Summer Immersion Programme 2023

Internet of Things

It's the Beginning of Machines Taking Over the World

What's Inside


THE NORTH

THE NORTHCAP UNIVERSITY

About NCU

The NorthCap University (NCU) is a progressive multidisciplinary university located in the city-centre of Gurugram, Haryana. The university's rich heritage of 25+ years, 11,000+ alumni and robust academic infrastructure enables deep linkages with government, industry and research bodies. The university operates four schools in its state-of-the-art urban campus and hosts a diverse student body of engineering & technology, management, liberal arts, law, and applied sciences aspirants.

NCU is a National Assessment and Accreditation Council (NAAC) Grade A accredited university that serves as a research as well as talent catalyst between students and industry. Guided by eminent academicians and industry leaders, it follows an immersive pedagogy to deliver undergraduate, postgraduate as well as doctoral programmes. The university is a comprehensive partner of Arizona State University (#1 University in the U.S. for innovation, outreach and stewardship) and benefits from a strategic collaboration which focuses on innovation, internationalisation and digitisation. NCU students enjoy accelerated master's programmes in the US given this partnership.

NCU is recognised by the University Grants Commission (UGC) and the Bar Council of India (BCI). It is a Member of the Association of Indian Universities (AIU), Member of the Association of Commonwealth Universities (ACU) UK, a Member of the American Society for Quality and is accredited by Accreditation Services for International Colleges (ASIC), UK. With a 5-Star QS Ranking for Teaching, Employability & Online Learning, NCU ranks among the Top 30 Best Performing Universities as per ARIIA rankings. Students from NCU work with reputed global as well as Indian organisations in engineering, technology and management fields.

25+ YEARS OF EXCELLENCE

Programme Overview

"If you think that the internet has changed your life, think again. The Internet of Things is about to change it all over again!" as said Mr. Brendan O'Brien, Chief Architect & Co-Founder of Aria Systems, clearly sums up the story about the future and rightly explains why all this hype around the Internet of Things. The IoT is when everyday products such as refrigerators, watches, speakers and more connect to the internet and to one another.

IoT isn't a thing at all. It has become Internet of Everything. It's the focal point for innovation across each and every domain.

The future, which will be dominated by IoT, requires a paradigm shift in the design of products and services. When everything is interconnected, it is even more critical that all stakeholders have a strategic roadmap for creating user-centered, future ready, differentiated products that drive business growth. Enterprises, governments, and utilities are scaling their IoT mindsets to improve their operations, security, productivity, and profitability. The potential benefits to society and the global economy cannot be overstated.

This non-credit programme is designed for undergraduate & postgraguate students at Cintana partnered institutions & other international universities/institutions who are interested in experiencing student life at The NorthCap University, Gurugram, India. During the two-week programme, participants will have an opportunity to stay in India, attend experiential and collaborative learning themed around Internet of Things for the 21st century, and master the essential skill of Internet of Things. There are no prerequisites for this programme.

The participants would be able to learn all of the components of IoT. They will explore hardware, software and data technologies that support IoT adoption, security concerns related to IoT. In addition, they would get the opportunity to participate in many campus and community cultural tours and activities. The participants would be divided into small groups to work on a project incorporating their innovative thinking and learned skills. On the closing day of the programme, these groups will present their project at an adjudicated competition. The competition will reinforce the experiential and project-based learning for the students.

*The NorthCap University reserves the right to adjust or change out any programmatic elements as the university deems fit for the overall experience of the participant and execution of the programme.

Objectives

- Provide an overview and brief history of the field of Internet of Things to solve real world problems
- Demonstrate the ability to use microcontrollers and interfacing of edge computing device with various microcontrollers
- Develop an understanding of the fundamentals of messaging and communication protocols, addressing and identification protocols of IoT and alignment around concepts that are required for building a smart device
- Provide an overview and develop an understanding of Gateway computing i.e. connecting devices to cloud, analyse and visualise data. They will develop introductory level of competency for connected devices

Learning Outcomes

After taking this course, participants will be able:

- To understand the basics and fundamentals of Microcontrollers and Microprocessors, fundamental elements and underlying technologies of Internet of Things
- To gain knowledge about development boards, basic sensors and actuators
- To learn interfacing different peripherals with Arduino board, Node MCU, Raspberry Pi
- To understand and study the basic messaging and communication protocols of IoT
- To understand and study the Addressing and identification protocols of IoT
- To understand the Gateway computing i.e. connecting devices to cloud, analyse and visualise data
- To discover the culture and people of the North Indian region through day tours

About the Programme

Prerequisite: Basic computer & Internet knowledge

Who Should Pursue This: This programme is ideal for anyone who wants to learn about connected devices. Participants from a broad range of academic programmes across engineering sciences & management can participate in this summer immersion programme.

Pedagogical Approach and Resource Persons: Classes are experiential and collaborative. While course instructors do provide a significant amount of substantive instruction, students learn largely by engaging directly with the subject matter through activities such as simulations, workshops, meetings with guest speakers, assigned readings, and group projects.

All the resource persons for this summer immersion programme are Industry and Academia practitioners who are experts in the Internet of Things field and have a passion and demonstrated aptitude for teaching.

The themes of this learning experience are around innovative and entrepreneurial thinking in the area of Internet of Things and are targeted at an undergraduate and postgraduate, international learner audience. During this 2-week period, participants will be engaged for technical topics related to Internet of Things, Monday through Friday.

