

FYUGP CURRICULAR FRAMEWORK FOR BACHELORS PROGRAMME WITH INFORMATION TECHNOLOGY AS MAJOR

SEMESTER	COURSE CODE	TYPE OF COURSE	TITLE OF COURSE	CREDITS	
				THEORY	PRACTICAL / TUTORIAL
I	BIT122J	CT-1	INFORMATION TECHNOLOGY: BASIC COMPUTING	4	2
II	BIT222J	CT-1	INFORMATION TECHNOLOGY: COMPUTER ARCHITECTURE AND ORGANISATION	4	2
III	BIT322J	CT-1	INFORMATION TECHNOLOGY: C PROGRAMMING	4	2
IV	BIT422J1	CT-1	INFORMATION TECHNOLOGY: OOPS USING C++	3	1
	BIT422J2	CT-2	INFORMATION TECHNOLOGY: OPERATING SYSTEMS	4	2
	BIT422J3	CT-3	INFORMATION TECHNOLOGY: SOFTWARE ENGINEERING	4	2
V	BIT522J1	CT-1	INFORMATION TECHNOLOGY: DOT NET	3	1
	BIT522J2	CT-2	INFORMATION TECHNOLOGY: DATABASE MANAGEMENT SYSTEM	4	2
	BIT522J3	CT-3	INFORMATION TECHNOLOGY: DATA STRUCTURES USING 'C'	4	2
VI	BIT622J1	CT-1	INFORMATION TECHNOLOGY: SYSEM ANALYSIS AND DESIGN	3	1
	BIT622J2	CT-2	INFORMATION TECHNOLOGY: CORE JAVA PROGRAMMING	4	2
	BIT622J3	CT-3	INFORMATION TECHNOLOGY: CYBER SECURITY	4	2
FOR FYUGP HONOURS					
VII	BIT722J1	CT-1	INFORMATION TECHNOLOGY: MOBILE COMPUTING	3	1
	BIT722J2	CT-2	INFORMATION TECHNOLOGY: DATA COMMUNICATIONS AND NETWORKS	4	2
	BIT722J3	CT-3	INFORMATION TECHNOLOGY: PYTHON PROGRAMMING	4	2
VIII	BIT822J1	CT-1	INFORMATION TECHNOLOGY: MACHINE LEARNING	3	1
	BIT822J2	CT-2	INFORMATION TECHNOLOGY: COMPUTER GRAPHICS	4	2
	BIT822J3	CT-3	INFORMATION TECHNOLOGY: MICROPROCESSOR	4	2
FOR FYUGP HONOURS WITH RESEARCH					
VII	BIT722J1	CT-1	INFORMATION TECHNOLOGY: INTRODUCTION TO INNOVATION AND ENTREPRENEURSHIP TECHNOLOGY	3	1
	BIT722J2	CT-2	INFORMATION TECHNOLOGY: DATA COMMUNICATIONS AND NETWORKS	4	2
	BIT722J3	CT-3	INFORMATION TECHNOLOGY: PYTHON PROGRAMMING	4	2
VIII	BIT822J1	CT-1	INFORMATION TECHNOLOGY: MACHINE LEARNING	3	1
	BIT822JP	PROJECT	INFORMATION TECHNOLOGY: PROJECT WITH DISSERTATION	-	12

FYUGP CURRICULAR FRAMEWORK FOR BACHELORS PROGRAMME WITH INFORMATION TECHNOLOGY AS MINOR

SEMESTER	COURSE CODE	TYPE OF COURSE	TITLE OF COURSE	CREDITS	
				THEORY	PRACTICAL / TUTORIAL
I	BIT122N	CT-1	INFORMATION TECHNOLOGY: BASIC COMPUTING	4	2
II	BIT222N	CT-1	INFORMATION TECHNOLOGY: COMPUTER ARCHITECTURE AND ORGANISATION	4	2
III	BIT322N	CT-1	INFORMATION TECHNOLOGY: C PROGRAMMING	4	2
IV	BIT422N	CT-1	INFORMATION TECHNOLOGY: OOPS USING C++	3	1
V	BIT522N	CT-1	INFORMATION TECHNOLOGY: DOT NET	3	1
VI	BIT622N	CT-1	INFORMATION TECHNOLOGY: SYSEM ANALYSIS AND DESIGN	3	1
VII	BIT722N	CT-1	INFORMATION TECHNOLOGY: MOBILE COMPUTING	3	1
VIII	BIT822N	CT-1	INFORMATION TECHNOLOGY: MACHINE LEARNING	3	1

