UNIVERSITY OF JAMMU

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

Academic Section
Email: academicsectionju14@gmail.com

NOTIFICATION
(22/Nov./Adp/69)

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

Subject	**Semester**	**for the examination to be held in the years**
Computer Application (B.A/B.Sc.)	Semester-I	December 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/22/9266-9305
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

Sumitra Sharma 7/11/22.
Deputy Registrar (Academic)
7/11

B. A. / B. Sc. Honours
IN
COMPUTER APPLICATIONS

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

UNIVERSITY OF JAMMU, JAMMU

Syllabus of B.A/B.Sc. Honours in Computer Applications

(Four Year Undergraduate Programme)

For the students to be admitted in the year 2022-23, 2023-24 and 2024-25

The B.A/B.Sc. Honours programme in Computer Application is a four-year undergraduate programme based on Semester System and consists of **eight** semesters. The student will opt Major and Minor courses from the same discipline. For minor course, any subject other than major available in the college shall be chosen from within same discipline. However, Multidisciplinary foundation courses are to be chosen from the disciplines other than that of Major and Minor courses.

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	UMJCAT101	Computer Fundamentals and Office Tools	4(3L+1P)	15	60	10	15	100
2	Minor	UMICAT102	Computer Fundamentals and Office Tools	4(3L+1P)	15	60	10	15	100
3	MD	UMDCAT103	Understanding Computers	3	15	60	NA	NA	75
4	SEC	USECAT104	Office Tools	2	10	40	NA	NA	50

Semester – II

S. No.	Course Type	Course No.	Course Title	Credits	Marks				Total Marks
					Theory		Practical/Tutorial		
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJCAT201	Fundamentals of Internet	4(3L+1P)	15	60	10	15	100
2	Minor	UMICAT202	Fundamentals of Internet	4(3L+1P)	15	60	10	15	100
3	MD	UMDCAT203	Understanding Internet	3	15	60	NA	NA	75
4	SEC	USECAT204	Understanding e-Services	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. <u>03 and 04 credits papers</u> **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks.	03 hours for 03/04 credits	60 Marks for 03/04 Credits
Section B shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	2½ hours for 02 credits	40 Marks for 02 Credits
2. <u>02 credits papers</u> **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 2½ Marks.		
Section B shall consist Six (6) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 10 Marks.		
Note: Convener, BOS, can make minor modification in the scheme Skill course, if required. However, it must be clearly reflected in the syllabus.		

PRACTICAL/TUTORIAL

i. Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous assessment
ii. Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination

Instructions for paper setter

1. **3 / 4 Credits Paper**

Total marks: 60

Time allotted: 3 hours

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

Section A

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

(4 x 3 = 12 marks)

Section B

Total of Eight (8) long answer questions (two from each unit) shall be set. The candidates are required to attempt four questions. Each question shall be of 12 Marks.

(4 x 12 = 48 marks)

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

2. **2 Credits Paper**

Total marks: 40

Time allotted: 2½ hours

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

Section A

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

(4 x 2½ = 10 marks)

Section B

Total of Six (6) long answer questions (two from each unit) shall be set. The candidates are required to attempt three questions. Each question shall be of 10 Marks.

(3 x 10 = 30 marks)

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

B. A. / B. Sc. Honours
IN
COMPUTER APPLICATIONS

Semester wise Course details

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

CA (Arts and Science) - FIRST SEMESTER

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

Course Title: Computer Fundamentals and Office Tools
Course Code: UMJCAT101
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 basics concepts of computers.
2. To learn the mechanisms of office tools.
3. To gain knowledge on software and applications.
4. To brief the students about DOS & Windows.

UNIT – I

Computer and its Characteristics, Applications of Computer, Digital and Analog Computer, Generation of Computer, Block Diagram of a Computer, Computer Types: Mainframe Computer, Super Computer, Mini Computer. Memory hierarchy: Registers, Cache Memory, Primary Memory (RAM, ROM, EEPROM, UVPROM), Storage Units(Bit, Byte, KB, MB etc.). Secondary Storage Devices and its Storage Mechanism, Input and Output Devices: Keyboard, Point and Draw Devices, Data Scanning Devices, Voice Recognition Device, Digitizers, Monitor, Printer and its Types, Projector.

15 Hours

UNIT - II

Software and its Types (System Software, Application Software, Firmware Software), Operating System and its functions, Types of OS :Single user, Multi user, Multitasking, Batch OS, Real Time OS, 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: Addition, Subtraction, Multiplication. Complement of Numbers, Complement methods: r's and r-1 Complement, ASCII Code, EBCDIC, BCD Numbers.

15 Hours

UNIT – IV

Anatomy of Window: Title Bar, Menu Bar, Tool Bar, Scroll Bars, Document Area, and Status Bar.
Desktop Elements: Icons, My Computer, Recycle Bin, Taskbar, My Documents.
Control panel ,Disk Defragmentation, DOS, Evolution of DOS, Internal Commands : CLS, Ver, COPY, Volume, Date, Time, MD, CD, RD, Copy, Del, Ren, Move etc., External Commands : CHKDSK, FORMAT, Xcopy , Attrib, Defrag etc.

