CO403.5 |
| 21 | Write and execute on kit assembly program to interface 8279 programmable key board interface. | CO403.5 |
| 22 | Write and execute on kit assembly program to interface 8259 programmable interrupt controllers. | CO403.5 |
| 23 | Write and execute on kit assembly program to interface 8257DMA controller. | CO403.5 |

*Ten experiments in a semester as per the discretion of the subject teacher.

**Major Equipment/Materials:**

| | |
|------|------|
| 1. | Microcontroller 8051 trainer Kit |
| 2. | 8051 Simulator software (open source) |
| 3. | Computer System(p-IV and latestversion) |

| | |
|---|---|
| 4. | Peripheral Interfacing Trainerkits |
| 5. | 8085 Microprocessor TrainingKit |
| 6. | Interfacing Card for MicroprocessorKit |
| 7. | Microcontroller Development Board withProgrammer |
| 8. | Universal EmbeddedTrainer |
| 9. | Input InterfaceModule |
| 10 | Motor DriveModule |
| 11 | Embedded Training Kit |
| 12 | ADC/DAC Module |
| 13 | Computer InterfaceModule |
| 14 | Function Generator/ PulseGenerator |
| 15 | Cathode Ray Oscilloscope(C.R.O.) |
| 16 | DisplayModule |

## Reference Books/Web Portals:

| S.N. | Title | Author | Publication |
|---|---|---|---|
| 1 | THE 8051 MICROCONTROLLER AND EMBEDDED SYSTEMS Using Assembly and C | Muhammad Ali Mazidi,Janice GillispieMazidi and Rolin D McKinlay | Pearson Second edition. |
| 2 | Microcontrollers : Principles And Applications | Pal Ajit | EEE, PHI ,New Delhi,(Latest edition) |
| 3 | The 8051 Microcontrollers: Architecture, Programming and Applications | Rao Dr. K Uma | Pearson Education India, New Delhi,(Latest edition) |
| 4 | The 8051 microcontroller and embedded systems | Mazidi Ali, Muhammad Mazidi Gillispie Janice | PHI, New Delhi,(Latest edition) |
| 5 | The 8051 Microcontroller: Architecture, Programming, and Applications | Kenneth Ayala J. | Thomson Delmar learning,(latest Edition) |
| 6 | The 8051 Microcontroller, | Mackenzie | Education India, New Delhi,(Latest edition) |
| 7 | Programming and customizing the 8051 microcontroller | Predko Michael | McGraw-Hill, International edition |
| 8 | Micrprocessor architecture programming and applicationwith 8085/8080A | Ramesh S. Gaonkar | Wiley Eastern Ltd. |
| 9 | Introduction to Microprocessor | Aditya P. Mathur | McGraw-Hill Inc.,US |
| 10 | Microprocessor & Interfacing | Dougus V. Hall | Mcgraw Hill Education (India) Private Limited |
| 11 | Microprocessors & Fundamentals | B. Ram | Dhanpat Rai Publications |
| | nptel.ac.in | | |
| | swayam.gov.in | | |