

CSE-Artificial Intelligence and Machine Learning/ Artificial Intelligence and Machine Learning, VIII-Semester

AL 803(A) Introduction to IOT

Course Objective:

The objective of this course is to provide an understanding of the technologies and the standards relating to the Internet of Things and to develop skills on IoT technical planning.

Unit I IoT definition, Characteristics, IoT conceptual and architectural framework, Components of IoT ecosystems, Physical and logical design of IoT, IoT enablers, Modern day IoT applications, M2M communications, IoT vs M2M, IoT vs WoT, IoT reference architecture, IoT Network configurations, IoT LAN, IoT WAN, IoT Node, IoT Gateway, IoT Proxy, Review of Basic Microcontrollers and interfacing.

Unit II Define Sensor, Basic components and challenges of a sensor node, Sensor features, Sensor resolution; Sensor classes: Analog, Digital, Scalar, Vector Sensors; Sensor Types, bias, drift, Hysteresis error, quantization error; Actuator; Actuator types: Hydraulic, Pneumatic, electrical, thermal/magnetic, mechanical actuators, soft actuators

Unit III Basics of IoT Networking, IoT Components, Functional components of IoT, IoT service oriented architecture, IoT challenges, 6LowPAN, IEEE 802.15.4, ZigBee and its types, RFID Features, RFID working principle and applications, NFC (Near Field communication), Bluetooth, Wireless Sensor Networks and its Applications

Unit IV MQTT, MQTT methods and components, MQTT communication, topics and applications, SMQTT, CoAP, CoAP message types, CoAP Request-Response model, XMPP, AMQP features and components, AMQP frame types

Unit V IoT Platforms, Arduino, Raspberry Pi Board, Other IoT Platforms; Data Analytics for IoT, Cloud for IoT, Cloud storage models & communication APIs, Attacks in IoT system, vulnerability analysis in IoT, IoT case studies: Smart Home, Smart framing etc.

References:

1. Vijay Madiseti, Arshdeep Bahga, “Internet of Things, A Hands on Approach”, University Press
2. Dr. SRN Reddy, Rachit Thukral and Manasi Mishra, “Introduction to Internet of Things: A practical Approach”, ETI Labs
3. Pethuru Raj and Anupama C. Raman, “The Internet of Things: Enabling Technologies, Platforms, and Use Cases”, CRC Press
4. Jeeva Jose, “Internet of Things”, Khanna Publishing House, Delhi
5. Adrian McEwen, “Designing the Internet of Things”, Wiley
6. Raj Kamal, “Internet of Things: Architecture and Design”, McGraw Hill
7. Cuno Pfister, “Getting Started with the Internet of Things”, O Reilly Media

Course Outcomes:

After the completion of this course, the students will be able to:

1. Understand Internet of Things and its hardware and software components
2. Interface I/O devices, sensors & communication modules
3. Analyze data from various sources in real-time and take necessary actions in an intelligent fashion
4. Remotely monitor data and control devices
5. Develop real life IoT based Projects

New Scheme Based On AICTE Flexible Curricula

CSE-Artificial Intelligence and Machine Learning/ Artificial Intelligence and Machine Learning, VIII-Semester

Open Elective – AL 803(B) Bio Informatics

Objective:

The course has been designed to be an entry level in Bioinformatics. It is introductory in nature and will provide an overview of the concepts and practices in Bioinformatics. The course structure has been designed such that students will acquire skills required to become Assistant Programmer/Technical Assistant

in Bioinformatics. It would also help students to acquire a good foundation to take up further studies.

Course Outcomes: After Completing the course student should be able to:

1. To get introduced to the basic concepts of Bioinformatics and its significance in Biological data analysis.
2. Describe the history, scope and importance of Bioinformatics and role of internet in Bioinformatics.
3. Explain about the methods to characterize and manage the different types of Biological data.
4. Classify different types of Biological Databases.
5. Introduction to the basics of sequence alignment and analysis.

Unit-I

Introduction: Introduction to bioinformatics, objectives of bioinformatics, Basic chemistry of nucleic acids, structure of DNA & RNA, Genes, structure of bacterial chromosome, cloning methodology, Data maintenance and Integrity Tasks.

Unit-II

Bioinformatics Databases & Image Processing: Types of databases, Nucleotide sequence databases, Protein sequence databases, Protein structure databases, Normalization, Data cleaning and transformation, Protein folding, protein function, protein purification and characterization, Introduction to Java clients, CORBA, Using MYSQL, Feature Extraction.