15 Hours

Suggested readings/ references:

1. P.K Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications.
2. Alexix Leon, Mathewes Leon, "Fundamentals of Information Technology",Leon Press.
3. Suresh K. Basandra, "Computer Systems Today", Galgotia Publications.
4. V. Rajaraman, "Fundamentals of Computers",PHI Learning Pvt. Ltd.
5. Peter Nortan, "Introduction to Computers", Tata Mcgraw Hill.
6. Joyce Coax , Joan Preppernau,,Steve Lambert and Curtis Frye, "Microsoft Office System step by step", Microsoft Press, 2007.
7. R.K. Taxali, "PC Software for Windows", McGraw Hill.

CA (Arts and Science) - FIRST SEMESTER

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

Course Title: Computer Fundamentals and Office Tools
Course Code: UMJCAT101
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 consists 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 consists 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

CA (Arts and Science) - FIRST SEMESTER

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

Course Title: Computer Fundamentals and Office Tools
Course Code: UMICAT102
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 basics of computers.
2. To learn the mechanisms of office tools.
3. To gain knowledge on software and applications.
4. To brief the students about DOS & Windows.

UNIT – I

Computer and its Characteristics, Applications of Computer, Digital and Analog Computer, Generation of Computer, Block Diagram of a Computer, Computer Types: Mainframe Computer, Super Computer, Mini Computer. Memory hierarchy: Registers, Cache Memory, Primary Memory (RAM, ROM, EEPROM, UVPROM), Storage Units(Bit, Byte, KB, MB etc.). Secondary Storage Devices and its Storage Mechanism, Input and Output Devices: Keyboard, Point and Draw Devices, Data Scanning Devices, Voice Recognition Device, Digitizers, Monitor, Printer and its Types, Projector. 15 Hours

UNIT - II

Software and its Types (System Software, Application Software, Firmware Software), Operating System and its functions, Types of OS :Single user, Multi user, Multitasking, Batch OS, Real Time OS, 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: Addition, Subtraction, Multiplication. Complement of Numbers, Complement methods: r's and r-1 Complement, ASCII Code, EBCDIC, BCD Numbers. 15 Hours

UNIT – IV

Anatomy of Window: Title Bar, Menu Bar, Tool Bar, Scroll Bars, Document Area, and Status Bar.
Desktop Elements: Icons, My Computer, Recycle Bin, Taskbar, My Documents.
Control panel ,Disk Defragmentation, DOS, Evolution of DOS, Internal Commands : CLS, Ver, COPY, Volume, Date, Time, MD, CD, RD, Copy, Del, Ren, Move etc., External Commands : CHKDSK, FORMAT, Xcopy , Attrib, Defrag etc.

15 Hours

Suggested readings/ references:

1. P.K Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications.
2. Alexix Leon, Mathewes Leon, "Fundamentals of Information Technology",Leon Press.
3. Suresh K. Basandra, "Computer Systems Today", Galgotia Publications.
4. V. Rajaraman, "Fundamentals of Computers", PHI Learning Pvt. Ltd.
5. Peter Nortan, "Introduction to Computers", Tata Mcgraw Hill.
6. Joyce Coax , Joan Preppernau,,Steve Lambert and Curtis Frye, "Microsoft Office System step by step", Microsoft Press, 2007.
7. R.K. Taxali, "PC Software for Windows", McGraw Hill.

CA (Arts and Science) - FIRST SEMESTER

Course:	Minor	Course Title: Computer Fundamentals and Office Tools	
Course Credits:	(L-P-T)	Course Code: UMICAT102	
	(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

CA (Arts and Science) - FIRST SEMESTER

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

Course Title: Understanding Computers.
Course Code: UMDCAT103
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 basics 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, Generations of Computer, Digital, Analog, Hybrid Computer, Computer Memory and its Types, Primary memory (RAM, ROM,PROM,EEPROM), Storage Units(Bit,Byte,KB,MB, GB,TB), Secondary Storage Devices: Hard Disks, Optical Disks, Compact Disks, Zip Drive, Flash Drives, Input Devices (Keyboard, Mouse, Joystick, Scanner), 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: Advantages and Disadvantages of Computer Languages), Translators: Interpreter, Compiler, Linker, Loader, Computer Viruses (Trojan, Malware, Spyware etc.), Antivirus Software. 10 Hours

