NOTIFICATION
(23/August/Adp./74)

In partial modification of this office Notification No. F.Acd/II/23/6286-6296 dated 11.07.2023, 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 change the Title of Course no. UMICST303: "Digital Electronics" Instead Of "Object Oriented Programming using C++" of the subject of Bachelor of Computer Application (BCA) of Semester IIIrd for Four Year Under Graduate Programme as per NEP-2020 (as given in the annexure) under the Choice Based Credit System for the examinations to be held in the years Dec. 2023, 2024 and 2025.

The Syllabi of the courses is available on the University website: www.jammuuniversity.ac.in

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/23/8139 – 8149.
Dated: 10-8-2023.
Copy for information and necessary action to:

1. Dean, Faculty of Mathematical Science
2. 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 notify

Deputy Registrar (Academic)

Bachelor of Computer Applications (BCA)

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	**Bachelor of Computer Applications (BCA)** BCA (Web Technology) BCA (Data Science) BCA (Software Development)	Computer Applications (for BCA degree)

University of Jammu

Bachelor of Computer Applications (BCA)

WEB TECHNOLOGY

SCHEME

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

COURSES OF STUDY

September 2022

Semester–I

S. No.	Course Type	Course No.	Course Title	Credits	Marks Theory		Practical/Tutorial		Total Marks
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJCST101	Web Designing	4(3L+1P)	15	60	10	15	100
2	Minor	UMICST102	Computer Fundamentals	4(3L+1P)	15	60	10	15	100
3	MD	UMDCST103	World Wide Web and Internet	3	15	60	NA	NA	75
4	SEC	USECST104	PC Software: Installation and Troubleshooting	2	10	40	NA	NA	50

Semester–II

S. No.	Course Type	Course No.	Course Title	Credits	Marks Theory		Practical/Tutorial		Total Marks
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJCST201	Scripting Languages	4(3L+1P)	15	60	10	15	100
2	Minor	UMICST202	Web Programming using PHP	4(3L+1P)	15	60	10	15	100
3	MD	UMDCST203	Introduction to Web Designing	3	15	60	NA	NA	75
4	SEC	USECST204	Cyber Security	2	10	40	NA	NA	50

Semester–III

S. No.	Course Type	Course No.	Course Title	Credits	Marks Theory		Practical/Tutorial		Total Marks
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJCST301	Fundamentals of Operating System	4(3L+1P)	15	60	10	15	100
2	Major	UMJCST302	Database Management System	4(3L+1P)	15	60	10	15	100
3	Minor	UMICST303	Digital Electronics	4(3L+1T)	15	60	10	15	100
4	MD	UMDCST304	World Wide Web and Internet	3	15	60	NA	NA	75
5	SEC	USECST305	System Analysis and Design	2	10	40	NA	NA	50

Semester–IV

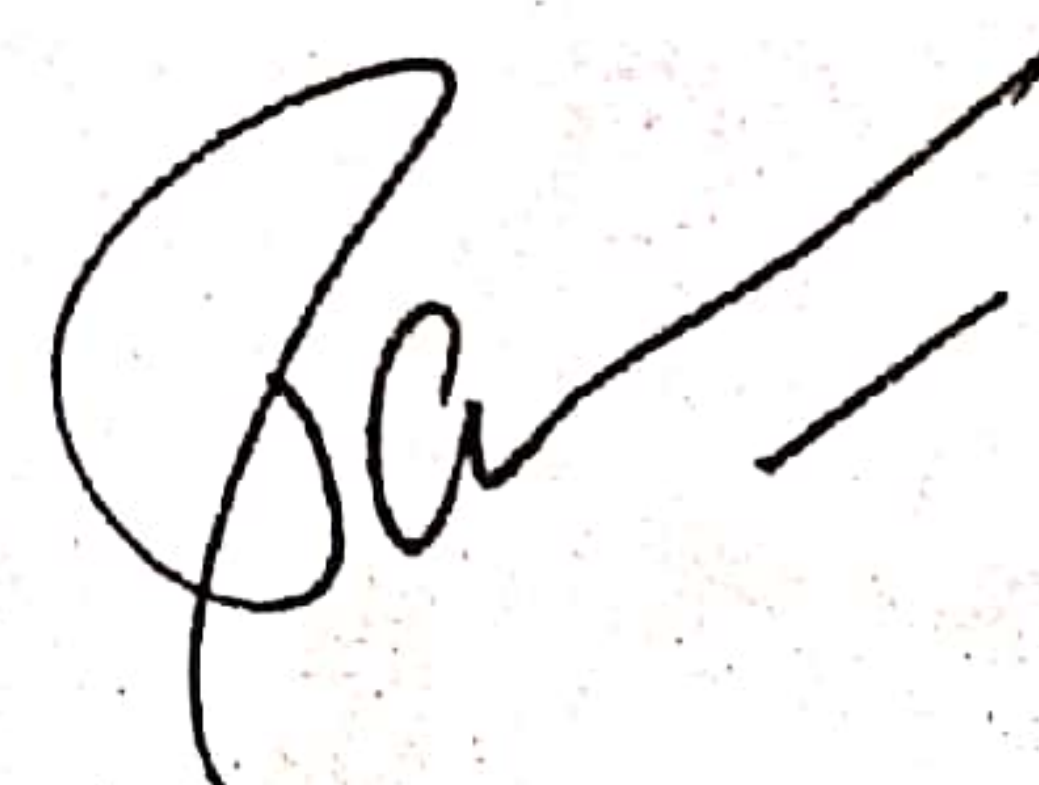| S. No.	Course Type	Course No.	Course Title	Credits	Marks Theory		Practical/Tutorial		Total Marks
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJCST401	Express Frameworks	4(3L+1P)	15	60	10	15	100
2	Major	UMJCST402	Data Structures using C	4(3L+1T)	15	60	10	15	100
3	Major	UMJCST403	Mathematical Foundation of Computer Science	4(3L+1T)	15	60	10	15	100
4	Major	UMJCST404	Python Programming	4(3L+1T)	15	60	10	15	100
5	Minor	UMICST405	Internet of Things	4(3L+1T)	15	60	10	15	100

SCHEME OF EXAMINATION

Each course shall be comprised of Mid Semester Assessment Test and End-Semester Examination. The responsibility of conduct and evaluation of the Mid Semester Assessment test lies with the Course Coordinator. The End Semester Examination shall be conducted by the University and question papers shall got set by the Controller of Examinations. The Mid Semester Assessment marks awarded to the students in each course shall be displayed on the notice board well in advance, at least one week before the commencement of End Semester examination. The 03/04 and 02 credits paper shall have 04 and 03 units, respectively.

Practicals/Tutorials as applicable in a course (Major/Minor) are extension of the theory programme in an inbuilt (3+1) credits course i.e. 03 credits of theory and 01 credit of practical/tutorial. However, 02 credits major course of 5th semester will have only theory component. Each four credits paper will have 75 Marks for theory and 25 Marks for practical/tutorial. The break-up for 75 Marks for theory paper shall contain 15 Marks for Mid Semester Assessment Test and 60 Marks for End Semester Examination. There will be continuous assessment of 10 Marks and final examination of 15 Marks for Practical/Tutorial component in each course.

