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S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours Per Week			Total Credits
				Theory			Practical			L	T	P	
				End. Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem.	Lab Work					
1	IT71	PEC	Professional Elective Course-III	70	20	10	-	-	100	3	1	-	4
2	IT72	OEC	Open Elective Course-II	70	20	10	-	-	100	3	1	-	4
3	IT73	PCC	Information and Cyber Security	70	20	10	30	20	150	3	-	2	4
4	IT74	PCC	Introduction to Artificial Intelligence & Machine Learning	70	20	10	30	20	150	3	-	2	4
5	IT75	PCC	Internet of Things	70	20	10	30	20	150	3	-	2	4
6	IT76	MC	Industrial Training Evaluation	-	-	-	60	40	100	-	-	4	2
			Total	**350**	**100**	**50**	**150**	**100**	**750**	**15**	2	**10**	**22**
7	IT77	DLC	Self-Learning Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	-	-	-	-	8
8	IT78	MC	NSS/NCC/Swatchhata Abhiyan/Rural Outreach	Qualifier									
Additional Course for Honours or Minor Specialization				Permitted to opt for maximum 8 credits against additional MOOC courses in subject code IT77 for the award of Honours (Minor Specialization).									

Note: 01. Departmental BOS will decide list of three/four elective subjects for each PEC and OEC.
02. MOOC/NPTEL subjects shall be taken with permission of HOD/Coordinator
03. Industrial training presentation & viva shall take place in VII Sem. which students have already done in VI Sem.

Professional Elective Course-III		
S.No.	**Subject Code**	**Subject Name**
1	IT71A	Simulation and Modeling
2	IT71B	Advance Computer Architecture
3	IT71C	Real Time Operating Systems

Open Elective Course-II		
S.No.	**Subject Code**	**Subject Name**
1	IT72A	Wireless and Mobile Communication
2	IT72B	Embedded Systems
3	IT72C	Distributed Systems

1 hour lecture (L) = 1 credit | 1 hour Tutorial (T) = 1 credit | 2 hour Practical (P) = 1 credit

PEC: Professional Elective Course, OEC: Open Elective Course, PCC: Professional Core Course, DLC: Distance Learning Course, MC: Mandatory Course

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Subject Code	Subject Name and Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT71A	SIMULATION ANDMODELING	70	20	10	-	-	100	3	1	-	4

Module I
Introduction to Modeling and Simulation: Nature of Simulation, Systems , Models and Simulation, Continuous and Discrete Systems, system modeling, Principles used in modeling, Static and Dynamic physical models, Static and Dynamic Mathematical models, concept of simulation, Components of a simulation study. Introduction to Static and Dynamic System simulation, continuous and discrete time simulation. Advantages, Disadvantages and pitfalls of Simulation.

Module II
Probability Concepts in Simulation: Stochastic variables, discrete and continuous probability functions, Distributed Random numbers, generation of random numbers-Uniform and Non Uniform Random numbers, variance reduction techniques-Introduction, Common Random numbers- Rationale, Applicability and Synchronization.

Module III
Introduction to Queuing Theory: Characteristics of queuing system, Poisson's formula, berth- death system, equilibrium of queuing system, Queuing Disciplines, Simulation of single and two server queue. Analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems,computer networks etc.

Module IV
Discrete-Event Simulation: Components and Organization of a Discrete-Event Simulation Model, Determining the Events and Variables, approaches for time advance. Generation of arrival patterns, Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization , Recording Distributions and Transit times.

Module V
Introduction to Simulation languages: GPSS: Action times, Succession of events, Choice of paths, Conditional transfers, program control statements. SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements.

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Reference Books:

1. Gorden G., System simulation, Printice Hall.
2. Law .,Simulation Modeling And Analysis, McGraw Hill
3. Payer T., Introduction to system simulation, McGraw Hill.
4. Spriet, Computer Aided Modeling and Simulation, W.I.A.
5. Sushil, System Dynamics, Wiley Eastern Ltd.
6. Shannon R.E., System simulation, Prentice Hall.

Course Outcomes:

CO1: To understand the principles used in modeling.

CO2: To understand the probability concepts used in simulation.

CO3: To give overview of discrete event simulation.

CO4: To introduce simulation languages GPSS, SIMSCRIPT.

CO5: To discuss queuing theory and its applications in computer system.

