



# UNIVERSITY OF JAMMU

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

Academic Section

Email: [academicsectionju14@gmail.com](mailto:academicsectionju14@gmail.com)

## NOTIFICATION (23/July/Adp./58)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the Syllabi and Courses of Studies in the subject of **Information Technology** of Semester **IIIrd** and **IVth** for **Four Year Under Graduate Programme (FYUGP)** under the **Choice Based Credit System** as per **NEP-2020** (as given in the annexure) for the examinations to be held in the years as per the details given below:

Subject	Semester	For the examinations to be held in the year
Information Technology	Semester- III	Dec. 2023, 2024 and 2025
	Semester-IV	May 2024, 2025 and 2026

The Syllabi of the courses is also available on the University website: [www.jammuuniversity.ac.in](http://www.jammuuniversity.ac.in).

Sd/-  
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/23/6308-6318  
Dated: 11-7-2023.

Copy for information and necessary action to:

- 1 Dean, Faculty of Mathematical Sciences
- 2 HOD/Convener, Board of Studies in **Computer Science & IT**
- 3 Sr. P.A. to the Controller of Examinations
- 4 All members of the Board of Studies
- 5 Confidential Assistant to the Controller of Examinations
- 6 I/C Director, Computer Centre, University of Jammu
- 7 Deputy Registrar/Asst. Registrar (Conf. /Exams. UG)
- 8  Incharge, University Website for Uploading of the notification.

  
Deputy Registrar (Academic)


**B. A. / B. Sc. Honours**  
**IN**  
**INFORMATION TECHNOLOGY**

**SYLLABUS**

*Four Year Undergraduate Programme*

*As per NEP 2020 guidelines*

*Under Choice based Credit System*

**FOR THE STUDENTS TO BE ADMITTED IN THE SESSIONS**  
**2022-23, 2023-24, 2024-25**

## Course Details for Four Year UG Programme

S. NO.	COURSES	DISCIPLINES
1	Computer Applications (CA)- Arts & Science	Natural Science and Arts & Humanities
2	Information Technology (IT)- Arts & Science	Natural Science and Arts & Humanities
3	<b>Bachelor of Computer Applications (BCA)</b>	Computer Applications (for BCA degree)
	BCA (Web Technology)	
	BCA (Data Science)	
	BCA (Software Development)	

**COURSES OF STUDY****Semester - I**

S. No.	Course Type	Course No.	Course Title	Credits	Marks				Total Marks
					Theory		Practical/Tutorial		
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJITT101	Fundamentals of IT	4(3L+1P)	15	60	10	15	100
2	Minor	UMIITT102	Basics of Computation	4(3L+1T)	15	60	10	15	100
3	MD	UMDITT103	IT : Basics and Application	3	15	60	NA	NA	75
4	SEC	USEITT104	Office Tools	2	10	40	NA	NA	50

**Semester - II**

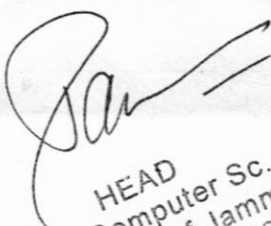
S. No.	Course Type	Course No.	Course Title	Credits	Marks				Total Marks
					Theory		Practical/Tutorial		
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJITT201	Internet and Web Designing using HTML	4(3L+1P)	15	60	10	15	100
2	Minor	UMIITT202	Programing Concepts and Paradigms	4(3L+1P)	15	60	10	15	100
3	MD	UMDITT203	Technical Communication	3	15	60	NA	NA	75
4	SEC	USEITT204	Understanding e-Services	2	10	40	NA	NA	50

**Semester-III**

S. No.	Course Type	Course No.	Course Title	Credits	Marks				Total Marks
					Theory		Practical/Tutorial		
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJITT301	Programming in C	4(3L+1P)	15	60	10	15	100
2	Major	UMJITT302	Data communication and Networking	4(3L+1P)	15	60	10	15	100
3	Minor	UMIITT303	Digital Electronics	4(3L+1T)	15	60	10	15	100
4	MD	UMDITT304	E-commerce	3	15	60	NA	NA	75
5	SEC	USEITT305	Cyber Security	2	10	40	NA	NA	50

