



Department of Computer Science & Information Technology

CIRCULAR

Ref. No.: AJU/CS&IT/036/2024-25

Date: 06.09.2024

This is hereby to inform all the students that Department of Computer Science & IT is going to organize a Value Added Course on "Embedded Systems with IOT" from 12th September 2024 to 28th September 2024. Interested students can register themselves through the link [<https://shorturl.at/uAKMV>].

Arvind Pandey

Dr. Arvind Kumar Pandey
Dean
School of Engineering & IT
ARKA JAIN University, Jharkhand

Dean
School of Engineering & IT
ARKA JAIN University, Jharkhand

**Detailed Report on Value Added Course on Embedded Systems with IOT
from 12-09-2024 to 28-09-2024**

Date of Event	12-09-2024 to 28-09-2024
Name of the Event	Value Added Course on Embedded Systems with IOT
Type of the Event	Skill Development
Conducted by	Mr. Utkarsh, Dr. Arvind Kumar Pandey
No. of Participants	51

The Value-Added Course on Embedded Systems with IOT organized from 12-09-2024 to 28-09-2024, in the Department of Computer Science and IT, ARKA Jain University, Jharkhand. The Program was Coordinated by Mr. Utkarsh and convened by Dr. Arvind Kumar Pandey, Dean, School of Engineering and IT.

In this course students will be able to:

- Learn about the architecture and working of microcontrollers, microprocessors, and other embedded hardware.
- Understand the role of embedded systems in real-time applications.
- Gain skills in programming microcontrollers like Arduino.
- Write programs to interface sensors, actuators, and peripherals using different communication protocols (I2C, SPI, UART, etc.).
- Get introduced to the concepts of IoT, including its architecture and key technologies.
- Learn how to connect devices and communicate with them over the internet.
- Learn how to interface various sensors (temperature, humidity, proximity, etc.) and actuators (motors, relays) with embedded systems.
- Collect data from sensors and control devices remotely using IoT.
- Design and implement projects that demonstrate IoT use cases, such as smart home automation, environmental monitoring, and industrial automation.
- Learn about security risks in IoT systems, including data privacy, authentication, and encryption techniques.

The value-added course, was initiated by Mr. Utkarsh on 12-09-2024 in computer Lab of the Dept. of CS & IT Lab at 01:00 PM. All the students had joined the course and learned about the Embedded Systems. Every day they had given some assignment

works to do the more practices. The content of the course was completely practical based. In the last day of the program students had appeared in the test and qualified the above-mentioned value-added course with the minimum criteria.

POSTER OF THE EVENT

The poster features a dark blue background with a yellow banner for the course title. At the top, it lists various accreditation logos including JGI, ARKA JAIN University, NAAC Grade A, Outlook ICARE Ranking 2023, Ranked 3rd in Top-10 Emerging Private Universities in India, ISO, and others. The course is organized by the School of Engineering & IT, Department of Computer Science & IT. The dates are 12th to 28th September 2024, and the time is 01:00 PM to 03:00 PM. The convenor is Dr. Arvind Kumar Pandey, Dean of the School of Engineering & IT, and the coordinator is Mr. Utkarsh. A registration link is provided as <https://shorturl.at/uAKMV>, accompanied by a QR code. Contact information includes the phone number 1800-1200-200 and social media handles for Facebook and Instagram, both named 'arkajainuniversity'. A circular graphic on the right side of the poster depicts an industrial facility with overlaid IoT and data icons.

JGI **ARKA JAIN** **NAAC** **Outlook** **RANKED 3rd** **ISO**
University GRADE **A** ICARE RANKING 2023 IN "TOP-10 EMERGING PRIVATE UNIVERSITIES IN INDIA" CATEGORY ACCREDITED UNIVERSITY

