

UNIVERSITY OF JAMMU

(NAAC ACCREDITED A + GRADE UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

NOTIFICATION

(23/Sept/Adp/ 83)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, has been pleased to authorize the adoption of the revised Syllabi and Courses of Studies in **Bachelor of Technology (B.Tech.) in Information Technology** for Semester III & IV under the **Credit Based System** as per the new AICTE Model Curriculum (as given in the Annexure) for the candidates of **Govt./Pvt. Engineering Colleges affiliated with the University of Jammu** for the Examinations to be held in the years indicated against each Semester as under:-

Branch	Semester	For the Examination to be held in the years
Information Technology	Semester-III	December 2023, 2024, 2025 and 2026
	Semester-IV	May, 2024, 2025, 2026 and 2027

The Syllabi of the course are available on the University Website: www.jammuuniversity.ac.in.

Sd/-
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/23/ 9969-9979

Dated: 13/09/2023

Copy for information & necessary action to:-

1. Dean Faculty of Engineering
2. Principal, GCET/MBSCET/BCET/YCET
3. C.A to the Controller of Examinations
4. Joint/Assistant Registrar (ExamsProf./Eval Prof./Confidential)
- ✓ 5. Incharge University Website

Assistant Registrar (Academic)

Subinayal 13/Sept/23
18/13/9/23 Talyr 12/09/23

ANNEXURE-I

**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

B.Tech. Information Technology 3rd Semester

Contact Hrs: 28

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
BST8303	Basic Science Course	Graph Theory	2	1	0	50	100	150	3	100%
CST3301	Professional Core Course	Object Oriented Programming Using C++	2	1	0	50	100	150	3	100%
CST3302	Professional Core Course	Digital System Design	2	1	0	50	100	150	3	100%
ATT4301	Professional Core Course	Fundamentals of Database Management System	2	1	0	50	100	150	3	100%
CST3304	Professional Core Course	Computer Organization and Architecture	2	1	0	50	100	150	3	100%
HMT7302	Humanities & Social Science Course	Organization Management	2	1	0	50	100	150	3	100%
CSP3311	Professional Core Course	Object Oriented Programming Using C++ Lab	0	0	2	50	-	50	1	100%
CSP3312	Professional Core Course	Digital System Design Lab.	0	0	2	50	-	50	1	100%
JTP4311	Professional Core Course	Fundamentals of Database Management System Lab	0	0	2	50	-	50	1	100%
MOC4311	Massive Open Online Course	MOOC	0	0	2	50	-	50	1	100%
NCC4301	Non-Credit Course	Internet of Things	2	0	0	Satisfactory/ Un-Satisfactory			Non-Credit	100%
TOTAL			14	6	8	500	600	1100	22	

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: 3RD SEMESTER

CREDITS: 3

BRANCH: INFORMATION TECHNOLOGY

COURSE TITLE: GRAPH THEORY

L T P

MARKS

COURSE NO.: BST8303

External

Internal

DURATION OF EXAM: 3 HOURS

2 1 0

100

50

COURSE OUTCOMES

At the end of the course the student will be able to :-

CO1	Understand and apply fundamental aspects of graph theory tools in solving practical problems
CO2	Evaluate the basics concepts of groups, its examples and related results.
CO3	Create graphs and trees using different transversal methods.
CO4	Improve proof of writing skills

Detailed Syllabus

Section-A

Algebraic System

Definition, examples and related basic theorems on Groups, Sub groups, Cosets & Normal Subgroups, Logic operators, truth tables
(10 Hrs)

Graph Theory

Basic terminology, multi graphs and weighted graphs, connectivity; walk, trail and path, circuits & Cycles, shortest path in weighted graphs, Algorithm of shortest path, Hamiltonian and Eulerian paths and circuits, Eulerian trail & circuit, Eulerian graphs, Hamiltonian cycle, Hamiltonian graph, Konisberg Bridge problem.
(12 Hrs)

Section-B

Planar Graph

Introduction to Planar Graph, maps and region, Euler's formula. Kuratowski's graphs and Kuratowski's theorem.
(05Hrs)

Trees and Cut Sets

Trees, Rooted Trees, path lengths in rooted trees, prefix codes binary search trees, spanning trees and cut sets and circuits.
(05Hrs)

Books Recommended:

- | | |
|--|---------------------------|
| 1. Discrete Mathematics and its Applications, Tata McGraw – Hill | Kenneth H. Rosen, |
| 2. Discrete Mathematics with Applications, 4th edition, Wadsworth Publishing Co. Inc. | Susanna S. Epp |
| 3. Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill | C L Liu and D P Mohapatra |
| 4. Graph Theory | NarsinghDeo |