FYUGP CURRICULAR FRAMEWORK FOR BACHELORS PROGRAMME WITH APPLIED INFORMATION TECHNOLOGY AS MINOR

SEMESTER	COURSE CODE	TYPE OF COURSE	TITLE OF COURSE	CREDITS	
				THEORY	PRACTICAL / TUTORIAL
I	AIT122N	CT-1	INFORMATION TECHNOLOGY: DIGITAL ELECTRONICS	4	2
II	AIT222N	CT-1	INFORMATION TECHNOLOGY: OPEN-SOURCE TOOLS AND TECHNOLOGIES	4	2
III	AIT322N	CT-1	INFORMATION TECHNOLOGY: CLOUD COMPUTING	4	2
IV	AIT422N	CT-1	COMPUTER APPLICATIONS: IOT FUNDAMENTALS	3	1
V	AIT522N	CT-1	INFORMATION TECHNOLOGY: DESIGN ANALYSIS AND ALGORITHM	3	1
VI	AIT622N	CT-1	INFORMATION TECHNOLOGY: DATA MINING	3	1
VII	AIT722N	CT-1	INFORMATION TECHNOLOGY: ARTIFICIAL INTELLIGENCE	3	1
VIII	AIT822N	CT-1	COMPUTER APPLICATIONS: LATEX	3	1

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DIRECTORATE OF IT&SS / CONVENOR BOUGS

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CT-1: 1st Semester						
Course Title	Course Code	Credits-06			Total Marks- 90	
		Theory	Tutorial	Practical	Theory	Tutorial
Basic Computing	BIT122J	04	02	Nil	60	30

Unit I

Introduction to Computing-Computer Systems, Components of a computer system, Hardware and software, Evolution and generations of computers, and Classification of computers on the basis of capacity, purpose, and generation.

Data representation in digital computer. Number System: Bit, byte, binary, decimal, octal systems and hexadecimal conversion from one system to the other, representation of characters, integers and fractions. Binary Arithmetic: Addition, subtraction and multiplication. Computer Codes-BCD, Gray Code, ASCII and Unicode.

Unit II

Problem Solving approaches top-down and bottom up programming. Representation of Algorithm, Flowchart, Pseudo code and Source Code with examples. Transformation of Algorithms into source code.

The Role of Algorithms in Computing, Algorithms as a technology, analyzing algorithms, Designing algorithms, Growth of Functions.

Computer languages - Machine language, assembly language, higher level language, 4GL. Translator Programs - Compiler, Interpreter, Assembler.

Unit III

Operating Systems-Introduction, Features, Functions- Process Management, Memory Management, File Management, Device Management etc. Introduction to different Operating Systems. Different types and classification of Operating Systems.

Data, Information and Knowledge. Database, database management system, database System, Database Applications. Structured and Unstructured data. Big Data. Different kinds of databases.

Unit IV

Internet, History of Internet, Features and uses of Internet. Internet Architecture, IP Address, Domain Name. Managing the Internet. Introduction to WWW, Web browsers, Websites, Email, Search Engine etc.

Connecting to the Internet, Internet Connections, Internet Address, Internet Services, Uses of Internet, Introduction to Internet of Things (IoT) and Cloud Computing. Introduction to E-commerce, E-governance, E-government, Smart homes with relevant examples like AMS, admissions systems etc.