UNIT - III

Anatomy of Window: Title Bar, Menu Bar, Tool Bar, Scroll Bars, Document Area, and Status Bar.
Desktop Elements: Icons, My Computer, Recycle Bin, Taskbar, My Documents, Anatomy of Window: Title Bar, Menu Bar, Tool Bar, Scroll Bars, Document Area, and Status Bar.
Control panel ,DiskDefragmentation, DOS,Evolution of DOS,Internal Commands : CLS, Ver, COPY, Volume, Date, Time, MD, CD, RD, Copy, Del, Ren, Move, Path External Commands : CHKDSK,FORMAT,Xcopy,Attrib, Defrag etc. 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. r's Complement and r-1' Complement, Data Representation. 15 Hours

Suggested readings/ references:

1. P.K Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications.
2. Alexix Leon, Mathewes Leon, "Fundamentals of Information Technology",Leon Press.
3. Suresh K. Basandra, "Computer Systems Today", Galgotia Publications.
4. V. Rajaraman, "Fundamentals of Computers", PHI Learning Pvt. Ltd.
5. Peter Nortan, "Introduction to Computers", Tata Mcgraw Hill.
6. Joyce Coax , Joan Preppernau,,Steve Lambert and Curtis Frye, "Microsoft Office System step by step", Microsoft Press, 2007.
7. R.K. Taxali, "PC Software for Windows", McGraw Hill.

CA (Arts and Science) - FIRST SEMESTER

Course:	Multidisciplinary Foundation Course (MD)	Course Title: Understanding Computers.	
Course Credits:	(L-P-T)	Course Code: UMDCAT103	
	(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

NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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

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

(4 x 3 = 12 marks)

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

(4 x 12 = 48 marks)

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

CA (Arts and Science) - FIRST SEMESTER

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

Course Title: Office Tools
Course Code: USECAT104
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

Course objectives & learning outcomes:

1. To provide working knowledge of word processing software.
2. To impart the skill to work with features of a spreadsheet software.
3. To develop the ability to prepare PowerPoint presentation.

UNIT -I

Word: Text Editor: Types- Line Editor, Word Editor, Page editor and their features. Entering text: selecting, editing, inserting,moving, copying, deleting, undo, redo, spell check. Formatting document: Changing Font type, applying effects, changing color, case, alignment, applying Superscript, Subscript, creating bulleted and Numbered List, Applying Border and Shading, Applying Drop Cap Effect, Header, Footer. Using Clip Art, Word Art. Working with Table: Creating, Entering Data, Modifying, Formatting, Inserting Picture. Copying Formatting to another Selection, Page Formatting, Setting Page Properties, Previewing and Printing a Document, Using Mail Merge. 10 Hours

UNIT -II

Excel: Introduction to Row, Cell, Workbook, Worksheet. Components and features of a Worksheet, Moving Around the Spreadsheet, Entering Data, Inserting and Deleting Cells, Columns and Rows, Changing Row Height and Column Width, Types of Data, Performing Calculations, Using Formula, Sorting Data, Custom Sorting, Charts, Filters. AutoFill and Flash Fill, Managing Worksheets, Saving Workbook. 10 Hours

UNIT-III

Powerpoint: Starting Powerpoint, Components, Creating and Saving Presentations, Opening, Closing, Running and Exiting a Presentation, Adding and deleting slides to a Presentation, Formatting Text in a slide, Inserting Objects in a Slide, Rotating and Resizing a Picture, Shape, Text or Object, Transitions, Animations and Views. 10 Hours

Suggested readings/ references:

1. Joe Habraken, "Microsoft Office Inside Out (Office 2021 and Microsoft 365)", Microsoft Press.
2. Joan Lambert, Curtis Frye, "Microsoft Office 2016 Step by Step", Microsoft Press.
3. Linda Foulkes , "Learn Microsoft Office 2019: A Comprehensive Guide to Getting Started with Word, PowerPoint, Excel,Acess, and Outlook", Packt Publishing Limited.

CA (Arts and Science) - FIRST SEMESTER

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

Course Title: Office Tools
Course Code: USECAT104
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 -

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.

CA (Arts and Science) - SECOND SEMESTER

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

Course Title: Fundamentals of Internet
Course Code: UMJCAT201
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 Internet.
2. To understand basic web fundamentals.
3. To gain knowledge on network protocols and their applications.
4. To brief the students about web designing using HTML.

UNIT - I

Computer Networks: Definition, Goals, Advantages and Disadvantages, Categories of Network, Topologies, Data Communication and its Components (Sender, Receiver, Protocol, Message, Medium), Transmission modes (Simplex, Half Duplex, Full Duplex), Transmission medium: Co-axial, Twisted Pair and Fiber Optic Cables,, Radio waves, Microwaves, Satellites, Networking devices (Modem, Switch, Hub, Router, Bridge, Gateway).

15 Hours

UNIT - II

Internet: Definition and features, Applications, History, Advantages and Disadvantages. Web Terminologies: Web Browser, Types of browsers, Web address, Emergence and evolution of World Wide Web (WWW), Web Site, Web page (Static and Dynamic), Web Client, Web Server, URL, DNS, Search Engines.

