

Practical Workbook  
**CS-301**  
**Microprocessor Based System Design**



Name : \_\_\_\_\_  
Year : \_\_\_\_\_  
Batch : \_\_\_\_\_  
Roll No : \_\_\_\_\_  
Department: \_\_\_\_\_

**Department of Computer & Information Systems Engineering**  
**NED University of Engineering & Technology**

**Practical Workbook**  
**CS-301**  
**Microprocessor Based System Design**



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**Department of Computer & Information Systems Engineering**  
**NED University of Engineering & Technology**

# INTRODUCTION

This workbook has been compiled to assist the conduct of practical classes for CS-301 Microprocessor Based System Design. Practical work relevant to this course aims at providing students a chance to interact with a microcontroller kit. These kits can be used with additional peripherals not provided on board and implementation of many microcontroller based system can be easily learned through a series of step-wise lab sessions. Microcontroller programs can be easily written using embedded C and compiled to a hex code which can be run by the controller and for that Atmel studio 7 is chosen. To download the hex code on flash embedded in microcontroller, Khazama Programmer software is used.

Additionally, practical work in this workbook also includes simulation based labs to learn basic interfacing of microcontrollers with different peripherals and the simulation software is Proteus.

Course Profile of CS-301 Microprocessor Based System Design lays down the following Course Learning Outcome:

**“Practice** interfacing microprocessor with other system components (P3, PLO-3)”

All lab sessions of this workbook have been designed to assist the achievement of the above CLO. A rubric to evaluate student performance has been provided at the end of the workbook.

Lab session 01 introduces the students to embedded C programming and Atmel Studio 7 IDE. Lab 02 allows the students to explore AVR Microcontroller architecture and AVR board features. Lab sessions 3 through 6 cover the use of basic AVR board peripherals like LED bank, switches and Seven Segment Displays through ATmega162 GPIO's and learning the basics of C operations on data received from GPIO's. Lab 06 assists in learning about timers and counters.

Lab session 7 and 8 helps in learning to interface LCD's and keypad. Lab session 9 is related to interfacing ADC's.

Lab sessions 10 and 11 covers interfacing microcontroller with different devices using serial communication. Lab sessions 12 and 13 are designed to help students learn interfacing microcontrollers using simulation software. A Complex Engineering Activity Based Project will also be assigned to the students (Lab session 14) which will be evaluated in the 16<sup>th</sup> week.

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