Tutorial: (2-Credits)

Note: The Tutorial Component shall be based on the Unit-I to Unit-IV

ReferenceBooks

1. IntroductiontoInformationTechnology,VRajaraman,PHI
2. IntroductiontoComputers, PeterNorton, 7thEdition, McGrawHillEducation
3. FundamentalsofComputers, V.Rajaraman, PHIPublications
4. ComputerFundamentals,AnitaGoel,PearsonEducationIndia

CT-1: 1 st Semester						
Course Title	Course Code	Credits-06			Total Marks- 90	
		Theory	Tutorial	Practical	Theory	Practical
Digital Electronics	AIT122N	04	Nil	02	60	30

UNIT I:

NUMBER SYSTEMS: Binary, Octal, Decimal, Hexadecimal. Number base conversions,

Binary Arithmetic: Binary Addition, Decimal Subtraction Using 9's and 10's Compliment, Binary Subtraction Using 1's and 2's Compliment, Multiplication and Division.

LOGIC GATES: AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR.

Implementations of Logic Functions using gates, NAND-NOR implementations

Unit-II:

BOOLEAN ALGEBRA: Boolean postulates and laws – De-Morgan's Theorem, Principle of Duality, Boolean expression – Boolean function, Minimization of Boolean expressions – Sum of Products (SOP), Product of Sums (POS), Minterm, Maxterm, Canonical forms, Conversion between canonical forms, Karnaugh map Minimization, Don't care conditions, Quine-McCluskey method.

Unit-III:

Combinational Circuits: Half Adder, Full Adder, Parallel Adder, Half Subtractor, Full Subtractor, 4-Bit Binary Adder Subtractor, Multiplexer, Demultiplexer, Decoder, Encoder, Parity Detector. Implementation of combinational logic using MUX, BCD to 7 segment decoders.

Unit IV:

SEQUENTIAL CIRCUITS: Flip flops SR, JK, T, D and Master slave, Excitation table, Edge triggering, Level Triggering, Realization of one flip flop using other flip flops. Asynchronous/Ripple counters, Synchronous counters, Modulo-n counter, Ring Counters. Design of Synchronous counters: state diagram, Circuit implementation. Shift registers.

Practical: (2-Credits)

Note: *The Practical Component shall be based on the Unit-I to Unit-IV*

SUGGESTED READING:

- 1) Navaneeth, Kale and Gokhale, "Digital and Analogue Technique". ISBN-81-225-0153-2
- 2) Soumitra Mandal, "Digital Electronics", TMH, ISBN 0-07015382-5
- 3) Modern Digital Electronics by R.P. Jain, Tata McGrawHill.
- 4). Digital Fundamentals by Thomas Floyd, Prentice Hall.
- 5). Digital Logic and computer Design by' Morris Mano, PHI pvt. Ltd.
- 6) Jacob Millman, Christos Halkias, Chetan D Parikhu, Integrated Electronics, Tata McGraw

CT-1: 2 nd Semester						
Course Title	Course Code	Credits-06			Total Marks- 90	
		Theory	Tutorial	Practical	Theory	Tutorial
Computer Architecture and Organization	BIT222J	04	02	Nil	60	30

UNIT-I

Basic Structure of computer, and basic operational concepts, registers (general purpose registers, accumulator, status register, program counter, stack pointer, word size and register size).data movement among registers.

UNIT-II

Computer Instructions (input/output, instructions, register referenced instructions, direct addressing mode memory referenced instructions), how an instruction is executed? Instructions formats, bus structure and addressing modes.

UNIT-III

ALU & control unit organization: simple ALU organization, floating point ALU, Arithmetic processors, control unit organization: functional requirements of a control unit, structure of a control unit, micro-programmed and hardware control unit.

UNIT-IV

I/O organization: Peripheral devices(input/output devices),synchronous and asynchronous communication, I/O(input/output)interface, (serial and parallel points),data transfer and synchronization, programmed I/O interrupt initiated I/O, DMA, interrupts (software and hardware).

Main Memory (ROM, RAM-static and dynamic RAM), design of main memory (RAM 4x4), virtual memory (paging & page replacement).