Unit-III

Sequence Alignment and database searching: Introduction to sequence analysis, Models for sequence analysis, Methods of optimal alignment, Tools for sequence alignment, Dynamic Programming, Heuristic Methods, Multiple sequences Alignment

Unit-IV

Gene Finding and Expression: Cracking the Genome, Biological decoder ring, finding genes through mathematics & learning, Genes prediction tools, Gene Mapping, Application of Mapping, Modes of Gene Expression data, mining the Gene Expression Data.

Unit V

Proteomics & Problem solving in Bioinformatics: Proteome analysis, tools for proteome analysis, Genetic networks, Network properties and analysis, complete pathway simulation: E-cell, Genomic analysis for DNA & Protein sequences, Strategies and options for similarity search, flowcharts for protein structure prediction

Recommended Books:

1. Gopal & Jones, BIOINFORMATICS with fundamentals of Genomics & Proteomics, TMH Pub
2. Rastogi, Bioinformatics – Concepts, skills & Applications, CBS Pub
3. Claverie, Bioinformatics, Wiley pub
4. Stekel, Microarray Bioinformatics, Cambridge

CSE-Artificial Intelligence and Machine Learning/ Artificial Intelligence and Machine Learning, VIII-Semester

Open Elective –AL 803(c) Managing Innovation and Entrepreneurship

COURSE OBJECTIVE

The aim of the course is to motivate students to innovate in business. In the first place, to achieve this goal, students will be introduced to the basic terminology, typology of innovations and historical context for better comprehension. Also issues of innovation management will be introduced. Students will become familiar with the impact of innovation, innovative processes and aspects that affect it, including applicable methods and innovation management techniques. Course contents:

UNIT-I

Innovation, the basic definition and classification: The relationship of innovation and entrepreneurship, creation of competitive advantage based on innovation. Innovative models, Product, process, organizational and marketing innovation and their role in business development.

UNIT-II

Sources of innovation (push, pull, analogies), transfer of technology. Creative methods and approaches used in innovation management. Approaches to management of the innovation process (agile management, Six Thinking Hats, NUF test).

UNIT-III

Project approach to innovation management, method Stage Gate, its essence, adaptation of access to selected business models. In-house business development of the innovation process in the company. Open Innovation as a modern concept, the limits of this method and its benefits for business development.

UNIT-IV

Innovations aimed at humans, role of co-creation in the innovation process. The strategy of innovation process, types and selection of appropriate strategies.

UNIT-V

Measurement and evaluation of the benefits of innovation for business (financial and non- financial metrics, their combination and choice). Barriers to innovation in business, innovation failure and its causes, post-audits of innovative projects. Organization and facilitation of an innovation workshop.

REFERENCE BOOKS

1. CLARK, T. – OSTERWALDER, A. – PIGNEUR, Y. Business model generation: a handbook for visionaries, game changers, and challengers. Wiley Publications
2. BESSANT, J R. – TIDD, J. Managing innovation: integrating technological, market and organizational change. Wiley Publications

New Scheme Based On AICTE Flexible Curricula

CSE-Artificial Intelligence and Machine Learning/ Artificial Intelligence and Machine Learning, VIII-Semester
Open Elective –AL 804(D) Human Computer Interaction

Unit I: Introduction, Human Computer Interaction (HCI) concepts and definitions, Nature of interaction human and Machine, interaction design, understanding and conceptualizing interaction, understanding users, interfaces and interactions, data gathering.

Unit II: Introduction to User Centered System Design (UCSD), Natural computing, user centered system design, core concepts, interactive design and its strength and weakness, types of user model, user model and evaluation, Heuristic evaluation.

Unit III: Psychological user models. Black box models of human performance, including perception, motor control, memory and problem-solving. Quantitative analysis of performance. Human processor, keystroke level model, and GOMS descriptions of user performance.

Unit IV: Modeling of system understanding. Mental models and metaphor, use of design prototypes, controlled experiments. Cognitive walkthrough. Evaluation from the perspective of a novice learning to use the system.

Unit V: Task analysis and design. Contextual and qualitative studies, use-case driven design. Research techniques. Cognitive dimensions of notations, CSCW, ubiquitous computing, new interaction techniques, programmability.

References:-

1. Alan Dix, Janet E. Finlay, “Human-Computer interaction”, Pearson Education.
2. Olsen, “Human-Computer Interaction”, Cengage Learning.
3. Preece, J. Sharp, H. & Rogers, “Interaction design: beyond human-computer interaction Y. Wiley.
4. Smith Atakan Serengal, “Human-Computer Interaction”, Cengage Learning