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SubjectCode	Subject Name and Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT 71B	Advance Computer architecture	70	20	10	-	-	100	3	1	-	4

Module I
Evolution of Computer Architecture, System Attributes to performance, Multiprocessor and Multi computers, Data and resource dependencies, Hardware & Software Parallelism, Program Partitioning and scheduling, Grain sizes and latency, Grain packing & Scheduling, Static Multiprocessor scheduling, Program flow Mechanisms, Control flow and Data flow, Demand-driven mechanism, Back plane Bus systems, Bus specification, Arbitration, Transaction and interrupt, IEEE future bus + Standards.

Module II
Cache Memory organization, Cache performance issues, Interleaved Memory organizations, Bandwidth and fault tolerance, Memory allocation Schemes. Linear pipeline processors, asynchronous and synchronous Nudels, Speedup, Efficiency and through put. Non- linear pipeline processors, Reservation and latency analysis, Collision free scheduling. Braches handling and Hazard avoidance, Dynamic instruction scheduling, Arithmetic pipeline design, super scalar and super pipeline design.

Module III
Vector computers, Vector instruction types, Vector access Memory schemes, Multi vector Multi processors, Compound vector processing, Static and dynamic Interconnection networks. Cache coherence, Snoopy bus protocols, Directory protocols, Hardware synchronization mechanisms, Message passing mechanisms, Message routing schemes, Deadlock and Virtual channels, Flow control strategies, Multicast reacting algorithms.

Module IV
Principles of scalable performance, Performance metrics and measures, Parallelism profile in programs, Harmonic mean performance, Efficiency, Utilization and quality, Standardperformance measures, Application models of parallel computers. Speedup performance laws, Amdahls law for fixed workload, Memory bounded speedup model, Scalability analysis and approaches, Scalability matrix and goals.

Module V
Introduction to parallel programming and parallel programming models, Parallel languages and compilers, dependence analysis of data arrays, Code optimization and scheduling,Loop parallization and pipelining, Parallel program development and environments, Synchronization, Shared variable program structures.

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Reference Books :

- Kai Hwang, Advance Computer Architecture, McGraw Hill.

Course Outcomes:

CO1: To familiarize with Evolution of Computer Architecture and Program Partitioning.

CO2: To understand Cache Memory organization and Linear pipeline processors.

CO3: To understand Vector computers.

CO4: To get exposure to Principles of scalable performance, metrics and measures.

CO5: To Introduce parallel programming and parallel programming models.

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SubjectCode	Subject Name and Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT 71C	Real Time OperatingSystems	70	20	10	-	-	100	3	1	-	4

Module I
Introduction Introduction to IINIX/LINUX, Overview of Commands, File UO, (open, create, close, lseek, read, write), Process Control (fork, vfork, exit, wait, waitpid, exec).

Module II
Real Time Operating Systems Brief History of OS, Defining RTOS, The Scheduler, Objects, Services,Characteristics of RTOS, Defining a Task, asks States and Scheduling, Task Operations, Structure, Synchronization, Communication and Concurrency. Defining Semaphores, Operations and Use, Defining Message Queue, States, Content, Storage, Operations and Use.

Module III
Objects, Services and UO Pipes, Event Registers, Signals, Other Building Blocks, Component Configuration, Basic VO Concepts, VO Subsystem.

Module IV
Exceptions,Interrupts and Timers Exceptions, Intemrpts, Applications, Processing of Exceptions and Spurious lntemrpts, Real Time Clocks, Programmable Timers, Timer Intemrpt Service Routines (ISR), Soft Timers, Operations.

Module V
Case Studies of RTOS RT Linux, MicroC/OS-[, VxWorks, Embedded Linux, and Tiny OS. Textbook RealTime Conceptsfor Embedded Systems - Qing Li, Elsevier, 2011

Reference Books:

l. Embedded Systems- Architecture, Programming and Design by Rajkamal,z0}7, TMH.

2. Advanced WIX Programming, Richard Stevens

Course Outcomes:

CO1: To Introduce UNIX/LINUX.

CO2: To understand Real Time Operating Systems.

CO3: To understand Objects, Services and I/O in RTS.

CO4: To understand exceptions, Interrupts and Timers in RTS.

CO5: To analyze Case Studies of RTOS

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Subject Code	Subject Name and Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT72A	WIRELESS & MOBILE COMMUNICATION	70	20	10	-	-	100	3	1	-	4

Module I

Introduction of Wireless Networks, Different Generations of Wireless Networks. Characteristics of the Wireless Medium: Radio Propagation Mechanisms, Path Loss Modelling and Signal Coverage, Effect of Multipathand Doppler, Channel Measurement and Modelling Techniques.