Tutorial: (2-Credits)

Note: *The Tutorial Component shall be based on the Unit-I to Unit-IV*

References:

V.C Hamacher, A.G Vranesic and S.G Zaky,"Computer Organization"

J.P Hayes," Computer System Architecture", McGrawHill

Morris Mano," Computer System Architecture", Prentice Hall of India

CT-1: 2nd Semester						
Course Title	Course Code	Credits-06			Total Marks- 90	
		Theory	Tutorial	Practical	Theory	Practical
Open-Source Tools and Technologies	AIT222N	04	Nil	02	60	30

UNIT-I

Introduction: Need of Open Sources – Advantages of Open Sources – Applications – FOSS – FOSS usage - Free Software Movement, Commercial aspects of Open-Source movement -Certification courses issues - global and Indian. Application of Open Sources–Commercial aspects of Open-Source movement- Contrasting and comparing open source vs. traditional development Methodologies

UNIT-II

Introduction to Linux, History of Linux – Features of Linux - Drawbacks of Linux, Components of Linux. Difference Between Linux and Windows., Difference Between Linux and Unix, Linux is Virus proof, Various Linux Distributions, Pros and Cons Understanding Files and Directories in Linux - File Structure and hierarchy, File Permissions, root, shell, Using VI editor and command associated with it.

UNIT III

Linux Commands and Utilities : Basic Commands –mkdir, touch, ls, pwd, cd, chmod, df, du, dd, adduser, passwd, rm, rmdir, date. cat, tail, cmp, diff, wc, sort, rmdir, cp, more, who, whoami, mv, chmod, kill, write, wall, merge , mail, news – pipes, filters and redirection utilities.

UNIT-IV

Shell Scripts: Creating and executing simple shell programs – variables – special characters – comparison of expressions – iteration statements – conditional statements – functions.

Open source software tools: Browsers – Processors – Compilers.

Practical: (2-Credits)

Note: *The Practical Component shall be based on the Unit-I to Unit-IV*

References

1. N. B. Venkateshwarlu (Ed); Introduction to Linux: Installation and Programming, B S Publishers; 2005.
2. Matt Welsh, Matthias KalleDalheimer, Terry Dawson, and Lar Kaufman, Running Linux, Fourth Edition, O'Reilly Publishers, 2002
3. The Linux Kernel Book Rem Card, Eric Dumas and Frank Mevel Wiley Publications sons, 2003
4. Linux - The Complete Reference Richard Peterson Tata McGraw Hill, New Delhi

CT-1: 3rd Semester						
Course Title	Course Code	Credits-06			Total Marks- 90	
		Theory	Tutorial	Practical	Theory	Practical
C-Programming	BIT322J	04	Nil	02	60	30

UNIT-I

C Fundamentals- Character set, Identifiers and keywords, Data Types, Constants, Variables and Arrays, Declarations, Operators & Expressions, Library functions, Statements, Symbolic Constants.

Operators- Arithmetic operators, Unary operators, Relational operators, Logical operators

Data Input and Output- printf(), scanf(), getc(), getch(), getchar(), putc(), putchar(), gets(), puts().

UNIT-II

Storage Class in C- Automatic, Register, static, external

Control Statements- if statement, if-else statement, nested if statement, got statement, switch-case statement

Loops- while (), do-while (), for (), nested loops, break, continue, exit (), comma operator.

UNIT-III

Arrays- Arrays, one dimensional array, Various Operation on Array (Inserting of Element, Deleting of Element, Sorting and Searching) and two-dimensional arrays (Matrix Addition, Transpose of Matrix, Matrix Multiplication). Arrays and strings – standard string functions

Functions- defining function, accessing function, passing arguments to functions, function prototype, recursion, passing array to a function.

Pointers - pointer declaration, operators and pointers, passing pointer to a function, pointer and one-dimensional arrays, array of pointers, Dynamic memory allocation.

UNIT-IV

Structures and Unions- defining a structure, processing a structure, user defined data type, sorting structures, passing structure to a function. Overview of union.

File Management - introduction, defining and opening a file, closing a file. Input/output operations file. Random access file. Command line arguments.

Practical: (2-Credits)

5. Note: The Practical Component shall be based on the Unit-I to Unit-IV

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SUGGESTED READING:

1. "Programming in C" by Schaum Series
2. "Let Us C" by Yashwant Kanitkar, BPB Publications
3. "Programming in ANSCI C" by E. Balaguruswamy, Tata McGraw Hill
4. "Art and Craft of C" by R.B. Patel.
5. "Programming with C" by Bryan Gottfried, Tata McGraw Hill

CT-1: 3rd Semester						
Course Title	Course Code	Credits-06			Total Marks- 90	
		Theory	Tutorial	Practical	Theory	Tutorial
Cloud Computing	AIT322N	04	02	Nil	60	30

Unit - I

Introduction to Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio-computing, Mobile Computing, Quantum Computing, Optical Computing, Nano-computing, Network Computing. **Cloud Computing Fundamentals:** Motivation, Need, Definition of Cloud Computing. **Principles of Cloud computing:** Five Essential Characteristics, Four Cloud Deployment Models, Three Service Offering Models, Cloud Ecosystem, Requirements for Cloud Services.