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: 3RD SEMESTER

CREDITS: 3

BRANCH: INFORMATION TECHNOLOGY

COURSE TITLE: OBJECT ORIENTED

PROGRAMMING USING C++

COURSE NO: CST3301

DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

At the end of the course the student will be able to :-

CO1	Understand the difference between Structured Programming approach and Object Oriented Programming approach.
CO2	Acquire knowledge in developing object oriented solutions to problems by learning the usage of Data Abstraction, Encapsulation, and Inheritance.
CO3	Design and Implement programs using Classes and Objects.
CO4	Understand the concept of Inheritance, Polymorphism, Operator Overloading and Function Overloading.
CO5	Apply the concepts of Object Oriented Programming in Templates & Exception Handling, File related operations and in real-time application development.

Detailed Syllabus

Section- A

Review of Pointers: Passing parameters, Array of Pointers, Character Pointers. **(2 hrs)**

Programming Techniques: Unstructured, Procedural, Modular. Introduction to Objects, Object and Cohesion (3 hrs) Overview of C++: Object Oriented programming, Encapsulation, Polymorphism, Inheritance, Console I/O, C++ Comments. **(3 hrs)**

Classes and Objects: Metaclass, Abstract class, Public and Private variables, Constructor and Destructor Functions, Constructors taking parameters, Object Pointers, In-Line Functions, Automatic Inlining, Friend Functions, This Pointer, New & Delete, Array of Objects. **(12 hrs)**

Section- B

Overloading: Function Overloading, Overloading Constructor Functions, Operator overloading, Overloading Binary and Unary Operators, Overloading Relational & Logical Operators. **(8 hrs)**

Inheritance: Using Protected Members, Multiple Inheritance, Virtual Base Classes, Introduction to Virtual Functions. **(6 hrs)**

Templates & Exception Handling: Use of Templates, Function Templates, Class Templates, Handling Exception. **(4 hrs)**

File Handling: I/O Basics, Ifstream, Ofstream, Fstream, Open(), Close(), EOF(), Binary I/O, Get(), Put(), Read(), Write(), Random Access, Seekg(), Seekp(), Tellg(), Tellp(). **(4 hrs)**

BOOKS RECOMMENDED:

- | | |
|-------------------------------|--|
| 1. Programming in C++ | Balaguru swamy |
| 2. C++ the Complete Reference | Herbert Schildt. |
| 3. Mastering C++ | K.R. Venugopa l & T. Ravisha n ka r& Raj Kumar . |
| 4. Turbo ++ | Robert Lafore. |

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: B.E. 3RD SEMESTER

CREDITS: 3

BRANCH: INFORMATION TECHNOLOGY

COURSE TITLE: DIGITAL SYSTEM DESIGN

COURSE NO. : CST3302

DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

At the end of the course the student will be able to :-

CO1	Examine the structure of number systems and perform the conversion among different number systems.
CO2	Illustrate reduction of logical expressions using boolean algebra, k-map and tabulation method and implement the functions using logic gates.
CO3	Realize combinational circuits for given application and also able to implement combinational logic circuits using programmable logic devices.
CO4	Design and analyze the synchronous and asynchronous sequential circuits using flip-flops.

Detailed Syllabus

Section- A

Introduction: Difference between Analog and Digital systems, Advantages and Disadvantages of digital system. (2 hrs)

Number Systems: Introduction, Number systems: Decimal, Binary, Octal, Hexadecimal; Conversions; Representation of Signed Numbers, Sign magnitude, 1's complement, 2's complement, r's complement; Binary Arithmetic – addition, subtraction, multiplication and division, Binary codes: BCD, Excess-3 code, Gray code, Hamming code, Alphanumeric codes. (10 hrs)

Minimization Techniques : Introduction, Boolean Algebra: Laws and Theorems, Demorgan's Theorem, Simplification of Boolean functions by Boolean algebra, K-map method and Quine McClusky method in SOP and POS forms. (5 hrs)

Logic gates : Introduction, Logic Gates: Basic gates, Universal gates, Derivation of other gates from universal gates, Half adder, Full adder, BCD adder, Half and Full subtractor, Binary multiplier, Dividers, ALU. (6 hrs)

Section-B

Combinational Circuits: Code converters, Magnitude comparators, Parity Generators/checkers, Encoders, Priority encoder, Decoders, Multiplexers, Demultiplexer. Programmed logic devices–Read only memory, Programmable Read only Memories (PROM) and Programmable Logic Arrays (PLA), Programmable Array Logic (PAL). (10 hrs)