Module II

Introduction to cellular mobile system A basic cellular system, performance criteria, Uniqueness ofMobile Radio Environment, Operation of cellular systems, Planning and cellular system, Analog and digital cellular systems. Elements of cellular radio system design: General description of the problem, Concept of frequency channels, Co channel interface reduction factor, Cell splitting, Consideration of the components of cellular systems.

Module III

Cell coverage for signal and traffic: General introduction, obtaining the mobile point-to-point mode propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point-to- point prediction model-characteristics, cell site, antenna heights and signal coverage cells, mobile-to-mobile propagation.

Module IV

Introduction to Wireless LAN, Evolution of WLAN, Wireless Home Networking, Technologies for Home Area Network (HAN), Overview of IEEE 802.11, Reference Architecture, PHY and MAC Layer, Wireless ATM, HIPERLAN.

Module V

IEEE 802.15 WPAN, HomeRF, Bluetooth, Interference between Bluetooth and 802.11, Adhoc Networks,Introduction to 2.5 G and 3 G Networks.

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Reference Books :

1. Kaveh Pahlavan, Prashant Krishnamurthy "principles of Wireless Networks", PHI.
2. Qing- An Zeng, Dharma Prakash Agrawal "Introduction to Wireless and Mobile Systems"CENGAGE Learning.
3. Sumit Kasera, Nishit Narang, A P Priyanka "2.5 G Mobile Networks: GPRS and EDGE", TMH
4. Dr. KAMILO FEHER "Wireless Digital Communications" , PHI
5. Jochen Schiller " Mobile Communications", PEARSON

Course Outcomes:

CO1 : To compare various wireless systems.

CO2: To understand the cellular mobile system and its problems and its solution.

CO3: To outline the cell coverage for various control Modules.

CO4: To give overview of IEEE reference architecture.

CO5: To discuss various generations of mobile wireless technology.

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Subject Code	Subject Name and Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT72B	Embedded Systems	70	20	10	-	-	100	3	1	-	4

Module I
Introduction to Embedded System, Categories, Requirements, Applications, Challenges and Issues. Core of Embedded system, Memory, Sensors and Actuators, communication interface, embedded firmware, system components.

Module II
Architecture of 8051 microcontroller, memory organization, registers, interrupts, addressing modes, instruction sets. Interfacing methods parallel I/O interface, Parallel Port interfaces, Memory Interfacing, High Speed I/o Interfacing, Interrupts, interrupt service routing, features of interrupts, Interrupt vector and Priority, timing generation and measurements,

Module III
Fundamental issues of hardware software co-design, computational models in embedded design. Embedded firmware design approaches- Embedded firmware development languages-Assembly language based, high level language based, mixed. Programming in embedded C.

Module IV
Embedded System Development Environment: KEIL Integrated Development Environment (IDE), Types of files Generated on Cross-Compilation, Disassembler/Decompiler, Simulators, Emulators and Debugging

Module V
Real Time Operating Systems: Task and Task States, tasks and data, semaphores andshared Data Operating system Services, Message queues, Timer Function, Events, Memory Management, Interrupt Routines in an RTOS environment, Basic design using RTOS.

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Reference Books :

1. Shibu K V, "Introduction to Embedded System", TMH.
2. David E Simon, "An Embedded Software Primer", Pearson education Asia, 2001
3. Steven F. Barett, Daniel J. Pack, "Embedded Systems" Pearson education, First Impression 2008.
4. Vahid Frank, Tony Givargis, "Embedded System Design", John Wiley and Sons, Inc.
5. Dream Tech Software Team, "Programming for Embedded Systems" Wiley Publishing houseInc.

Course Outcomes:

CO1: To familiarize with Embedded System, Categories, Requirements, Applications

CO2: To understand Architecture of 8051 microcontroller

CO3: To understand Embedded firmware design approaches.

CO4: To get exposure to Embedded System Development Environment

CO5: To study Real Time Operating systems.

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Subject Code	Subject Name and Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT72C	Distributed Systems	70	20	10	-	-	100	3	1	-	4

Module I
Characterization of Distributed Systems: Introduction, Examples of distributed Systems,Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection.Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutualexclusion algorithms.

Module II
Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms. Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.

Module III
Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. Security: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent. Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System, Recent advances.

Module IV
Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault tolerant services, highly available services, Transactions with replicated data

Module V
Distributed Algorithms: Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm.CORBA Case Study: CORBA RMI, CORBA services.

