UNIVERSITY OF JAMMU

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

Academic Section
Email: academicsectionju14@gmail.com

NOTIFICATION
(23/July/Adp./56)

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 **Computer Science** of Semester **IIIrd** and **IVth** for **Four Year Under Graduate Programme** of **Bachelor of Computer Applications (FYUGP-BCA)** 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:

S. No.	Branch of BCA	Semester	For the examinations to be held in the year
1.	Web Technology (WT)	Semester-III	Dec. 2023, 2024 and 2025
		Semester-IV	May 2024, 2025 and 2026
2.	Data Science (DS)	Semester-III	Dec. 2023, 2024 and 2025
		Semester-IV	May 2024, 2025 and 2026
3.	Software Development (SD)	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

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/23/6286-6296
Dated: 11.7.2023
Copy for information and necessary action to:

1 Dean, Faculty of Mathematical Science
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)

10/7/23 10/7/23

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

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

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	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				Total Marks
					Theory		Practical/Tutorial		
					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				Total Marks
					Theory		Practical/Tutorial		
					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	Object Oriented Programming using C++	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				Total Marks
					Theory		Practical/Tutorial		
					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. <u>03 and 04 credits papers</u> **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.	03 hours for 03/04 credits	60 Marks for 03/04 Credits
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.	2½ hours for 02 credits	40 Marks for 02 Credits
2. <u>02 credits papers</u> **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.		
PRACTICAL/TUTORIAL		
i. Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous assessment	
ii. Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for 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.

(4 x 3 = 12 marks)

Section B

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.

(4 x 2½ = 10 marks)

Section B

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.

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

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.

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.

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

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

15 Hours

UNIT - II

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

15 Hours

UNIT - III

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

15 Hours

UNIT – IV

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

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.

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

BCA (Web Technology) - THIRD SEMESTER

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

Course Title: Object Oriented Programming using C++
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

Course objectives & learning outcomes:

1. To learn the fundamentals of Object oriented programming.
2. To learn basic object oriented concepts like data abstraction, encapsulation etc.
3. To gain knowledge on object and class concepts.
4. To brief the students about Inheritance and its types.

UNIT – I

The Object Oriented Methodology: Paradigms of Programming Languages, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure Oriented Approaches, Benefits of OOPs, Applications of OOPs.

15 Hours

UNIT - II

Language Basics: Basic program construction, data types: integer, character, float, double, long double and Boolean. Input output statements: cin, cout, comments, escape sequence, manipulators, type conversion, arithmetic, logical and relational operators. For loop, while loop & do loop and if, if...else, switch control statements. Structures, Functions: passing arguments to functions, returning values from functions, reference arguments, overloaded functions, inline functions, default arguments, variables and storage class and returning by reference.

15 Hours

UNIT – III

Objects And Classes: A simple class, C++ objects as physical objects, object as function argument, constructors as function argument, overloaded constructors, copy constructors, returning objects from functions, structures and classes, static class data, const and classes, Arrays and Strings.

15 Hours

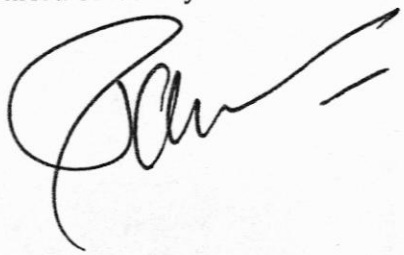
UNIT – IV

Inheritance: derived class and base class, derived class constructors, overloading member functions, class hierarchies, public and private inheritance, level of inheritance, multiple inheritance, new and delete operator.

15 Hours

Suggested readings/ references:

1. Robert Lafore, " Object Oriented Programming in C++" Techmedia Publication.
2. Herbert Shieldt, " The complete reference C" Tata McGraw Hill Publication.
3. Saurav Sahay, "Object Oriented Programming in C++", Oxford University Press.



BCA (Web Technology) - THIRD SEMESTER

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

Course Title: Object Oriented Programming using C++
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.

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

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.

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

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.

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(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.