NOTIFICATION
(22/Nov./Adp/70)

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 of **Semester Ist and IInd 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 indicated against each:

S.NO	Branch of BCA	Semester	For the examinations to be held in the year
1.	Web Technology (WT)	Semester-I	Dec.2022, 2023 and 2024
		Semester-II	May 2023, 2024 and 2025
2.	Data Science (DS)	Semester-I	Dec.2022, 2023 and 2024
		Semester-II	May 2023, 2024 and 2025
3.	Software Development (SD)	Semester-I	Dec.2022, 2023 and 2024
		Semester-II	May 2023, 2024 and 2025

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

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/22/7306 - 9345
Dated: 7 - 11 - 2022

Copy to:
1. Dean, Faculty of Mathematical Sciences
2. HOD/Convener, Board of Studies in Computer Science & IT
3. All members of the Board of Studies
4. C.A. to the Controller of Examinations
5. Director, Computer Centre, University of Jammu
6. Asst. Registrar (Conf. /Exams. UG)
7. Incharge University Website for necessary action please

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

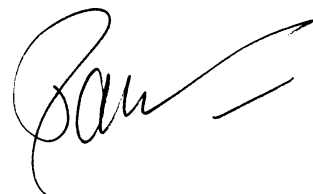# Bachelor of Computer Applications
(BCA)

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 Theory Mid Semester	Theory End Exam	Practical/Tutorial Assessment	Practical/Tutorial Exam	Total Marks
1	Major	UMJBCT101	Web Designing	4(3L+1P)	15	60	10	15	100
2	Minor	UMIBCT102	Computer Fundamentals	4(3L+1P)	15	60	10	15	100
3	MD	UMDBCT103	World Wide Web and Internet	3	15	60	NA	NA	75
4	SEC	USEBCT104	PC Software: Installation and Troubleshooting	2	10	40	NA	NA	50

Semester–II

S. No.	Course Type	Course No.	Course Title	Credits	Marks Theory Mid Semester	Theory End Exam	Practical/Tutorial Assessment	Practical/Tutorial Exam	Total Marks
1	Major	UMJBCT201	Scripting Languages	4(3L+1P)	15	60	10	15	100
2	Minor	UMIBCT202	Web Programming using PHP	4(3L+1P)	15	60	10	15	100
3	MD	UMDBCT203	Introduction to Web Designing	3	15	60	NA	NA	75
4	SEC	USEBCT204	Cyber Security	2	10	40	NA	NA	50

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 shallbe 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.	03 hours for 03/04 credits	60 Marks for 03/04 Credits
Section B shall consistEight (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. 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 consistSix (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	15 Marks for Final examination

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

Instructions for paper setter

1. <u>3 / 4 Credits Paper</u>

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) - FIRST SEMESTER

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

Course Title: Web Designing
Course Code: UMJBCT101
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 2022, 2023, and 2024

Course objectives & learning outcomes:
1. To learn the fundamentals of Internet.
2. To understand basic web fundamentals.
3. To gain knowledge on HTML and CSS style sheets
4. To brief the students about java script and constructs.

UNIT – I

The basics of Internet, World Wide Web, 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.

           15 Hours

UNIT - II

Web Browser, Installing and setting up browsers, cookies, security features in Browsers, Client-Side Scripting Languages- VB Script and Java Script, Active X control and Plug-ins, Web Server Architecture, Image maps, CGI, API web database connectivity-DBC, ODBC

           15 Hours

UNIT - III

Introduction to HTML, Tags and Attributes, Text Styles and Text Arrangements, Text, Effects, Exposure to Various Tags (DIV, MARQUEE, NOBR, DFN, HR, LISTING, Comment, IMG), Color and Background of Web Pages, Design Tables and Forms, Lists and their Types, Image Tag, Hypertext, Hyperlink and Hypermedia, Links, Anchors and URLs, Links to External Documents, Creating Table, Frame, Form and Style Sheet, Dynamic HTML, Document Object Model, Features of DHTML, Introduction to CSS, and its types (Inline, Internal and External), Text boxes, Pseudo Classes, Selectors, Animations, Transitions etc.
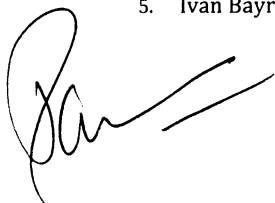
           15 Hours

UNIT – IV

Introduction to Java Script, Embedding JavaScript in HTML, Objects, Methods, Events and Functions, Tags, Operators, Data Types, Literals and Type Casting in JavaScript, Programming Construct, Array and Dialog Boxes, Relating JavaScriptto DHTML, Dynamically Changing Text, Style, Content

           15 Hours

Suggested readings/ references:
1. Achyut Godbole and Atul Kahate, "Web Technologies", McGraw Hill.
2. Burdman, "Collaborative Web Development", Addison Wesley.
3. Jeffrey C. Jackson, "WebTechnologies", Prentice Hall
4. Sharma &Sharma, "Developing E-Commerce Sites", Addison Wesley
5. Ivan Bayross, "Web Technologies Part II", BPB Publications.

BCA (Web Technology) - FIRST SEMESTER

Course: Major	Course Title: Web Designing
Course Credits: (L-P-T)	Course Code: UMJBCT101
(3-1-0)	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 2022, 2023, and 2024

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) - FIRST SEMESTER

Course: Minor	Course Title: Computer Fundamentals.
Course Credits: (L-P-T)	Course Code: UMIBCT102
(3-1-0)	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 2022, 2023 and 2024

Course objectives & learning outcomes:
1. To learn the fundamentals of Computer Fundamentals.
2. To learn the concepts of number system and operating system.
3. To gain knowledge on software and applications.
4. To brief the students about word processing and editing tools.

UNIT - I
The basics of Internet, World Wide Web, 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.

15 Hours

UNIT - II
Software and its Types (System Software, Application Software, Firmware Software) Computer Languages and its types (Machine Language, Assembly Language, High Level Language: Merits and Demerits of Computer Languages), Translators: Compiler, Linker, Interpreter, Loader, computer virus and its types (Trojan, Malware, Spyware etc.), Antivirus Software

15 Hours

UNIT – III
Number system: Decimal, Binary, Octal, Hexadecimal, Conversion of one number system to another, arithmetic operations,Complement,Introduction to operating system,Architecture,Types of Operating System,Parallel, Distributed & Real time Operating System,Multiprogramming,Multitasking, Time sharing,Memory Management,File Management.
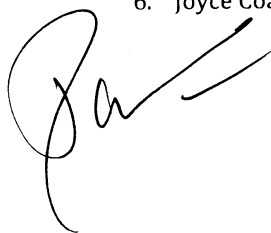
15 Hours

UNIT – IV
Using Word Processing: Features of Word processing software, Opening and Closing of documents, Text creation and Manipulation, Formatting of text, Table handling, Spell check, language setting and thesaurus, Using Spreadsheet tool: Basics of Spreadsheet, features, Formulas and Functions, header and footer, deleting or Inserting Cells, Rows and Columns, Goal Seek, Sorting and Filter, Creating charts.Using Slide Presentation Tool: Basics of PowerPoint, Preparation and Presentation of Slides, Master Slides, setup Slide Show, Formatting and Clip Arts, PowerPoint Views, Assigning Slide Transitions, Header/Footer, Word Art, Templates.

