"Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe
Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR (Autonomous)

Department of Electronics

Certificate Course 2022-23

"Arduino based Embedded System Design"

Index

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

"Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe
Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE, KOLHAPUR (Autonomous)
Estd. June 1964
2130 E, Tarabai Park, Tal- Karveer, Dist. Kolhapur 416 003
UGC Recognition under 2 F & 12 (B) UGC Acts 1956
Affiliated to Shivaji University, Kolhapur (M.S.)
Ph.: 0231-2658612,2658840, Resi.: 0231-2653962 Fax: 0231-2658840
Website: www.vivekanandcollege.org E-mail: info@vivekanandcollege.org

Date: 30/09/2022

Department of Electronics

Certificate Course in

"Arduino based Embedded System Design"

Notice

All the students (Arts, Commerce, Science and professional courses) are hereby informed that, **Department of Electronics** is organizing three months certificate course in **"Arduino based Embedded System Design"** The students who are interested can enrol name on or before **Thursday, 6th Oct. 2022** to the course in the department of Electronics. There are only 40 seats for this course, so admissions will be done on first come first basis.

Couse Details:

Name of the Course: "Arduino based Embedded System Design"
Duration: 3 months, 30 Periods (Weekly 3 lectures)
Course Fee: Rs. 800/

Course Co-ordinator:

Dr. C. B. Patil (9922049750)
Mr. P. R. Bagade (9890063936)
Mr. N. P. Mote (9921990399)
Dr. M. S. Patil (9921991299)

(Dr. C. B. Patil)
Head
Department of Electronics
Vivekanand College, Kolhapur.

VIVEKANAND COLLEGE ESTD JUNE 1964 KOLHAPUR-416 003

(Dr. R. R. Kumbhar)
PRINCIPAL
Vivekanand College
Kolhapur

" Education for Knowledge, Science and Culture."
- Shikshanmaharshi Dr. Bapuji Salunkhe

SHRI SWAMI VIVEKANAND SHIKSHAN SANSTHA'S

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

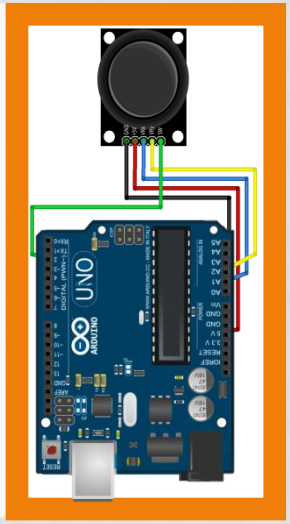
Department of Electronics

Organized

Career Oriented Course (COC)

on

"ARDUINO BASED EMBEDDED SYSTEM DESIGN"



Course Contents:

Embedded system, Arduino Platform, General Hardware Interfacing, Arduino Sensors Interfacing, Embedded System Design

Course Co-ordinators:

- Dr. C. B. Patil
- Mr. P. R. Bagade
- Mr. N. P. Mote
- Dr. M. S. Patil

Department of Electronics

Certificate course in Arduino based Embedded System Design

Objective:

An embedded system is combination of hardware and software. Embedded systems are used in different fields like home appliances, automobiles, industrial machines, vending machines, medical equipments etc. The Arduino is an Open source platform for building such embedded systems. In this course, we are going to study the Arduino platform includes hardware, software Integrated Development Environment (IDE), programming language Embedded C and different interfacing.

