Daffodil Polytechnic Institute

Daffodil Polytechnic Institute, Institute Code: 50238

Lesson Plan – Academic session: August/September 2023 – February 2024

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| Subject Teacher | : Md. Badeuzzamal Sarker( Instructor) |
| Subject Name | : Microcontroller & PLC |
| Subject Code | : 66868 |
| Technology | : Electrical |
| Semester | : 6th |
| Reference Book | : Microcontroller & PLC (Reference Book :Technical Publication |

| *Marks* | Grade Point | Letter Grade | *Marks* | Grade Point | Letter Grade |
|---|---|---|---|---|---|
| 80> | 4.00 | A+ | 55-59 | 2.75 | B- |
| 75-79 | 3.75 | A | 50-54 | 2.50 | C+ |
| 70-74 | 3.50 | A- | 45-49 | 2.25 | C |
| 65-69 | 3.25 | B+ | 40-44 | 2.00 | D |
| 60-64 | 3.00 | B | 0-39 | 0.00 | F |

| Mark Distribution (for 150 Marks) | | | |
|---|---|---|---|
| Theory Marks | | Practical Marks | |
| Midterm | 20 | PC | 25 |
| Class test | 05 | PF | 25 |
| Quiz test | 05 | - | - |
| Final | 120 | - | - |
| **Total** | **150** | Total | 50 |

## AIMS

To provide the students with opportunities to acquire knowledge, skills and attitude in the area of Microcontroller and PLC emphasizes on:The Fundamentals of microcontroller. The features of the 8051 microcontroller. • The architecture of 8051 microcontroller. • Develop C language program for the 8051 microcontroller. • Understand I/O port Programming. Understand the Timer and Counter of the 8051. Interfacing LCD and Real world devices. Relay logic control • Ladder diagram elements and programming.

## SHORT DESCRIPTION

Fundamentals of microcontroller, hardware of 8051, instruction set, Assembly language programming, C programming, Timer, Interrupt, DC motor interfacing, Stepper motor interfacing, interfacing LCD display, Relay logic control, Fundamentals of PLC, PLC ladder diagram programming, Inter relay, Jump and Call, Timer and Counter

| Lecture | Chapter | Topic | Outcomes | Supporting Equipment |
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| 01 | **Understand the Fundamentals of Micro controller.** | 1.1 Define Microcontroller.<br>1.2Mention the types of Micro controller.<br>1.3Compare CISC and RISC.<br>1.4Mention the field of Microcontroller applications. | 1.Understand about of Micro controller . | Micro controller chip https://www.youtube.com/watch?v=vh_aCAHThTQ |
| 02 | **Understand the Fundamentals of Micro controller.** | 1.5List the commercial Microcontrollers with salient features<br>1.6Mention the criteria for choosing a microcontroller | 1.Understand about of Micro controller . | Micro controller chip https://www.youtube.com/watch?v=vh_aCAHThTQ |

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| 03 | **Understand Features and Architecture of the Intel 8051 Microcontroller.** | 2.1 . Define 8051 family.<br>2.2.Mention the features of the Intel 8051 microcontroller and PIC.<br>2.3.Compare the features of different member of the 8051 family.<br>2.4.Describe the simplified Block diagram of the Intel 8051 microcontroller.<br>2.5.Explain the programming model of the 8051 microcontroller. | 1.Provide understanding Architecture of the Intel 8051 Microcontroller. | Micro controller chip<br><br>https://www.youtube.com/watch?v=O-UALuVyyLY |
| 04 | **Chapter 1 to 2 (up to Class)** | **1st Quiz Test** | | |
| 05<br><br>06 | **Understand Features and Architecture of the Intel 8051 Microcontroller.** | 2.6.Describe the memory organization of the 8051 microcontroller mentioning the function of<br>SFR, Register bank, bit addressable & general purpose RAM.<br>2.7.State the function of each flag of the PSW register.<br>2.8.Explain the pins and signals of the 8051 microcontroller.<br>2.9.Describe the Clock and Reset circuits of the 8051.<br>2.10.Compare Atmel 89C2051 and 89C4051 with 8051.equation. | 2.Architecture of the Intel 8051 Microcontroller. | https://www.youtube.com/watch?v=O-UALuVyyLY |
| Assignment-01 | Assignment on lecture 01,02,03,04,05 | | To build up their confidence level & increase creativity on chapter- 01 & 02 | Must be submitted within the next two lecture. |
| Lab Report-01 | | Test a program to take a value of X and get the value of X2 and see the output on port P2. | | Must be submitted within the next two Lab classes. |
| 07 | **Understand Programming 8051 using C programmi** | 3.1Mention the reasons for writing program in C.<br>3.2List C data types and opera | 3.To know about Programmin | https://www.youtube.com/watch?v=M0VljVAfMVE |