15 Hours

Suggested readings/ references:
1. P.K Sinha and Priti Sinha, "Computer Fundamentals", BPB Publications.
2. Alexix Leon and Mathewes Leon,"Fundamentals of Information Technology",Leon TechWorld
3. Suresh K. Basandra, "Computer Systems Today", Galgotia Publications.
4. V. Rajaraman, "Fundamentals of Computers", IEEE.
5. Peter Nortan,"Introduction to Computers", Tata McGraw Hill
6. Joyce Coax et al., "Microsoft Office System step by step", Microsoft Press.

BCA (Web Technology) - FIRST SEMESTER

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

Course Title: Computer Fundamentals.
Course Code: UMIBCT102
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 2022, 2023 and 2024

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)–FIRST SEMESTER

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

Course Title: World Wide Web and Internet
Course Code: UMDBCT103
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 2022, 2023 and 2024

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 WebBrowsers, Client -Side Scripting Languages-VBScript and Java Script, Server-Side Scripting languages, ActiveXControls and Plug-ins, WebServer Architecture.

10 Hours

UNIT - II
The basics of Internet, World Wide Web, Web page, Home page, Web site, Static, Dynamicand 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)–FIRST SEMESTER

Course: Multidisciplinary Foundation Course (MD)

Course Credits: (L-P-T)

            (3-0-0)

Total marks: 75

Course Title: World Wide Web and Internet

Course Code: UMDBCT103

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 2022, 2023 and 2024

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.

BCA (Web Technology)–FIRST SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: PC Software: Installation and Troubleshooting
Course Credits: (L-P-T)   Course Code: USEBCT104
                 (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

For examinations to be held in Dec 2022, 2023, and 2024

Course objectives & learning outcomes:
1.   To provide knowledge about the PC Hardware.
2.   To brief about different utilities and PC settings.
3.   To develop the ability to configure, setup and troubleshoot PC.

UNIT -I
Introduction to PC Hardware: Study of basic I/O systems, Types of Memories- Static RAM and Dynamic RAM, ROM, PROM, EPROM, EEPROM, External Storage Devices, CPU (Central Processing Unit)- ALU and control, Motherboard and Processor :Types of Processor, System performance Motoring.   **10 Hours**
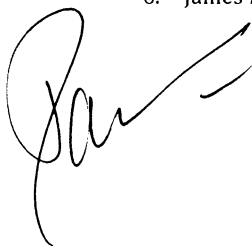
UNIT -II
BIOS Configuration: Study of BIOS Set-up- Advance set-up, Boot configuration, Boot Menu, Installation of Operating System (Windows), Control panel, Installation and uninstallation of application software, Setting System Date and Time, Hard Disk: Formatting of Hard disk, Partitioning of Hard disk in different logical drives, Defragmenting Hard disk using defrag, Scan Disk for checking disk space, Disk clean up, Scan disk, Installation of Device Drivers: Different types of Motherboard drivers: Network, Audio, and Graphics, Modem. Display Settings: Resolution, Themes, multiple displays, Projector Set up.   **10 Hours**

UNIT-III
Configuration of External devices: Physical set-up of Printers- Performing test print out, Printing of document etc, Scanner set-up, Webcam, Bluetooth device, Memory card reader, Diagnostic and troubleshooting of PC: POST (Power on Self Test), Maintenance of PC, Error messages, Task Manager. Concept of compression Compression Utilities: WinZip, PKZIP, files recovery, Antivirus, CD/DVD Writing Software, Concept of Virtual drives and Image files (ISO).   **10 Hours**

Suggested readings/ references:

1.   Mark Minasi, "The complete PC Upgrade & Maintenance Guide", BPB Publications.
2.   D Balasubramanian, "Computer Installation and Servicing", Tata McGraw Hill Education.
3.   Robert C. Brenner, "Trouble Shooting and Repair Guide", BPB Publications.
4.   Scott Mueller, "Upgrading and Repairing PC's", PHI Publications, Fourth Edition.
5.   Adane Nega Tarekegn, "A Simple Guide to Computer Maintenance and Troubleshooting", LAP LAMBERT Academic Publishing.
6.   James Karney, "Upgrade & Maintain Your PC", M & T Books; 2nd edition.

BCA (Web Technology)–FIRST SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: PC Software: Installation and Troubleshooting
Course Credits: (L-P-T)   Course Code: USEBCT104
                     (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

For examinations to be held in Dec 2022, 2023, and 2024

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.

BCA (Web Technology)–SECOND SEMESTER

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

Course Title: Scripting languages
Course Code: UMJBCT201
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 2023, 2024 and 2025

Course objectives & learning outcomes:
1. To understand basic web fundamentals.
2. To learn object-oriented programming concepts.
3. To gain knowledge on server-side scripting.
4. To brief the students about server connectivity.

UNIT – I
Introduction to JavaScript, Variables in JavaScript, Statements, Operators, Comments, Expressions, and Control Structures. JavaScript Scopes, Strings, String Methods, Numbers, Number Methods, Boolean Values, Dates, Date Formats, Date Methods, Arrays, Array Methods.
Objects, Object Definitions, Object Properties, Object Methods, Object Prototypes. Functions, Function Definitions, Function Parameters, Function Invocation, Function Closures.

15 Hours

UNIT – II
Introduction to Object Oriented Programming in JS: Method, Constructor, Inheritance, Encapsulation, Abstraction, Polymorphism.
Document Object Model (DOM), Object hierarchy in JavaScript, DOM Elements, DOM Events, DOM Methods, DOM Manipulation. Forms, Forms API, Forms Validation, Regular Expressions, Errors, Debugging.

15 Hours

UNIT – III
Introducing to jQuery, jQuery selectors, jQuery events, jQuery animation effects, jQuery DOM traversal and manipulation, Data attributes and templates, jQuery DOM utility functions, jQuery plugins.
JSON: JavaScript Object Notation (JSON), Introduction and need of JSON, JSON Syntax Rules, JSON Data - a Name and a Value, JSON Objects, JSON Arrays, JSON Files, JSON Parsing
Ajax: Introduction to Ajax, Ajax Framework, Ajax Architecture, Web services and Ajax, Ajax using JSON and jQuery.

15 Hours

UNIT – IV
Introduction to Node.js, Browser JS vs. Node.js, ECMAScript 2015 (ES6), Node.js REPL.
Introduction to Asynchronous programming and callbacks, Promises and async & await, The Event Loop and Timers.
Understanding Node modules, exportsand require.Introduction to npm: package. json and package-lock.json files, Install, update, and manage package dependencies, Local and global packages

15 Hours

Suggested Readings:
1. Paul Deitel, Henry Deitel & Abbey Deitel,"Internet & World Wide Web", Pearson Education
2. Deitel et al., "XML - How to Program",Pearson Education
3. Douglas Crockford, "JavaScript: The Good Parts", O'Reilly
4. Vasan Subramanian, "Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, andNode", Apress.

BCA (Web Technology)–SECOND SEMESTER

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

Course Title: Scripting languages
Course Code: UMJBCT201
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 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)-SECOND SEMESTER

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

Course Title: Web Programming using PHP
Course Code: UMIBCT202
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 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
The basics of Internet, World Wide Web, 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.

15 Hours

UNIT – II
Fundamentals of HTML, Text formatting tags, Inserting Images, Links, Lists, Creating Tables, Frames, Forms, Anchors and URLs, Links to External Documents, Creating Table, Frame, Form and Style Sheet, Dynamic HTML, Document Object Model.