Sequential Circuits: Introduction, Latches, Flip-flops: Types, their conversions and applications, Shift Registers: Serial/Parallel in/out, Bi-directional, Universal shift register, Counters: Synchronous, Asynchronous, Decade, Binary, Modulo-n, Shift register counters; Design of Synchronous sequential circuits, State Reduction and Assignment. (10 hrs)

BOOKS RECOMMENDED:

- | | |
|--|------------------|
| 1. Digital Design | Morris Mano |
| 2. Digital Electronics | R.P Jain |
| 3. Digital Logic Design | J.P. Hayes |
| 4. Digital Electronics & Circuits Design | Thomas Mac calla |
| 5. Digital Electronics | R.K Gour |

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: 3rd SEMESTER
BRANCH: INFORMATION TECHNOLOGY
**COURSE TITLE: FUNDAMENTALS OF DATABASE
MANAGEMENT SYSTEM**
COURSE NO.: ITT4301
DURATION OF EXAM: 3 HOURS

CREDITS: 3			MARKS	
L	T	P	External	Internal
2	1	0	100	50

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Explain simple DBMS with respect to traditional file system & Discuss DBMS architecture and other related concepts.
CO2	Describe various data models like Physical, Object based and Record based Data Models.
CO3	Apply Relational Algebra, Relational Calculus and SQL commands for handling DBMS
CO4	Apply the concept of Normalization to maintain database consistency.
CO5	Create schedules for concurrency control system and understand locking techniques.
CO6	Explain the different types of failures and recovery management schemes

Detailed Syllabus

Section - A

Basic Concepts: - Overview of Database Management System, DBMS vs Traditional File Processing System, Database system and architecture, Data Independence, Components of Database System Environment, Components of DBMS, DBMS-Advantages and disadvantages, Database Users, Data Models. **(4 hours)**

Data Modeling using Entity Relationship Model: -ER Model Concepts, Notations for ER Diagram, Constraints, Design issues, Weak Entity sets, Extended ER features, Design of ER database scheme, Reduction of ER schemes to tables. **(4 hours)**

Relational Model and Database Design: - Attributes and domains, Tuples, Relations and Schemas, Relation Representation, Keys, Integrity Rules, Relational Algebra, Relational Calculus. Functional Dependency, Normal Forms-1NF, 2NF, 3NF, BCNF, Multivalued Dependency, Fourth Normal Form, Normalization using Join Dependencies **(8 hours)**

Section- B

Query Processing and Optimization

Algorithms for executing query operations, Heuristics for query optimizations. **(4 hours)**

Transactions: - Transaction concepts, transaction state, implementation of Atomicity and Durability, Concurrent execution, Serializability, Recoverability, Implementation of isolation. **(6 hours)**

Concurrency Control: - Lock based protocols, Timestamp based protocols, Validation based protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling. **(8 hours)**

Recovery Systems: -Failure classification, Storage Structure, Recovery and Atomicity, Recovery concept based on Deferred Update, Recovery concept based on immediate update, Shadow Paging, Recovery with Concurrent Transactions, Buffer Management. **(6hours)**

BOOKS RECOMMENDED:

- | | |
|---|------------------------|
| 1. Database concepts | Korth, Silberchatz-TMH |
| 2. An Introduction to Database Systems | Bipin C. Desai |
| 3. Principles of Database Management system | Aho Ullman |
| 4. Oracle | Ivan Bayross. |

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: 3RD SEMESTER

CREDITS: 3

BRANCH: INFORMATION TECHNOLOGY

**COURSE TITLE: COMPUTER ORGANIZATION AND
ARCHITECTURE**

MARKS

COURSE NO. : CST3304

L	T	P	External	Internal
2	1	0	100	50

DURATION OF EXAM: 3 HOURS

COURSE OUTCOMES

At the end of the course the student will be able to: -

CO1	Understand the basic architecture and operational concepts in designing CPU.
CO2	Analyze various component units (ALU& CU) and Organization of CPU.
CO3	Analyze various memories management techniques like Virtual Memory and Cache Memory.
CO4	Apply the concepts of Parallel Processing in designing high performance processors
CO5	Analyze the working of different types of Processors

Detailed Syllabus

Section-A

Introduction: - Basic structure of Computers, stored programme concept, Basic Operational concepts, Functional Units, Machine language, concept of memory locations, addresses, addressing modes. (6 hrs)

Processing and execution: - Processing unit, execution of instructions, control step sequence, different types of instruction, ALU Design, Arithmetic Processes, Control Unit Design, Hardwired & Micro programmed Control Unit. (6 hrs)

CPU:-General Register Organization, Stack Organization, Instruction format, RISC, CISC. (4 hrs)

Input output organization: - Introduction to I/O Devices, I/O Systems-Programmed Control, Interrupt controlled & DMA Data Transfer Schemes, I/O Processors and their Architecture (IOP). (6 hrs)