The 03 credits paper shall be of 75 Marks consisting of 60 Marks for external examination and 15 Marks for Mid Semester Assessment test. All 02 credits courses shall be of 50 marks comprising 40 marks for External examination and 10 Marks for Mid Semester Assessment Test.

THEORY

DESCRIPTION	TIME ALLOTTED	MARKS
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies.	1½ hours	15 Marks for 03/04 Credits 10 Marks for 02 Credits

End Semester University Examination shall be conducted for entire syllabus. The break up is as under:

1. 03 and 04 credits papers

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.

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.

2. 02 credits papers

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 2½ Marks.

Section B shall consist Six (6) 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 10 Marks.

Note: Convener, BOS, can make minor modification in the scheme Skill course, if required. However, it must be clearly reflected in the syllabus.

03 hours for 03/04 credits	60 Marks for 03/04 Credits	
2½ hours for 02 credits	40 Marks for 02 Credits	

PRACTICAL/TUTORIAL

i. Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous assessment
ii. Final Examination	15 Marks for Final examination

Note: The BOS shall device the mechanism of Final examination.

Instructions for paper setter

1. 3 / 4 Credits Paper

Total marks: 60
Time allotted: 3 hours
The question paper will be divided into the following two sections. No question shall be repeated in the question paper.

Section A

Total of Four (4) short answer questions (one from each unit) shall be set. The candidates are required to attempt all questions. Each question shall be of 3 Marks.

Section B   (4 x 3 = 12 marks)

Total of Eight (8) long answer questions (two from each unit) shall be set. The candidates are required to attempt four questions. 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.

2. 2 Credits Paper

Total marks: 40
Time allotted: 2½ hours
The question paper will be divided into the following two sections. No question shall be repeated in the question paper.

Section A

Total of Four (4) short answer questions (at least one from each unit) shall be set. The candidates are required to attempt all questions. Each question shall be of 2½ Marks.
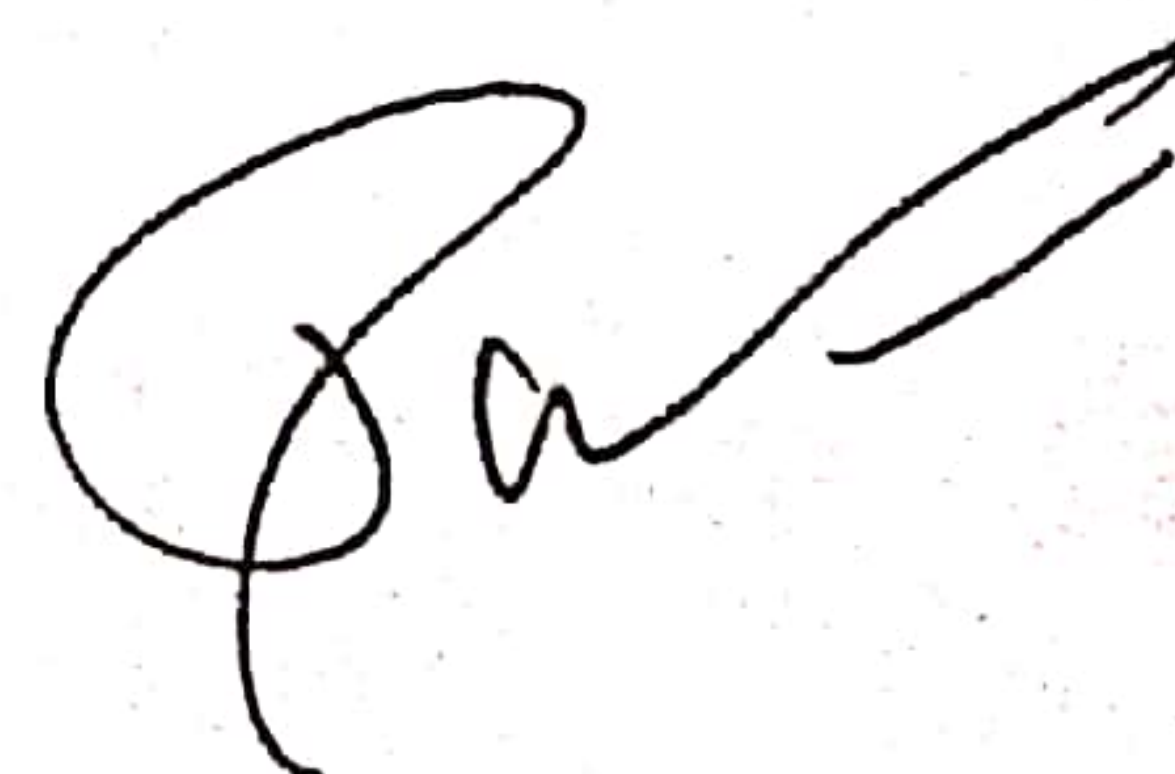
Section B   (4 x 2½ = 10 marks)

Total of Six (6) long answer questions (two from each unit) shall be set. The candidates 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.

University of Jammu

Four year UG Programme

BCA (Web Technology) -THIRD SEMESTER

Course Title: Fundamentals of Operating System
Course Code: UMJCST301
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

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

Course objectives & learning outcomes:
1. To learn the fundamentals of Operating System.
2. To understand different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
3. To gain knowledge on memory management concepts.
4. To brief the students about different file handling techniques.

UNIT – I
Introduction to Operating System: Definition, Types of Operating Systems: Batch Systems, Concepts of Multiprogramming and Time Sharing, and Real Time Systems. Operating System Structures and Services.

15 Hours

UNIT - II
Process Management: Process Concepts, Process States and Process Control Block.
CPU Scheduling: Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Priority, and Round Robin.
Deadlocks: Deadlock Characterization, Resource allocation graph, Deadlock Prevention and Avoidance.