15 Hours

UNIT – III
CSS and its types (Inline, Internal and External), Text boxes, Selectors, Introduction to Java Script, Objects, Methods, Events and Functions, Tags, Operators, Data Types, Literals and Type Casting in JavaScript, Programming Construct, Array and Dialog Boxes, Relating JavaScript to DHTML

15 Hours

UNIT – IV
Introduction to PHP, Basic data types and Functions, Passing Information between web pages, GET, POST, Session, Cookie Management, Error handling, PHP functions for database connectivity,Updation and deletion of data using PHP,Displaying data from database in webpage.

15 Hours

Suggested readings/ references:
1. Burdman, "Collaborative Web Development", Addison Wesley.
2. Jeffrey C. Jackson, "Web Technologies", Prentice Hall.
3. Ivan Bayross, "Web Technologies Part II", BPB Publications.
4. Rasmus Ledroff, "Programming PHP",O'Reilly.

BCA (Web Technology)-SECOND SEMESTER

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

Course Title: Web Programming using PHP
Course Code: UMIBCT202
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 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) - SECOND SEMESTER

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

Course Title: Introduction to Web Designing
Course Code: UMDBCT203
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 May 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 and scripting concepts.

UNIT - I
Basics of Internet, World Wide Web, Overview of Protocols like http, ftp etc. Web Browser, Installing and Setting up a Browsers, Client-Side Scripting Languages-VBScript and Java Script, Active Xcontrol and Plug-ins, WebServer Architecture, Image maps, CGI and basics.

10 Hours

UNIT - II
Introduction to HTML, Essential Tags, Tags and Attributes, Text Styles and Text Arrangements, Text, Effects, Exposure to Various Tags (DIV, MARQUEE, NOBR, DFN, HR, LISTING, Comment, IMG), Color and Background of Web Pages, Lists and their Types, Attributes of Image Tag, Hypertext, Hyperlink and Hypermedia, Links, Creating Table, Frame, Form and Style Sheet.

10 Hours

UNIT – III
Introduction to CSS and types, External, Internal and embedded Stylesheet, CSS text boxes, Tables, Animations and other tags.

10 Hours

UNIT – IV
Introduction to Java Script, Java ScriptObjects, Methods, Events and Functions, Tags, Operators, Data Types, Literals and Type Casting in JavaScript, Programming Construct, Array, Dialog Boxes, Dynamically Changing Text, Style, Content.

15 Hours

Suggested readings/ references:
1. Burdman, "Collaborative Web Development", Addison Wesley.
2. Sharma &Sharma, "Developing E-Commerce Sites", Addison Wesley
3. Ivan Bayross, "Web Technologies Part II", BPB Publication

BCA (Web Technology) - SECOND SEMESTER

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

Course Title: Introduction to Web Designing
Course Code: UMDBCT203
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 May 2023, 2024 and 2025

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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.

BCA (Web Technology) - SECOND SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: Cyber Security
Course Credits: (L-P-T)   Course Code: USEBCT204
                 (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

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

Course objectives & learning outcomes:
1. To provide knowledge about the PC Hardware.
2. To brief about different utilities and PC settings.
3. To develop the ability to configure, setup and troubleshoot PC.

UNIT –I

Cyberspace, Architecture of cyberspace, Internet, World Wide Web, Advent of internet, Internet infrastructure for data transfer and governance, Internets ociety, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security.

Classification of cyber crimes, Common cyber crimes-cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks.

10 Hours

UNIT -II

Cybercriminals modus-operandi, Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offences, Organizations dealing with Cyber crime and Cyber security in India.

Introduction to Social networks, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media.

10 Hours

UNIT-III

Definition of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices.

Introduction to digital payments, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in authorized banking transactions

10 Hours

Suggested readings/ references:

1. R. C Mishra, "Cyber Crime Impact in the New Millennium", Auther Press Edition.
2. Sumit Belapure and Nina Godbole, "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt. Ltd.
3. Henry A. Oliver, "Security in the Digital Age: Social Media Security Threats and Vulnerabilities", Pearson.
4. Elias M. Awad, "Electronic Commerce", Prentice Hall of India Pvt Ltd.
5. Kumar K, "Cyber Laws: Intellectual Property & E-Commerce Security", Dominant Publishers.
6. Eric Cole, Ronald Krutz, James W. Conley, "Network Security Bible", 2nd Edition, Wiley India Pvt. Ltd.
7. E. Maiwald, "Fundamentals of Network Security", McGraw Hill.

BCA (Web Technology) - SECOND SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: Cyber Security
Course Credits: (L-P-T)   Course Code: USEBCT204
       (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

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

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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.

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**

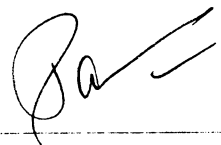# Bachelor of Computer Applications (BCA)

DATA SCIENCE

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	UMJBCT131	Problem Solving using C	4(3L+1P)	15	60	10	15	100
2	Minor	UMIBCT132	Data Science Basics	4(3L+1P)	15	60	10	15	100
3	MD	UMDBCT133	Data Mining and Data Warehousing	3	15	60	NA	NA	75
4	SEC	USEBCT104	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	UMJBCT231	Introduction to Data Science	4(3L+1P)	15	60	10	15	100
2	Minor	UMIBCT232	Python Programming	4(3L+1P)	15	60	10	15	100
3	MD	UMDBCT233	Introduction to Machine Learning	3	15	60	NA	NA	75
4	SEC	USEBCT204	Cyber Security	2	10	40	NA	NA	50

BCA (Data Science) - FIRST SEMESTER

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

Course Title: Problem Solving using C
Course Code: UMJBCT131
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 2022, 2023 and 2024

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

Algorithm, Flowcharts, Flowchart Symbols, Flowchart Rules, Assemblers, Compilers and Interpreters, Pseudo Code, Introduction to C programming, Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Format of C program, Arithmetic, Relational & Logical Operators, Assignment Operators, Increment & Decrement Operators, Operator Precedence & Associativity.   15 Hours

UNIT – II

Formatted Input, Formatted Output, escape sequences, Conditional Statements: if Statement, if........ else Statement, Nested if....else Statements, Switch Statement, conditional Operator, Goto Statement, loops- for loop, while loop, do-while loop, break and continue statement.   15 Hours

UNIT – III

Qualifiers, Storage classes, Pointers definition, Declaring Pointer Variables, using pointer variable, Arrays: One, Two and Multi Dimension Arrays, Initialization of one and two dimensional Arrays, Declaring and Initializing String Variables, String Handling Functions.   15 Hours

UNIT – IV

Preprocessor directives, Function Definition, Function Calls (call by value & call by address method) Returning Value, Types of Functions, Recursion, Passing Arrays to Functions, Macros, Defining Structure, Declaring and Accessing Structure Variables, Structures and Unions,Basics of File Handling and operations like open, close, read, write etc. Enumerations.   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.
6. Shubhnandan S. Jamwal, Programming in C, Pearson Publications.
7. H.M. Deitel and P.J. Deitel, C How to Program, PHI.