Section-B

Memory Management: - Memory organization, Characteristics of memory size, Access time, Read/write cycletime, Sequential and Random-access semiconductor memories, Virtual memory and its implementation, Cache memory and its types- Split and Unified, levels of Caches. (6 hrs)

Parallel processing – Basic Concepts of Parallel Processing, Architectural Classification Schemes, Levels of Parallelism, Parallelism in Uniprocessor System, Introduction to Multiprocessor Systems, Its Classification, Multiprocessor vs Multicomputer Systems, Introduction to Pipelining, Classification of Pipelined processors, Pipelined Structures, Principles of Designing Pipelining Processors, Pipeline Hazards & Conflicts. (8 hrs)

Vector and SIMD Array Processing --Introduction to Vector Processors, Array Processors, Their Architectural Classification and Characteristics, Multicore processors. (6 hrs)

BOOKS RECOMMENDED:

Books Recommended:

- | | |
|---|------------------------------------|
| 1. Computer Architecture & Organization | John P. Hayes (McGraw Hill) |
| 2. Computer System Architecture | Morris Mano |
| 3. Computer System Architecture | V.K. Jain |
| 4. Computer Organization | Carl V. Hamacher |
| 4. Fundamentals of Parallel Processing | Harry F. Jordan and.Gita Alaghband |

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: 3RD SEMESTER

CREDITS: 3

BRANCH: INFORMATION TECHNOLOGY

COURSE TITLE: ORGANISATION MANAGEMENT

COURSE NO.-HMT7302

DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

At the end of the course the student will be able to: -

CO1	Understand how organizations functions
CO2	Understand the various behaviour of the organizations and their processes to compete in the business world.
CO3	Understand basic management concepts and enhance the leadership skills of the managers.
CO4	Understand appropriate intervention in directing employees towards achieving organisational goal.

Detailed Syllabus

Section-A

Concept and Evolution of Management

Management: Meaning, Characteristics, Functions and Scope. Classical Theory of management: Henry . Fayol Administrative Management Theory and Taylor Scientific Management Theory. **(6Hrs)**

Planning

Characteristics, Significance and Barriers to effective Planning Process of Planning and its types. Steps taken to make Planning effective. **(6Hrs)**

Decision Making

Meaning, Characteristics, Importance & Process of Decision Making. Types of Decisions, Techniques for improving Group Decision Making. Limitations of Decision Making. **(6Hrs)**

Section - B

Organizing

Forms of Organization: - Formal and Informal. Departmentation and its bases. Forms of organization structure: -Line, Line & Staff organization structure. **(6Hrs)**

Directing and Leading

Direction: - Importance and Principles of Direction. Leadership - characteristics, Functions, Importance. Styles of Leadership- Autocratic, participative and Free - Rein. Communication: Concept, Process Types.& Barriers. **(6Hrs)**

Controlling and Coordinating

Controlling: - Concept, Importance, Process. Types and Stages of Control. Co-ordinating: Importance. and Principles, External & Internal Co-ordination, Techniques of Effective Coordination. **(6Hrs)**

Books Recommended:

1. Essentials of Management
2. Principles & Practice of Management
3. Management & organization
4. Principles & Functions of Management
5. Organization and Management

Koontz, H & Wehrich, H., McGrawHill Int.
Prasad, L.M.
Allen, McGraw Hill Int.
Jain, J.K PrateekPrak
Agrawal, R.D.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: 3RD SEMESTER

CREDIT: 1

BRANCH: INFORMATION TECHNOLOGY

COURSE TITLE: OBJECT ORIENTED PROGRAMMING LAB

COURSE NO.: CSP3311

DURATION OF EXAM: 3HRS

MARKS

L	T	P	External	Internal
0	0	2	-	50

COURSE OUTCOMES

After Completion of this course the student will be able to: -

CO1	Develop solutions for a range of problems using Objects and Classes.
CO2	Implement the concepts of Constructors, Destructors and Operator Overloading.
CO3	Apply fundamental algorithmic problems including Type Casting, Inheritance.
CO4	Implement the concepts of Run Time Polymorphism using Virtual Functions
CO5	Implement the concepts of Generic Programming, Templates, File Handling using C++.

Lab Experiments:

Experiment 1	Design and implement programs using Pointers.
Experiment 2	Design and implement programs using Classes and Objects.
Experiment 3	Design and implement programs using Constructors and Destructors.
Experiment 4	Design and implement programs using the concepts of Inheritance.
Experiment 5	Design and implement programs using Friend Function.
Experiment 6	Design and implement programs using New and Delete operator.
Experiment 7	Design and implement programs using the concepts of Overloading.
Experiment 8	Design and implement programs using the concepts of files.