15 Hours

UNIT - III

IP Address, Types of IP Address (IPv4, IPv6), Classes of IP Addresses, .Internet Connection Protocols (HTTP/HTTPs, FTP, SMTP, POP3).

Introduction to HTML, Structure of HTML Program, HTML tags, HTML Basic Tags , HTML Formatting Tags ,HTML Color Coding, Div and Span Tag for grouping,HTML List: Unordered, Ordered, Definition; HTML image and Image mapping.

15 Hours

UNIT - IV

HTML table, HTML Table tags :TABLE, TR,TH,TD etc.; Table tag attributes :table border ,bgcolor , align, Cell Spacing and Cell Padding etc.; Colspan and Rowspan, HTML frame ,frameset tag, frame tag attributes, HTML iframe tag and its attributes;

HTML Form, form tag attributes: action, method, name; Form Controls: Text Input box, Checkboxes, Radio Box, Select Box , File Select box ,Hidden Controls, Clickable Buttons, Submit and Reset Button.

15 Hours

Suggested Readings:

1. Andrew.S. Tannenbaum, "Computer Networks", Pearson.
2. Williams Stallings, "Data and Computer Communication", Pearson.
3. Forouzan, "Data Communication and Networking", McGraw Hill Professional Publication.
4. Douglas E. Comer, "The Internet Book", Prentice Hall.

CA (Arts and Science) - SECOND SEMESTER

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

Course Title: Fundamentals of Internet
Course Code: UMJCAT201
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 consists 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 consists 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

CA (Arts and Science) - SECOND SEMESTER

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

Course Title: Fundamentals of Internet
Course Code: UMICAT202
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 Internet.
2. To understand basic web fundamentals.
3. To gain knowledge on network protocols and their applications.
4. To brief the students about web designing using HTML.

UNIT - I

Computer Networks: Definition, Goals, Advantages and Disadvantages, Categories of Network, Topologies, Data Communication and its Components (Sender, Receiver, Protocol, Message, Medium), Transmission modes (Simplex, Half Duplex, Full Duplex), Transmission medium: Co-axial, Twisted Pair and Fiber Optic Cables,, Radio waves, Microwaves, Satellites, Networking devices (Modem, Switch, Hub, Router, Bridge, Gateway).

15 Hours

UNIT - II

Internet: Definition and features, Applications, History, Advantages and Disadvantages. Web Terminologies: Web Browser, Types of browsers, Web address, Emergence and evolution of World Wide Web (WWW), Web Site, Web page (Static and Dynamic), Web Client, Web Server, URL, DNS, Search Engines.

15 Hours

UNIT - III

IP Address, Types of IP Address (IPv4, IPv6), Classes of IP Addresses, .Internet Connection Protocols (HTTP/HTTPs, FTP, SMTP, POP3).

Introduction to HTML, Structure of HTML Program, HTML tags, HTML Basic Tags , HTML Formatting Tags ,HTML Color Coding, Div and Span Tag for grouping,HTML List: Unordered, Ordered, Definition; HTML image and Image mapping.

15 Hours

UNIT - IV

HTML table, HTML Table tags :TABLE, TR,TH,TD etc.; Table tag attributes :table border ,bgcolor , align, Cell Spacing and Cell Padding etc.; Colspan and Rowspan, HTML frame ,frameset tag, frame tag attributes, HTML iframe tag and its attributes;

HTML Form, form tag attributes: action, method, name; Form Controls: Text Input box, Checkboxes, Radio Box, Select Box ,File Select box ,Hidden Controls, Clickable Buttons, Submit and Reset Button.

15 Hours

Suggested Readings:-

1. Andrew.S. Tannenbaum, "Computer Networks", Pearson.
2. Williams Stallings, "Data and Computer Communication", Pearson.
3. Forouzan, "Data Communication and Networking", McGraw Hill Professional Publication.
4. Douglas E. Comer, "The Internet Book", Prentice Hall.

CA (Arts and Science) - SECOND SEMESTER

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

Course Title: Fundamentals of Internet
Course Code: UMICAT202
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 consists 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 consists 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

CA (Arts and Science)–SECOND SEMESTER

Course:	Multidisciplinary Foundation Course (MD)	Course Title: Understanding Internet
Course Credits:	(L-P-T)	Course Code: UMDCAT203
	(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 of Internet.
2. To understand basic web fundamentals.
3. To gain knowledge on network protocols and their applications.
4. To brief the students about various network devices and network security.

UNIT - I

Computer Networks: Definition, Goals, Advantages and Disadvantages, Types (LAN, MAN, WAN), Topologies, Data Communication and its Components (Sender, Receiver, Protocol, Message, Medium), Transmission Medium (Wired and Wireless): Co-axial cables, Twisted pair, Optical Fiber, Electromagnetic Spectrum, Radio waves, Microwaves, Satellites, Transmission Impairments and attenuation,, Transmission modes (Simplex, Half Duplex, Full Duplex), Networking devices (Modem, Switch, Hub, Router, Bridge, Gateway).