Duration of course: 30 hours

Syllabus:

1 Embedded system (2 hours)

- Introduction to Embedded system
- Microcontroller vs Microprocessor
- Applications of Embedded system

2 Arduino Platform (7 hours)

- Introduction to Arduino
- Arduino history and family
- Pin configuration and architecture AVR
- Introduction to Arduino Integrated Development Environment Software(IDE)
- Programming in Embedded C
- Data types, variables and constants
- Operators
- Control statements

3 General Hardware Interfacing (10 hours)

- LED interfacing
- Switch interfacing
- Relay interfacing

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

- LCD interfacing
- Buzzer interfacing
- Digital sensors interfacing
- Interfacing of DC Motor
- Interfacing of Stepper Motor

4 Arduino Sensors Interfacing (6 hours)

- Humidity sensor
- Temperature sensor
- moisture sensor
- Accelerometer sensor
- Proximity sensor
- IR sensor
- Ultrasonic sensor

5 Embedded System Design (5 hours)

- home automation
- Car Parking System
- Solar Street Light system
- Irrigation System

Software requirement:

Arduino Integrated Development Environment (IDE) software

Hardware requirement:

Arduino UNO with USB cable

Course Fee: Rs.800/-

"Education for Knowledge, Science and culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Department of Electronics

Career Oriented Course (COC) in

"Arduino based Embedded System Design-2022-23"

Registered Students List

Sr. No.	Roll No.	Name of Student	Class
1	8358	BHOPALE SAKSHI TUSHAR	B.Sc. III
2	8359	BIDRE PRAJAKTA SUNIL	B.Sc. III
3	8360	JADHAV SIDDHESH VISHNU	B.Sc. III
4	8361	KAMBLE KETAN ASHOK	B.Sc. III
5	8362	KHOT ANKITA BALASO	B.Sc. III
6	8363	KOIGADE SOURABH SANJAY	B.Sc. III
7	8364	KONDEKAR ASMITA TANAJI	B.Sc. III
8	8365	MAURYA MUSKAN KRUPASHANKAR	B.Sc. III
9	8366	PATIL ANIRUDHA VITTHAL	B.Sc. III
10	8367	PATIL NIKHIL SUNIL	B.Sc. III
11	8368	PATIL SANDEEP JAYSING	B.Sc. III
12	8369	POWAR ATUL DHONDIRAM	B.Sc. III
13	8370	ROPALKAR VRUSHALI UMESH	B.Sc. III
14	8371	SHINDE AKANKSHA SANTOSH	B.Sc. III
15	8372	SHIRKE PRERANA PRADEEP	B.Sc. III
16	8373	TODKAR SHIVANI DIPAK	B.Sc. III
17	8374	YADAV BHGYSHRI BHARAT	B.Sc. III
18	8509	SURYAVANSHI AJAY MOHAN	B.Sc. III
19	8521	KADWADE GANESH NARAYAN	B.Sc. III
20	8533	JADHAV PRADNYA PRASHANT	B.Sc. III

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

(Dr. C. B. Patil)

Head

Department of Electronics

Vivekanand College, Kolhapur.

Department of Electronics

Career Oriented Course (COC) in

"Arduino based Embedded System Design-2022-23"