BCA (Data Science) - FIRST SEMESTER

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

Course Title: Problem Solving using C
Course Code: UMJBCT131
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 2022, 2023 and 2024

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(4 x 3 = 12 marks)

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(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 (Data Science) – FIRST SEMESTER

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

Course Title: Data Science Basics
Course Code: UMIBCT132
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 2022, 2023 and 2024

Course objectives & learning outcomes:
1. Introduction to basics of data science.
2. Understanding the concepts of data mining.
3. To learn about functioning of machine learning techniques.
4. Understanding the concepts of data visualizations.

UNIT-I
Introduction to Data Science: Definition, benefits and uses of data science and big data.
Facets of Data: Structured data, unstructured data, natural language, machine generated data, network data, audio, images and video streaming data.
Data science process: overview of data science process, defining the goal, retrieving data, data preparation, data exploration, build the models.   15 Hours

UNIT-II
DATA: Definition, characteristics of data, classification of digital data.
The Data Science Fundamentals: Distributed file system, data integration framework, machine learning framework, system deployment, security.
Data Mining: definition, languages for data science, collection data–hunting, logging, scraping, cleaning.
                                                                         15 Hours

UNIT-III
Machine Learning: Definition, Applications of machine learning in data science, Types ofMachineLearning-supervisedlearning,semisupervisedlearning,un-supervisedlearning, Linear regression, Decision tree classifier, Bayes - Naive bayes   15 Hours

UNIT-IV
Data Visualization: Definition, importance of data visualization in data science, ExploratoryDataanalysis-confrontingnewdataset,visualizationtools,developingavisualizationaesthetic– maximizing data link ratio
Chart Types: Tabular data, dot and line plots, scatter plots, bar plots and pie charts.   15 Hours

Suggested readings/ references:

1. Davy Cielen , Arno D.B.Meysman and Mohamed Ali, "Introducing Data Science", Published by Manning
2. Steven S.Skiena, "The Data Science Design Manual", Published by Springer Nature.
3. Cathy O'Neil and Rachel Schutt, "Doing Data Science, Straight Talk from the Frontline", O'Reilly.
4. Jure Leskovek, AnandRajaraman and Jeffrey D.Ullman, "Mining of Massive Datasets", Cambridge University Press.

BCA (Data Science) – FIRST SEMESTER

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

Course Title: Data Science Basics
Course Code: UMIBCT132
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 2022, 2023 and 2024

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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

BCA (Data Science) – FIRST SEMESTER

Course: Multidisciplinary Foundation Courses (MD)   Course Title: Data Mining and Data Warehousing
Course Credits: (L-P-T)   Course Code: UMDBCT133
                 (3-0-0)   Mid Semester assessment: 15 Marks of 1.5 hours duration
Total marks: 75   End Semester assessment: 60 Marks of 3.0 hours duration

For examinations to be held in Dec 2022, 2023, and 2024

Course objectives & learning outcomes:

1. Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
2. Extract interesting patterns from large amounts of data.
3. Discover the role played by data mining in various fields.
4. Choose and employ suitable data mining algorithms to build analytical applications

UNIT-I

Data Mining: Data and Types of Data, Data Mining Functionalities. Interestingness, Patterns– Classification of Data Mining systems,Data mining Task primitives, Major issues in Data Mining–Data Preprocessing.
                             10 Hours

UNIT-II

Data Warehouse and OLAP Technology for Data Mining: Introduction to Data Warehouses, Differences between Operational Database Systems and Data Warehouses, Multidimensional Data Model, Three-tier Data Warehouse Architecture, Schemas -Stars, Snowflakes and Fact Constellations.
         10Hours

UNIT-III

Classification: Classification and Prediction, Basic concepts, Decision tree induction, Bayesian classification, Rule–based classification, Lazy learner.   10Hours

UNIT-IV

Clustering and Applications: Cluster analysis, Types of Data in Cluster Analysis, Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density–Based Methods, Grid–Based Methods, Outlier Analysis.   15 Hours

Suggested readings/ references:

1. JiaweiHan&MichelineKamber, "DataMining-ConceptsandTechniques-,3rdEdition", Elsevier.
2. MargaretHDunham, "DataMiningIntroductoryand Advancedtopics"PEA.
3. Ian H.Witten and EibeFrank, "DataMining:Practical Machine Learning Toolsand Techniques,"Morgan Kaufmann.

BCA (Data Science) – FIRST SEMESTER

Course: Multidisciplinary Foundation Courses (MD)   Course Title: Data Mining and Data Warehousing
Course Credits: (L-P-T)   Course Code: UMDBCT133
                        (3-0-0)   Mid Semester assessment: 15 Marks of 1.5 hours duration
Total marks: 75   End Semester assessment: 60 Marks of 3.0 hours duration

For examinations to be held in Dec 2022, 2023, and 2024

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(4 x 12 = 48 marks)

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

BCA (Data Science) – FIRST SEMESTER

Course:	Skill Enhancement Course (SEC)	Course Title: PC Software: Installation and Troubleshooting
Course Credits:	(L-P-T)	Course Code: USEBCT104
	(2-0-0)	Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks:	50	End Semester assessment: 40 Marks of 2.5 hours duration

For examinations to be held in Dec 2022, 2023, and 2024

Course objectives & learning outcomes:
1. To provide knowledge about the PC Hardware.
2. To brief about different utilities and PC settings.
3. To develop the ability to configure, setup and troubleshoot PC.

UNIT -I
Introduction to PC Hardware: Study of basic I/O systems, Types of Memories- Static RAM and Dynamic RAM, ROM, PROM, EPROM, EEPROM, External Storage Devices, CPU (Central Processing Unit)- ALU and control, Motherboard and Processor :Types of Processor, System performance Motoring.   **10 Hours**

UNIT -II
BIOS Configuration: Study of BIOS Set-up- Advance set-up, Boot configuration, Boot Menu, Installation of Operating System (Windows), Control panel, Installation and uninstallation of application software, Setting System Date and Time, Hard Disk: Formatting of Hard disk, Partitioning of Hard disk in different logical drives, Defragmenting Hard disk using defrag, Scan Disk for checking disk space, Disk clean up, Scan disk, Installation of Device Drivers: Different types of Motherboard drivers: Network, Audio, and Graphics, Modem. Display Settings: Resolution, Themes, multiple displays, Projector Set up.   **10 Hours**

UNIT-III
Configuration of External devices: Physical set-up of Printers- Performing test print out, Printing of document etc, Scanner set-up, Webcam, Bluetooth device, Memory card reader, Diagnostic and troubleshooting of PC: POST (Power on Self Test), Maintenance of PC, Error messages, Task Manager. Concept of compression Compression Utilities: WinZip, PKZIP, files recovery, Antivirus, CD/DVD Writing Software, Concept of Virtual drives and Image files (ISO).   **10 Hours**

Suggested readings/ references:
1. Mark Minasi, "The complete PC Upgrade & Maintenance Guide", BPB Publications.
2. D Balasubramanian, "Computer Installation and Servicing", Tata McGraw Hill Education.
3. Robert C. Brenner, "Trouble Shooting and Repair Guide", BPB Publications.
4. Scott Mueller, "Upgrading and Repairing PC's", PHI Publications, Fourth Edition.
5. Adane Nega Tarekegn, "A Simple Guide to Computer Maintenance and Troubleshooting", LAP LAMBERT Academic Publishing.
6. James Karney, "Upgrade & Maintain Your PC", M & T Books; 2nd edition.