10 Hours

UNIT - II

Internet: Definition and Features, Applications, History, Advantages and Disadvantages. Web Terminologies: Web Browser, Types of browsers, Web address, World Wide Web (WWW) and its architecture, Web Site, Web Page (Static and Dynamic), Web Client, Web Server, URL, DNS, Search Engines. 10 Hours

UNIT - III

IP Addresses, Types of IP Address (IPv4, IPv6), Classes of IP Addresses, Internet Service Provider, Internet Connection Protocols (HTTP/HTTPs, FTP, SMTP, POP3). E-mail basics: Opening E-mail account, Creating and Sending E-mail messages, Replying E-mail Messages, Forwarding E-mail messages, Searching E-mail, Advantages and Limitations of E-mail, E-mail Addressing: Header, Body, Attachments, Signature, Carbon Copy, Blind Carbon Copy, Mailbox (Inbox and Outbox), Handling SPAM. 10 Hours

UNIT - IV

Basics of E-Commerce and Digital Marketing, Benefits and challenges of E-Commerce. E-Governance: Introduction, Advantages, Various E-Governance Initiatives. Online Transactions Systems and its Types (UPI, Internet Banking, NEFT/RTGS and IMPS), Audio and Video Conferencing, Social Networks, Advantages and Disadvantages of Social Networks, Short Range Connectivity Methods (Wi-Fi, Bluetooth, Hotspot), File Uploading, File Downloading, Internet Ethics, NETIQUETTES. 10 Hours

Suggested Readings:

1. Andrew.S. Tannenbaum, "Computer Networks", Pearson.
2. Williams Stallings, "Data and Computer Communication", Pearson.
3. Forouzan, "Data Communication and Networking", McGraw Hill Professional Publication.
4. Douglas E. Comer, "The Internet Book", Prentice Hall.

CA (Arts and Science)–SECOND SEMESTER

Course:	Multidisciplinary Foundation Course (MD)	Course Title: Understanding Internet
Course Credits:	(L-P-T)	Course Code: UMDCAT203
	(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 consists 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 consists Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.

(4 x 12 = 48 marks)

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

CA (Arts and Science) - SECOND SEMESTER

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

Course Title: Understanding e-Services
Course Code: USECAT204
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 May 2023, 2024 and 2025

Course objectives & learning outcomes:

1. To provide working knowledge of word processing software.
2. To impart the skill to work with features of a spreadsheet software.
3. To develop the ability to prepare PowerPoint presentation.

UNIT – I

Web Security

Malware and its types, Viruses ,Worms Spyware ,Trojan horse ,Logic Bombs ,Ransomware , Key loggers , Adware, Spyware

Cyber threats and its types : Denial of Service ,Man in the Middle ,Phishing ,SQL Injection , Password Attacks, cyber stalking etc.

Protection against Cyber threats, identity protection, proper usage of passwords, privacy, confidentiality of information, Anti Virus, firewall, reporting cybercrime.

10 Hours

UNIT - II

Electronic Mail , Instant Messaging and Collaboration

Basics of E-mail: What is an Electronic Mail, Mailbox: Inbox and Outbox, Creating and Sending a new E-mail, attachment , difference between Bcc & Cc , Forwarding an E-mail message, Replying an E mail Message, Sorting and Searching emails, Spam mail, Draft mail, trash,E-mail Filter .

Instant Messaging and Collaboration: Using Instant messaging, Instant messaging providers, Best Practices for Instant Messaging , Netiquettes;

Google forms: Creation , Sharing ,Setting ,Managing responses, Google sheets. 10 Hours

UNIT – III

E-Governance Services and Financial Literacy

Definition of e-Governance, Interactions in e-Governance: Government to Government, Government to Citizen, Government to Business, Government to Employee, Advantages of e-Governance, Various e-Governance Initiatives, Using various E-governance services like Dig locker, Aadhar,Parivahan,GEM etc

E-payment system, Types of e-payment system: UPI [Unified Payment Interface] ,AEPS [Aadhaar Enabled Payment System] ,USSD[Unstructured Supplementary Service Data] ,Card [Credit / Debit}, eWallet ,PoS [Point of Sale] , Internet Banking : National Electronic Fund Transfer (NEFT) ,Real Time Gross Settlement (RTGS) Immediate Payment Service (IMPS),Secured Online Payment methods. 10 Hours

Suggested Readings:

1. Roberta Bragg, Mark Rhodes-Ousley, Keith Strassberg, "Network Security: The Complete Reference", McGraw Hill Education.
2. E Balagurusamy, "Fundamentals of Computers", Tata McGraw Hill.
3. Behrouz A. Forouzan, "Data Communication and Networking", McGraw Hill Education.
4. P. Kumar, A.Tomar, and R. Sharmila, "Emerging Technologies in Computing: Theory, Practice, and Advances", 1st Edition, 2021.
5. Peter Norton, "Introduction to Computers", Tata McGraw Hill.
6. K. C. Laudon, & C.G. Traver, "E-commerce", MA: Pearson, 2013.