**Semester-IV**

S. No.	Course Type	Course No.	Course Title	Credits	Marks				Total Marks
					Theory		Practical/Tutorial		
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJITT401	Database Management System & SQL	4(3L+1P)	15	60	10	15	100
2	Major	UMJITT402	Data Structure using C Language	4(3L+1T)	15	60	10	15	100
3	Major	UMJITT403	Software Engineering	4(3L+1T)	15	60	10	15	100
4	Major	UMJITT404	Fundamentals of Operating System	4(3L+1T)	15	60	10	15	100
5	Minor	UMIITT405	Operating System	4(3L+1T)	15	60	10	15	100

  
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 Jammu-180006



**IT (Arts and Science) - THIRD SEMESTER**

Course: Major  
Course Credits: (L-P-T)  
(3-1-0)  
Total marks: 100

Course Title: Programming in C  
Course Code: UMJITT301  
Mid Semester assessment: 15 Marks of 1.5 hours duration  
End Semester assessment: 60 Marks of 3.0 hours duration  
Practical: 25 Marks

*For examinations to be held in Dec 2023, 2024 and 2025*

**Course objectives & learning outcomes:**

1. To learn the fundamentals of programming language.
2. To understand the concept of different control structures.
3. To learn about different data structures
4. To understand the concept of procedural programming.

**UNIT - I**

Problem solving, Algorithms, Flowcharts, History of C language, Structure of C program, Basic input/output statement, compiling and running a C program, Errors: syntax, linker, runtime and logical errors.

Character set of C language, identifiers, keywords, data types, variables, constants.

15 Hours

**UNIT - II**

Preprocessor directives, Operators: Unary, Binary: Mathematical, Relational and Logical operators, ternary operator, Operator precedence and associativity, selection statements- if statement, if-else statement, nested if, ladder if statement, switch statement.

15 Hours

**UNIT - III**

Iterative statements-while loop, do while, for loop, Nested loops, infinite loops, goto statement, break and continue statement.

Functions-prototype of a function: parameter list, return type, function call, passing arguments to a function: call by address, call by value, recursive function, user defined and library functions- mathematical and string functions.

15 Hours

**UNIT - IV**

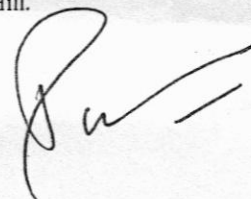
Storage classes in C. Arrays (Single and double dimensional): Definition, Declaration. Passing array to function.

Pointers: Understanding Pointers, Accessing the address of variable, declaring pointer Variables, Initialization, accessing a variable through pointer.

15 Hours

**Suggested readings/ references:**

1. E. Balaguruswami, Programming in C, PHI
2. Gottfried. B, Theory and problems of Programming with C Language, Tata Mc Graw Hill.
3. Kenneth. A, C Problem Solving and Programming, PHI.
4. Dan Gookin, C Programming, Wiley Dreamtech.
5. Y. P. Kanetkar, Understanding Pointers In C, BPB Publications.



**IT (Arts and Science) - THIRD SEMESTER**

Course: Major  
 Course Credits: (L-P-T)  
 (3-1-0)  
 Total marks: 100

Course Title: Programming in C  
 Course Code: UMJITT301  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 3.0 hours duration  
 Practical: 25 Marks

*For examinations to be held in Dec 2023, 2024 and 2025*

**NOTE FOR PAPER SETTERS FOR EXAMINATIONS -**

The question paper will be divided into the following two sections. No question will be repeated in the question paper.

**Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks.

(4 x 3 = 12 marks)

**Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.

(4 x 12 = 48 marks)

**Note:** -The paper setter shall ensure that the questions are uniformly distributed over entire syllabus.

**Practical/ tutorial Evaluation**

Daily evaluation of practical's/tutorials/Viva voce/Records etc.