Attendance sheet

Sr. No.	Roll No.	Name of the students	Date									
			10-10-22	11-10-22	12-10-22	17-10-22	18-10-22	19-10-22	10-11-22	11-11-22	12-11-22	14-11-22
1	8358	BHOPALE SAKSHI TUSHAR	Bhopale	Bhopale	Bhopale	AB	AB	Bhopale	Bhopale	Bhopale	Bhopale	AB
2	8359	BIDRE PRAJAKTA SUNIL	Bielke	Bielke	AB	Bielke	Bielke	Bielke	AB	Bielke	Bielke	Bielke
3	8360	JADHAV SIDDHESH VISHNU		AB			AB			AB		
4	8361	KAMBLE KETAN ASHOK										
5	8362	KHOT ANKITA BALASO	A·B·khot		A·B·khot	A·B·khot	A·B·khot	A·B·khot	A·B·khot	A·B·khot	A·B·khot	A·B·khot
6	8363	KOIGADE SOURABH SANJAY										
7	8364	KONDEKAR ASMITA TANAJI	AKondekar	AKondekar	AB	AKondekar	AKondekar	AKondekar	AKondekar	AKondekar	AKondekar	AKondekar
8	8365	MAURYA MUSKAN K.	MBKM	MBKM	MBKM	AB	MBKM	MBKM	MBKM	AB	MBKM	MBKM
9	8366	PATIL ANIRUDHA VITTHAL	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
10	8367	PATIL NIKHIL SUNIL					AB					
11	8368	PATIL SANDEEP JAYSING									AB	
12	8369	POWAR ATUL DHONDIRAM	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab
13	8370	ROPALKAR VRUSHALI UMESH	Vrpalkar	Vrpalkar	Vrpalkar	Vrpalkar		Vrpalkar	Vrpalkar	Vrpalkar	Vrpalkar	Vrpalkar
14	8371	SHINDE AKANKSHA SANTOSH										
15	8372	SHIRKE PRERANA PRADEEP	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke
16	8373	TODKAR SHIVANI DIPAK	Shivani	Shivani		Shivani	Shivani	Shivani	Shivani	Shivani	Shivani	AB
17	8374	YADAV BHGYSHRI BHARAT										
18	8509	SURYAVANSHI AJAY MOHAN										
19	8521	KADWADE GANESH NARAYAN						AB	AB		AB	
20	8533	JADHAV PRADNYA PRASHANT										

VIVEKANAND COLLEGE ESTD JUNE 1964 KOLHAPUR 416003

Department of Electronics

Career Oriented Course (COC) in

"Arduino based Embedded System Design-2022-23"

Attendance sheet

Sr. No.	Roll No.	Name of the students	Date									
			15-11-22	16-11-22	21-11-22	22-11-22	25-11-22	28-11-22	29-11-22	30-11-22	1-12-22	2-12-22
1	8358	BHOPALE SAKSHI TUSHAR	Bhopale	Bhopale	AB	Bhopale	Bhopale	Bhopale	Bhopale	Bhopale	AB	Bhopale
2	8359	BIDRE PRAJAKTA SUNIL	Bidre	Bidre	Bidre	Bidre	Ab	Bidre	Bidre	Bidre	Bidre	AB
3	8360	JADHAV SIDDHESH VISHNU	Jadhav	AB	Jadhav	Jadhav	Jadhav	Ab	Jadhav	Ab	Jadhav	Jadhav
4	8361	KAMBLE KETAN ASHOK	Kamble	Kamble	Kamble	Kamble	Kamble	Kamble	Kamble	Kamble	Kamble	Kamble
5	8362	KHOT ANKITA BALASO	A.B.khot	A.B.khot	A.B.khot	A.B.khot	A.B.khot	AB	A.B.khot	A.B.khot	A.B.khot	A.B.khot
6	8363	KOIGADE SOURABH SANJAY	Koigade	Koigade	Koigade	Koigade	Koigade	Ab	Koigade	Koigade	Koigade	Koigade
7	8364	KONDEKAR ASMITA TANAJI	Akondekar	Akondekar	Akondekar	Akondekar	AB	Akondekar	Akondekar	Akondekar	Akondekar	Akondekar
8	8365	MAURYA MUSKAN K.	MKaurya	MKaurya	MKaurya	MKaurya	MKaurya	MKaurya	MKaurya	MKaurya	MKaurya	MKaurya
9	8366	PATIL ANIRUDHA VITTHAL	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab
10	8367	PATIL NIKHIL SUNIL	Patil	Patil	Patil	Patil	Patil	AB	Patil	Patil	Patil	Patil
11	8368	PATIL SANDEEP JAYSING	Patil	Patil	Patil	ANAND COLLEGE ESTD 2006	Patil	Patil	Ab	Patil	Patil	Patil
12	8369	POWAR ATUL DHONDIRAM	Ab	Ab	Ab	Ab	Ab	Ab	Ab	AB	AB	Ab
13	8370	ROPALKAR VRUSHALI UMESH	Vpalkar	Vpalkar	Vpalkar	Vpalkar	Vpalkar	Vpalkar	Vpalkar	Vpalkar	Vpalkar	Vpalkar
14	8371	SHINDE AKANKSHA SANTOSH	Ashinde	Ashinde	Ashinde	Ashinde	Ashinde	Ashinde	Ashinde	Ashinde	Ashinde	Ashinde
15	8372	SHIRKE PRERANA PRADEEP	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke	Pshirke
16	8373	TODKAR SHIVANI DIPAK	Shivani	Shivani	Ab	Shivani	Shivani	Shivani	Ab	Shivani	Shivani	Shivani
17	8374	YADAV BHGYSHRI BHARAT	Bhyadav	Bhyadav	Bhyadav	Bhyadav	Bhyadav	Bhyadav	Bhyadav	Bhyadav	Bhyadav	Bhyadav
18	8509	SURYAVANSHI AJAY MOHAN	Ajay	Ajay	AB	Ajay	Ajay	Ab	Ajay	Ajay	Ajay	Ajay
19	8521	KADWADE GANESH NARAYAN	Gokul	Gokul	Gokul	Gokul	Gokul	Ab	Gokul	Ab	Ab	Gokul
20	8533	JADHAV PRADNYA PRASHANT	Padhav	Padhav	Padhav	Padhav	Padhav	Padhav	Padhav	Padhav	Padhav	Padhav