SCHOOL OF ENGINEERING & IT
DEPARTMENT OF COMPUTER SCIENCE & IT
Organizes

VALUE ADDED COURSE ON
EMBEDDED SYSTEMS WITH IOT

12TH SEPTEMBER TO 28TH SEPTEMBER 2024

TIME 01:00 PM TO 03:00PM

CONVENOR:
DR. ARVIND KUMAR PANDEY
DEAN
SCHOOL OF ENGINEERING & IT

COORDINATOR:
MR. UTKARSH

Link for Registration:
<https://shorturl.at/uAKMV>

1800-1200-200 arkajainuniversity arkajainuniversity

Figure 1: Poster of Value-added course on embedded systems with IOT

BROCHURE OF THE EVENT

Sessions	Topics
4	Unit 2: Arduino Programming Date: 16.09.2024 Time: 1:00 to 3:00 PM
5	Interfacing with sensors and actuators • Serial Monitor – send and receive data. • Glowing led on Arduino Uno. • Blinking a led • Glowing 4 led's in pattern • Interface a buzzer Date: 18.09.2024 Time: 1:00 to 3:00 PM
6	Interfacing with sensors and actuators • Interface a button with a led • Interface a 7-segment display • Interface Ultrasonic sensor with a led and a buzzer • Interface IR sensor with a led Date: 19.09.2024 Time: 1:00 to 3:00 PM
7	Unit 3: Interfacing with sensors and actuators • Interface 16*2 LCD • Interface Servo motor. • Interface Servo motor with potentiometer. • Interface Keypad module (4*4). Date: 20.09.2024 Time: 1:00 to 3:00 PM
8	Project Automatic hand wash dispenser Date: 21.09.2024 Time: 1:00 to 3:00 PM
9	Interfacing with sensors and actuators • Interface a RGB led • Interface light dependent resistor or Photoresistor with a led. • Interface DHT 11 temperature Sensor. • Interface RFID module. Date: 23.09.2024 Time: 1:00 to 3:00 PM
10	Unit 4: Interfacing with sensors and actuators • Interface Bluetooth HC-05 module. • L298N Motor Driver • L293D Motor Shield • DC Motor • Interface Flame Sensor Date: 24.09.2024 Time: 1:00 to 3:00 PM
11	Introduction to IoT Date: 25.09.2024 Time: 1:00 to 3:00 PM
12	Communication in IoT Date: 26.09.2024 Time: 1:00 to 3:00 PM

Sessions	Topics
13	Unit 5: Final Project – I • Voice Control Car Date: 27.09.2024 Time: 1:00 to 3:00 PM
14	Final Project – II • Home automation. Date: 28.09.2024 Time: 1:00 to 3:00 PM

Registration Link:
<https://shorturl.at/uAKMV>

VISION OF THE UNIVERSITY

To be among the best of the institutions for engineers and technologists with attitudes, skills and knowledge and to become an epicentre of creative solutions.

MISSION OF THE UNIVERSITY

To achieve and impart quality education with an emphasis on practical skills and social relevance.

Co-Ordinator : Mr. Utkarsh
Convener : Dr. Arvind Kumar Pandey

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ARKA JAIN
University
 Jharkhand

IOT

Internet of Things

Value Added Course On

“EMBEDDED SYSTEMS WITH IOT”

Department of Computer Science & IT
 School of Engineering & IT
ARKA JAIN University,
Jharkhand

Figure 2: Brochure of Value-added course on embedded systems with IOT

ABOUT JGI

JGI Group is an education provider and an entrepreneurship incubator in India. The Group successfully operates 85 educational institutions with 51,600 students and 6,450 employees engaged at the K-12, undergraduate and postgraduate levels spread across 64 campuses pan India. A leader in the education sector and a pioneer in the venture sector, JGI Group are constantly in search of new opportunities to expand its horizon.

ABOUT ARKA JAIN UNIVERSITY

An academic institute ought to set its vision of high noted academic, intellectual and entrepreneurial development. ARKA JAIN University (AJU), Jamshedpur is committed to human development at all levels through education and entrepreneurship. It provides quality education thereby creating human assets for the nation and the globe as well. AJU is a premier private university of Jharkhand with a venerable legacy of the JGI group sprinting ahead for national acclamation for noted academic standards, diverse educational programs, distinguished faculties, varied co-curricular activities and state-of-the-art infrastructures. The University is on the way to sustain the acclaimed standards and best practices in higher education. It is committed to nation building and unflinching adherence to universal university human values. The sprawling university spreads across 25 acres of lush green land leaving no stone unturned in providing state-of-the-art facilities in various sectors including education, sports, entrepreneurship, research, and other academic ventures. The campus of the University is situated at Mohanpur, Gamharra, Dist: Seraikela – Kharsawan, 13 km from the steel city, Jamshedpur. Popularly known as Tatanagar, named after the visionary industrialist Shri J.N.Tata, founder of TATA Groups. The magnificence of the university lies in the enhancement of various courses with leaps and bounds. ARKA JAIN University aids each.

ABOUT ENGINEERING & IT

AJU School of Engineering & Information Technology is established with an aim to provide quality education and entrepreneurship development. ARKA JAIN University is an intellectual destination that draws inspired students from diverse backgrounds. Bachelor of Computer Applications is a 3-year undergraduate programme. It is extended over six semesters. The primary objective of our BCA program is to provide a foundation of computing principles and business practices for effectively using/managing information systems and enterprise software. This program aids the students to get a sound understanding of Computer Applications which can give them a perfect start for a challenging career in the field of Information Technology. This program prepares students with the necessary skills to build successful careers in the information sector. The curriculum is truly tuned for the holistic development of the students and aims at nurturing them as proficient programmers and computer professionals. MCA program caters to the foundation of computing principles and business practices and to train the students to analyse problems in a wide range of applications. This program provides exposure to the students to enterprise software management methodologies. The teaching-learning include innovative pedagogies like case assignment, live projects, lab assignments, exploration of different software tools and presentation with viva voce. The MCA programme emphasizes on the depth of the knowledge of the recent trends and technologies in demand. The MCA program helps students in development of entrepreneurial abilities, personality development, and soft skill development throughout the course.