CA (Arts and Science) - SECOND SEMESTER

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

Course Title: Understanding e-Services
Course Code: USECAT204
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 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.

UNIVERSITY OF JAMMU

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

Academic Section
Email: academicsectionju14@gmail.com

NOTIFICATION
(23/July/Adp./57)

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

Subject	**Semester**	**For the examinations to be held in the year**
Computer Applications (B.A/B.Sc.)		
	Semester- III	Dec. 2023, 2024 and 2025
	Semester-IV	May 2024, 2025 and 2026

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

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/23/6297-6307
Dated: 11-7-2023

Copy for information and necessary action to:

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

Deputy Registrar (Academic)

10/7/23 10/7/23

B. A. / B. Sc. Honours
IN
COMPUTER APPLICATIONS

SYLLABUS

Four Year Undergraduate Programme

As per NEP 2020 guidelines

Under Choice based Credit System

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

Course Details for Four YearUG Programme

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

UNIVERSITY OF JAMMU, JAMMU

Syllabus of B.A/B.Sc. Honours in Computer Applications

(Four Year Undergraduate Programme)

For the students to be admitted in the year 2022-23, 2023-24 and 2024-25

The B.A/B.Sc. Honours programme in Computer Application is a four-year undergraduate programme based on Semester System and consists of **eight** semesters. The student will opt Major and Minor courses from the same discipline. For minor course, any subject other than major available in the college shall be chosen from within same discipline. However, Multidisciplinary foundation courses are to be chosen from the disciplines other than that of Major and Minor courses.

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	UMJCAT101	Computer Fundamentals and Office Tools	4(3L+1P)	15	60	10	15	100
2	Minor	UMICAT102	Computer Fundamentals and Office Tools	4(3L+1P)	15	60	10	15	100
3	MD	UMDCAT103	Understanding Computers	3	15	60	NA	NA	75
4	SEC	USECAT104	Office Tools	2	10	40	NA	NA	50

Semester – II

S. No.	Course Type	Course No.	Course Title	Credits	Marks				Total Marks
					Theory		Practical/Tutorial		
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJCAT201	Fundamentals of Internet	4(3L+1P)	15	60	10	15	100
2	Minor	UMICAT202	Fundamentals of Internet	4(3L+1P)	15	60	10	15	100
3	MD	UMDCAT203	Understandin g Internet	3	15	60	NA	NA	75
4	SEC	USECAT204	Understanding e-Services	2	10	40	NA	NA	50

SEMESTER – III

S. No.	Course Type	Course No.	Course Title	Credits	Marks				Total Marks
					Theory		Practical/Tutorial		
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJCAT301	C Programming	4(3L+1P)	15	60	10	15	100
2	Major	UMJCAT302	PC Assembly and Installations	4(3L+1P)	15	60	10	15	100
3	Minor	UMICAT303	PC Assembly and Installations	4(3L+1T)	15	60	10	15	100
4	MD	UMDCAT304	Understanding Computers	3	15	60	NA	NA	75
5	SEC	USECAT305	Cyber Security	2	10	40	NA	NA	50

Semester – IV

S. No.	Course Type	Course No.	Course Title	Credits	Marks				Total Marks
					Theory		Practical/Tutorial		
					Mid Semester	End Exam	Assessment	Exam	
1	Major	UMJCAT401	Data Structures using C	4(3L+1P)	15	60	10	15	100
2	Major	UMJCAT402	Operating System	4(3L+1T)	15	60	10	15	100
3	Major	UMJCAT403	Computer Networks	4(3L+1T)	15	60	10	15	100
4	Major	UMJCAT404	Mathematical Foundation of Computer Science	4(3L+1T)	15	60	10	15	100
5	Minor	UMICAT405	Computer Networks	4(3L+1T)	15	60	10	15	100

B. A. / B. Sc. Honours
IN
COMPUTER APPLICATIONS

Semester wise Course details

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

CA (Arts and Science) - THIRD SEMESTER

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

Course Title: C Programming
Course Code: UMJCAT301
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

Course objectives & learning outcomes:

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

UNIT – I

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.

CA (Arts and Science) - THIRD SEMESTER

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

Course Title: C Programming
Course Code: UMJCAT301
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

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Section A shall consists 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 consists 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.