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Reference Books:

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design",Pearson Ed.
3. Ramakrishna,Gehrke," Database Management Systems", Mc Grawhill
4. Tenanuanbaum, Steen," Distributed Systems", PHI
5. Gerald Tel, "Distributed Algorithms", Cambridge University Pres Gerald Tel,"Distributed Algorithms", Cambridge University Press

Course Outcomes:

CO1: To familiarize with Characterization of Distributed Systems, System Models and Theoretical Foundation for Distributed System.

CO2: To understand Distributed Deadlock Detection, Distributed Mutual Exclusion and Agreement Protocols.

CO3: To understand Distributed Objects and Remote Invocation, Security and Distributed File Systems.

CO4: To get exposure to Transactions and Concurrency Control in Distributed Transactions.

CO5: To understand Distributed Algorithms and CORBA.

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		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT73	Information & CyberSecurity	70	20	10	30	20	150	3	-	2	4

Module I
Basic of Cryptography, secret key cryptography, Types of attack, Substitution ciphers, Transposition ciphers, block ciphers and steam ciphers, Confusion and Diffusion, Data encryption standard, round function, modes of operation, cryptanalysis, brute force attack, Security Goals (Confidentiality, Integrity, Availability).

Module II
Public key Cryptography, Modulo arithmetic, Greatest common divisor, Euclidean algorithm, RSA algorithm, hash function, attack on collision resistance, Diffie hellman key exchange, Digital signature standard, elliptic curve cryptography.

Module III
Authentication: One way Authentication, password based, certificate based, Mutual Authentication ,shared secret based, Asymmetric based, Authentication and key agreement, centralized Authentication, eavesdropping, Kerberos, IP security overview:- security association & Encapsulating security payload ,tunnel and transfer modes, internet key exchange protocol, Secure Socket Layer(SSL), Transport Layer Security (TLS).

Module IV
Software vulnerabilities:Phishing Attacks, buffer overflow vulnerability, Format String attack, Cross Site Scripting, SQL injection Attacks, Email security:- Security services of E- mail ,Establishing keys, Privacy ,Authentication of the source, Message integrity ,Non-Repudiation, Viruses, Worms, Malware.

Module V
Web Issue: Introduction, Uniform Resource Locator/uniform resource identify, HTTP, Cookies, Web security problem, Penetration Testing, Firewalls:- functionality, Polices and Access Control, Packet filters, Application level gateway, Encrypted tunnel, Security architecture, Introduction to intrusion detection system.

References Books:

- Bernard Menezes, " Network Security and Cryptography", CENGAGE Learning.
- Charlie Kaufman, " Network Security", PHI.
- Forouzan, "Cryptography & Network Security",
- TMH Randy Weaver, " Network Infrastructure Security", Cengage Learning.
- Atual Kahate, " Cryptography and Network Security", TMH.
- William Stalling, " Cryptography and Network security", Pearson.

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List of Experiments:

1. Study of Network Security fundamentals - Ethical Hacking, Social Engineering practices.
2. System threat attacks - Denial of Services.
3. Sniffing and Spoofing.
4. Web Based Password Capturing.
5. Virus and Trojans.
6. Anti-Intrusion Technique - Honey pot.
7. Symmetric Encryption Scheme - RC4.
8. Block Cipher-S-DES, 3-DES.
9. Asymmetric Encryption Scheme - RSA.
10. IP based Authentication.

Course Outcomes:

CO1: To give overview of cryptography and DES.

CO2: To understand various cryptography algorithms.

CO3: To familiarize with the different authentication techniques.

CO4: To introduce various software vulnerabilities.

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		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT74	Introduction to Artificial Intelligence and Machine Learning	70	20	10	30	20	150	3	-	2	4

Module I

Introduction to AI and State Space Search: Meaning and definition of Artificial Intelligene, Study and Comparision of Breadth First Search, Depth First Search techniques, Hill Climbing, Best First Search, A*Algorithm, AO*Algorithms etc., Various types of control strategies. Representation of knowledge: Knowledge representation, problems in representing knowledge, knowledge representation using, proportional and predicate logic, comparision of proportional and predicate logic, resolution, refutation, deduction, theorem proving, inferencing, monotonic and no monotonic reasoning.