NOTE: Additional Lab experiments/practicals will be performed based on the course contents requirements.

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: B.E. 3RD SEMESTER

CREDIT: 1

BRANCH: INFORMATION TECHNOLOGY

COURSE TITLE: DATA SYSTEM DESIGN LAB.

COURSE NO. :CSP3312

MARKS

L	T	P	External	Internal
0	0	2	-	50

COURSE OUTCOMES

After Completion of this course the student will be able to: -

CO1	Implement logic gates and realization of OR, AND, NOT AND XOR Functions using universal gates.
CO2	Design and implement combinational circuits like half adder/full adder, half subtractor/full subtraction, code converters, comparators, MUX/DEMUX
CO3	Design and implement sequential circuits like flip-flops, counters and shift registers

Lab Experiments:

Experiment 1	Verification of truth tables of Logical Gates AND / OR / NOT, NAND, NOR, EXOR, EXNOR, Gates.
Experiment 2	Implementation of Boolean expression using AND, OR, NOT, NAND, & NOR logic
Experiment 3	Implementation of Decoder, Encoder, Code Converter using IC's & Gates.
Experiment 4	To implement Half Adder, Half Subtractor, Full Adder, Full Subtractor using different IC's & Gates.
Experiment 5	Implementation of multiplexer, demultiplexer using IC's & gates.
Experiment 6	Design of BCD to 7 segment display using logical gates & IC's.
Experiment 7	To design & verify truth table of Flip Flops.
Experiment 8	To design various asynchronous counters using flip flops, gates & IC's
Experiment 9	To design various synchronous counters using flip flops, gates & IC's.
Experiment 10	To design & verify truth tables of shift Registers.

NOTE: Each student has to perform at least 8 experiments out of which 40% shall be simulation based. Additional Lab experiments/practicals will be performed based on the course contents requirements

Approved

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: 3rd SEMESTER
BRANCH: INFORMATION TECHNOLOGY
**COURSE TITLE: FUNDAMENTALS OF DATABASE
MANAGEMENT SYSTEM LAB**
COURSE NO. : ITP4311

CREDIT: 1

MARKS				
L	T	P	External	Internal
0	0	2	-	50

COURSE OUTCOMES

After Completion of this course the student will be able to: -

CO1	Devise queries using DDL, DML, DCL and TCL commands.
CO2	Implement various types of functions in SQL
CO3	Implement the concept of High level programming language (Control structures, Procedures and Functions)

Lab Experiments:

- Experiment 1** Implement DDL Commands
- Experiment 2** Update the database system using DML commands
- Experiment 3** Apply Integrity constraints for the specified system.
- Experiment 4** Implement various Aggregate functions, Operators and TCL
- Experiment 5** Implement various Date and String functions
- Experiment 6** Implementation of Group by, having, order by, like, Union, Intersect, Minus
- Experiment 7** Perform Join operations
- Experiment 8** Implementation of Analytical Functions using OVER and PARTITION with ORDER BY
- Experiment 9** Implementation of Views in SQL
- Experiment 10** High level programming language extensions (Control structures, Procedures and Functions)

NOTE: Additional Lab experiments/ practical's will be performed based on the course contents requirements.

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: B.E 3RD SEMESTER

BRANCH: INFORMATION TECHNOLOGY

COURSE TITLE: MooC

COURSE NO. : MOC4311

CREDIT: 1

L	T	P	MARKS
0	0	2	50

A massive open online course (MooC) is a model for delivering learning content to any person who wants to take a course by means of the web. It has been incorporated in the 3rd semester. To evaluate a MooCs course following is the scheme proposed:

Breakup of Marks:

- **Attendance- 10 marks**
Students will have to visit the lab twice a week as per the time table and pursue their respective online course.
- **Report file-15marks**
A detailed report of about 20-25 pages has to be submitted to the department at the end of the semester. It should contain details about the course that was undertaken by the student. A copy of the assignments with solutions that have been uploaded on the MooC platform should also be included in the final report. A copy of the certificate if awarded should also be appended to thereport.
- **Presentation- 15 marks.**
The presentation should be given to the peers/students focusing on the key points of the course with an aim to share the knowledge.
- **Certification- 10 marks**
The students awarded with the certificate will be given 10 marks.(Copy to be attached in the report.)

The students can opt for a choice of MooC from the list provided hereunder: -

1. C#
2. Web Development
3. Python
4. PHP
5. Android
6. Programming using MATLAB
7. JavaScript Basics
8. Client Server Communication
9. Web Security Fundamentals
10. SQL

But not limited to this. Students can opt for a course other than in the above list after approval from the Department.