Unit - II

Cloud Computing Architecture: cloud Architecture, User/Client Layer, Network Layer, Cloud Management Layer, Hardware Resource Layer, Network Connectivity in Cloud Computing, Public Cloud Access Networking, Private Cloud Access Networking

UNIT – III

Cloud Computing Management: Cloud Application, Benefits and Drawbacks Applications on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure, Managing the Cloud Application, Migrating Application to Cloud, Cloud Deployment Models: Private Cloud, Outsourced Private Cloud, Community Cloud, On-Premise Community Cloud, Hybrid Cloud. **Cloud Service Models:** Infrastructure as a Service, Platform as a Service, Software as a Service, Introduction to Open-Source Tools for IaaS, Paas& SaaS: Apache.

UNIT - IV

Technological Drivers for Cloud Computing: SOA and Cloud, SOA and SOC, Benefits of SOA, Multi-core Technology: Multi-core Processors and VM Scalability, Memory and Storage Technologies, Cloud Storage Requirements, Networking Technologies, Web 2.0: Characteristics, Difference from Web 1.0, Applications, Social Media, Marketing, Education.

Tutorial: (2-Credits)

Note: *The Tutorial Component shall be based on the Unit-I to Unit-I*

References:

1. Essentials of Cloud Computing, K Chandrasekaran, CRC Press [ISBN: 3: 978--4822-0544-2]
2. Raj Kumar Buyya, James Broberg and rezeiM.Goscinski, -Cloud Computing: Principles and Paradigms,-Wiley 2011.
3. Srinivasan, J.Suresh,-Cloud Computing – a Practical Approach for Learning and Implementation, Pearson India, [ISBN 978131776513]
4. Toby Velte, Anthony Velte, Robert Elsenpeter,-Cloud Computing, a Practical Approach - McGraw Hill, 2010 [ISBN: 0071626948]

CT-1: 4 th Semester						
Course Title	Course Code	Credits-			Total Marks-	
		Theory	Tutorial	Practical	Theory	Practical
OOPS Using C++	BIT422J1	03	Nil	01	45	15

UNIT-I:

Introduction to object-oriented approach (OOA) and object-oriented programming (OOP), concept of object and class.

Features of OOP-Encapsulation, Abstraction, Inheritance and Polymorphism. Advantages of OOP over structured programming.

Introduction to C++ with general basic features of operators and control structure (if, if-else, switch-case, while, do-while, for, etc.)

UNIT-II:

Classes-specifying class, defining member functions and member variables, scope resolution operator, access specifiers and accessing class members, friend class, static class members.

Objects-Dynamic allocation operators (New and Delete), arrays of objects, object as function argument and functions returning objects, object assignment.

Functions-Inline functions, friend functions. Default arguments, reference variables.

Constructors-parameterized, multiple constructors in a class, copy constructor, destructor. **Function overloading, operator overloading** (unary, binary).

UNIT-III:

Inheritance-Defining derived classes. Inheritance types-single, multilevel, multiple, hierarchical and hybrid inheritance. Virtual base classes.

Pointers-Pointer to objects, this pointer, pointer to derived class.

Polymorphism-Virtual functions, pure virtual functions, abstract classes.

Tutorials: (1-Credit)

Note: *The Tutorial Component shall be based on the Unit-I to Unit-III*

Books:

- 1 "Object oriented programming with C++" by E Balaguruswamy
- 2 "The complete reference C++" by Herbert Schildt
"Object oriented programming in C++" by Robert Lafore

CT-2: 4 th Semester						
Course Title	Course Code	Credits-			Total Marks-	
		Theory	Tutorial	Practical	Theory	Practical
Operating Systems	BIT422J2	04	02	Nil	60	30

Unit I

Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel. Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching. Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads,

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and non-pre-emptive, FCFS, SJF, RR.