BCA (Data Science) – FIRST SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: PC Software: Installation and Troubleshooting
Course Credits: (L-P-T)   Course Code: USEBCT104
                        (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

For examinations to be held in Dec 2022, 2023, and 2024

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(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.

BCA (Data Science) - SECOND SEMESTER

Course: Major

Course Credits: (L-P-T)

                    (3-1-0)

Total marks: 100

Course Title: Introduction to Data Science

Course Code: UMJBCT231

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 2023, 2024 and 2025

Course objectives & learning outcomes:

1. Introduction to basics of data science.
2. Understanding the concepts of data mining.
3. To learn about functioning of machine learning techniques.
4. Understanding the concepts of data visualizations.

UNIT-I

Introduction to Data Science: Definition, benefits and uses of data science and big data.

Facets of Data: Structured data, unstructured data, natural language, machine generated data, network data, audio, images and video streaming data.

Data science process: overview of data science process, defining the goal, Retrieving data, data preparation, data exploration, build the models, cleaning and transforming data, presentation and automation.

              15 Hours

UNIT-II

DATA: Definition, characteristics of data, classification of digital data.

The Data Science Fundamentals: Distributed file system, data integration framework, machine learning framework, system deployment, security.

Data Mining: definition, languages for data science, collection data–hunting, logging ,scraping, cleaning data-errors. artifacts, data compatibility, dealing with missing values, outlier detection.   15 Hours

UNIT-III

Machine Learning: Definition, Applications of machine learning in data science, Types of Machine Learning-supervised learning, semi supervised learning, un-supervised learning, Linear regression, Decision tree classifier, Bayes - Naive bayes   15 Hours

UNIT-IV

Data Visualization: Definition, importance of data visualization in data science, Exploratory Data analysis-confronting new dataset, visualization tools, developing a visualization aesthetic–maximizing data link ratio, proper scaling and labeling, effective use of color and shading, the power of repetition.

Chart Types: Tabular data, dot and line plots, scatter plots, bar plots and pie charts.   15 Hours

Suggested readings/ references:

1. Davy Cielen , Arno D.B.Meysman and Mohamed Ali, "Introducing Data Science", Published by Manning
2. Steven S. Skiena, "The Data Science Design Manual",Published by Springer Nature.
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4. Jure Leskovek, Anand Rajaraman and Jeffrey D.Ullman, "Mining of Massive Datasets", Cambridge University Press.

BCA (Data Science) - SECOND SEMESTER

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

Course Title: Introduction to Data Science
Course Code: UMJBCT231
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 2023, 2024 and 2025

NOTE FOR PAPER SETTERS FOR EXAMINATIONS –

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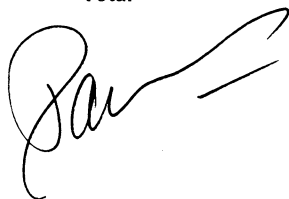
Pattern for external practical examination
Practical file   5 Marks
Written examination   5 Marks
Viva-Voce   5 Marks
Total   15 Marks

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

BCA (Data Science)–SECOND SEMESTER

Course: Minor   Course Title: Python Programming
Course Credits: (L-P-T)   Course Code: UMIBCT232
                 (3-1-0)   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 May 2023, 2024 and 2025

Course objectives & learning outcomes:
1. Provide in-depth knowledge of developing and debugging Python Programs.
2. Illustrate and manipulate core data structures like Lists, Dictionaries, Tuples, and Strings.
3. Understand the concept of files and exception handling

UNIT-I
Introduction: Basic concepts: Functional Programming, OOPS and Data Structures Getting Started: Running Code in the Interactive Shell, Input, Processing and Output, Editing, Saving and Running a Script, Working of Python. Variables, Expressions and Statements: Values and Data Types, Variables, Keywords, String Literals, Escape Sequences, Operators and Operands, Expressions and Statements, Interactive mode and Script mode, Order of Operations, Comments.   15 Hours

UNIT-II
Conditional Statements and Loops: Modulus Operator, Boolean Expressions, Logical Operators, Conditional Execution "if statement", Alternative Execution "else clause", Chained Conditionals "elif clause", Nested Conditionals, while statement, For loop, Break and Continue Statement.   15 Hours

UNIT-III
Functions Function Calls, Type Conversion Functions, Math Functions, Composition, Adding new functions, Importing modules with "from", Recursion, Stack Diagram for Recursive Functions.
String Functions-Traversal, Comparison, Searching, Counting, Pre-defined String Functions.   15 Hours

UNIT-IV
Lists, Dictionaries and Tuples: Lists- List as a Sequence, Traversing a list, List Operations, List Slices, List Methods, Map, filter and Reduce, Deleting Elements, Lists and Strings.
Dictionaries-Dictionary as a set of counters, Looping and Dictionaries, Reverse Look Up, Dictionaries and Lists. Tuples-Tuple Assignment, Tuples as return values, Variable Length argument tuples, Lists and Tuples, Dictionaries and Tuples.   15 Hours

Suggested readings/ references:

1. Allen B. Downey, "Think Python", O'Reilly, Sebastopol, California.
2. Aditya Kanetkar and Yashavant Kanetkar, "Let us Python", BPB publications.
3. John Zelle , "Python Programming: An Introduction to Computer Science", Franklin, Beedle & AssociatesInc.
4. Martin C. Brown., "Python: The Complete Reference", McGraw Hill.
5. Harsh Bhasin, "Python for beginners", New age international ltd

BCA (Data Science)–SECOND SEMESTER

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

Course Title: Python Programming
Course Code: UMIBCT232
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 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 (Data Science) - SECOND SEMESTER

Course: Multidisciplinary Foundation Courses (MD)   Course Title: Introduction to Machine Learning
Course Credits: (L-P-T)   Course Code: UMDBCT233
                (3-0-0)   Mid Semester assessment: 15 Marks of 1.5 hours duration
Total marks: 75   End Semester assessment: 60 Marks of 3.0 hours duration

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

Course objectives & learning outcomes:
1. To understand the concepts of Machine Learning.
2. Understanding the real world applications of classification.
3. To understand complexity of Machine Learning algorithms and their limitations.
4. Analyzing various machine learning algorithms.

UNIT-I
Introduction, Types of machine learning: supervised, unsupervised, semi-supervised and reinforcement learning,Machine learning model, Steps in the design of learning system, Challenges in machine learning, Applications of machine learning.   10 HOURS

UNIT-II
Labelled data, Introduction to classification and its types, Statistical summary of data, Data pre-processing, Normalization, Training and Testing, Cross Validation, Steps in building a classifier in python.Classification algorithms: K-nearest neighbor, Support vector machine, Decision tree, etc., Classification evaluation metrics
                                                         10HOURS

UNIT-III
Feature Selection: Introduction and its importance, Feature selection techniques, Principal component analysis.Unlabeled data, Introduction to clustering and its applications, Cluster formation methods, K-means algorithm, Hierarchical clustering, etc.
        10HOURS

UNIT-IV
Overfitting, Underfitting, Bias and Variance, Imbalanced dataset and its handling, Hyper-parameter tuning, Ensemble methods: Bagging and Boosting, Ensemble voting.   15 HOURS

Suggested readings/ references:

1. Manohar Swamynathan "Mastering Machine Learning with Python in Six Steps", Apress.
2. Machine Learning, "A Probabilistic Perspective", MIT Press, 2012 by Kevin Murphy.
3. Shai Shalev-Shwartz, Shai Ben-David, "Understanding Machine Learning: From Theory to Algorithms".
4. Mark Summerfield, "Programming in python 3: A Complete Introduction to Python Programming".
5. Tim Hall and J-P Stacey, "Python 3 for Absolute Beginners", 2009

BCA (Data Science) - SECOND SEMESTER

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

Course Title: Introduction to Machine Learning
Course Code: UMDBCT233
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 May 2023, 2024 and 2025

NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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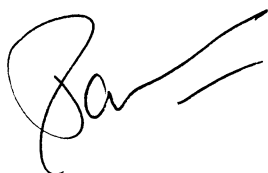
Section A shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks.