10 marks

**Final Examination**

15 Marks

**Pattern for external practical examination**

Practical file	5 Marks
Written examination	5 Marks
Viva-Voce	5 Marks
Total	15 Marks

**Pattern for external tutorial examination**

Assignment file	10 Marks
Viva-Voce	5 Marks
Total	15 Marks

**IT (Arts and Science) – THIRD SEMESTER**

Course: Major  
 Course Credits: (L-P-T)  
 (3-1-0)  
 Total marks: 100

Course Title: Data Communication and Networking  
 Course Code: UMJITT302  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 3.0 hours duration  
 Practical: 25 Marks

*For examinations to be held in Dec 2023, 2024 and 2025*

**Course objectives & learning outcomes:**

1. To study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
2. To study the fundamentals of Physical layer, and explain the types of transmission media with real time applications.
3. To study data link layer concepts, design issues, and protocols.
4. To gain core knowledge of Network layer routing protocols and IP addressing.
5. To explore the basic knowledge of cryptography and network security

**UNIT-I Fundamentals of Communication and Network Topologies**

Basics of Communication: Analog and Digital, Data and Signal, Point to Point and Multi-Point Connections

Network Topologies, Transmission Modes, Inter-networking, LAN Technologies and Protocols, Modulation and its type, Overview of switching techniques

15 Hours

**UNIT-II IP Addresses and Protocols**

IP Addresses and Types (IPv4 and IPv6), Classes of IP Addresses, OSI Reference Model, TCP/IP Model, Routing Information Protocols: Unicast and Multicast, Socket Programming Concepts (TCP,UDP)

15 Hours

**UNIT-III Network Protocols and Security**

Client-Server Architecture, HTTPs, DNS, SMTP, FTP Protocols, Network Security: Threats, Attacks, and Firewalls  
**Cryptographic Algorithms:** DES, AES, RSA, Key Exchange Methods, Digital Signatures

15 Hours

**UNIT-IV Introduction to Scripting Languages**

Server-side and Client-side Scripting Languages Concepts, Introduction to JavaScript, Data Types, Variables

Conditional and Loop Control Statements, Functions, String Manipulation, Mathematical Functions

15 Hours

**Suggested readings/ references:**

1. Andrew S. Tanenbaum, "Computer Networks", 5 e, 2013, Pearson Education Asia.
2. Behrouz A. Forouzan, "Data Communications and Networking", 4e, 2004, Tata McGraw Hills.
3. William Stallings. "Data and Computer Communication", 7e, 2016, Pearson Education Asia.
4. Prakash C. Gupta, "Data Communications and Computer Networks", PHI
5. Michael A. Miller, "Data and Network Communications", 2e, Delmar Thomson Learning.
6. James F. Kurose and Keith W. Ross, "Computer Networking", 3e, Pearson Education.
7. William A. Shay, "Understanding Data Communications and Networks", 2e, Thomson Asia Pvt. Ltd.
8. Peter Norton and Dave Kearns, "Complete Guide to Networking", ie, Techmedia India Ltd.
9. Douglas E. Comer, "Internet networking with TCP/IP Vol I & II", 3e, PHI.



## IT (Arts and Science) – THIRD SEMESTER

Course: Major  
 Credits: (L-P-T)  
 (3-1-0)  
 Total marks: 100

Course Title: Data Communication and Networking  
 Course Code: UMJITT302  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 3.0 hours duration  
 Practical: 25 Marks

***For examinations to be held in Dec 2023, 2024 and 2025***

### NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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**Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. (4 x 3 = 12 marks)

**Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks. (4 x 12 = 48 marks)

**Note:** -The paper setter shall ensure that the questions are uniformly distributed over entire syllabus.

#### Practical/ tutorial Evaluation

Daily evaluation of practical's/tutorials/Viva voce/Records etc.