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**B.Tech. Information Technology 3rd Semester Examination to be held in the
Year December 2023, 2024, 2025, 2026**

CLASS: B.E. 3RD SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: INTERNET OF THING
COURSE No: NCC4301

CREDITS: 0

L	T	P	Marks
2	0	0	Satisfactory/Unsatisfactory

COURSE OUTCOMES

At the end of the course the student will be able to: -

CO1	Explain what Internet of Things is.
CO2	Understand mechanism and key technologies in Internet of Things.
CO3	Explain business models in the Internet of Things.
CO4	Understand the application of Internet of Things.

Detailed Syllabus

Unit I: Introduction

What is the Internet of Things?: History of IoT, About IoT, Overview and Motivations, Examples of Applications, Internet of Things Definitions and Frameworks :IoT Definitions, IoT Architecture

Unit II: Fundamental IOT Mechanisms and Key Technologies

Identification of IoT Objects and Services, Structural Aspects of the IoT, Key IoT Technologies

Unit III: Business Models For The Internet Of Things

Business Models and Business Model Innovation, Business Model Scenarios for the Internet of Things.

Unit IV: Internet of Things Application

Smart Metering Advanced Metering Infrastructure, e-Health Body Area Networks, City Automation, Automotive Applications, Home Automation, Smart Cards

NOTE: This is a Mandatory Non-Credit Course. Two objective papers will be conducted internally by the department. The students are required to score at least 40% or above in totality to be considered qualified in the course.

Books Recommended:

- | | |
|--|--|
| 1. Building the Internet of Things with IPv6 and MIPv6 | Daniel Minoli |
| 2. Architecting the Internet of Things | Bernd Scholz,Reiter, Florian Michahelles |
| 3. Identity Management for Internet of Things | Parikshit N. Mahalle&Poonam N. Railkar |

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ANNEXURE-II

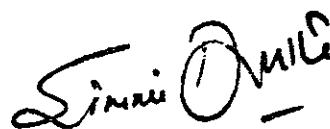
**B.Tech. Information Technology 4th Semester Examination to be held in the Year
May 2024,2025,2026,2027**

B.Tech. Information Technology 4th Semester

Contact Hrs: 26

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
ITT4401	Professional Core Course	Principles of Operating System	2	1	-	50	100	150	3	100%
CST3401	Professional Core Course	Data Structures	2	1	-	50	100	150	3	100%
ITT4402	Professional Core Course	System Analysis and Design	2	1	-	50	100	150	3	100%
CST3403	Professional Core Course	Java Programming	2	1	-	50	100	150	3	100%
HMT7401	Humanities & Social Science Course	Management Accounting And Finance	2	1	-	50	100	150	3	100%
MOC4401	Massive Open Online Course	SWAYAM / NPTEL	3	-	-	100	-	100	3	100%
CSP3411	Professional Core Course	Data Structures Lab	-	-	3	75	-	75	1.5	100%
ITP4411	Professional Core Course	Principles of Operating System lab	-	-	3	75	-	75	1.5	100%
CSP3413	Professional Core Course	Java Programming Lab	-	-	2	50	-	50	1	100%
TOTAL			13	5	8	550	500	1050	22	

Approved


**B. Tech. Information Technology 4th Semester Examination to be held in the
Year May 2024, 2025, 2026, 2027**

CLASS: 4TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: PRINCIPLES OF OPERATING SYSTEM
COURSE NO.: ITT4401
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
2	1	0	External	Internal
			100	50

COURSE OUTCOMES

At the end of the course the student will be able to: -

CO1	Understand operating system structure
CO2	Analyze the various process scheduling schemes
CO3	Understand the concept of deadlock
CO4	Compare Various Memory Management Schemes
CO5	Understand system threats and need of security

Detailed Syllabus
Section-A

Introduction: Operating System- objectives, functions, The Evolution of Operating Systems, Types of Operating Systems, Operating System Structure-System components, operating system services, System Calls, System Programs, System structure, Virtual Machines. **(5 Hrs)**

Process Management: Process Concept, Process scheduling, Operations on Processes, Interprocess Communication- Shared Memory System and Message Passing Systems, Remote Procedure Call, Remote Method Invocation. **(5 Hrs)**

CPU Scheduling: Scheduling concepts, Scheduling Criteria, Scheduling algorithms, Algorithm Evaluation, Multiprocessor scheduling, Thread Scheduling **(5 Hrs)**

Process Synchronization: Principles of Concurrency, Critical Regions-Critical Section Problem, Semaphores, Classical Problems of Synchronization **(4 Hrs)**

Deadlocks: System model, Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Deadlock Recovery. **(5Hrs)**