                                                  (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.

BCA (Data Science) - SECOND SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: Cyber Security
Course Credits: (L-P-T)   Course Code: USEBCT204
               (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

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

Course objectives & learning outcomes:
1.   To provide knowledge about the PC Hardware.
2.   To brief about different utilities and PC settings.
3.   To develop the ability to configure, setup and troubleshoot PC.

UNIT –I
Cyberspace, Architecture of cyberspace, Internet, World Wide Web, Advent of internet, Internet infrastructure for data transfer and governance, Internets ociety, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security.
Classification of cyber crimes, Common cyber crimes-cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks.   10 Hours

UNIT -II
Cybercriminals modus-operandi, Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offences, Organizations dealing with Cyber crime and Cyber security in India.
Introduction to Social networks, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media.
                                                                                         10 Hours

UNIT-III
Definition of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices.
Introduction to digital payments, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in authorized banking transactions
                                                                                         10 Hours

Suggested readings/ references:

1.   R. C Mishra, "Cyber Crime Impact in the New Millennium", Auther Press Edition.
2.   Sumit Belapure and Nina Godbole, "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt. Ltd.
3.   Henry A. Oliver, "Security in the Digital Age: Social Media Security Threats and Vulnerabilities", Pearson.
4.   Elias M. Awad, "Electronic Commerce", Prentice Hall of India Pvt Ltd.
5.   Kumar K, "Cyber Laws: Intellectual Property & E-Commerce Security", Dominant Publishers.
6.   Eric Cole, Ronald Krutz, James W. Conley, "Network Security Bible", 2nd Edition, Wiley India Pvt. Ltd.
7.   E. Maiwald, "Fundamentals of Network Security", McGraw Hill.

BCA (Data Science) - SECOND SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: Cyber Security
Course Credits: (L-P-T)   Course Code: USEBCT204
                       (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

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

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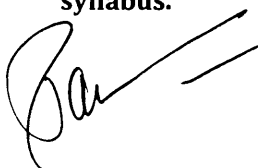
Section A shall consist Four (4) short answer questions (at least one from each unit). The students are required to attempt all questions. Each question shall be of 2½ Marks.

(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.

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**

Bachelor of Computer Applications (BCA)

SOFTWARE DEVELOPMENT

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	UMJBCT161	Programming Paradigms & C Language	4(3L+1P)	15	60	10	15	100
2	Minor	UMIBCT162	Computer Fundamentals and PC Software	4(3L+1P)	15	60	10	15	100
3	MD	UMDBCT163	Computer Fundamentals	3	15	60	NA	NA	75
4	SEC	USEBCT104	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	UMJBCT261	Data and File Structures using C Language	4(3L+1P)	15	60	10	15	100
2	Minor	UMIBCT262	Python Programming	4(3L+1P)	15	60	10	15	100
3	MD	UMDBCT263	C Programming	3	15	60	NA	NA	75
4	SEC	USEBCT204	Cyber Security	2	10	40	NA	NA	50

BCA (Software Development) - FIRST SEMESTER

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

Course Title: Programming Paradigms & C Language
Course Code: UMJBCT161
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 2022, 2023 and 2024

Course objectives & learning outcomes:
1. To learn the fundamentals of Computer programming.
2. To learn the mechanisms of different control structures.
3. To gain knowledge about linear and non linear data types in C language.
4. To brief the students about file handling.

UNIT-I
Overview of different programming paradigms, Algorithm and its characteristics, Representation of Algorithm, Flowchart, Flowchart symbols, Advantages and Limitations of Flowchart.
History of C language, Structure of C program, Compiling and Running a C program, Errors: Syntax, Logical, Linker and Logical, C-Preprocessor, Header file, File inclusion.
Character set, Keyword, Identifier, Constant, Datatype, Variable, Operators: Arithmetic, Assignment, Increment and Decrement, Logical, Relational and Comma. Precedence and Associativity.   15 Hours

UNIT-II
Conditional control statement: if, if-else, nested if, Ternary operator, if-else-if ladder, switch case, goto statement.
Loops control statement: Loop control, while (), do-while(), for(), break statement, continue statement, nested loops.
Functions: Types of function, function prototype, function declaration, function definition, scope, local and global variable, passing parameters to a function, call by value, pointer, call by reference.
Storage classes in C: Types of storage classes with examples.   15 Hours

UNIT-III
Arrays (Single and double dimensional): Definition, Declaration, Accessing, Bound Checking, Passing to function.
Arrays and Pointers: Accessing single dimensional array using Pointers, accessing 2D array using Pointers, passing arrays to functions with pointers.
Strings: Definition, Declaration, Accessing, passing to function, Standard Library function, string manipulation using pointers.
                                                                              15 Hours

UNIT-IV
Structure: Introduction to structures, Array of structures, Nesting of structures, Pointer to structures, Passing structures to functions, Nested Structures.
Union: Unions initialization and accessing the members of a union.
Data and File handling: Introduction to Data Files, File opening modes, File handling functions, Managing records in a file, Managing text files.
                                                                        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.

BCA (Software Development) - FIRST SEMESTER

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

Course Title: Programming Paradigms & C Language
Course Code: UMJBCT161
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 2022, 2023 and 2024

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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.

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 (Software Development) - FIRST SEMESTER

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

Course Title: Computer Fundamentals and PC software.
Course Code: UMIBCT162
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 2022, 2023 and 2024

Course objectives & learning outcomes:
1. To learn the fundamentals of Computer Fundamentals.
2. To learn the mechanisms of office tools.
3. To gain knowledge on software and applications.
4. To brief the students about PC software basics.

UNIT – I

Computer and its Characteristics, Applications of Computer, Digital and Analog Computer, Generation of Computer, Computer Types: Mainframe Computer, Super Computer, Mini Computer. Memory: RAM, ROM, EEPROM, UVPROM, Storage Units, Various secondary storage devices like: Hard disk drives, Optical Disks: CD, DVD, Blu-ray disks, etc. Input and Output Devices: Keyboard, Mouse, Joystick, Scanner, touch panels, Monitor, LEDs, TFTs, Printer and its Types.

                15 Hours

UNIT - II

Software and its Types (System Software, Application Software, Firmware Software) Computer Languages and its types (Machine Language, Assembly Language, High Level Language: Merits and Demerits of Computer Languages), Translators: Compiler, Linker, Interpreter, Loader, computer virus and its types, Antivirus Software.

                15 Hours

UNIT - III

Number system: Decimal, Binary, octal, hexadecimal, conversion of one number system to another, arithmetic operations: addition, subtraction, multiplication. Complement of Numbers, complement methods: r's and r-1 complement, ASCII Code, EBSDIC.