15 Hours

UNIT - III
Memory Management: Logical and Physical Address Space, Swapping, Contiguous and Non- Contiguous Allocation, Paging, Segmentation, Demand Paging
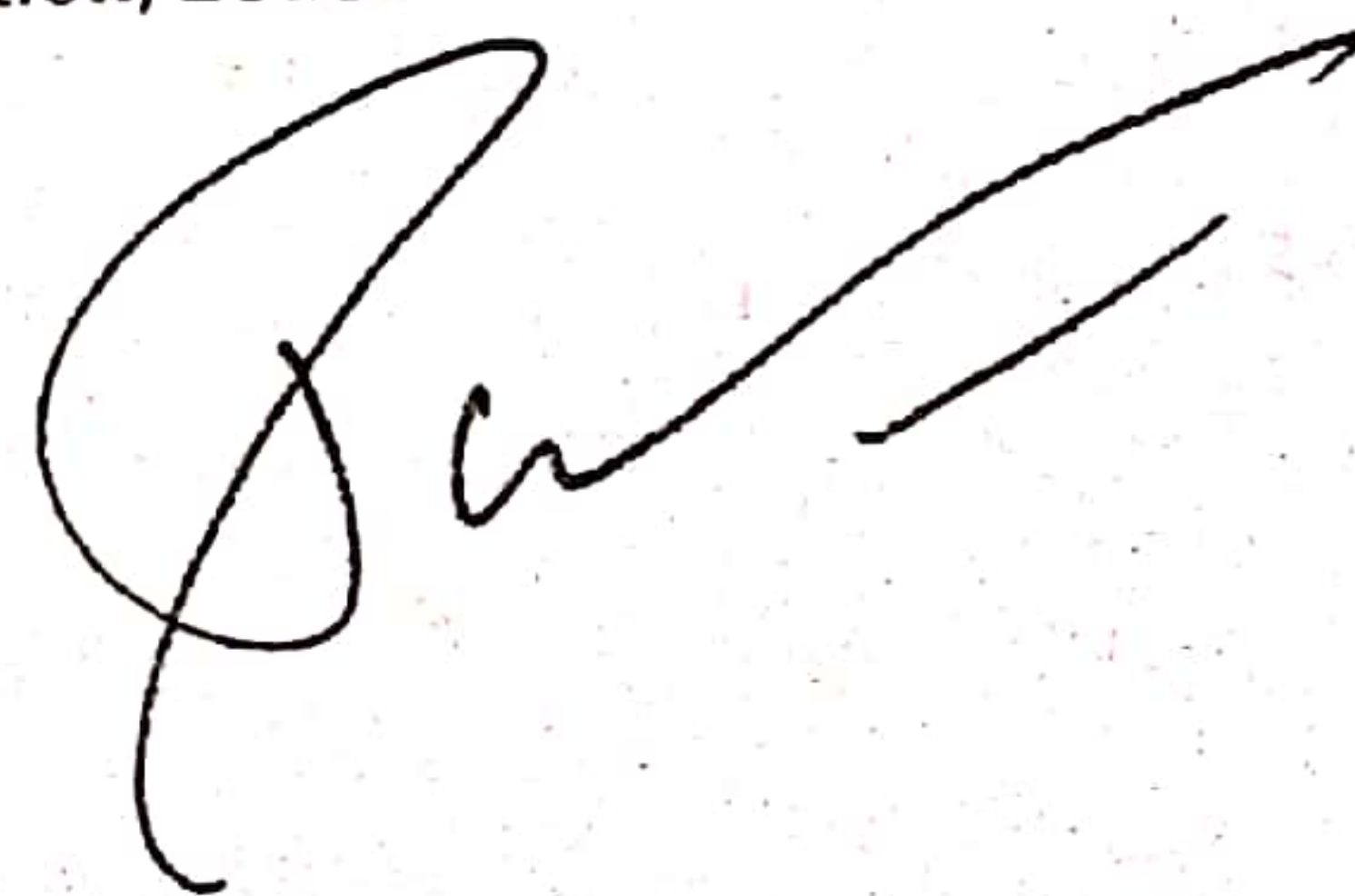Page Replacement Algorithms: FIFO, Optimal, LRU, Thrashing,

15 Hours

UNIT – IV
File System and Management: File Concepts, Access Methods, Directory Structure, Protection and Consistency, File System Structure, Allocation Methods: Continuous Allocation, Chained Allocation and Indexed Allocation.
Introduction to LINUX/UNIX: Various Parts of Operating System, Kernel, Important Parts of Kernel, Commands: pwd, mkdir, rmdir, 1s, cat, more, less, mv, cp, rm, pwd, who, write, who am i, passwd, ps, kill, date. cal, man, banner, Regular Expression: grep, fgrep

15 Hours

Suggested readings/ references:
1. Operating Systems Concepts – Silberschatz, Galvin and Gagne, Wiley Publications
2. Operating Systems: A Concept based Approach – D M Dhamdhere, 2nd Edition.
3. Sumitabha Das, "Unix concept and Programming", McGraw Hill education, 4th Edition, 2015.

University of Jammu

September 2022

BCA (Web Technology) - THIRD SEMESTER

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

Course Title: Fundamentals of Operating System
Course Code: UMJCST301
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.

Final Examination

10 marks

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

BCA (Web Technology) -THIRD SEMESTER

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

Course Title: Database Management System
Course Code: UMJCST302
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 DBMS
2. To understand the relational database design principles.
3. To gain knowledge on basic issues of transaction processing and concurrency control
4. To brief the students about SQL programming.

UNIT – I

Introduction: Basic Concept and Definitions, Data and Information, Data Dictionary, Data Item or Field, Entity & attributes, Record, Applications of DBMS, File Processing System versus DBMS, Advantages and Disadvantages of DBMS, Architecture of DBMS, Users of DBMS, Views of Data

UNIT - II   15 Hours

Relational DBMS: Definition, Concept of Table, Relation, Tuple, Attribute, Various keys, Role of Database administrator, Data Models, Entity Relationship Diagram (ERD), Relational Algebra Operations.

UNIT - III   15 Hours

Normalization: Anomalies and data redundancies in Database, Dependencies [functional, fully functional and minimal/irreducible set], Normal forms [1st, 2nd, 3rd, BCNF]

