ICC **23ICC12 Industrial IOT**   **2   0   8   6**

Version: 01.00

Duration	150 hours (2 hours theory and 8 hours practical per week) as specified above
Industry Collaborator	M/s. HMI Engineering Services, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
23ICC03.1	Understand the basics of IIOT & IOT	1, 2, 3 & PSO1	3	L1-L3
23ICC03.2	Demonstrate the components of IIOT & IOT	1, 2, 3 & PSO1	3	L1-L3
23ICC03.3	Describe the Communication Technologies of IIoT	1, 2, 3 & PSO1	3	L1-L3
23ICC03.4	Analyze the Visualization and Data Types of IIoT	1, 2, 3 & PSO1	3	L1-L3
23ICC03.5	Describe the methods of Retrieving the data	1, 2, 3 & PSO1	3	L1-L3
23ICC03.6	Explain the Control & Supervisory Level of Automation	1, 2, 3 & PSO1	3	L1-L3

Deliverables

MODULE 1: Introduction & Architecture

Theory

IIoT and connected world, the difference between IoT and IIoT, Architecture of IIoT, IOT node, Challenges of IIOT.

Practice

Introduction to Arduino, ESp8266, Introduction to raspberry Pi.

MODULE 2: IIOT Components

Theory

Fundamentals of Control System, introductions, components, closed loop & open loop system.

Introduction to Sensors (Description and Working principle): Sensor, Types of sensors, working principle of basic Sensors - Ultrasonic Sensor, IR sensor, MQ2, Temperature and Humidity Sensors (DHT-11). Digital switch, Electro Mechanical switches.

Practice

Measurement of temperature & pressure values of the process using raspberry pi/node mcu.

Modules and Sensors Interfacing (IR sensor, Ultrasonic sensors, Soil moisture sensor) using Raspberry pi/node mcu.

Modules and Actuators Interfacing (Relay, Motor, Buzzer) using Raspberry pi/node mcu.

MODULE 3: Communication Technologies of IIoT

Theory

Communication Protocols: IEEE 802.15.4, ZigBee, Z Wave, Bluetooth, BLE, NFC, RFID

Industry standards communication technology (LoRAWAN, OPC UA, MQTT), connecting into existing Modbus and Profibus technology, wireless network communication.

Practice

Demonstration of MQTT communication.

Demonstration of LoRa communication.

MODULE 4: Visualization and Data Types of IIoT

Theory

Front-end EDGE devices, Enterprise data for IIoT, Emerging descriptive data standards for IIoT, Cloud data base, Cloud computing, Fog or Edge computing. Connecting an Arduino/Raspberry pi to the Web: Introduction, setting up the Arduino/Raspberry pi development environment, Options for Internet connectivity with Arduino, Configuring your Arduino/Raspberry pi board for the IoT.

Practice

Visualization of diverse sensor data using dashboard (part of IoT's 'control panel')

Sending alert message to the user. ways to control and interact with your environment)

MODULE 5: Retrieving Data

Theory

Extraction from Web: Grabbing the content from a web page, Sending data on the web, Troubleshooting basic Arduino issues, Types of IoT interaction, Machine to Machine interaction (M2M).

Practice

Device control using mobile Apps or through Web pages.

Machine to Machine communication.

MODULE 6: Control & Supervisory Level of Automation

Theory

Programmable logic controller (PLC), Real-time control system, Supervisory Control & Data Acquisition (SCADA). HMI in an automation process, ERP & MES.

Practice

Digital logic gates programming using ladder diagram.

Implementation of Boolean expression using ladder diagram.

Simulation of PLC to understand the process control concept.

MODULE 7: Application of IIOT

Case study: Health monitoring, Iot smart city, Smart irrigation, Robot surveillance.