                15 Hours

UNIT – IV

PC Maintenance and Troubleshooting: Opening the PC and identification. Study of different blocks, Assembling and disassembling. Basic Device Configuration and Installation-Printers, Microphone, Monitor, Mother Board, Sound Card, Video Card, tips on Trouble Shooting. Types of Internet connections: Dialup, Broadband, Leased Line, Wi-Fi, Wi-Max, 2G, 3G, 4G, 5G, WWW, E-mails, Search Engines, Social Networking. Cloud application. Audio-video Conferencing. Voice over Internet Protocol (VOIP).

                15 Hours

Suggested readings/ references:
1. P.K Sinha and Priti Sinha, "Computer Fundamentals", BPB Publications.
2. Alexix Leon, Mathewes Leon, "Fundamentals of Information Technology",Leon Techworld.
3. Suresh K. Basandra, "Computer Systems Today", Galgotia Publications.
4. V. Rajaraman, "Fundamentals of Computers",EEE.
5. Peter Nortan, "Introduction to Computers", Tata Mcgraw Hill.

BCA (Software Development) - FIRST SEMESTER

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

Course Title: Computer Fundamentals and PC software.
Course Code: UMIBCT162
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 2022, 2023 and 2024

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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.

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 (Software Development) - FIRST SEMESTER

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

Course Title: Computer Fundamentals
Course Code: UMDBCT163
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 2022, 2023, and 2024

Course objectives & learning outcomes:
1. To learn the fundamentals of Computer Fundamentals.
2. To understand hardware and software.
3. To gain knowledge of operating system.
4. To brief the students about number system.

UNIT – I
Introduction to Computer, History of Computer, Features of Computer, Uses of Computers, Generation of Computer, Digital, Analog, Hybrid Computer, Computer Memory and its types, types of Primary memory, Storage Units, Secondary storage Devices: Hard disk drives, Optical Disks: CD, DVD, etc. Input Devices types, and Output Devices Monitor, Plotter. Printer and its Types.

                                10 Hours

UNIT - II
Software and Hardware, Type of Software: System Software, Application Software, Firmware Software, Computer Languages and its types: Machine Language, Assembly Language, High Level Language, Translators: Interpreter, Compiler, Linker, Loader, Computer Viruses introduction, Antivirus Software.

                                10 Hours

UNIT – III
Operating System, Functions of Operating System, Types of Operating System (Single User and Multi User), Windows operating system and its features, Desktop Elements of windows OS, Anatomy of Window: Title Bar, Menu Bar, Tool Bar, Scroll Bars, Document Area, and Status Bar.

                                10 Hours

UNIT – IV
Computer Number System: Decimal Number, Binary Number, Octal Number, Hexadecimal Number, Arithmetic Operations(Addition, Subtraction, Multiplication) on Binary Number, Conversion of one Number System to another.

                                15 Hours

Suggested readings/ references:
1. P.K Sinha and Priti Sinha, "Computer Fundamentals", BPB Publications.
2. Alexix Leon, Mathewes Leon, "Fundamentals of Information Technology",Leon Techworld.
3. Suresh K. Basandra, "Computer Systems Today", Galgotia Publications.
4. V. Rajaraman, "Fundamentals of Computers",EEE.
5. Peter Nortan, "Introduction to Computers", Tata Mcgraw Hill.

BCA (Software Development) - FIRST SEMESTER

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

Course Title: Computer Fundamentals
Course Code: UMDBCT163
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 2022, 2023, and 2024

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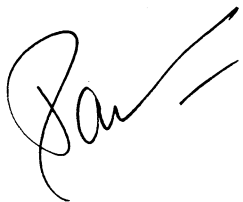
Section A shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks.

(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.

BCA (Software Development) - FIRST SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: PC Software: Installation and Troubleshooting
Course Credits: (L-P-T)   Course Code: USEBCT104
                 (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

For examinations to be held in Dec 2022, 2023, and 2024

Course objectives & learning outcomes:
1. To provide knowledge about the PC Hardware.
2. To brief about different utilities and PC settings.
3. To develop the ability to configure, setup and troubleshoot PC.

UNIT -I

Introduction to PC Hardware: Study of basic I/O systems, Types of Memories- Static RAM and Dynamic RAM, ROM, PROM, EPROM, EEPROM, External Storage Devices, CPU (Central Processing Unit)- ALU and control, Motherboard and Processor :Types of Processor, System performance Motoring.   10 Hours

UNIT -II

BIOS Configuration: Study of BIOS Set-up- Advance set-up, Boot configuration, Boot Menu, Installation of Operating System (Windows), Control panel, Installation and uninstallation of application software, Setting System Date and Time, Hard Disk: Formatting of Hard disk, Partitioning of Hard disk in different logical drives, Defragmenting Hard disk using defrag, Scan Disk for checking disk space, Disk clean up, Scan disk, Installation of Device Drivers: Different types of Motherboard drivers: Network, Audio, and Graphics, Modem. Display Settings: Resolution, Themes, multiple displays, Projector Set up.   10 Hours

UNIT-III

Configuration of External devices: Physical set-up of Printers- Performing test print out, Printing of document etc, Scanner set-up, Webcam, Bluetooth device, Memory card reader, Diagnostic and troubleshooting of PC: POST (Power on Self Test), Maintenance of PC, Error messages, Task Manager. Concept of compression Compression Utilities: WinZip, PKZIP, files recovery, Antivirus, CD/DVD Writing Software, Concept of Virtual drives and Image files (ISO).   10 Hours

Suggested readings/ references:

1. Mark Minasi, "The complete PC Upgrade & Maintenance Guide", BPB Publications.
2. D Balasubramanian, "Computer Installation and Servicing", Tata McGraw Hill Education.
3. Robert C. Brenner, "Trouble Shooting and Repair Guide", BPB Publications.
4. Scott Mueller, "Upgrading and Repairing PC's", PHI Publications, Fourth Edition.
5. Adane Nega Tarekegn, "A Simple Guide to Computer Maintenance and Troubleshooting", LAP LAMBERT Academic Publishing.
6. James Karney, "Upgrade & Maintain Your PC", M & T Books; 2nd edition.

BCA (Software Development) - FIRST SEMESTER

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

Course Title: PC Software: Installation and Troubleshooting
Course Code: USEBCT104
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 2022, 2023, and 2024

NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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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.

BCA (Software Development) - SECOND SEMESTER

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

Course Title: Data and File Structures using C Language
Course Code: UMJBCT261
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 2023, 2024 and 2025

Course objectives & learning outcomes:
1. To have the basic understanding of memory management.
2. To understand various sequential and non-sequential memory arrangement.
3. To understand the working of various linked lists.
4. To brief the students about various trees and graphs.

UNIT – I

Introduction to data structures: - Concepts of data and algorithm, Relation between Data Structure & Algorithm, Introduction to Time & Space complexity, Data types, Data Structures & Abstract data types, Representation of Arrays, Sparse matrices.   15 Hours

UNIT – II

Stacks and Queues: - Concept of Stacks, Operation on Stacks, Multiple stacks, Application of stacks in Infix, Postfix, Prefix, Recursion, Concept of Queues, Operation on Queues, Multiple Queues, Priority Queues, Circular Queues.   15 Hours

UNIT – III

Insertion, Deletion and Traversal on Linear Linked Lists, Doubly Linked List, Circular Linked List, Linked List as Data Structure, Header nodes, Stacks & Queues using linked list, Dynamic memory management, Garbage Collection.   15 Hours

UNIT – IV

Trees and Graphs: binary trees and its representation using Linked list, Operations on Binary Trees, Traversal Algorithms, Threaded Binary Trees and its Traversal algorithms, Representation of Graphs, Traversal methods, Applications Undirected Graphs, Directed Graph& their Traversal, Depth first, Breadth First, Shortest Path algorithms (Dijkstra and Floyd).