10 marks

#### Final Examination

15 Marks

#### Pattern for external practical examination

Practical file	5 Marks
Written examination	5 Marks
Viva-Voce	5 Marks
Total	15 Marks

#### Pattern for external tutorial examination

Assignment file	10 Marks
Viva-Voce	5 Marks
Total	15 Marks



**IT (Arts and Science) – THIRD SEMESTER**

Course: Minor  
 Course Credits: (L-P-T)  
 (3-0-1)  
 Total marks: 100

Course Title: Digital Electronics  
 Course Code: UMIITT303  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 3.0 hours duration  
 Practical/Tutorial: 25 Marks

*For examinations to be held in Dec 2023, 2024 and 2025*

**Course objectives & learning outcomes:**

1. To familiarize students with the components of digital electronics, logical organization and the hardware and corresponding algorithms for computer arithmetics.
2. To study memory organization and the functions of each element of a memory hierarchy.
3. To understand processor performance at different levels of processing.
4. To familiarize students with the design of a Hardware descriptive language.
5. To help the students in understanding and analyzing different hardware designs. mathematical

**UNIT-I**

**Data and Information:** Features of Digital Systems, Number Systems: Decimal, Binary, Octal, Hexadecimal & their inter conversions, Representation of Data: Signed Magnitude, r's complement & r-1's complement, Binary Arithmetic, Fixed point representation and Floating-point representation of numbers.

**Codes:** BCD, Excess-3, Gray code, hamming code, alphanumeric codes (ASCII, EBCDIC, UNICODE), code conversions.

10 Hours

**UNIT-II**

**Boolean Algebra:** Basic gates (AND, OR, NOT gates), Universal gates (NAND and NOR gates), Implementing all gates using Universal gates, other gates (XOR, XNOR gates). Boolean identities, Boolean Theorems, Multi level NAND & NOR gates, De Morgan Laws. Karnaugh maps: SOP and POS forms,

10Hours

**UNIT-III**

**Combinational Circuits:** Half adder, full adder, code converters, combinational circuit design, Multiplexers and demultiplexers, encoders, decoders, Combinational design using mux and demux.

**Sequential Circuit Design:** Flip flops (RS, Clocked RS, D, JK, JK Master Slave, T, Counters, Shift registers and their types, Counters: Synchronous and Asynchronous counters.

10Hours

**UNIT-IV**

**Computers:** Basic Organization, Memory: ROM, RAM, Static and Dynamic RAM, DRAM Refreshing, PROM, EPROM, EEPROM, Secondary Memory: Hard Disk & optical Disk, Cache Memory, I/O devices, Memory Hierarchy, Solid State Disk.

15 Hours

**Suggested readings/ references:**

1. Jiawei Han & Micheline Kamber, "Data Mining - Concepts and Techniques - 3rd Edition", Elsevier.
2. Margaret H Dunham, "Data Mining Introductory and Advanced Topics" PEA.
3. Ian H. Witten and Eibe Frank, "Data Mining: Practical Machine Learning Tools and Techniques" Morgan Kaufmann.
4. Modern Digital Electronics by R. P. Jain, 3rd Edition, McGraw Hill
5. Digital Design and Computer Organisation by Dr. N. S. Gill and J. B. Dixit, University S
6. M. Morris Mano, "Digital Design" 3rd Edition, PHI, New Delhi.
7. Digital Electronics By D.A. Godse, A.P. Godse, Technical Publications
8. Digital Electronics And Micro - Computers by R. K. Gaur, Dhanpat Rai Publications
9. Floyd, T.L. and Jain, R. P., Digital Fundamentals, Pearson Education.

**IT (Arts and Science) – THIRD SEMESTER**

Course: Minor  
 Course Credits: (L-P-T)  
 (3-0-1)  
 Total marks: 100

Course Title: Digital Electronics  
 Course Code: UMIITT303  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 3.0 hours duration  
 Practical/Tutorial: 25 Marks

*For examinations to be held in Dec 2023, 2024 and 2025*

**NOTE FOR PAPER SETTERS FOR EXAMINATIONS -**

The question paper will be divided into the following two sections. No question will be repeated in the question paper.

**Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks.

(4 x 3 = 12 marks)

**Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.

(4 x 12 = 48 marks)

**Note:** -The paper setter shall ensure that the questions are uniformly distributed over entire syllabus.

**Practical/ tutorial Evaluation**

Daily evaluation of practical's/tutorials/Viva voce/Records etc.

10 marks

**Final Examination**

15 Marks

**Pattern for external practical examination**

Practical file	5 Marks
Written examination	5 Marks
Viva-Voce	5 Marks
Total	15 Marks

**Pattern for external tutorial examination**

Assignment file	10 Marks
Viva-Voce	5 Marks
Total	15 Marks

## IT (Arts and Science) – THIRD SEMESTER

Course: Multi-disciplinary (MD)  
 Course Credits: (L-P-T)  
 (3-0-0)  
 Total marks: 75

Course Title: E-Commerce  
 Course Code: UMDITT304  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 2.5 hours duration

*For examinations to be held in Dec 2023, 2024 and 2025*

### Course objectives & learning outcomes:

1. Understand the basic concepts and technologies used in the field of management information systems;
2. Have the knowledge of the different types of management information systems;
3. Understand the processes of developing and implementing information systems;
4. Be aware of the ethical, social, and security issues of information system

### UNIT -I

**Overview of developments in Information Technology and Defining E-Commerce:** Introduction to e-Commerce, Scope of electronic commerce, definition, e-Commerce and Trade Cycle, Benefits and limitations of E-Commerce, E- Markets, Internet E-Commerce in perspective. Value chain, Supply chain, Electronic Market, Electronic Data Interchange, Internet Commerce, Architectural framework of Electronic Commerce, Web based E Commerce Architecture.

10 Hours

### UNIT -II

**Consumer Oriented E Commerce E-Retailing:** Traditional retailing and e retailing, Benefits of e retailing, Key success factors, Models of e retailing, Features of e retailing. E services: Categories of e-services, Web-enabled services, matchmaking services, Information-selling on the web, e entertainment, Auctions and other specialized services. Business to Business-Electronic Commerce

10 Hours

### UNIT-III

**Digital Marketing:** Digital Marketing, Online Advertisement, Ad Targeting, Search Engine Marketing, Keyword Advertising, Search Engine Optimization, Display Ad Marketing, Interstitial Ad, Video Ad, Advertising Exchanges, Programmatic Advertising, Real-Time Bidding, E-mail Marketing, Affiliate Marketing, Social Marketing, Mobile Marketing, Local Marketing, Online Marketing Metrics, Pricing Models for Online Advertisements, Case Studies: Facebook Marketing Tools, Twitter Marketing Tools, Pinterest Marketing Tools, Location Based Marketing Tools: Google AdSense

10 Hours

### UNIT-IV

**Electronic Data Interchange:** Benefits of EDI, EDI technology, EDI standards, EDI communications, EDI Implementation, EDI Agreements, EDI Security. Electronic Payment Systems, Need of Electronic Payment System: Study and examine the use of Electronic Payment system and the protocols used, Study Electronic Fund Transfer and secure electronic transaction protocol for credit card payment. Digital economy: Identify the methods of payments on the net – Electronic Cash, cheques and credit cards on the Internet.

10 Hours

### Suggested readings/ references:

1. Commerce, Strategy, Technologies and Applications By: David Whiteley Tata McGraw-Hill Edition.
2. Elias. M. Awad, " Electronic Commerce", Prentice-Hall of India Pvt Ltd.
3. RaviKalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.
4. Efraim Turban, Jae Lee, David King, H.Michael Chung, "Electronic Commerce–A ManagerialPerspective", Addison-Wesley.
5. Elias M Award, "Electronic Commerce from Vision to Fulfilment", 3rd Edition, PHI, Judy Strauss, Adel El-Ansary, Raymond Frost, "E-Marketing", 3RDEdition, Pearson Education.