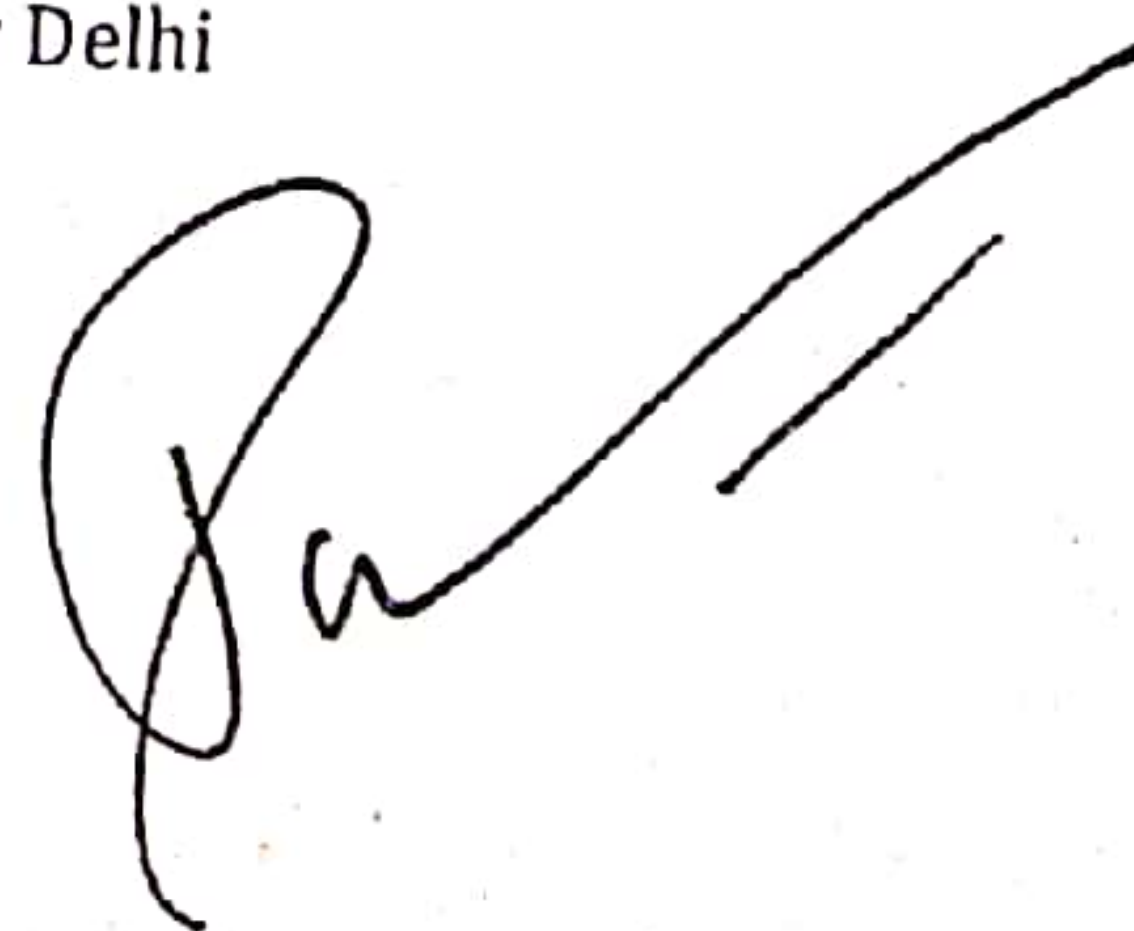### UNIT – IV   15 Hours

Overview of SQL: Introduction of SQL, History of SQL, Data types in SQL, Table creation, insertion, deletion, alteration and retrieval of data from table, Table deletion, simple & nested queries using DDL, DML and DCL commands, SQL queries using conditions like where, where-like, order by, greater than, less than, if-then, if-then-else, if-then else if, data integrity constraints, views, joins.

                                                                            15 Hours

Suggested readings/ references:
1. Elmsari and Navathe, "Fundamental of Database System", Addison Wesley. New York.
2. H.Korth & A. Silberschatz, "Database System Concepts", TMH.
3. Date. CJ, "An Introduction to Database System", Narosa Publishing House. New Delhi.
4. Desai, B, "An Introduction to Database Concepts", Galgotia Publications. New Delhi

University of Jammu

September 2022

BCA (Web Technology) - THIRD SEMESTER

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

Course Title: Database Management System
Course Code: UMJCST302
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
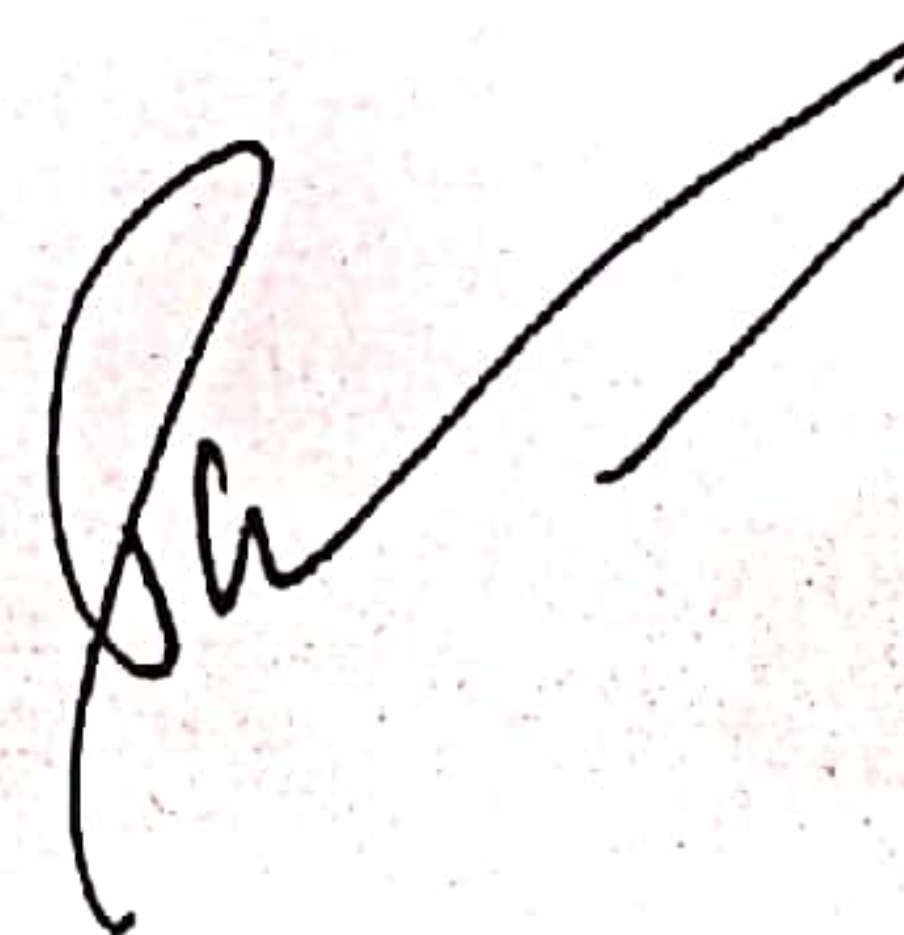Daily evaluation of practical's/tutorials/Viva voce/Records etc.

Final Examination

10 marks

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

Four year UG Programme   University of Jammu

BCA (Web Technology) - THIRD SEMESTER

Course: Minor   Course Title: Digital Electronics
Course Credits: (L-P-T)   Course Code: UMICST303
          (3-0-1)   Mid Semester assessment: 15 Marks of 1.5 hours duration
Total marks: 100   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 concept of digital and binary systems.
2. To introduce the concept of Boolean algebra.
3. To build the foundation for understanding the digital logic circuits and their use in combinational and sequential logic circuit design.

UNIT – I
Overview of Digital systems, Data Representation, Integer Representation, Floating point Representation, Error Detection, Parity, Checksum, Rules of floating point arithmetic.

15 Hours

UNIT - II
Logic Gates: Basic gates- AND, OR, NOT; Combination of basic gates- NAND, NOR, XOR, XNOR; Logic Gates Truth Tables, Logic symbols and design. Representation of computer codes: ASCII Code, BCD Code, Excess-3 Code, Grey Code.