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

10 marks

Final Examination

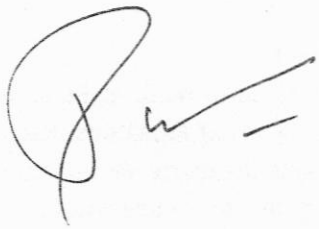
15 Marks

Pattern for external practical examination

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

Pattern for external tutorial examination

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



CA (Arts and Science) - THIRD SEMESTER

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

Course Title: PC Assembly and Installations
Course Code: UMJCAT302
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

Course objectives & learning outcomes:

1. To have basic knowledge of PC Assembly and Installation.
2. To learn about Computer Maintenance and system tools.
3. To gain knowledge of OSS and open source data recovery tools

Unit-1

Peripheral Devices: Input and output devices, UPS (Online/Offline).

PC Tools: Connectors, Types of connectors - DIN Connector, Centronic connector, RS-232 Connector, RCA Connector, e-SATA, RJ 45 Connector, Computer ports: Serial port and Parallel port, PS/2 Port, USB Port, VGA Port, HDMI Port, Power Connector, Ethernet/LAN Port, Motherboard, its components, Types of motherboard, SMPS, Types of SMPS, RAM, ROM and its types.
Controller cards: USB controller card, Graphics and Video controller card, Network controller card, TV Tuner controller card, Sound controller card
Display cards, Sound card, FAX/Modem cards, LAN cards, Ethernet cards.

15 Hours

Unit-2

Assembling the system: Major components of computer system and mandatory steps for assembling the computer system, POST, BIOS and its types, BIOS settings, Formatting /Partitioning of Hard disk, Operating system and its functions, Features of UNIX/ Windows, Installation of Operating system. 15 Hours

Unit-3

Computer Maintenance and system tools: Windows file repairing -System file checker(SFC) and Deployment image servicing and management (DISM), Disk Defragmentation, Disk Cleanup, ScanDisk, Open Source Software (OSS) and its features, use of some common Open Source Data Recovery tools : Recuva Disk Drill, Pandora Recovery, EaseUS Data Recovery, Restoration, Booting process ,Types of booting. 15 Hours

Unit-4

Control Panel: Control panel and its components, Adding and removing a printer, installing/uninstalling programs.
Using system restore features, Creating recovery disk, Antivirus and its features, installing/uninstalling Antivirus, Device manager and its features.
Creating Operating system image and installing OS from image file.
Modem and its types, installation of MODEM, setting up Broadband connection.

15 Hours

Suggested Readings/Refrences:

1. P.K. Sinha and Priti Sinha, " Computer Fundamentals", BPB Publications.
2. R.K. Taxali ,"PC Software for Windows Made Simple", Tata McGraw Hill.
3. Wikibooks contributors, "How to Assemble a Desktop PC", Platypus Global Media.
4. Jacob Beckerman," How to build a computer ,"A step by step guide", Kindle Edition.

CA (Arts and Science) - THIRD SEMESTER

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

Course Title: PC Assembly and Installations
Course Code: UMJCAT302
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

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(4 x 3 = 12 marks)

Section B shall consists 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.

Practicla/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	15Marks

Pattern for external tutorial examination

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

CA (Arts and Science) – THIRD SEMESTER

Course: Minor
Course Credits: 4(L-P-T)
(3-0-1)
Total marks: 100

Course Title: PC Assembly and Installations
Course Code: UMICAT303
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

Course objectives & learning outcomes:

1. To have basic knowledge of PC Assembly and Installation.
2. To learn about Computer Maintenance and system tools.
3. To gain knowledge of OSS and open source data recovery tools

Unit-1

Peripheral Devices: Input and output devices, UPS (Online/Offline).

PC Tools: Connectors, Types of connectors - DIN Connector, Centronic connector, RS-232 Connector, RCA Connector, e-SATA, RJ 45 Connector, Computer ports: Serial port and Parallel port, PS/2 Port, USB Port, VGA Port, HDMI Port, Power Connector, Ethernet/LAN Port, Motherboard, its components, Types of motherboards, SMPS, Types of SMPS, RAM, ROM and its types.

Controller cards: USB controller card, Graphics and Video controller card, Network controller card, TV Tuner controller card Sound controller card.

Display cards, Sound card, FAX/Modem cards, LAN cards, Ethernet cards. 15 Hours

Unit-2

Assembling the system: Major components of computer system and mandatory steps for assembling the computer system, POST, BIOS and its types, BIOS settings, Formatting /Partitioning of Hard disk, Operating system and its functions, Features of UNIX/ Windows, Installation of Operating system. 15 Hours

Unit-3

Computer Maintenance and system tools: Windows file repairing -System file checker (SFC) and Deployment image servicing and management (DISM), Disk Defragmentation, Disk Cleanup, ScanDisk, Open Source Software (OSS) and its features, use of some common Open Source Data Recovery tools : Recuva Disk Drill, Pandora Recovery, EaseUS Data Recovery, Restoration, Booting process ,Types of booting. 15 Hours

Unit-4

Control Panel: Control panel and its components, Adding and removing a printer, installing/uninstalling programs.

Using system restore features, Creating recovery disk, Antivirus and its features, installing/uninstalling Antivirus, Device manager and its features.

Creating Operating system image and installing OS from image file .