Department of Electronics

Career Oriented Course (COC) in

"Arduino based Embedded System Design-2022-23"

Attendance sheet

Sr. No.	Roll No.	Name of the students	Date									
			3-12-22	5-1-23	6-1-23	7-1-23	12-1-23	13-1-23	14-1-23	19-1-23	20-1-23	21-1-23
1	8358	BHOPALE SAKSHI TUSHAR						Ab	Ab		Ab	
2	8359	BIDRE PRAJAKTA SUNIL										
3	8360	JADHAV SIDDHESH VISHNU					Ab		Ab			
4	8361	KAMBLE KETAN ASHOK										
5	8362	KHOT ANKITA BALASO			Ab							
6	8363	KOIGADE SOURABH SANJAY										
7	8364	KONDEKAR ASMITA TANAJI		Ab							Ab	
8	8365	MAURYA MUSKAN K.			Ab	Ab						
9	8366	PATIL ANIRUDHA VITTHAL	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab
10	8367	PATIL NIKHIL SUNIL					Ab					
11	8368	PATIL SANDEEP JAYSING										
12	8369	POWAR ATUL DHONDIRAM	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab
13	8370	ROPALKAR VRUSHALI UMESH							Ab			
14	8371	SHINDE AKANKSHA SANTOSH		Ab							Ab	
15	8372	SHIRKE PRERANA PRADEEP			Ab				Ab			
16	8373	TODKAR SHIVANI DIPAK			Ab	Ab		Ab				
17	8374	YADAV BHGYSHRI BHARAT				Ab						
18	8509	SURYAVANSHI AJAY MOHAN					Ab	Ab				
19	8521	KADWADE GANESH NARAYAN	Ab			Ab				Ab		Ab
20	8533	JADHAV PRADNYA PRASHANT			Ab				Ab			

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC)
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50

Name of Student: Sakshi T. Bhopale **Roll No.** 8358

Marks obtained: 42/50

Q. 1. Select correct alternative (each two marks) **[50]**

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display

c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment

c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, _____ is selected.

a.Command b.Data c.both command & data d.none of these

VIVEKANAND COLLEGE ESTD JUNE 1964

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a.10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC):
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50 (48)

Name of Student: Prajakta Sunil Bidre **Roll No.** 3359

Marks obtained: 48/50

Q. 1. Select correct alternative (each two marks) **[50]**

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display
c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment
c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, _____ is selected.

a.Command b.Data c.both command & data d.none of these

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a.10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC):
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50 32

