

Value Added course on

“Introduction to AVR microcontroller and programming in embedded C”

At GIDC Degree engineering college, Abrama, Navsari

Course Hours: 24 Hours

Duration: 27/6/17 to 7/7/17

The objective of this program is to give basic and depth knowledge of AVR Microcontroller with their programming so that student can design real time projects on Embedded Systems (Home Automation, Home Security, Industrial Automation, Telecom, Automobile, Defence etc.). To cover the course content total 24 hours are required which is adjusted during 27/6/17 to 7/7/17.

Course fee: 1000/- per student for **GDEC college** students and **2000/-** per student for other college students. Maximum 20 participants are allowed. Payment may be accepted by Cash or Check/ DD in favour of “GIDC Degree Engineering College”. **Last date of Registration is 22/06/2017.**

Eligibility

2nd/ 3rd year student of B.E./B.Tech. form Electrical, Electronics and Computer Science. Recommended for 3rd/final year engineering students.

Pre-requisites

Knowledge of Basics of Electronics, Digital Electronics, C language programming and any 8-bit Microcontroller 8051/PIC

Benefits

- Confidence build up with knowledge of range of Microcontrollers
- Good understanding of implementation of advanced C concepts
- Fare understanding of Embedded Software development
- Experience of BEST learning practice
- Acquire skills to do better Minor/Major Projects
- Can participate in various national/international competition and techfest

Features

- Understanding of AVR Microcontroller
- Knowledge of Advanced Embedded C programming
- Knowledge of interfacing different modules like Relays, Bluetooth, LCD, motors
- Experience of working with real time programmer/debugger
- Experience of different sensor module programming

Course coordinator: Prof Ketan K. Lad, Prof Dhaval Patel, Prof. Rohit Damor

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Registration Form

Registration fee: 1000/- per person for **GDEC college** students and **3000/-** per for other college students

For online registration visit : <https://goo.gl/forms/OIRixQHoqygWnrq2>

For Offline Registration, Please fill up below form and post to college address before last date of registration

Name :
Enrolment No.
Institute Name:
Department:
Mob:
Email:
Date:

Sign of Applicant

Signature with seal of Authority

Course content:

DAY -1 (6 Hours)

Section 1 : Introduction to AVR Microcontroller

Introduction to ATMEL ATmega32A

Basic Architecture of ATmega32A

- Pin Diagram
- Memory Organisation
- SFRs description

Introduction to General Microcontroller Terms

- Program Counter
- Accumulator (or Working Register)
- Reset
- Clock Cycle, Machine Cycle, Instruction Cycle
- Interrupts
- SFRs & GPRs
- Stack, Stack Pointer, Stack Operation

Brief Introduction to Internal Features

- General Purpose Input-Output PORTs
- Interrupt
- Timers
- Analog to Digital Convertors
- USART
- EEPROM

Section 3 : Detailed Description to Development Tools

AVR studio, Win AVR, Proteus - ISIS

Section 4 : Embedded C Programming of GPIO and Basic Internal Peripherals of Controller

Revision to C Programming Language

- Overview of C language
 - Data Types
 - Variables
- Control Statements
 - if statement
 - if-else statement
 - Nested if statement

- Nested if else statement
- Loops
 - for loop
 - while loop
 - do while loop
 - Loop in Loop (Nested Loop)
- Arrays
 - One dimensional array
 - Two dimensional array

Pointers & String

Embedded C Introduction

LED interfacing

- LED Introduction
- LED Interfacing with Microcontroller
- LED Patterns programming

Linear Switches

- Introduction to Switches
- Interfacing of Switches with Microcontroller
- Switches Programming

DAY-2 (6 hours)

Liquid Crystal Display(LCD)

- Introduction to LCD
- Types of LCD (Character & Graphical)
- Introduction to Character LCD & its Types
- Introduction to Pin Diagram of Character LCD
- Interfacing of Character LCD with Microcontroller
- Description of Character LCD Commands
- Practice of Character LCD Programs

Timers / Counters

- Understanding the Timer/Counter Concepts
- Introduction to Timer2 & Timer3 Concepts
- Introductions to Timer SFRs and their access
- Programming concept of Timers to Generate delays
- Practice of various delay programs

DAY-3 (6 Hours)

Section 6 : Programming of Advanced Internal Peripherals of Controller

Analog to Digital Converter(ADC)

- Introduction to ADC Process
- Need of ADC
- ADC Resolutions & Relation between Vin & Digital Output
- Programming Concept of ADC
- Practice of Different ADC Programs
- Digital Voltmeter and Ammeter concept
- Temperature measurement concept

Universal Asynchronous Receiver Transmitter(UART)

- Introduction to Serial & Parallel Communication
- Introduction to Synchronous & Asynchronous Communication
- Introduction to UART and its SFRs
- Programming concept of Serial Trasmmitter & Receiver using UART
- Practice of UART Programs

DAY-4 (6 Hours)

Section 8 : Interfacing of External Peripherals to controller

Relay

- Introduction to Relay
- Description of Working of Relay
- Interfacing of relay with Microcontroller
- Application of Relay
- Simulation of Relay Circuits

Motors

- Introduction to Motors
- Controlling of DC Motor and Speed Control of DC Motor Concept
- Simulation of Motor Programs