Section-B

Memory Management: Base machine, Resident Monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Paging, Segmentation, Virtual Memory-Demand Paging, Page Replacement, Allocation of frames, Thrashing, Cache memory organization. **(10Hrs)**

I/O Management & Disk Scheduling: I/O Devices and the organization of I/O function, I/O Buffering, Disk I/O Operating System Design Issues. **(4Hrs)**

File System: File Concept-File organization and Access mechanism, File Directories, File Sharing, Implementation issues. **(3Hrs)**

Protection & security: Protection- Goals of protection, Domain of protection, Access & rights. Security & threats - the problems of security, authentication, program threats, System threats, Threat monitoring. **(3Hrs)**

Books Recommended:

- | | | |
|----|--|------------------------------------|
| 1. | Operating System: Concept & Design | Milenkovic M |
| 2. | Operating System Design & Implementation | Tanenbaum, A.S. |
| 3. | Operating System Concepts | Silbersehatz A. and Peterson, J.L. |
| 4. | Operating Systems | Stalling, Willam |
| 5. | An Introduction to operating Systems | Dietel, H.N. |

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Amrinder *Sham* *Sirani Omic* *Samer*

**B. Tech. Information Technology 4th Semester Examination to be held in the
Year May 2024, 2025, 2026, 2027**

CLASS: 4TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: DATA STRUCTURES
COURSE NO.: CST3401
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

At the end of the course the student will be able to: -

CO1	Understand and analyze the time Space Complexity of programs and data structures.
CO2	Knowledge of various data structures ,their operations, applications and relative merits.
CO3	Ability to develop algorithmic solutions to various problems by using appropriate Data Structure and to analyze the solutions. .
CO4	Develop algorithms for various sorting and searching techniques and compare their performance in terms of Space and Time complexity

Detailed Syllabus

Section- A

Introduction to data structures: - Concepts of data and algorithm, Relation between Data Structure & Algorithm, Introduction to Time & Space complexity, Types of asymptotic notations and orders of growth, Algorithm efficiency - best case, worst case, average case,, Representation of Arrays, Sparse matrices. **(2Hrs)**

Stacks and Queues: - Concept of Stacks, Operation on Stacks, Application of stacks, Expression evaluation, conversion of Infix, Postfix, Prefix expressions , Recursion, Tower of Hanoi, Concept of Queues, Operation on Queues, Types of queues - Priority Queues, Circular Queues, Double ended Queues. **(10Hrs)**

Linked Lists: - Insertion, Deletion and Traversal on Linear Linked Lists, Doubly Linked List, Circular Linked List, Header nodes, Stacks & Queues using linked list, Application-Polynomial manipulation, Dynamic memory management, Garbage Collection **(10Hrs)**

Section-B

Trees: -Binary trees and its representation using Linked list, Operations on Binary Trees, Traversal Algorithms, Applications, Binary Search Trees -insertion, deletion , finding min and max , Threaded Binary Trees and its Traversal algorithms, Optimum Search Trees,AVL trees -basic operations (rotation , insertion and deletion) **(10Hrs)**

Graphs: -Representation of Graphs, Traversal methods, Applications Undirected Graphs, Directed Graph& their Traversal, Depth first, Breadth First, Shortest Path algorithms-Dijkstra, Minimum Cost Spanning tree (Prim and Kruskal). **(8Hrs)**

Sorting & Searching: Exchange Sort (Bubble, Quick sort), Selection & Tree Sorting, Insertion sort, Shell Sort, Address Calculation Sort, Merge & Radix Sort, Analysis of sorting algorithms Sequential Searching, searching an Ordered Table, Index sequential search, Binary search, Tree searching **(5Hrs)**

Books Recommended:

- | | |
|--------------------------------------|--------------------------------|
| 1 Data Structure using C | Tenenbaum, Langsam, Augenstein |
| 2 Fundamentals of data structures | Horowitz E. and Sahni S. |
| 3 Data structures and Program Design | Robert L. Kruse. |
| 4 Data Structures & Algorithm | Aho, Hopcraft and Ullman. |
| 5 Data Structure with Applications | Sorenson. |

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Amrinder

Shan

Sinai Dhillon

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**B. Tech. Information Technology 4th Semester Examination to be held in the
Year May 2024, 2025, 2026, 2027**

CLASS: 4TH SEMESTER

CREDITS: 3

BRANCH: INFORMATION TECHNOLOGY

COURSE TITLE: SYSTEM ANALYSIS AND DESIGN

COURSE NO. : ITT4402

DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES

At the end of the course the student will be able to: -

CO1	Explain the system development life cycle
CO2	Describe various approaches of system analysis and design
CO3	Demonstrate the understanding of testing and maintenance
CO4	Analyze System Threats and disaster recovery