Name of Student: Siddesh Vishnu Jadhav **Roll No.** 8360

Marks obtained: 32/50

Q. 1. Select correct alternative (each two marks) **[50]**

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display

c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment

c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, ____ is selected.

a.Command b.Data c.both command & data d.none of these

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a.10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC):
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50 48

Name of Student: **Roll No.** 8361

Marks obtained: 48/50

Ketan Ashok Kamble

Q. 1. Select correct alternative (each two marks) **[50]**

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display

c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment

c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, _____ is selected.

a.Command b.Data c.both command & data d.none of these

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a.10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

48/50

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC):
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50

Name of Student: Ankita Balaso Khot Roll No. 8362

Marks obtained: 48/50

[50]

Q. 1. Select correct alternative (each two marks)

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display

c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment

c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, _____ is selected.

a.Command b.Data c.both command & data d.none of these

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a.10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC):
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50

Name of Student: Sourabh Tagshing Koigade Roll No. 8363

Marks obtained: 24/50

Q. 1. Select correct alternative (each two marks) [50]

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display

c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment

c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, _____ is selected.

a.Command b.Data c.both command & data d.none of these

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a.10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC):
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50

Name of Student: Asmita Tanaji Kondekar **Roll No.** 8364

Marks obtained: 38/50

Q. 1. Select correct alternative (each two marks) **[50]**

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display

c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment

c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, _____ is selected.

a.Command b.Data c.both command & data d.none of these

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR (M.S.) 416 003

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a.10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC):
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50

Name of Student: Muskan Kejpashankar Maurya **Roll No.** 8365

Marks obtained: 48/50

Q. 1. Select correct alternative (each two marks) **[50]**

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display

c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment

c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, _____ is selected.

a.Command b.Data c.both command & data d.none of these

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a. 10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC):
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50

Name of Student: Nikhil Sunil Patil Roll No. 8367

Marks obtained: 48/50

Q. 1. Select correct alternative (each two marks) **[50]**

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display

c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment

c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, _____ is selected.

a.Command b.Data c.both command & data d.none of these

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a.10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part-III (Electronics) Examination: 2022-23

Career Oriented Course (COC):
Arduino based Embedded System Design

Date: 31-01-2023 Time: 1 hour Marks : 50

Name of Student: Roll No. 8368

Sandeep J. Patil Marks obtained: 50/50

Q. 1. Select correct alternative (each two marks) [50]

1.LCD stands for _____.

a.Light crystal display b.Liquid crystal display

c.Light ceramic display d.none of these

2.In Arduino _____ core microcontroller is used.

a.AVR b.PIC c.ARM d.8051

3.Which microcontroller is used in Arduino UNO?

a.ATmega328p b.ATmega2560 c.ATmega32114 d.ATmega16

4.In Arduino UNO, the Tx and Rx pins stands ____ port.

a.USB b.SPI c.I2C d.UART

5.What is the Arduino UNO?

a.Software b.Hardware c.device d.Network Protocol

6.What does IDE stand for?

a.In Deep Environment b.Integrated Development Environment

c.Internal Deep Escape d.all of these

7.How many PWM pins are availables on arduino uno board?

a.6 b.5 c.4 d.8

8.A program written with the IDE for Arduino is called _____.

a.IDE source b.Sketch c.Cryptography d.Source code

9.How much bit resolution of ADC channel in Arduino UNO?

a.7 b.8 c.9 d.10

10.In LCD interfacing, when RS=1, _____ is selected.

a.Command b.Data c.both command & data d.none of these

11.LCD is having____ control lines

a.3 b.4 c.5 d.6

12.To fade the intesity of LED , _____ function is used.

a.analogWrite() b.digitalWrite() c.delay() d.pinMode()

13.In Arduino UNO board _____ is analog channel pins.

a.3 b.4 c.5 d.6

14.how many digital I/O pins are available on Arduino uno board?