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

| ICC | 20ICC06 Battery System – Design Engineering | 2 | 0 | 8 | 6 |

Version: 01.00

Duration	150 hours (2 hours theory and 8 hours practical per week) as specified above
Industry Collaborator	M/s. Vihaan Electrix, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC06. 1	Determine specifications of the Battery system	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC06.2	Design the Battery system	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC06.3	evaluate each design option based on parameters such as safety, performance and cost	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC06.4	Testing and validation of the design	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC06.5	perform safety test to minimize overcharging and overheating	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC06.6	perform failure mode and effect analysis of the Battery System	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs

L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK:Depth of Knowledge

Deliverables

Determining specifications of the Battery system

Electric Vehicle level specifications, EV specifications into Battery System level specifications, Battery potential and load requirement based on Electric Vehicle specification, list various design options / specifications available at each component level of the Battery system, selection of battery system specifications to suit specifications of cells and modules, Battery system circuit based on Battery application, electrical, mechanical or thermal interface requirements, statistical modelling and state diagrams for the battery operations.

Designing the Battery system:

Cross-functional partners to integrate the battery into the final system, designing, building, and testing code to satisfy design requirements, hardware, and software systems for battery protection, charging and gauging, design connections between anode / cathode terminals through use of suitable busbars, simulations of the designed circuit, charging and discharging of the battery in a controlled manner.

Testing and validation of the design:

design areas where checking and testing is essential, requirements for continuous automation test case, correct application for activation, using technologies of traction battery and battery charger.

Performing safety test:

test plans for batteries at the component and system level, safety test to minimize overcharging and overheating.

Performing cycle test:

failure mode and effect analysis (FMEA) of the battery system, SoC for determining electrolyte's specific gravity in each cell

by using hydrometer.

Performing load test:

load testing to remove AMPS from a battery, electrical worst-case (circuit performance), rigorous failure /root cause on battery related problems.

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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Board of Studies

ICC **20ICC10 Machine Learning Engineer**   2   0   8   6

Version: 01.00

Duration	150 hours (2 hours theory and 8 hours practical per week) as specified above
Industry Collaborator	M/s. Vihaan Electrix, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC10.1	Evaluate the existing Machine Learning (ML) processes	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC10.2	Analyse large and complex datasets to extract insights and select the appropriate technique to be used	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC10.3	Develop models to achieve the business objectives	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC10.4	Analyses the machine learning algorithms that could be used to solve a given problem	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC10.5	Perform statistical analysis to resolve data set problems	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC10.6	Train models and optimize their hyper-parameters	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs
L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK: Depth of Knowledge

Deliverables

Prepare to Develop Machine Learning (ML) Systems:

Machine Learning (ML) processes, appropriate datasets and data representation methods, large and complex datasets to extract insights, need of retraining the existing machine programs based on objectives, data validation strategies, pre-processing or feature engineering for a given dataset, data augmentation pipelines, models to achieve the business objectives, along with the relevant metrics to track.

Develop and Assist in the Implementation of Machine Learning (ML) Systems:

Machine learning algorithms, Logistic Regression, and Naive Bayes, based on statistical modelling procedures, data cleaning to remove the irrelevant data and ensure its quality and accuracy, data acquisition process, prepare the data by transforming textual and graphical data into numbers for use in the machine learning system, create data pipeline depending on the machine learning application needs Linear Regression, , differences in data distribution, statistical analysis to resolve data set problems, solve complex problems with multi-layered data sets, use data modelling and evaluation strategy to find patterns and predict unseen instances, evaluate and transform data science prototypes.

Perform machine learning tests:

Design machine learning systems/applications and self-running Artificial Intelligence (AI) software to automate predictive models, carry out machine learning tests, interpret the test results and make appropriate adjustments based on test results, carry out research and implement best practices to improve the existing machine learning infrastructure, optimize existing machine learning libraries and frameworks based on testing, create useful information from unstructured data by auto-tagging images and text-to-speech conversions.

Train and retrain models:

Train models and optimize their hyper-parameters, analyses the errors of the model and develop appropriate strategies to rectify them, retrain the existing systems based on new machine learning model, document the machine learning processes as per the organizational policy, follow the latest machine learning developments and technologies.