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| | **ng.** | tors for 8051<br>3.3Describe creating time dela y in C.<br>3.4Write program in C for sen ding data to port, Accessing co de RO Data serialization and In terrupt operation. | g | |
| 08 | **Chapter 1 to 3** | **1st Class Test** | | |
| 09 | **Understand the 8 051 Timer and Co unter** | 4.1<br>List the function of a timer.<br>4.2Discuss the mode of operat ion of a timer.<br>4.3Describe the function of ea ch bit of TMOD & TCON Regist er.<br>4.4Write code for setting time r in different mode.<br>4.5Explain the procedure of st arting, stopping and controllin g timer. | **1. Understand on 8051 Timer a nd Counter** | https://www.youtube. com/watch?v=0SZPr4i GACg |
| Lab Report-02 | | Develop and test a program for displaying 0 to 9 using 7-Segment display. | | Must be submitted within the next two Lab classes. |
| 10 | **Understand the 8 051 Timer and Co unter** | 4.6Calculate the initial value of timer for creating a certain de lay.<br>4.7Write subroutine for creati ng delay of certain amount of t ime using Timer.<br>4.8Develop program for gener ating square wave.<br>4.9Describe the Timer as an ev ent counter. | **8051 Timer a nd Counter** | https://www.youtube. com/watch?v=0SZPr4i GACg |
| 11 | Understand the I nterrupt of the 80 51 Microcontrolle r. | 5.1List the source of interrupt of the 8051.<br>5.2Define Interrupt service rou tine (ISR).<br>5.3Mention the interrupt prior ity and vector locations.<br>5.4Describe each bit of the int errupt enable (IE) register. | 8051 Microc ontroller. | **https://www.youtube .com/watch?v=EEaOR 2p9G2k** |

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| 12 | **Chapter 4 to 6** | **2nd Quiz Test** | | |
| 13 | Understand the I nterrupt of the 80 51 Microcontrolle r. | 5.5Describe the procedure of enabling and disabling interru pt.<br>5.6Mention the steps in execu ting an interrupt.<br>5.7Describe the register prote ction during interrupt.<br>5.8Describe External Hardware , Timer and Serial communicati on Interrupt.<br>5.9State the common problem with interrupt. | 7.Develop concept 8051 Microc ontroller. | 8051 Microcontroller. |
| 14 | **Chapter 4 to 6 (Up to class)** | **2nd Class Test** | | |
| Assignm ent-02 | Assignment on lecture 01,02,03,05,06 | | To build up their confidence level & increase creativity on chapter-01,02 & 03 | Must be submitted within the next two lecture. |
| Lab Report-03 | | Develop and test a program for Interfacing LCD. | | Must be submitted within the next two Lab classes. |
| **MIDTERM Examination** | | | | |
| 15 | **Understand LCD and Real world In terfacing.** | 6.1Describe the pin diagram of LCD.<br>6.2Describe the Instruction reg ister, data register and busy fla g.<br>6.3List the LCD command code s,<br>6.4Write Program for displayin g data to LCD6.5Describe the o | | **LCD Display** |