Detailed Syllabus

Section – A

Systems concept: Definition, Characteristics, Elements and Types of system, System Development life cycle, role and need of System Analyst, System analyst as an agent of change. **(06 Hrs)**

System Analysis: System planning and initial investigation, information gathering techniques, Feasibility Study – types and its importance, Cost Benefit Analysis – Tools and techniques. **(06Hrs)**

System Design: Introduction, Methodology, Tools for structured design - Data Flow Diagrams, Flowcharts, Structure Charts-Symbols and types, Decision Tree, Decision Table, Structured English, Data Dictionary, Entity-Relationship Model. **(08 Hrs)**

Section-B

System Testing and maintenance: Test Plan, Activity network for system testing. Documentation Tools used in SDLC, Testing and validation, Maintenance activities and issues. **(06 Hrs)**

System Security: Introduction, Threats to System, Control Measures, Disaster Recovery and contingency planning, Audit Trails, Risk Management **(08 Hrs)**

Case study of the following systems:

Library Management System, University Management System. **(06 Hrs)**

Books Recommended:

- | | | |
|----|---|----------------------------------|
| 1. | Elements of System Analysis | Marvin Gore and John W. Stubbe. |
| 2. | System Analysis and Design | Thapliyal M.P |
| 3. | Modern Systems Analysis & Design | Hoffer, George and Valacich |
| 4. | SSAD: System Software Analysis and Design | Mehta Subhash and Bangia Ramesh. |

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Amrinder

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Sinni Dhillon

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**B. Tech. Information Technology 4th Semester Examination to be held in the
Year May 2024, 2025, 2026, 2027**

CLASS: 4TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: JAVA PROGRAMMING
COURSE NO. CST3403:
DURATION OF EXAM: 3 HOURS

CREDITS: 3

			MARKS	
L	T	P	External	Internal
2	1	0	100	50

COURSE OUTCOMES

At the end of the course the student will be able to: -

CO1	Understand the concepts of Object-Oriented Programming paradigm and platform portability in Java.
CO2	Apply concepts of Classes, Objects and Methods to tackle real world problems.
CO3	Analyze errors and exceptions by using Exception Handling mechanism.
CO4	Examine the Multithreading techniques by extending Thread class and develop interface, Applets and Web pages
CO5	Create Graphic User Interface using Abstract Window Toolkit

Detailed Syllabus

Section – A

Java Evolution, And Overview of Java Language: Java History–Features of java, how java different from C and C++, Java and World Wide Web, Web Browser. Java Environment: Java Development kit (JDK), Application Programming Interface (API). Java Programming Structure, Java Tokens, Constants, Variables, Expressions, Decision Making Statements and Looping, Java Statements, Overview of Arrays and Strings, Machine Neutral, Java Virtual Machine (JVM), Command Line Arguments. **(6Hrs)**

Arrays and Strings: Arrays, One-Dimensional arrays, Creating an Array, declaration of arrays, initialization of arrays, Two-Dimensional arrays, String arrays, String methods, String Buffer class, Vectors, Wrapper classes. **(4Hrs)**

Classes, Objects and Methods: Introduction, defining a class, creating objects, accessing class members, constructors, methods overloading, static members. **(4Hrs)**

Inheritance: Defining a sub class, sub class constructor, multilevel variables, Final classes, and Finalize methods, Abstract methods and classes, visibility control. **(4 Hrs)**

Managing Errors and Exceptions: Introduction, Types of Errors–Compile time and Run time errors, Exceptions, Types of Exceptions, Syntax of Exception handling code, Multiple catch statements, using finally statement, Throwing our own exceptions. **(4 Hrs)**

Section- B

Multithreaded Programming: Introduction to threads, Creating Threads, Extending the Thread Class, Implementing the Runnable interface, life cycle of a thread, priority of a thread, synchronization, Deadlock. **(6Hrs)**

Interfaces and Applet Programming: Introduction, defining interfaces, extending interfaces, implementing interfaces. Introduction, how applet differ from applications, building applet code, applet life cycle, About HTML, designing a web page, passing parameters to applets, getting input from the User. **(6Hrs)**

Graphics Programming: Introduction, the Abstract Windowing Toolkit (AWT), frames, event-driven programming, layout managers, panels, canvasses, drawing geometric figures. Creating User Interface: Introduction, describe various user interface Components: button, label, text field, text area, choice, list, check box checkbox group. **(8Hrs)**

Books Recommended:

- | | |
|---------------------------------------|---------------------|
| 1 Programming with JAVA | Balagurusamy TMH |
| 2 An Introduction to JAVA Programming | Y.DanielLiangTMH |
| 3 The Complete Reference JAVA 2 | Herbert Schield TMH |

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

Amrinder

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