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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Board of Studies

| ICC | **20ICC01 Competitive Programming** | | | 2 | 0 | 8 | 6 |

Version: 01.00

Duration	240 hours (2 hours theory and 14 hours practical per week) as specified above
Industry Collaborator	M/s. Demy Software Solutions, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
23ICC07.1	Understand the basics of Programming	1, 2, 3, PSO #1	3	L1, L2, L3
23ICC07.2	Explain various types of Operators, operations, relations, and techniques in programming	1, 2, 3, PSO #1	3	L1, L2, L3
23ICC07.3	Demonstrate gaming basics	1, 2, 3, PSO #1	3	L1, L2, L3
23ICC07.4	Execute various Operations on Linked lists	1, 2, 3, PSO #1	3	L1, L2, L3
23ICC07.5	Explore various applications of the techniques.	1, 2, 3, PSO #1	3	L1, L2, L3
23ICC07.6	Solving various problems of Binary Trees, insertion, deletion and updation.	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs

L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK:Depth of Knowledge

Deliverables

WEEK 1 - Introduction- Execution of a program, Decimal - Binary conversion, Ranges of Data Types and constraints, Complexity Analysis of Algorithms, Big-O Notation, Time & Space Analysis and Constraints, Importance of constraints

WEEK 2 - Bit-Manipulation, Bitwise operators, Bit-masking, Modular Arithmetic, Recursion, Thinking Recursively, Recurrence Relations, Sorting Techniques, Two Pointer Technique

WEEK 3 - Binary Search, Applications of Binary Search, Lower Bound & Upper Bound, Finding Frequency, Optimization problems, Hashing, Hashing Techniques, Collision Resolutions, Inbuilt Libraries

WEEK 4 - Maps and Sets, Subarrays and Sub sequences, String matching, Sieve of Eratosthenes, Segmented Sieve, Game Theory, Nims Game, Counting Game

WEEK 5 - Prefix and Suffix concepts, Collecting water, Stacks, Balanced Parentheses, Largest Histogram Area, Queues, Sliding Window Maximum

WEEK 6 - Linked Lists, Various Operations on linked lists, LRU Cache, Cloning Linked list with random pointer, Doubly-linked list

WEEK 7 - Binary Trees, BT and FBT, Traversals, Various operations on Binary Trees, Binary Search Trees, Insertion, Updating and Deletion

WEEK 8 - More Problems on Binary Trees, Iterative Traversals, Least Common Ancestor, Heaps, Quick Select, Running Median, Trie, Introduction and Implementation

WEEK 9 - Problems on Tries, Maximum XOR pair, Partitioning of string, 1D Dynamic Programming, Approaching DP problem, Problems on Overlapping subproblems, Problems on Optimal Substructure, Longest Increasing Subsequence

WEEK 10 - 2D Dynamic Programming, Compute NCR, Knapsack, Matrix chain multiplication, Graphs, Introduction and Implementation, Dijkstra, Topological sort.

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	9 (Nine)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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ICC **20ICC11 Data Scientist**   2 0 8 6

Version: 01.00

Duration	150 hours (2 hours theory and 8 hours practical per week) as specified above
Industry Collaborator	M/s. Vihaan Electrix, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC11. 1	Determine specifications of the Battery system	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC11. 2	Design the Battery system	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC11. 3	evaluate each design option based on parameters such as safety, performance and cost	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC11. 4	Testing and validation of the design	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC11. 5	perform safety test to minimize overcharging and overheating	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC11. 6	perform failure mode and effect analysis of the Battery System	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs
L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK:Depth of Knowledge

Deliverables

Determining specifications of the Battery system

Electric Vehicle level specifications, EV specifications into Battery System level specifications, Battery potential and load requirement based on Electric Vehicle specification, list various design options / specifications available at each component level of the Battery system, selection of battery system specifications to suit specifications of cells and modules, Battery system circuit based on Battery application, electrical, mechanical or thermal interface requirements, statistical modelling and state diagrams for the battery operations.

Designing the Battery system:

Cross-functional partners to integrate the battery into the final system, designing, building, and testing code to satisfy design requirements, hardware, and software systems for battery protection, charging and gauging, design connections between anode / cathode terminals through use of suitable busbars, simulations of the designed circuit, charging and discharging of the battery in a controlled manner.