15 Hours

UNIT – III
Boolean algebra: Boolean variables, operators and expressions, Laws of Boolean algebra, De-Morgan's law, Principle of duality, Implementation of Boolean expression using logic gates. SOP, POS, Simplification of SOP and POS forms of Boolean expressions.
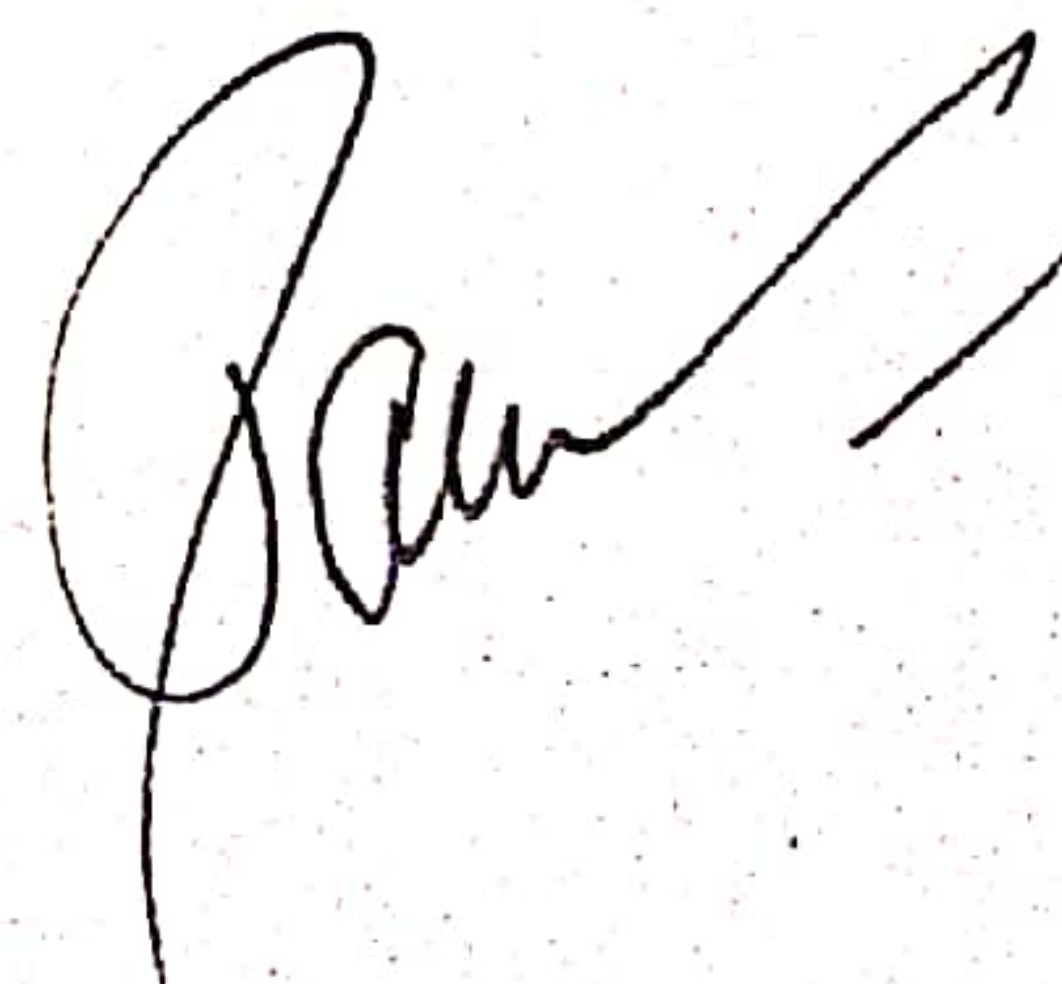
15 Hours

UNIT – IV
Minimization of gates using K- maps techniques, Combinational circuits: Half adder and subtractor; Full adder and subtractor, Multiplexor, De- Multiplexor; Encoder, decoder, Sequential circuits: Flipflops- RS, D, JK.

15 Hours

Suggested readings/ references:

1. Thomas L. Floyd, " Digital Electronics: Pearson Education India, 10th edition, 2010
2. Donald P. Leach, Albert Paul, Gautam Saha, Digital Principles and Applications " Mc Graw Hill Publication 8th edition.
3. Atul P Godse, Dr. Deepali A Godse, Digital electronics(A conceptional approach) " Dhanpat Rai publications.
4. Kenneth J. Breeding, Digital Design Fundamentals, 2nd edition, Prentice-Hall.
5. Anant Agarwal and Jeffrey H. Lang, Foundations of Analog and Digital Electronic Circuits, Morgan Kaufmann, 2005.

University of Jammu

BCA (Web Technology) - THIRD SEMESTER

September 2022

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

Course Title: Digital Electronics
Course Code: UMICST303
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.

Final Examination

10 marks

Pattern for external practical examination   15 Marks

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

University of Jammu

Four year UG Programme

BCA (Web Technology) - THIRD SEMESTER

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

Course Title: World Wide Web and Internet
Course Code: UMDCST304
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration

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

Course objectives & learning outcomes:
1. To understand basic web fundamentals.
2. To understand concepts of mailing protocols.
3. To gain knowledge on network protocols and their applications.
4. To brief the students about web designing concepts.

UNIT - I
Web Browser, Installing and setting up Web Browsers, Client -Side Scripting Languages-VBScript and Java Script, Server-Side Scripting languages, ActiveX Controls and Plug-ins, Web Server Architecture.

10 Hours

UNIT - II
The basics of Internet, World Wide Web, Web page, Home page, Web site, Static, Dynamic and Active web page, Overview of Protocols – Simple Mail Transfer Protocol, Gopher, Telnet, Emails, TFTP, Simple Network Management Protocol, Hyper Text Transfer Protocol, Client server computing concepts.

10 Hours

UNIT – III
Electronic mail (E-mail), Usenet and newsgroup, File Transfer Protocol (FTP), Telnet, Finger, Internet Chat (IRC), Frequently asked questions (FAQ), The World Wide Web Consortium (W3C) – Origin and evolution, Standardizing the Web, W3C members, W3C recommendations, Browsing and searching, Browsing and information retrieval, Exploring the World Wide Web, Architecture of World Wide Web, Hyperlink, Hypertext Transfer Protocol (HTTP), URL.

10 Hours

UNIT – IV
WWW operations, Web standards, HTML – concept and version, Naming scheme for HTML Documents, HTML editor, Elements in HTML documents, XHTML, CSS, Extensible Stylesheet Language (XSL), Tips for designing Web pages, Web Authoring Tools and types.

15 Hours

Suggested readings/ references:
1. Burdman, "Collaborative Web Development", Addison Wesley.
2. Deitel, "Internet and World Wide Web: How to program", Pearson Publications.
3. Sharma &Sharma, "Developing E-Commerce Sites", Addison Wesley
4. Ivan Bayross, "Web Technologies Part II", BPB Publications.

University of Jammu

BCA (Web Technology)–THIRD SEMESTER

September 2022

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

Course Title: World Wide Web and Internet
Course Code: UMDCST304
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 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.
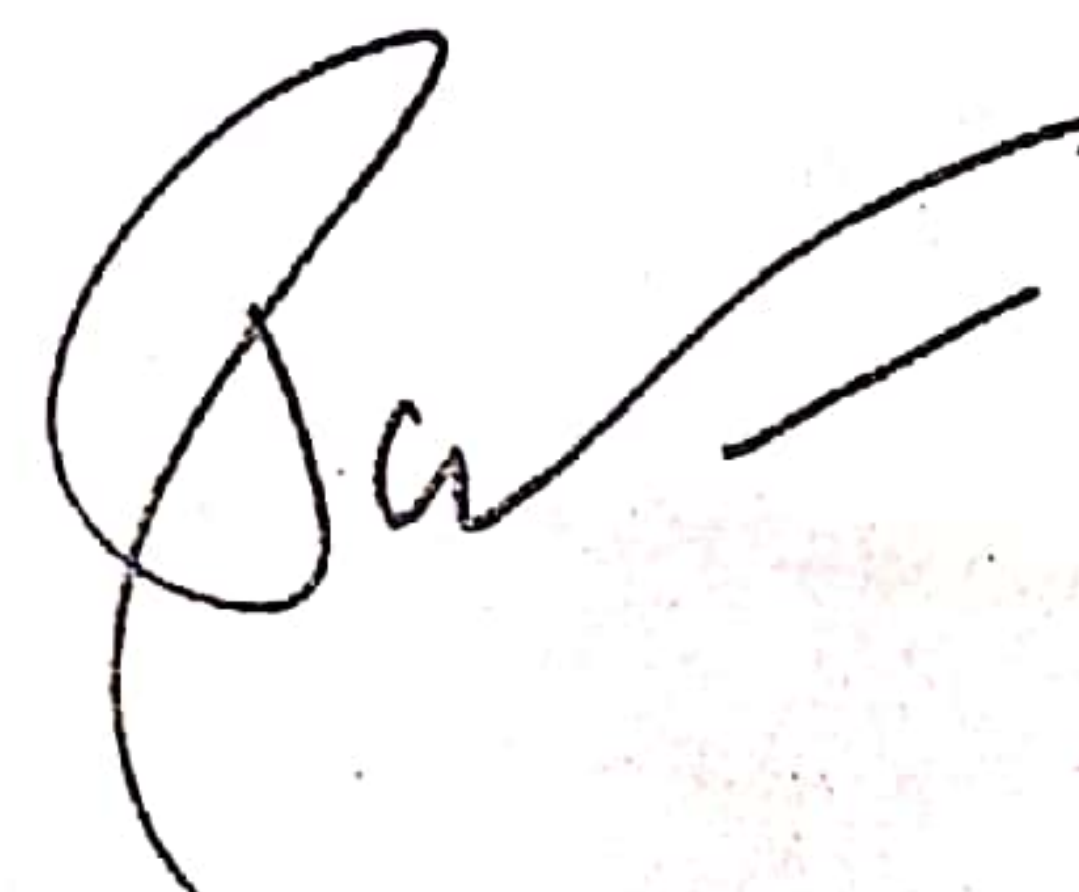
Section A shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks.