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| | | rganization of a matrix Keyboa rd. | | |
| Lab Report-04 | | Develop and test a program for automatic traffic light control using PLC. | | Must be submitted within the next two Lab classes. |
| 16 | | 6.6Explain the steps to detect and identify the key pressed.<br>6.7Describe interfacing ADC/D AC chips to the 8051.<br>6.8Develop program for Speed control a DC motor, a Stepper motor, display a word by DOT matrix display. | | |
| 17 | **Understand PLC a nd its Input outp ut (I/O) module.** | 7.1 Define PLC.<br>7.2Describe Historical backgro und of a PLC.<br>7.3Mention the difference bet ween PLC and computer. | 8.To know about PLC and its In put output (I /O) module. (Contu…) | https://www.youtube.com/watch?v=oAn__-vcvC4 |
| 18 | **Understand PLC a nd its Input outp ut (I/O) module.** | 7.4Explain the block diagram o f a PLC.<br>7.5Mention the configuration of a PLC.<br>7.6Define I/O module.<br>7.7Mention the functions of in put and output module. | 8.To know about PLC and its In put output (I /O) module. | |
| 19 | **Recognize Switch , Sensors and Rel ays.** | 8.1Define Switch, Sensors and Relay.<br>8.2Mention various types of S witches using symbol and narr ate it briefly.<br>8.3Classify the Sensors.<br>8.4Explain Photo sensor, Proxi mity sensor, RTD and thermoc ouple. | 9.To know about Sensors and Relays. | **Switch, Sensors and R elays.** |

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| **20** | **Chapter 06 to 8 (Up to Class)** | **3rd Quiz Test** | | |
| 21 | | 8.5 Define Relay.<br>8.6Describe the types of relay with symbol.<br>8.7Illustrate internal structure and pin configuration of Relay. | | |
| 22 | **Chapter 7 to 8** | **3nd Class Test** | | |
| 23 | **Understand the PLC Ladder Diagram Programming.** | 9.1List the PLC languages defined by International Electro-technical Commission (IEC).<br>9.2Define ladder diagram.<br>9.3Identify the standard IEC symbols used for input and output devices. | 10.To know about Diagram Programming . | https://www.youtube.com/watch?v=M-N7dI-i59I |
| 24 | **Understand the PLC Ladder Diagram Programming.** | 9.4Mention the notation used for I/O address.<br>9.5Draw the ladder diagram for Logic functions, latching and multiple outputs. | 10.To know about Diagram Programming . | https://www.youtube.com/watch?v=M-N7dI-i59I |
| 25 | Understand the Internal Relay (IR), Jump, Call and Comparator in PLC. | 10.1State the meaning of Internal relay.<br>10.2Describe the method of using internal relay.<br>10.3Mention the different ways of expressing internal relay addresses. | *11.To know about Comparator in PLC. .* | **PLC Bord** |
| **26** | **Chapter 09 to 10** | **4th Quiz Test** | | |
| 27 | **Understand the Timer and Counter in PLC.** | 11.1State the necessity of Timer and Counter in PLC.<br>11.2Describe the types of Timer with symbol.<br>11.3Explain the function of Timer in PLC. | 12.Develop knowledge Counter in PLC. | https://www.youtube.com/watch?v=vD7cdYz7gpg |
| 28 | **Chapter 9 to 11** | **4th Class Test** | | |

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| Assignment-03 | Assignment on lecture 01,02,03,05,06 | | To build up their confidence level & increase creativity on chapter-01,02 & 03 | Must be submitted within the next two lecture. |
| Lab Report-05 | | Develop and test a program for water level control using PLC. | | Must be submitted within the next two Lab classes. |
| **29** | **All Review Class** | **Chapter:1- 05 (**Regarding students problem) | | |
| **30** | **All Review Class** | **Chapter:05- 11 (**Regarding students problem) | | |
| **31** | **Model Test** | **All chapter** | | |

# *Final Examination*