ABOUT VALUE ADDED COURSE

- Tentative Timelines:
 1. Registration Opens : 06.09.2024
 2. Registration Closes : 11.09.2024
 3. Announcement of Selected Students : 12.09.2024
 4. Commencement of Classes : 12.09.2024
- The students are advised to read the guidelines, annexures as well as the embedded instructions in the registration forms very carefully before proceeding.
- List of students will be finalized on first come first serve basis.
- The names of the selected students will be put up in separate notice. A mail will also be sent to only selected students.
- On the commencement of the course, it is mandatory for the students to attend all the classes pertaining to the course.
- The total duration of the course shall be 30 hours. The classes will be held on second half.
- Registered students must be with their computer/laptop/tab having internet facility.
- Certificate will be issued only those students who will be regular in class and qualified the test.

**COURSE OUTLINE:
EMBEDDED SYSTEMS WITH IOT**

Sessions	Topics
1	Unit 1: Introduction to Embedded Systems Date: 12.09.2024 Time: 1:00 to 3:00 PM
2	Embedded Systems Programming Date: 13.09.2024 Time: 1:00 to 3:00 PM
3	Microcontroller Architecture Date: 14.09.2024 Time: 1:00 to 3:00 PM

Figure 3: Brochure of Value-added course on embedded systems with IOT

TOPIC OF VALUE-ADDED COURSE DATE AND DURATION:

Sessions	Topics	Date	Duration
	UNIT: 1		
1.	<i>Introduction to Embedded Systems</i> <ul style="list-style-type: none"> • Definition and characteristics of embedded systems. • Importance and applications of embedded systems. • Basic architecture of embedded systems. 	12-09-2024	2 hrs.
2.	<i>Embedded Systems Programming</i> <ul style="list-style-type: none"> • Introduction to programming languages for embedded systems. • Basics of writing and compiling embedded code. • Debugging techniques in embedded systems. • Introduction to Integrated Development Environments (IDEs). 	13-09-2024	2 hrs.
3.	<i>Microcontroller Architecture</i> <ul style="list-style-type: none"> • Overview of common microcontrollers (Arduino Uno, NodeMcu, etc.) • Arduino Architecture. 	14-09-2024	2 hrs.
	UNIT: 2		
4.	<i>Arduino Programming</i>	16-09-2024	2 hrs.

	<ul style="list-style-type: none"> • About structure and programming of Arduino Uno board. • Installation of Arduino IDE. • Basics of Writing and uploading code. • Installation of Libraries. 		
5.	<i>Interfacing with sensors and actuators</i> <ul style="list-style-type: none"> • Serial Monitor – send and receive data. • Glowing led on Arduino Uno. • Blinking a led • Glowing 4 led's in pattern • Interface a buzzer 	18-09-2024	2hrs.
6.	<i>Interfacing with sensors and actuators</i> <ul style="list-style-type: none"> • Interface a button with a led • Interface a 7-segment display • Interface Ultrasonic sensor with a led and a buzzer • Interface IR sensor with a led 	19-09-2024	2hrs.
	UNIT: 3		
7.	<i>Interfacing with sensors and actuators</i> <ul style="list-style-type: none"> • Interface 16*2 LCD 	20-09-2024	2hrs.

	<ul style="list-style-type: none"> • Interface Servo motor. • Interface Servo motor with potentiometer. • Interface Keypad module (4*4). 		
8.	Project <ul style="list-style-type: none"> • Automatic hand wash dispenser 	21-09-2024	2hrs.
9.	Interfacing with sensors and actuators <ul style="list-style-type: none"> • Interface a RGB led • Interface light dependent resistor or Photoresistor with a led. • Interface DHT 11 temperature Sensor. • Interface RFID module. 	23-09-2024	2hrs.
UNIT: 4			
10.	Interfacing with sensors and actuators <ul style="list-style-type: none"> • Interface Bluetooth HC-05 module. • L298N Motor Driver • L293D Motor Shield • DC Motor • Interface Flame Sensor 	24-09-2024	2hrs.
11.	Introduction to IoT <ul style="list-style-type: none"> • Definition and significance of IoT • Components of IoT systems 	25-09-2024	2hrs.