(4 x 3 = 12 marks)

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

(4 x 12 = 48 marks)

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

BCA (Web Technology) - THIRD SEMESTER

Course: Skill Enhancement Course (SEC)

Course Credits: (L-P-T)
(2-0-0)

Total marks: 50

Course Title: System Analysis and Design

Course Code: USECST305

Mid Semester assessment: 10 Marks 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

Course objectives & learning outcomes:

1. To learn the basics of Software and system development life cycle.
2. To learn different SRS and feasibility study.
3. To gain knowledge on DFDs, ER diagrams and tools.

Unit-1

Software Systems Analysis and Design Life Cycle: Requirements determination, requirements specifications, feasibility analysis, final specifications, hardware and software study, Software system design, Software system implementation, Software system evaluation, Software system modification.

15 Hours

Unit-II

Role of Software systems analyst, tools used in Software system analysis Information gathering: strategies, methods, case study Software system requirements specification: classification of requirements as strategic, tactical, operational and statutory. Feasibility analysis: deciding project goals, examining alternative solutions, cost – benefit analysis.
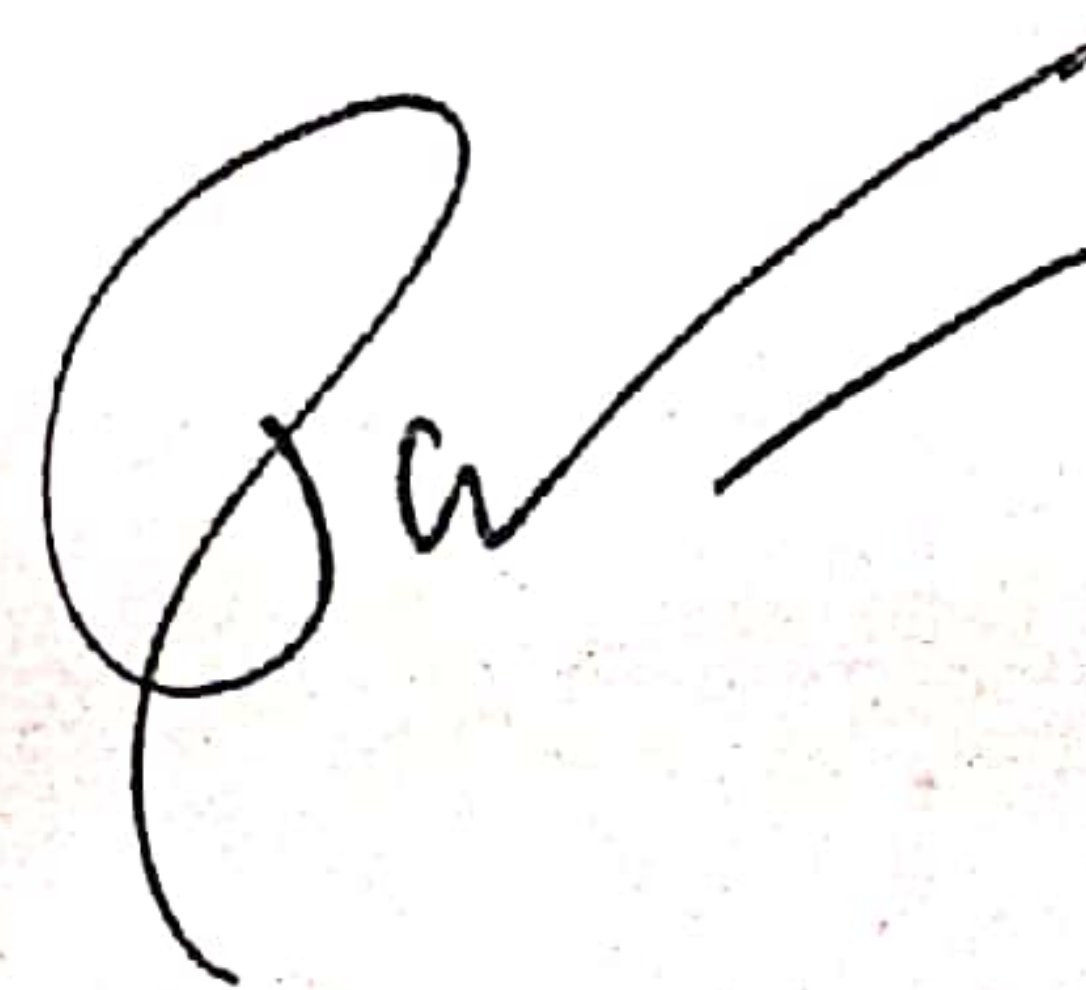
15 Hours

Unit-III

Tools for systems analysts: data flow diagrams, case study for use of DFD, leveling of DFDs, leveling rules, logical and physical DFDs, software tools to create DFDs. Data oriented Software systems design: entity relationship model, E-R diagrams, relationships, cardinality and participation, data base design.

15 Hours

Suggested Readings:

1. Software Engineering by Roger S. Pressman- Tata McGraw Hill.
2. Software Project Management by Bob Hughes and Mike Cotterell- Tata McGraw Hill.
3. Software Project Management by S. Kelkar- PHI.
4. Information Technology Project Management by Kathey and Schwalbe Thomson Learning
5. An Integrated Approach to Software Engineering by P. Jalote- PHI.

University of Jammu

BCA (Web Technology) - THIRD SEMESTER

September 2022

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

Course Title: System Analysis and Design
Course Code: USECST305
Mid Semester assessment: 10 Marks 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.

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.

(4 x 2½ = 10 marks)

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

(3 x 10 = 30 marks)

BCA (Web Technology)–FOURTH SEMESTER

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

Course Title: Express Frameworks
Course Code: UMJCST401
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 understand basic installation process of Express Framework.
2. To learn about various templates, data handling and storage concepts.
3. To brief the students about various security and authentication mechanisms in Express applications.