**IT (Arts and Science) - THIRD SEMESTER**

Course: Multi-disciplinary (MD)  
Course Credits: (L-P-T)  
(3-0-0)  
Total marks: 75

Course Title: E-Commerce  
Course Code: UMDITT304  
Mid Semester assessment: 15 Marks of 1.5 hours duration  
End Semester assessment: 60 Marks of 2.5 hours duration

*For examinations to be held in Dec 2023, 2024, and 2025*

**NOTE FOR PAPER SETTERS FOR EXAMINATIONS -**

The question paper will be divided into the following two sections. No question will be repeated in the question paper.

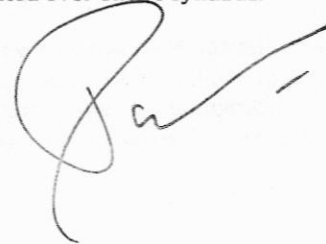
**Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks.

(4 x 3 = 12 marks)

**Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.

(4 x 12 = 48 marks)

**Note:** -The paper setter shall ensure that the questions are uniformly distributed over entire syllabus.





## CA (Arts and Science) - THIRD SEMESTER

Course:	Skill Enhancement Course (SEC)	Course Title: Cyber Security
Course Credits:	(L-P-T) (2-0-0)	Course Code: USEITT305
Total marks:	50	Mid Semester assessment: 10Marks of 1.5 hours duration End Semester assessment: 40 Marks of 2.5 hours duration

### Course objectives & learning outcomes:

1. To provide the basic knowledge of cyber crimes.
2. To impart the knowledge of security threats.
3. To learn the fundamentals of safeguarding against cyber crimes.

***For examinations to be held in Dec 2023, 2024 and 2025***

### UNIT-I

Cyber Crime and its types, Cyber security, Components of Cyber Security, Need of data privacy and security, Computer Security Concepts (Confidentiality, Integrity and Authentication).

Security Threats/Attacks - DoS, DDoS, Spoofing, virus, worms, Trojans, Backdoor, phishing, and spam, Vulnerabilities – Network, Operating System, Process, Human Protection from cyber-attacks.

### UNIT - II

Web attacks (Browser attacks, Web attacks targeting users, Obtaining user's or website data, email attacks), Digital payments and its security(Online banking security, Mobile banking security, Security of debit/credit card), Cyber Security of digital devices, Tools and technology for cyber security (Encryption, Anti-virus, Firewalls, Cyber security best practices, Platform to report cybercrime, Security controls (Management, Operational, Physical), Digital Forensics, Ethical hacking, Database Security, Social Engineering, Careers in cyber security.

### UNIT – III

Introduction to cryptography, Encryption and Decryption, Characteristics of Good Encryption Technique, Plain text and Cipher text, Substitution techniques–Caesar Cipher, Monoalphabetic Cipher, Polygram Substitution and Play Fair. Types of Encryption Systems, Cryptanalysis, Symmetric and asymmetric cryptography, Authentication (Password-Based, Address-Based and Certificate-Based Authentication)

### Suggested Readings:

1. Principles of Information Security – M. E. Whitman and H. J. Mattord, Cengage Learning.
2. Network Security Essentials: Applications and Standards - William Stallings, Pearson.
3. Cryptography and Network Security – Atul Kahate, McGraw Hill Professional Publication.
4. Information Security: The complete reference – Mark Rhodes-Ousley, McGraw Hill Professional Publication.
5. Information Security: Principles and Practices – Mark S. Merkow and Jim Breithaupt, Pearson.
6. Network Security: Private communication in a Private world – C. Kaufman, R. Perlman, M. Speciner, Pearson.

  
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**IT (Arts and Science) – THIRD SEMESTER**

Course: Skill enhancement Course (SEC)  
Course Credits: (L-P-T)  
(2-0-0)  
Total marks: 50

Course Title: Cyber Security  
Course Code: USEITT305  
Mid Semester assessment: 10Marks of 1.5 hours duration  
End Semester assessment: 40 Marks of 2.5 hours duration

*For examinations to be held in Dec 2023, 2024 and 2025*

**NOTE FOR PAPER SETTERS FOR EXAMINATIONS -**

The question paper will be divided into the following two sections. No question shall be repeated in the question paper.