	<ul style="list-style-type: none"> IoT applications and use cases IoT communication protocols (MQTT, CoAP, HTTP) 		
12.	<i>Communication in IoT</i> <ul style="list-style-type: none"> Wireless communication protocols (Wi-Fi, Bluetooth, Zigbee) IoT network architectures (star, mesh, client-server) IoT security considerations 	26-09-2024	2hrs.
	UNIT: 5		
13.	<i>Final Project - I</i> <ul style="list-style-type: none"> Voice Control Car 	27-09-2024	3hrs.
14.	<i>Final Project - II</i> <ul style="list-style-type: none"> Home automation. 	28-09-2024	3hrs.
15.	<i>Assessment and Feedback</i>		

PHOTOS OF THE EVENT



Figure 4: Photo of Value-added course on Embedded systems with IOT



Figure 5: Photo of Value-added course on Embedded systems with IOT



Figure 6: Photo of Value-added course on Embedded systems with IOT

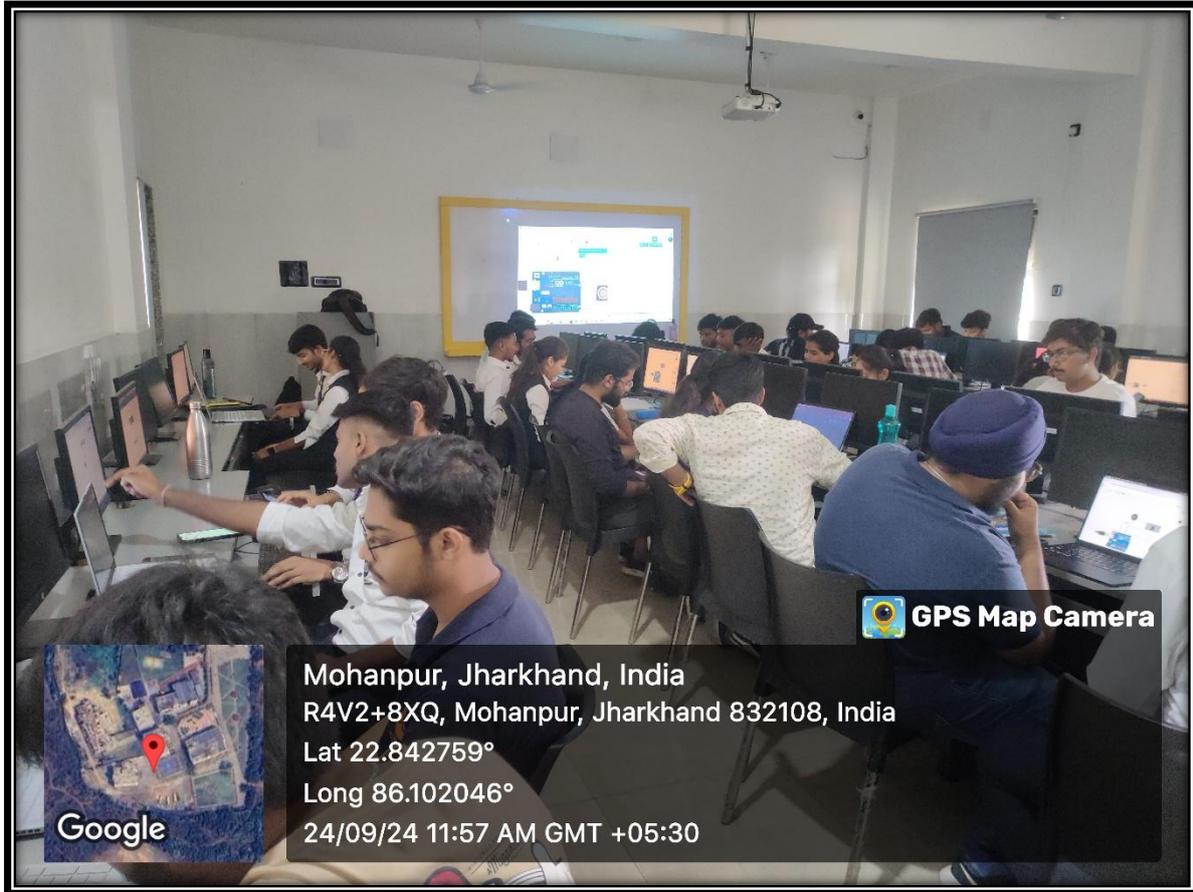


Figure 7: Photo of Value-added course on Embedded systems with IOT

LIST OF STUDENTS

Serial No	Name of the Candidate	Email ID	Affiliated Institute/ College/ University
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CERTIFICATES OF ACHIEVEMENT