Testing and validation of the design:

design areas where checking and testing is essential, requirements for continuous automation test case, correct application for activation, using technologies of traction battery and battery charger.

Performing safety test:

test plans for batteries at the component and system level, safety test to minimize overcharging and overheating.

Performing cycle test:

failure mode and effect analysis (FMEA) of the battery system, SoC for determining electrolyte's specific gravity in each cell by using hydrometer.

Performing load test:

load testing to remove AMPS from a battery, electrical worst-case (circuit performance), rigorous failure /root cause on battery related problems.

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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Board of Studies

| ICC | **20ICC09 Product Engineering** | **2** | **0** | **14** | **9** |

Version: 01.00

Duration	240 hours (2 hours theory and 14 hours practical per week) as specified above
Industry Collaborator	M/s. HMI Engineering Services, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC09.1	Understand the basics of Manufacturing Process	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC09.2	Explain the Manufacturing Design	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC09.3	Explore various Production Processes	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC09.4	Demonstrate various Production Machine Operations	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC09.5	Study the Product monitoring	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC09.6	Execute the Product Logistics	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs
L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK: Depth of Knowledge

Deliverables

Manufacturing Process Overview
Product concepts, Market feasibility, Engineering design, Prototyping, Production, Marketing/sales

Manufacturing Design
Product analysis: Materials, Cost
Production methods: Assembly lines, Work cells, Inventory, Work flow
Quality control: Production monitoring, Product testing

Production Processes
Machine and process overviews: Boring and machining, Presses, Molding/Casting, Welding, Finishing, Assembly
Materials: Applicable types, Cost, Availability

Production Machine Operations
Presses, Molding/Casting, Drilling/Boring, Machining, Welding, Finishing, Advanced Intelligence, Automation, Programmable Logic Controllers

Production Monitoring
Monitoring production processes: Baselines, Environmental control
Quality improvement: Production improvement

Finished Product Logistics
Delivery methods, Delivery options, Customer interaction

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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Board of Studies

ICC | **20ICC02 Web Technologies – Transferring to Practice**   2   0   8   6

Version: 01.00

Duration	150 hours (2 hours theory and 8 hours practical per week) as specified above
Industry Collaborator	M/s. Demy Software Solutions, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC02. 1	Learn the basics and application of HTML	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC02. 2	Understand the CSS3 module operation	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC02. 3	Explain JAVA script and its application	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC02. 4	Demonstrate the basics of jQuery	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC02. 5	Study the basics of Bootstrap and its application	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC02. 6	Understand the basics of Angular JS	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs
L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create. DoK:Depth of Knowledge

Deliverables

Module 1

Introduction HTML, HTML Basics, HTML Elements, HTML5 Semantic, HTML Attributes, HTML Headings, HTML Paragraph, HTML Styles, HTML Formatting, HTML Quotations, HTML Computer Code, HTML Comments & Colours, HTML CSS, Links and Images, HTML Lists, HTML Blocks, HTML Classes, HTML Layout, HTML Responsive, HTML I frames, HTML JavaScript, HTML Head, HTML Entities and URI Code, HTML Symbols and XHTML, HTML Charset and Forms

Module 2

Introduction CSS3, CSS3 Syntax, CSS3 How To, CSS3 Colours, CSS3 Backgrounds, CSS3 Boarders, CSS Padding, CSS Height/Width, CSS3 Gradients, CSS3 Shadows, CSS3 Text, CSS3 Fonts, CSS3 2D Transforms, CSS3 3D Transforms, CSS Links, CSS Lists, CSS Tables, CSS Box Model, CSS Outline, CSS Display, CSS Max-width, CSS Position, CSS Float, CSS Inline-block, CSS Align, CSS Combinators, CSS Pseudo-class, CSS Pseudo-element, CSS Navigation Bar, CSS Dropdowns, CSS Tooltips, CSS3 Images, CSS Attr Selectors, CSS Forms, CSS Counters, CSS3 Animations, CSS3 Buttons, CSS3 Pagination, CSS3 Multiple Columns, CSS3 User Interface, CSS3 Box Sizing, CSS3 Filters, CSS3 Media Queries, CSS3 Responsive