UNIT – I
Introduction to Express: Overview of Express, Installing Express and creating a project, Basic routing using Express, Understanding middleware in Express.

15 Hours

UNIT – II
Views and Templates: Introduction to Views and Templates, Using Pug (formerly known as Jade) for templating, creating views and templates in Express, Using layouts and partials, Handling errors and rendering error pages.

UNIT – III
15 Hours

Data handling and storage: Handling POST requests and data, Using forms to submit data to the server, Storing data in MongoDB using Mongoose, Retrieving and manipulating data from MongoDB.
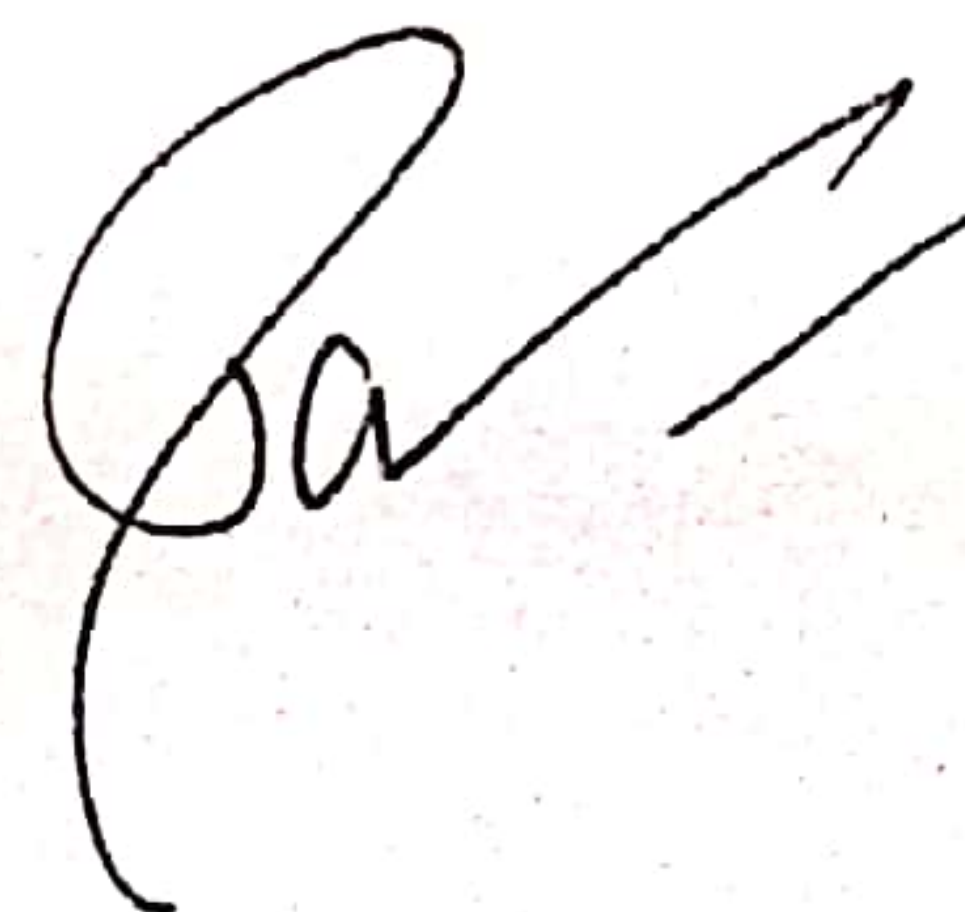
UNIT – IV
15 Hours

Authentication and Security: Introduction to Authentication and Security, Using Passport.js for authentication, Using sessions and cookies, Securing your Express application, Best practices for securing your application

15 Hours

Suggested Readings:
1. Azat Mardan, "The Comprehensive Book on Express JS", LeanPub
2. Dhruti Shah, "Node.JS Guidebook", BPB Publications, 2018
3. Basarat Ali Syed, "Beginning Node.js", A press, 2014

University of Jammu

September 2022

BCA (Web Technology)–FOURTH SEMESTER

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

Course Title: Express Frameworks
Course Code: UMJCST401
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.

Final Examination

10 marks

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

Four year UG Programme

University of Jammu

BCA (Web Technology)-FOURTH SEMESTER

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

Course Title: Data Structures using C
Course Code: UMJCST402
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 fundamentals of Data Structures and its types.
2. To understand representations of Arrays, Linked lists, Stacks, Trees etc.
3. To brief the students about sorting and searching algorithms.

UNIT – I
Introduction and Classifications of Data Structures. Data Structure operations. Time and space complexity of algorithms. Rate of Growth: Big O Notation. Recursion, Pointers: Definition, Initialization, Pointers arithmetic. Structures, Self Referential Structures.

15 Hours

UNIT – II
Linear Data Structures: Arrays and its representations, Stacks and Queues and its implementation using Arrays, Dynamic memory allocation, Linked lists, Linked list-based implementation of Stacks and Queues, Evaluation of Expressions, Applications of Arrays and Linked list

15 Hours

UNIT – III
Non-Linear Data Structures: Trees, Binary Trees, Binary tree representation and traversals, Binary Search Trees, Complete Binary 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, Merge Sort, Quick Sort, Selection Sort, Time and space complexity of sorting & search algorithms.

15 Hours

Suggested readings/ references:
1. Ashok N. Kamthane, "Introduction to Data Structures in C", Pearson Education.
2. Aaron M. Tenenbaum, "Data Structures Using C"
3. Tremblay, Jean-Paul, and Paul G. Sorenson, "An introduction to data structures with applications", McGraw-Hill

University of Jammu

BCA (Web Technology)-FOURTH SEMESTER

September 2022

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

Course Title: Data Structures using C
Course Code: UMJCST402
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

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

Final Examination

10 marks

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

BCA (Web Technology) - FOURTH SEMESTER

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

Course Title: Mathematical Foundation of Computer Science
Course Code: UMJCST403
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 understand basic concepts of set operations and calculus.
2. To gain knowledge on Linear equations and matrices operations.
3. To brief the students about vector spaces concepts.

UNIT – I

Sets, Relations and Functions: Definition of Sets and Subsets; Intersection Union and Complements: Demorgan's Law; Cardinality; Relations - Equivalence relation etc. Mapping One-One Onto etc.

UNIT - II
15 Hours

Calculus: Functions; Limits and Continuity; Differentiation and Integration; Differential Equations of first Order and first degree.

UNIT –III
15 Hours

Linear equations and Matrices: Various types of Matrices, Row/Column operations Solution of linear equations Gaussian Eliminations etc. Properties of determinants; Cramer's Rule; transpose and inverse of a Matrix.

UNIT – IV
15 Hours

Vector Spaces: Definition of Vector, Scalar Product, Vector Product Linear Independence; Bases, Subspace and dimensionality Inner products and Norms.

15 Hours

Suggested Readings/ References:
1. M.R. Puri, Dr. Raj Krishan" Modern Algebra ", Malhotra Brothers.
2. A.R. Vasishtha Publisher,"Matrices", Krishna Prakashan Mandir.
3. Trembley, J.P. and Manohar, R.P," Discrete Mathematical Structures with Applications to Computer Science", McGraw-Hill.