                                                                                        15 Hours

Suggested Readings:

1. Tanenbaum, Langsam and Augenstein, "Data Structure using C", Pearson.
2. Horowiz E. and Sahni S., "Fundamentals of data structures", Computer Science Press.
3. Robert L. Kruse, "Data structures and Program Design", Pearson.
4. Aho, Hopcraft and Ullman, "Data Structures & Algorithm", Pearson,
5. Sorenson, "Data Structure with Applications", McGraw-Hill.

BCA (Software Development) - SECOND SEMESTER

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

Course Title: Data and File Structures using C Language
Course Code: UMJBCT261
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 2023, 2024 and 2025

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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.

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 (Software Development) - SECOND SEMESTER

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

Course Title: Python Programming
Course Code: UMIBCT262
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 2023, 2024 and 2025

Course objectives & learning outcomes:
1. To Understand basics of python
2. To develop console application in python
3. To develop database application in python
4. Apply the concept of file handling in python and basic machine learning application

UNIT I
Introduction to Python Language, Strengths and Weaknesses, IDLE, Dynamic Types, Naming Conventions, String Values, string Operations, String Slices, String Operators, Numeric Data Types, Built-in Functions. Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods Special Methods Class Variables, Inheritance, Polymorphism.

15 Hours

UNIT II
Introduction, Control Flow and Syntax, Indenting, the if Statement, Relational Operators, Logical, Operators, True or False, Bit Wise Operators, the while Loop, break and continue, The for Loop, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections.

15 Hours

UNIT III
Introduction Defining Your Own Functions Parameters Function Documentation Keyword and Optional Parameters Passing Collections to a Function Variable Number of Arguments Scope Functions - "First Class Citizens" Passing Functions to a Function Mapping Functions in a Dictionary Lambda Modules Standard Modules – sys Standard Modules – math Standard Modules – time The dir Function.

15 Hours

UNIT IV
I/O and Error Handling in Python: Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data from a File, Additional File Methods, Handling IO Exceptions, Working with Directories, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions.

15 Hours

Suggested readings/ references:

1. Allen B. Downey, "Think Python", O'Reilly, Sebastopol, California.
2. Aditya Kanetkar and Yashavant Kanetkar, "Let us Python", BPB publications.
3. John Zelle , "Python Programming: An Introduction to Computer Science", Franklin, Beedle & Associates Inc.
4. Martin C. Brown., "Python: The Complete Reference", McGraw Hill.
5. Harsh Bhasin, "Python for beginners", New age international ltd.

BCA (Software Development) - SECOND SEMESTER

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

Course Title: Python Programming
Course Code: UMIBCT262
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 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 (Software Development) - SECOND SEMESTER

Course: Multidisciplinary Foundation Course (MD)   Course Title: C Programming
Course Credits: (L-P-T)   Course Code: UMDBCT263
        (3-0-0)   Mid Semester assessment: 15 Marks of 1.5 hours duration
Total marks: 75   End Semester assessment: 60 Marks of 3.0 hours duration

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

Course objectives & learning outcomes:
1. To learn the fundamentals programming concepts.
2. To understand basic control structures.
3. To gain knowledge on referencing variables in C.
4. To brief the students about functions and parameters in C.

UNIT – I
Algorithm, Representation of Algorithm, Flowcharts, Flowchart Symbols, Flowchart Rules, Advantages and Limitations of Flowcharts, Pseudo Code Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Format of c program, Arithmetic, Relational& Logical Operators, Assignment Operators, Increment & Decrement Operators, Operator Precedence & Associativity.

10Hours

UNIT – II
Formatted Input, Formatted Output, escape sequences, Simple if Statement, if..else Statement, Nesting of if....else Statements, , Switch Statement, conditional Operator, goto Statement, loops, break and continue statement.

10Hours

UNIT – III
Qualifiers, Storage classes, Pointer's definition, Declaring Pointer Variables, using pointer variable, Arrays: One, Two and Multi Dimension Arrays, Initialization of one- and two-dimensional Arrays, Declaring and Initializing String Variables, String Handling Functions.

10Hours

UNIT – IV
Preprocessor directives, Function Definition, Function Calls (call by value & call by address method) Returning Value, Types of Functions, Recursion, Passing Arrays to Functions, Macros, Defining Structure, Declaring and Accessing Structure Variables, Structures and Unions.

15 Hours

Suggested Readings:
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.
6. Shubhnandan S. Jamwal, "Programming in C", Pearson Publications.
7. H.M. Deitel and P.J. Deitel, "C How to Program", PHI.

BCA (Software Development) - SECOND SEMESTER

Course: Multidisciplinary Foundation Course (MD)   Course Title: C Programming
Course Credits: (L-P-T)   Course Code: UMDBCT263
                       (3-0-0)   Mid Semester assessment: 15 Marks of 1.5 hours duration
Total marks: 75   End Semester assessment: 60 Marks of 3.0 hours duration

For examinations to be held in May 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.

BCA (Software Development) - SECOND SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: Cyber Security
Course Credits: (L-P-T)   Course Code: USEBCT204
                          (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

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

Course objectives & learning outcomes:
1.   To provide knowledge about the PC Hardware.
2.   To brief about different utilities and PC settings.
3.   To develop the ability to configure, setup and troubleshoot PC.

UNIT –I

Cyberspace, Architecture of cyberspace, Internet, World Wide Web, Advent of internet, Internet infrastructure for data transfer and governance, Internets ociety, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security.

Classification of cyber crimes, Common cyber crimes-cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks.   10 Hours

UNIT -II

Cybercriminals modus-operandi, Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offences, Organizations dealing with Cyber crime and Cyber security in India.

Introduction to Social networks, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media.   10 Hours

UNIT-III

Definition of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices.

Introduction to digital payments, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in authorized banking transactions   10 Hours

Suggested readings/ references:

1.   R. C Mishra, "Cyber Crime Impact in the New Millennium", Auther Press Edition.
2.   Sumit Belapure and Nina Godbole, "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt. Ltd.
3.   Henry A. Oliver, "Security in the Digital Age: Social Media Security Threats and Vulnerabilities", Pearson.
4.   Elias M. Awad, "Electronic Commerce", Prentice Hall of India Pvt Ltd.
5.   Kumar K, "Cyber Laws: Intellectual Property & E-Commerce Security", Dominant Publishers.
6.   Eric Cole, Ronald Krutz, James W. Conley, "Network Security Bible", 2nd Edition, Wiley India Pvt. Ltd.
7.   E. Maiwald, "Fundamentals of Network Security", McGraw Hill.

BCA (Software Development) - SECOND SEMESTER

Course: Skill Enhancement Course (SEC)   Course Title: Cyber Security
Course Credits: (L-P-T)   Course Code: USEBCT204
                (2-0-0)   Mid Semester assessment: 10 Marks of 1.5 hours duration
Total marks: 50   End Semester assessment: 40 Marks of 2.5 hours duration

For examinations to be held in May 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.