Module 3:

Introduction to JavaScript, Java Script Language Basics, JavaScript Objects, JavaScript Scope, JavaScript Events, JavaScript Strings, JavaScript Numbers, JavaScript Math, JavaScript Arrays, JavaScript Boolean, JavaScript Comparisons, JavaScript Conditions, JavaScript Switch, JavaScript Loops, JavaScript Type Conversion, JavaScript RegExp, JavaScript Errors, JavaScript Debugging, JavaScript Hoisting, JavaScript Strict Mode, JavaScript Functions, JavaScript Objects, JavaScript Forms, JavaScript HTML DOM, JavaScript BOM

Module 4:

Introduction to jQuery, jQuery Syntax, jQuery Selectors, jQuery Events, jQuery Effects, jQuery HTML, jQuery Traversing, jQuery AJAX, jQuery Misc.

Module 5:

Introduction to Bootstrap, Bootstrap Basics, Bootstrap Grids, Bootstrap Themes, Bootstrap CSS, Bootstrap JS

Module 6:

Introduction to AngularJS, AngularJS Expressions, AngularJS Modules, AngularJS Data Binding, AngularJS Scopes, AngularJS Directives & Events, AngularJS Controllers, AngularJS Filters, AngularJS Services, AngularJS HTTP, AngularJS Tables, AngularJS Select, Fetching Data from MySQL, AngularJS Validation, AngularJS API, AngularJS Animations, AngularJS i18n and i10n

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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Chairman
Board of Studies

| ICC | **20ICC03 Java Spring boot** | | 2 | 0 | 8 | 6 |

Version: 01.00

Duration	150 hours (2 hours theory and 8 hours practical per week) as specified above
Industry Collaborator	M/s. Demy Software Solutions, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC03.1	Understand the JAVA programming.	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC03.2	Execute various methods in JAVA programming	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC03.3	Study and execute the OOPS concept	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC03.4	Demonstrate the debugging and testing of units	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC03.5	Learn the basics of Spring Boot	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC03.6	Explore the applications of Spring Boot and JAVA	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs

L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK:Depth of Knowledge

Deliverables

Java

Introduction to the course, software tools set up, Introduction about programming, Hello World Project and defining the main method. Variables, Starting with out expressions, Primitive data types, byte short, float, char, Boolean, double, casting.

Operators, operands, expressions. If else statement, Bit wise Operator, Ternary operator, Operator precedence and operator challenge. Keywords and expressions, statements white space and Indentation, code blocks, if then else statement.

Methods in Java, final Method. Code problems on JAVA – HACKERRANK. Method Overloading and Over riding, Control flow statements – if else, while do while, Problems on coding – Prime Number, Even Number, Fibonacci series

OOPS concept – classes, constructors and inheritance, composition, encapsulation, polymorphism, Arrays, Java list, Auto boxing and unboxing. Inner and Abstract classes and interfaces, Java Generics, Naming conventions and package, static and final keywords.

Java Collections, Debugging and unit testing, Data Bases. Basic input and output including Java.util, Concurrency in Java, Lambda expression, regular expressions

Spring Boot:

Introduction to Spring Boot – Build a hello world API, Understanding Spring boot project, Auto configuration. Create a Spring boot web application development, overview of spring boot project. Annotations, step by step code and debugging

Introduction to Junits, Mockito. Spring boot deep dive with rest API

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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Board of Studies

ICC 20ICC05 Information Security and Forensics
 2 0 8 6

Version: 01.00

Duration	150 hours (2 hours theory and 8 hours practical per week) as specified above
Industry Collaborator	M/s. HMI Engineering Services, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC05. 1	Understand the basic terminology of various servers, networking, security and hacking.	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC05. 2	Explore the web applications, testing, debugging, hacking, etc.	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC05. 3	Understand the coding techniques	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC05. 4	Demonstrating the usage of tools for testing, hacking, etc.	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC05. 5	Execute the code using various algorithms	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC05. 6	Perform various case studies to dive deep.	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs
L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK:Depth of Knowledge