a.10 b.12 c.13 d.5

15.LCD 16 x 2 means _____.

a.16 columns, 2 rows b.2 columns, 16 rows

c.16 columns, 16 rows d.2 columns, 2 rows

16.Data range for unsigned int is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

17.It starts with a /* and continues until a */ What does this do?

a.Loads a sketch b.Makes comments

c.Compiles quicker d.Makes stars appear

18.LDR stands _____.

a.Light Driven Receiver b.Light Driven Receptor

c.Light Dependent Resistor d.None of these

19.MQ-135 is _____ sensor.

a.smoke b.light c.humidity d.temperature

20._____ is accelerometer sensor.

a.ADXL335 b.MQ2 c.LM35 d.MQ3

21.HC-SR04 is _____ sensor.

a.smoke b.light c.Ultrasonic-distance d.LPG

22.DHT11 is _____ sensor.

a.smoke b.light c.LPG d.temperature & humidity

23.MQ3 is a _____ sensor

a.pressure b.LPG c.smoke d.alcohole

24.LM35 is _____ type of sensor.

a.smoke b.light c.LPG d.temperature

25.Data range for signed char is _____.

a.0 to 255 b.-127 to 127 c.0 to 65535 d.none of these

Department of Electronics
Career Oriented Course (COC) in
"Arduino based Embedded System Design-2022-23"
Theory Examination Marks Entry

Date of Exam 31/01/2023

Sr. No.	Roll No.	Name of the students	Theory	Practical	Total
1	8358	BHOPALE SAKSHI TUSHAR	42	47	89
2	8359	BIDRE PRAJAKTA SUNIL	48	45	93
3	8360	JADHAV SIDDHESH VISHNU	32	45	77
4	8361	KAMBLE KETAN ASHOK	48	42	90
5	8362	KHOT ANKITA BALASO	48	44	92
6	8363	KOIGADE SOURABH SANJAY	24	46	70
7	8364	KONDEKAR ASMITA TANAJI	38	46	84
8	8365	MAURYA MUSKAN K.	48	44	92
9	8366	PATIL ANIRUDHA VITTHAL	Absent	Absent	Absent
10	8367	PATIL NIKHIL SUNIL	48	42	90
11	8368	PATIL SANDEEP JAYSING	50	48	98
12	8369	POWAR ATUL DHONDIRAM	Absent	Absent	Absent
13	8370	ROPALKAR VRUSHALI UMESH	38	46	84
14	8371	SHINDE AKANKSHA SANTOSH	48	40	88
15	8372	SHIRKE PRERANA PRADEEP	48	47	95
16	8373	TODKAR SHIVANI DIPAK	48	45	93
17	8374	YADAV BHGYSHRI BHARAT	48	47	95
18	8509	SURYAVANSHI AJAY MOHAN	50	46	96
19	8521	KADWADE GANESH NARAYAN	48	45	93
20	8533	JADHAV PRADNYA PRASHANT	48	40	88

Examiner 1

Examiner 2

VIVEKANAND COLLEGE ESTD JUNE 1954 KOLHAPUR-416003

"Education for Knowledge, Science and Culture"

-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

NAAC Accredited 'A' Grade with CGPA 3.24, College with potential for Excellence by UGC
Star College by DBT, Govt. of India, ISO 9001 : 2015

Certificate

This is to certify that **MR./MISS.** _____

of B.Sc. Part - III has successfully completed the Certificate Course in ***"Arduino Based Embedded Systems Design"*** *under Career Oriented Course (COC) during the academic year 2022- 2023. The said certificate has been issued to him / her after qualifying the course examination in Theory and Practical at the Department of Electronics , Vivekanand College, Kolhapur (Autonomous)*

The testimonials , where of are at the seal of the college and the signatures of the Co-ordinator and the Principal of the said college.

Co-ordinator
Dr. C. B. Patil

Principal
Dr. R. R. Kumbhar