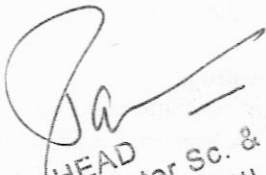
**Section A** shall consist Four (4) short answer questions (at least one from each unit). The students are required to attempt all questions. Each question shall be of 2½ Marks.

(4 x 2½ = 10 marks)

**Section B** shall consist Six (6) long answer questions (two from each unit). The students are required to attempt three questions. Each question shall be of 10 Marks.

(3 x 10 = 30 marks)

**Note:** The paper setter shall ensure that the questions are uniformly distributed over entire syllabus.

  
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**IT (Arts and Science) - FOURTH SEMESTER**

Course: Major  
 Course Credits: (L-P-T)  
 (3-1-0)  
 Total marks: 100

Course Title: Database Management System & SQL  
 Course Code: UMJITT401  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 3.0 hours duration  
 Practical: 25 Marks

*For examinations to be held in May 2024, 2025 and 2026*

**Course objectives & learning outcomes:**

1. To present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve efficiently, and effectively information from a DBMS.
2. Design ER-models to represent simple database application scenarios and convert them into relational tables
3. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.
4. To familiarize students with the basic issues of transaction processing and concurrency control.
5. Construct simple and moderately advanced database queries using Structured Query Language (SQL).

**UNIT-I**

**Overview of DBMS:** Data, Files, Records, Advantages and disadvantages of Traditional file Approach, Introduction to Database, DBMS: Introduction, Need of DBMS, components of DBMS, advantages and disadvantages. Three level Architectural of Database, Centralized and Client Server Architecture for DBMS, Advantages and Disadvantages of DBMS.

15 Hours

**UNIT-II**

**Relational DBMS:** definition, concept of table, Concept of keys (primary, unique, candidate, foreign etc). Data models and types of [traditional, semantic, hierarchical, network, relational] E-R diagram, Notations used in E-R Model, Relationships and Relationship types, Conversion of ER Diagram to Relational Model.. Database management System Structure, Data manager, Database Administrator and Data Dictionary, Relational data models, Relational Algebra.

15 Hours

**UNIT-III**

**Normalization:** Functional dependency, Anomalies and data redundancies in Database, Properties of Normalized relations, First, Second, Third Normal Form, Boyce-Codd Normal Form (BCNF), Fourth Normal Form, Fifth Normal Form.

**Overview of SQL:** Categories of SQL Commands: Data Definition Language, Data Manipulation Language, Query Processing, Data types in SQL, Operators, Expressions, Create Database, Drop Database

15 Hours

**UNIT-IV**

**SQL:** Table creation, insertion, deletion, Alter, Update and Delete Query. Select Statement, Inserting Values, Constraints, and Retrieval of data from Table, Table deletion, SQL queries using conditions like WHERE Clause, AND, OR, NOT, LIKE Clause, TOP Clause, ORDER BY And GROUP BY, WILD Cards, JOINS, DISTINCT Keyword, DATE Functions and Other In-Built Functions, VIEWS.

15 ours

**Suggested readings/ references:**

1. Bipin C.Desai: An Introduction to Database Systems, West-publishing company.
2. Elmasri, Navathe, Somayajulu, Gupta: Fundamentals of Database Systems, Pearson Education.
3. Date, C.J.: An Introduction to Database Systems Addison Wesley Pearson Education.
4. Narayan S Umanath, Richard W Scamell : Data Modelling and Database Design, Thomson Course Technology India Edition.
5. R.A. Parida, Vinod Sharma: The power of Oracle 9i, Firewall Media Publications.
6. Bayross Ivan: SQL, PL/SQL the programming language of Oracle, BPB publications.