Deliverables

Domain 1 – Introduction & Terminology

Global Anonymous: Proxy Server, TOR Browser, VPN, SOCKS, RDP, Psiphon, Surface Web, Deep Web, Dark Web, etc., Terminology about Web, Servers, Systems, Network Programming Languages, Hacking, IT Security, Intro to OWASP Top 10 Vulnerability. Intro to Bug Bounty & Enterprise Security and Risk Management with IT Security Life Cycle, Case Studies of Hacking, IT Security & C Forensics. Phishing + Live Hacking Impact Demonstration

Domain 2 – Hacking to Explore

Web Application Penetration Testing based in OWASP TOP 10 Vulnerabilities with Live Ex. Live Demonstration of SQLi, XSS, CSRF, and other bugs with tools and with Manual Testing. Bug Bounty, Latest CMS Exploitation, Cryptography & Practical Implementation, SSL Vulnerabilities & Live Testing, Mobile Hacking, Sniffing, Virus, Ransomware, Intro to Carding & Luhn algorithm

Domain 3 – Defence in Depth

Secure Code Review & Code Brabbing Techniques, Enterprise Security, Risk Management & Report, Tools & Web Apps Penetration Testing, Hacking Attacks & Case Studies, WAF, Firewall, Honeypots, UTM, Introduction to Security Compliance, Introduction to Mobile Apps Pen testing, Defence for Vulnerabilities
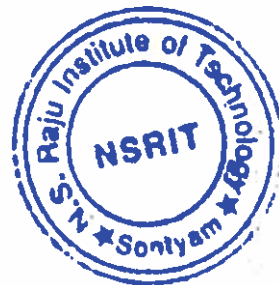
Domain 4 – Hacking Automation

Virtualization, Tools for Penetration Testing & Hacking, Kali Linux & It's Applications with Uses, Cloud Security & It's Fundamentals, SQLMAP, Metasploit, nmap etc, Exploits & Incident Response Analysis, Intro to Exploit Development & Research.

Assessment	
Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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Board of Studies

ICC 20ICC07 Block Chain Technology

2   0   8   6

Version: 01.00

Duration	150 hours (2 hours theory and 14 hours practical per week) as specified above
Industry Collaborator	M/s. HMI Engineering Services, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC07.1	Learn basics of Blockchain	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC07.2	Understand various Types of Blockchain	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC07.3	Demonstrate the concepts of Blockchain	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC07.4	Study the basics of Ethereum	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC07.5	Learn Solidity	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC07.6	Implement the Dapp	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs

L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK:Depth of Knowledge

Deliverables

Introduction to Blockchain

Definition of Blockchain, History of Blockchain, Explaining Distributed Ledger, Blockchain ecosystem, Explaining Distributed Ledger

Types of Blockchain

Private/Consortium/Permission-less, Public/Permissioned implementation difference, What Blockchain has to offer across Industry? Companies currently using Blockchain, Overview of what we are going to study in this course,

Key Concepts of the Blockchain

Mining -Mining algorithm, Node, peer, and block explanation, Merkle tree and Blockchain, Consensus Mechanisms- proof of work, proof of stake, How Bitcoin Blockchain works? What is Transaction?

Introduction to Ethereum

Ethereum: Blockchain with smart contract, What is Ether? Bitcoin vs Ethereum Blockchain, What is Ethereum wallet? What is Smart Contract? Ethereum clients, Geth Introduction, Setting up Private Blockchain using Geth.

Learn Solidity

Introduction to solidity, Hands on solidity, Understand and implement different use cases, Implement and deploy smart contract on Blockchain.

Implement Dapp

Setting up the environment, Tools to install – Truffle, MetaMask ,Testrpc, Implement and deploy your first Dapp, Different use cases for implementation of Dapp.

Future Scope

Talk about the future of the Blockchain, What is Hyperledger? What is Hash graph? Discussion on current

research on Blockchain, Understand current industry challenges and needs.