University of Jammu

BCA (Web Technology) - FOURTH SEMESTER

September 2022

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

Course Title: Mathematical Foundation of Computer Science
Course Code: UMJCST403
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

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(4 x 12 = 48 marks)

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

Final Examination

Pattern for external practical examination   10 marks
Practical file
Written examination   5 Marks   15 Marks
Viva-Voce   5 Marks
Total   5 Marks
                             15 Marks

Pattern for external tutorial examination
Assignment file
Viva-Voce   10 Marks
Total   5 Marks
                             15 Marks

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BCA (Web Technology) - FOURTH SEMESTER

Course: Major

Course Credits: (L-P-T)

                       (3-0-1)

Total marks: 100

Course Title: Python Programming

Course Code: UMJCST404

Mid Semester assessment: 15 Marks of 1.5 hours duration

End Semester assessment: 60 Marks of 2.5 hours duration

Practical: 25 marks

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

Course objectives & learning outcomes:

1. To learn about basic concepts of Python programming
2. To brief the students about different programming constructs and data types.
3. To gain knowledge on classes and module concepts.

UNIT –I

Python introduction, Python features and Application, Basic syntax, Python data types- Numeric (int, float, complex), String data type, Boolean data type, Sequence, Set, none; Variables, Input and output, output formatting, Comments-Single and Multiline comments

Arithmetic operators, Comparison operators, Logical operators, Bitwise operators, Assignment operators, Membership Operators, Identity Operators Precedence and associativity of operators, Expressions

                                               15 Hours

UNIT –II

Conditional statements (if-else, nested if), Looping statements (while, for, nested loops), Pass statements, comprehension

Built-in functions, User defined Functions, Defining and calling functions, Parameters and arguments, Return statement, Lambda functions, generator functions, map,

                                               15 Hours

UNIT-III

Lists, Tuples, Sets, Dictionaries, Accessing and modifying elements; Various operations on Lists, Tuples, Sets, Dictionaries. Python file handling, Creating file, file opening modes, Reading file, Writing File, deleting file

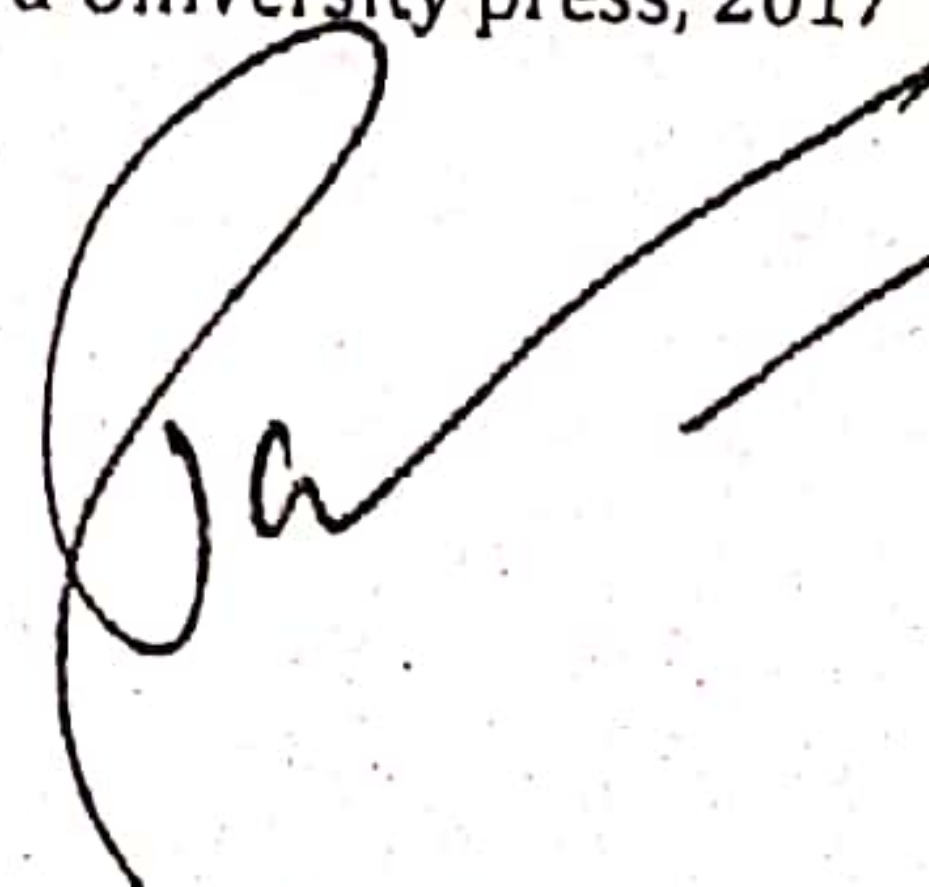   15 Hours

UNIT-IV

Classes and object, Encapsulation, Polymorphism, class method, static method, Inheritance, Single inheritance, Multiple inheritances, Multi-level inheritance, Method Resolution Order (MRO), Polymorphism, Method overriding and overloading

Modules and Packages, modules and packages, importing modules and packages, Creating and importing custom modules, Using built-in modules and packages,

                                               15 Hours

Suggested readings/ references:

1. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt. Ltd
2. Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015.
3. Reema Thareja, "Python Programming using problem solving approach", Oxford University press, 2017

University of Jammu

BCA (Web Technology) - SECOND SEMESTER

September 2022

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

Course Title: Python Programming
Course Code: UMJCST404
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 2.5 hours duration
Practical: 25 marks

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

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

Final Examination

10 marks

15 Marks

Pattern for external practical examination
Practical file	
Written examination	5 Marks
Viva-Voce	5 Marks
Total	5 Marks
	15 Marks

Pattern for external tutorial examination
Assignment file	
Viva-Voce	10 Marks
Total	5 Marks
	15 Marks

BCA (Web Technology) - FOURTH SEMESTER

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

Course Title: Internet of Things
Course Code: UMICST405
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 2.5 hours duration
Practical: 25 Marks

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

Course objectives & learning outcomes:
1. To learn about various concepts, terminologies and architecture of IoT systems.
2. To brief the students about sensors and actuators for design of IoT.
3. To gain knowledge on different protocols for design of IoT systems

UNIT –I
Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, IoT frameworks, IoT and M2M.

15 Hours

UNIT –II
Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, Raspberry Pi Development Kit, RFID Principles and components.

15 Hours

UNIT-III
Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, ZigBee, Z-Wave, IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, CoAP, MQTT. Edge connectivity and protocols.

15 Hours

UNIT-IV
Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

15 Hours

Suggested readings/ references:

1. Hakima Chaouchi, "The Internet of Things Connecting Objects to the Web", Wiley Publications
2. Olivier Hersent, David Boswarthick, and Omar Elloumi, "The Internet of Things: Key Applications and Protocols", Wiley Publications.
3. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media,2016.

University of Jammu

September 2022

BCA (Web Technology) - SECOND SEMESTER

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

Course Title: Internet of Things
Course Code: UMICST405
Mid Semester assessment: 10 Marks of 1.5 hours duration
End Semester assessment: 40 Marks of 2.5 hours duration
Practical: 25 Marks

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

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

Final Examination   10 marks

                                                                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