Required Software

A significant amount of time that students spend completing the course involve the use of Hardware and software. Instruction will be focused and directed based on the capabilities/features of:

- Ardunio, Node MCU, Raspberry Pi
- Arduino IDE, Communication protocols

An Ardunio IDE is made available to each student for the duration of the course.

Important Dates

This summer training and certification programme has been created with a complete focus on the practical aspects of Internet of Things. This course will help students to grab the key concepts like how the devices need to be connected with each other and through cloud.

This programme introduces one of the most important concepts of the Internet of Things i.e. programming the microcontrollers and Edge computing for IoT. It creates opportunities for students to discover the case studies for connected devices in software, automation, telecom industry. Students will learn all the features of microcontrollers that allow them to explore, experiment with, fix, prepare, and give solutions to real life problems eg. smart home, smart cart, smart grid etc.

Timeline

Programme Announcement	10th February 2023
Application Deadline	15th March 2023
Virtual Orientation	19th June 2023
Deadline for Students Providing Travel Information	30th June 2023
Student Arrival at NCU	8th-9th July 2023
First Day of the Programme	10th July 2023
Last Day of the Programme	21st July 2023
Student Departure	22nd-23rd July 2023

Programme Schedule

Week 1

Sun	Mon	Tue	Wed	Thurs	Fri	Sat
Arrival	**9:00 - 12:30**	**9:00 - 12:30**	**9:00 - 12:30**	**9:00 - 12:30**	**9:00 - 12:30**	
Check into Housing and Complete Online Orientation	Registration and Campus Tour	Special Guest Lecture: • Introduction to IoT IoT stack IoT Challenges • IoT Architecture and communication models • ATMEGA328p, Ardunio boards, Node MCU	Hands-on Training Session By NCU Experts: • Getting Started with Ardunio IDE, Microcontrollers • Basic commands, Interfacing basic Digital sensors • Interfacing Display Devices	Special Guest Lecture: • Interfacing of Actuators, DC motor AC motor • IoT framework/platform • IoT Hardware	Hands-on Training Session By NCU Experts: • Protocols for IoT • Basics of MQTT, CoAP protocols	Agra Trip
	Welcome Lunch 12:30-1:30 pm	Lunch 12:30-1:30 pm	Lunch 12:30-1:30 pm	Lunch 12:30-1:30 pm	Lunch 12:30-1:30 pm	
	1:30-3:30 pm Hands-on Training Session by NCU Experts: •The Fundamental of IoT	1:30-3:30 pm Design Thinking Workshop	1:30-3:30 pm Design Thinking Workshop	1:30-3:30 pm Summer@ NCU Sports Activity	1:30-3:30 pm Summer@ NCU Cultural Activity or Tour	

Week 2

Sun	Mon	Tue	Wed	Thurs	Fri	Sat
	9:00 - 12:00	**9:00 - 12:00**	**9:00 - 12:00**	**9:00 - 12:00**	**9:00 - 12:00**	
Free Day	Hands-on Training Session by NCU Experts: • Gateway computing • Connecting to cloud, analyse and visualise data	Special Guest Speaker & Workshop: • Security and Industrial IoT • Secure data transfer from device to device using encryption and decryption	Hands-on Training Session by NCU Experts: Machine Learning and AI with IoT Devices.	Capstone Project Implementation by Experts	Student competition Presentations and evaluations	Participants Departure
	Lunch 12:30-1:30 pm	Lunch 12:30-1:30 pm	Lunch 12:30-1:30 pm	Lunch 12:30-1:30 pm	Graduation Lunch 12:30-1:30 pm	
	1:30-3:30 pm Summer@NCU Yoga/Meditation Activity	1:30-3:30 pm Gurugram Tour	1:30-3:30 pm Delhi Tour	1:30-3:30 pm Final Preparation Time for Competition, Presentations	1:30-3:30 pm Closing Ceremony and Prize Distribution	

Visa Requirements

Participants in this programme will secure their own tourist visa prior to travel. Because of the Indian government's rules and regulations governing visas, the coursework for this programme is required to be incidental. This programme features informative workshops, guest speakers and experiential learning in the form of cultural activities and tours.

Summer Activities & Tours

- Design Thinking Session
- Sports Activity
- Cultural Activity
- Yoga/Mediation Activity
- Gurugram Tour
- Delhi Tour
- Agra Tour

Programme Fee

$1000 (Including accommodation, meals and local tours)

Payment

Institutions will collect payments in full locally from participating students in advance before their departure and The NorthCap University will invoice the institutions accordingly.

Programme Summary

Programme:	Non-credit
Duration:	2-weeks
Audience:	Undergraduate students
Visa:	Tourist
Workshops:	30 hours
Afternoon activities & tours:	6
Day Trips:	1

Application Fee & Details

Application Fee: **$50**
Form Link:
https://forms.gle/6fUGJzgPAErf2XmY6

Pre-Arrival Information and Orientation Meeting

After participants have registered, paid the application fee for the programme, and been accepted, they will receive a regular series of welcoming and pre-arrival emails. These emails will cover topics such as what to pack, what to expect when arriving at New Delhi's Indira Gandhi International Airport, and what to expect during their stay. These emails should be read carefully by the registered participants. Three weeks prior to the first day of the programme, The NorthCap University will hold a virtual information session for all the registered participants. This will be the first opportunity for participants to meet The NorthCap University's personnel who will be curating their entire experience. This orientation session will give an overview of the programme and what to expect, and there will be a time for questions and answers from the participants.

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