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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Board of Studies

| ICC | **20ICC08 Network Administration** | | **2** | **0** | **8** | **6** |

Version: 01.00

Duration	150 hours (2 hours theory and 8 hours practical per week) as specified above
Industry Collaborator	M/s. HMI Engineering Services, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC08.1	Understand the processes of updation, Installation of Operating System.	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC08.2	Understand the mapping of Hardware devices	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC08.3	Demonstrate the management of group and Computer accounts	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC08.4	Explain the File System Management	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC08.5	Study the server administration	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC08.6	Explore the disaster recovery	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs

L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK:Depth of Knowledge

Deliverables

Overview of Networking.

Installing or Upgrading a Network Operating System, Preparing for installation, Installing from different installation mediums, Upgrade process, Identifying setup errors

Managing Hardware Devices

Understanding device drivers and PnP. Adding new devices. Hardware resource settings and driver signing, Hardware profiles

Creating and Managing Accounts

User authentication. User profiles. Creating, managing and troubleshooting user accounts.

Implementing Group and Computer Accounts

Creating group objects. Group types and scopes. Build-in groups. Creating and managing computer accounts.

Managing File Access

Introduction to file systems. Creating and managing shared folders. Managing shared folder permissions. NTFS permissions

Managing Disks and Data Storage

Disk management concepts. Managing partitions and volumes. Fault tolerant disk strategies. Monitoring disk health. Disk utilities.

Advanced File System Management

File and folder attributes. Advanced attributes. Disk quotas The distributed file system.

Implementing and Managing Printers

Installing and sharing printers, Configuring and managing printer resources.

Using Group Policy

Creating and editing group policy objects. Group policy inheritance.

Server Administration

Procedures and standards. Terminal services and remote administration. Delegating administrative authority. Software update services.

Monitoring Server Performance and Disaster Recovery

Task manager, event viewer and performance console. Planning disaster recovery. Backing up data. Automated system recovery.

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	6 (Six)
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Dedicated certificate by the collaborating industries	Yes

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| ICC | 20ICC04 Robotic Process Automation | 2 | 0 | 8 | 6 |

Version: 01.00

Duration	240 hours (2 hours theory and 14 hours practical per week) as specified above
Industry Collaborator	M/s. HMI Engineering Services, Visakhapatnam

At the end of the course, students will be able to

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC04.1	Explore the Robotic Automation Process	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC04. 2	Understand the Process Flow and basic inputs and outputs	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC04. 3	Demonstrate the functioning of Business Objects	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC04. 4	Demonstrate the application of Object Studio attributes	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC04. 5	Explain the Case management and additional features	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC04. 6	Understand the functioning of Error management	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs
L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create. DoK:Depth of Knowledge

Deliverables

Module: 1 – Robotic Automation Process Studio

Running a Process, Basic Skills, Process Validation, Decision Stage, Calculation Stage, Data Items

Module: 2 – Process Flow

Decisions, Circular Paths, Controlling Play, Set Next Stage, Breakpoints, Collections and Loops, Layers of Logic, Pages for Organization

Module: 3 – Inputs and outputs

Input Parameters, Stepping and Pages, Data Item Visibility, Data Types, Output Parameters, Start-up Parameters, Control Room, Process Outputs

Module: 4 – Business Objects

Object Studio, Business Objects, BLUE PRISM CONTENT, Action Stage, Inputs and Outputs, The Process Layer

Module: 5 – Object Studio

Creating a Business Object, Application Modeler, Spying Elements, Attributes, Attribute Selection, Launch, Wait, , Timeouts, Terminate, Write, Press, Attach and Detach, Read, Actions, Action Inputs and Outputs, Data Items as Inputs

Module: 6 – Error Management

Exception Handling, Recover and Resume, Throwing Exceptions, Preserving the Current Exception, Exception Bubbling, Exception Blocks, Exception Handling in Practice.

Module: 7 – Case Management

Queue Items Commercial in Confidence, BLUE PRISM CONTENT, Work Queue Configuration, Defer, Attempts, Pause and Resume, Filters Reports

Module: 8 – Additional Features

Safe Stop, Collection Actions, Choice Stage, Logging, Log Viewer, System Manager, Process/Business Object , Grouping, Process and Object References, Export and Import

Module: 9 – Consolidation Exercise

Order System Process

Assessment

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