Module II

Knowledge Inference and Reasoning:-Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning. Game Playing: Game playing techniques like minimax procedure, alpha beta cutoffs, etc., planning. Study of the block world problem in robotics

Module III

Machine Learning:- Introduction to machine learning: basic concepts, understand and formalize the learning problem, model and parameters, training, validation and test data. Metrics for evaluation of model performance: Accuracy, Precision, Recall, Confusion Matrix, Blas variance tradeoffs, overfitting and Under fitting. Types of learning.

Module IV

Supervised Learning: Classification, Linear Regression, Linear Regression of one variable using gradient descent algorithm, linear regression of multiple variables using gradient descent algorithm. Logistic regression, decision trees, Ensemble learning-Boosting-Bagging, Naïve Baye's classifier, K-Nearest neighbours classifier, support vector machine.

Module V

Unsupervised Learning: Hierarchial clustering, K-means Clustering, Mixture Models, Density-Based Spatial clustering of application with noise(DBSCAN), ordering points to identify the clustering structure(OPTICS).Introduction to neural network: perception, Basic neural network structure, forward propagation, Cost functions, Error Back propagation Algorithm, Training by Gradient Descent.

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Reference Books:

1. Machine Learning: A Multistrategy Approach by **Ryszard Spencer Michalski, Ryszard Stanislaw Michalski, George Tecuci.**
2. Introduction to Machine Learning by Ethem Alpaydin.

Experiment List:

1. Design implementation and evaluation of algorithms for semi supervised learning
2. Study of perceptron update rules and perceptron conversion.
3. Study kernel regression & linear Regression.
4. Study of Bayesian Network.
5. Design of neural network using classification approach.
6. Study of Decision tree.
7. Study of split algorithm based on the Gini/index.
8. Study of practical aspect of machine learning.
9. Study of PAC learning algorithm.
10. Study of logistic regression.

Course Outcomes:

CO1: To introduce with the mathematical foundation of machine learning.

CO2: To understand and outline various machine learning algorithms and their classification.

CO3: To give insights of the practical aspects in machine learning, data processing and accuracy establishment.

CO4: To discuss about some special topics PAC objects.

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		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT75	Internet of Things	70	20	10	30	20	150	3	-	2	4

Module I
Introduction: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view,Physical design of IOT, Logical design of IOT, Application of IOT.

Module II
Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services.

Module III
Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles: Internet Connectivity, Internet based communication, [P addressing in IOT,Media Access control.

Module IV
Sensor Technology , Participatory Sensing, Industrial IOT and Automotive IOT , Actuator, Sensor data Communication Protocols ,Radio Frequency Identification Technology, Wireless Sensor Network Technology.

Module V
IOT Design methodology: Specification -Requirement, process, model, service, functional & operational view.IOT Privacy and security solutions, Raspberry Pi & arduino devices. IOT Case studies: smartcity streetlights control & monitoring.

H.O.D.
I.T. Department
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Jabalpur Engineering College, Jabalpur
(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)
(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) VII Semester (Information Technology)
w.e.f. July 2023

Reference Books:

1. Rajkamal,"Intemet of Things",Tata McGraw Hill publication
2. Vrjay Madisetti and Arshdeep Bahga, "Intemet of things(A-Hand-on-Approach)" ist Edition ,UniversalPress.
3. Hakima Chaouchi "The Intemet of Things: Connecting Objects", Wiley publication.
4. Charless Bell "MySQL for the Intemet of things", Apress publications.
5. Francis dacosta "Rethinking the Intemet ofthings:A scalable Approach to connecting everything", 1stedition, Apress publications 2013 '
6. Donald Norris"The Intemet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi andBeagleBone Black", McGraw Hill publication.

List of Experiments:

1. Excercise on Eclipse IoT Project.
2. Experiments on few Eclipse IoT Projects.
3. Any Experiment on architecture of lot Toolkit.
4. Exercise on smart object API Gateway service reference implementation in IoT Toolkit.
5. Experiment on HTTP-to-CoAP semantic mapping Proxy in IoT Toolkit.
6. Experiment o nent on Gate way as a service deployment in IoT Toolkit.
7. Experiment on application framework and embedded software agents for IoT Toolkit.
8. Excercise on working principle of Rasberry Pi.
9. Experiment on connectivity of Rasberry Pi with existing system components.

Course Outcomes:

CO1: To familiarize with Internet of things and their applications.

CO2: To understand M2M, SDN and NFV along with cloud based IOT models.

CO3: To understand various design principles like SOAP, REST.

CO4: To get exposure to sensor technology.

CO5: To understand IOT design methodology and IOT case studies.

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