Unit II

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock

Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation –Fixed and variable partition–Internal and External fragmentation and Compaction. Paging: Principle of operation – Page allocation–Hardware support for paging, Protection and sharing, Disadvantages of paging. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

Unit III

I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms.

Unit IV

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed).

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.

Tutorials: (2-Credits)

Note: *The Tutorial Component shall be based on the Unit-I to Unit-IV*

REFERENCES

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.
3. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
4. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley

CT-3: 4th Semester						
Course Title	Course Code	Credits-			Total Marks-	
		Theory	Tutorial	Practical	Theory	Practical
Software Engineering	BIT422J3	04	02	Nil	60	30

UNIT-I

Software process, SW Product, Characteristics of good SW Product, SW process models: waterfall, prototyping, RAD, incremental, and generic spiral model, 4G Techniques.

SW requirements analysis, types of requirements and steps involved in SRA, SW requirements Specifications, guidelines and prototypes for good SRS.

UNIT-II

Structured analysis and design, representation techniques used data modeling (ER Diagrams)

Process Modeling (DFD), Behavioral modeling (State-transition Diagram)

Software design concepts and principals, procedural and data abstraction, top-down design, call-return architecture, structural partitioning, characterization of effective modular design (functional independence, Cohesion, Coupling), SW architecture styles (data-centered, dataflow and layered architectures).

UNIT-III

Software Testing: Need for SW Testing, testing principle, approaches to the design test cases, black-box and white-box testing, Phases in testing activity: unit, integration, validation and system tests, concepts of verification and validation.

UNIT-IV

Software project management concepts, project planning and resource estimation techniques, simple Boehm model, risk analysis and management, project scheduling and tracking, software quality assurance, SW configuration management concepts: baseline, version Id, Introduction to CASE tools, categories of commonly used CASE Tools.

Tutorials: (2-Credits)

Note: *The Tutorial Component shall be based on the Unit-I to Unit-IV*

Books Recommended:

1. Software Engineering—Roger Pressman
2. Fundamentals of Software Engineering—Ghezzi, Jazayeri
3. Software Engineering—Ian Sommerville

CT-1: 4 th Semester						
Course Title	Course Code	Credits-			Total Marks-	
		Theory	Tutorial	Practical	Theory	Practical
IOT Fundamentals	AIT422N	03	01	Nil	45	15

Unit-I

Introduction to IoT: Definition, history, and evolution, Key components, and characteristics. IoT Architecture: Sensor nodes, Communication protocols (e.g., MQTT, CoAP), IoT Devices and Sensors: Types of sensors and actuators, Sensor networks, Data acquisition and processing.

Unit-II

Communication Technologies: Wireless communication (e.g., Wi-Fi, Bluetooth, Zigbee), IoT protocols (e.g., MQTT, HTTP, CoAP). Data Management and Analytics: Data storage and processing in IoT, Big Data analytics & Edge computing.

Security and Privacy: Threats and vulnerabilities in IoT, Authentication and access control &

Encryption and data integrity.

Unit-III

IoT Applications: Smart homes and cities, Industrial IoT (IIoT), Healthcare applications & Agriculture and environmental monitoring.

Ethical and Social Implications: Privacy concerns, Ethical considerations in IoT design and deployment, Regulatory issues.

Tutorials: (1-Credit)

Note: The Tutorial Component shall be based on the Unit-I to Unit-III

References:

"Building Internet of Things with the Arduino" by Charalampos Doukas

"Designing Connected Products: UX for the Consumer Internet of Things" by Claire Rowland, Elizabeth Goodman, Martin Charlier, Ann Light

"Practical Internet of Things Security" by Brian Russell, Drew Van Duren

"The Fourth Industrial Revolution" by Klaus Schwab

This syllabus provides a comprehensive introduction to IoT fundamentals while allowing for flexibility in terms of additional readings, guest lectures, and hands-on activities.

"Internet of Things: Principles and Paradigms" by Rajkumar Buyya, Amir Vahid Dastjerdi