**IT (Arts and Science) - FOURTH SEMESTER**

Course: Major  
 Course Credits: (L-P-T)  
 (3-1-0)  
 Total marks: 100

Course Title: Database Management System & SQL  
 Course Code: UMJITT401  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 3.0 hours duration  
 Practical: 25 Marks

*For examinations to be held in May 2024, 2025 and 2026*

**NOTE FOR PAPER SETTERS FOR EXAMINATIONS -**

The question paper will be divided into the following two sections. No question will be repeated in the question paper.

**Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks.

(4 x 3 = 12 marks)

**Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.

(4 x 12 = 48 marks)

**Note:** -The paper setter shall ensure that the questions are uniformly distributed over entire syllabus.

**Practical/ tutorial Evaluation**

Daily evaluation of practical's/tutorials/Viva voce/Records etc.

10 marks

**Final Examination**

15 Marks

**Pattern for external practical examination**

Practical file	5 Marks
Written examination	5 Marks
Viva-Voce	5 Marks
Total	15 Marks

**Pattern for external tutorial examination**

Assignment file	10 Marks
Viva-Voce	5 Marks
Total	15 Marks

**IT (Arts and Science)–FOURTH SEMESTER**

Course: Major  
 Course Credits: (L-P-T)  
 (3-0-1)  
 Total marks: 100

Course Title: Data Structure using C Language  
 Course Code: UMJITT402  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 3.0 hours duration  
 Practical: 25 Marks

*For examinations to be held in May 2024, 2025 and 2026*

**Course objectives & learning outcomes:**

1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes and threads and their communication.
3. To learn the mechanisms involved in memory management in contemporary OS.
4. Shell programming

**UNIT-I**

**Algorithms and Basics:** Analysis on Algorithm, Complexity of Algorithm, Introduction and Classifications of Data Structures. Data Structure operations. Time and space complexity of algorithms. Rate of Growth: Big O Notation. Structures, Self- Referential Structures

15 Hours

**UNIT-II**

**Linear Data Structures:** Arrays and its representations, Representation and Operations of Singly Linked Lists, Stacks and Queues and their implementation using Arrays and Linked lists. Applications of Arrays, Linked list, Stacks and Queues.

15 Hours

**UNIT-III**

**Non-Linear Data Structures:** Trees, Binary Trees, Binary tree representation and traversals, Binary Search Trees, Complete Tree, Heap, Graph and its representations, Applications of trees and Graphs.

15 Hours

**UNIT-IV**

**Sorting and Searching:** Linear Search and Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Quick Sort, Heap Sort, Time and space complexity of sorting & search algorithms

15 Hours

**Suggested readings/ references:**

1. S. Lipschutz, "Data Structures", Tata McGraw Hill Education, 1st Edition, 2008.
2. D. Samanta, "Classic Data Structures", PHI Learning, 2nd Edition, 2004.
3. Data Structure through C by Yashwant Kanetkar, BPB Publications.
4. Data Structure through C in Depth by S.N. Srivastva BPB Publications.
5. Introduction to Data Structure in C by Ashok N Kamthane, Pearson Publications.



**IT (Arts and Science)-FOURTH SEMESTER**

Course: Major  
 Course Credits: (L-P-T)  
 (3-0-1)  
 Total marks: 100

Course Title: Data Structure using C Language  
 Course Code: UMJITT402  
 Mid Semester assessment: 15 Marks of 1.5 hours duration  
 End Semester assessment: 60 Marks of 3.0 hours duration  
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*For examinations to be held in May 2024, 2025 and 2026*

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(4 x 12 = 48 marks)

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**Practical/ tutorial Evaluation**

Daily evaluation of practical's/tutorials/Viva voce/Records etc.

10 marks

**Final Examination**

15 Marks

**Pattern for external practical examination**

Practical file	5 Marks
Written examination	5 Marks
Viva-Voce	5 Marks
Total	15 Marks

**Pattern for external tutorial examination**

Assignment file	10 Marks
Viva-Voce	5 Marks
Total	15 Marks