Modem and its types, installation of MODEM, setting up Broadband connection. 15 Hours

Suggested Readings/Refrences:

P.K. Sinha and Priti Sinha, " Computer Fundamentals", BPB Publications.
R.K. Taxali ,"PC Software for Windows Made Simple", Tata McGraw Hill.
Wikibooks contributors, "How to Assemble a Desktop PC", Platypus Global Media.
Jacob Beckerman," How to build a computer ,"A step by step guide", Kindle Edition

CA (Arts and Science) - THIRD SEMESTER

Course: Minor
Course Credits: 4(L-P-T)
(3-0-1)
Total marks: 100

Course Title: PC Assembly and Installation
Course Code: UMICAT303
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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(4 x 3 = 12 marks)

Section B shall consists 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.

Practiclal/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	15Marks

Pattern for external tutorial examination

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

CA (Arts and Science) - THIRD SEMESTER

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

Course Title: Understanding Computers
Course Code: UMDCAT304
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration

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

Course objectives & learning outcomes:

1. To learn the basics 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, Generations of Computer, Digital, Analog, Hybrid Computer, Computer Memory and its Types, Primary memory (RAM, ROM,PROM,EEPROM), Storage Units(Bit,Byte,KB,MB, GB,TB), Secondary Storage Devices: Hard Disks, Optical Disks, Compact Disks, Zip Drive, Flash Drives, Input Devices (Keyboard, Mouse, Joystick, Scanner), 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: Advantages and Disadvantages of Computer Languages), Translators: Interpreter, Compiler, Linker, Loader, Computer Viruses (Trojan, Malware, Spyware etc.), Antivirus Software. 10 Hours

UNIT – III

Anatomy of Window: Title Bar, Menu Bar, Tool Bar, Scroll Bars, Document Area, and Status Bar.
Desktop Elements: Icons, My Computer, Recycle Bin, Taskbar, My Documents, Anatomy of Window: Title Bar, Menu Bar, Tool Bar, Scroll Bars, Document Area, and Status Bar.
Control panel ,DiskDefragmentation, DOS,Evolution of DOS,Internal Commands : CLS, Ver, COPY, Volume, Date, Time, MD, CD, RD, Copy, Del, Ren, Move, Path External Commands : CHKDSK,FORMAT,Xcopy,Attrib, Defrag etc.
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. r's Complement and r-1' Complement, Data Representation. 10 Hours

Suggested readings/ references:

1. P.K Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications.
2. Alexix Leon, Mathewes Leon, "Fundamentals of Information Technology",Leon Press.
3. Suresh K. Basandra, "Computer Systems Today", Galgotia Publications.
4. V. Rajaraman, "Fundamentals of Computers", PHI Learning Pvt. Ltd.
5. Peter Nortan, "Introduction to Computers", Tata Mcgraw Hill.
6. Joyce Coax , Joan Preppernau,,Steve Lambert and Curtis Frye, "Microsoft Office System step by step", Microsoft Press, 2007.
7. R.K. Taxali, "PC Software for Windows", McGraw Hill.

CA (Arts and Science) - THIRD SEMESTER

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

Course Title: Understanding Computers.
Course Code: UMDCAT304
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration

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

NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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

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

Section B shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.
(4 x 12 = 48 marks)
Note: -The paper setter shall ensure that the questions are uniformly distributed over entire syllabus.

CA (Arts and Science) - THIRD SEMESTER

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

Course Title: Cyber Security
Course Code: USECAT305
Mid Semester assessment: 10 Marks of 1.5 hours duration
End Semester assessment: 40 Marks of 2.5 hours duration

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

Course objectives & learning outcomes:

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

UNIT-I

Cyber Crime and its types, Cyber security, Components of Cyber Security, Need of data privacy and security, Computer Security Concepts (Confidentiality, Integrity and Authentication).
Security Threats/Attacks - DoS, DDoS, Spoofing, virus, worms, Trojans, Backdoor, phishing, and spam, Vulnerabilities – Network, Operating System, Process, Human. Protection from cyber-attacks. 10 Hours

UNIT - II

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

UNIT – III

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

10 Hours

Suggested Readings:

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

Network Security: Private communication in a Private world – C. Kaufman, R. Perlman, M. Speciner, Pearson

CA (Arts and Science) - THIRD SEMESTER

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

Course Title: Cyber Security
Course Code: USECAT305
Mid Semester assessment: 10 Marks of 1.5 hours duration
End Semester assessment: 40 Marks of 2.5 hours duration

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

NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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

Section A shall consists Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of $2\ ^1/_2$ Marks.

($4 \times 2\ ^1/_2 = 10$ marks)

Section B shall consists Eight (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.
($3 \times 10 = 30$ marks)

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

CA (Arts and Science) - FOURTH SEMESTER

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

Course Title: Data Structure using C
Course Code: UMJCAT401
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

Course objectives & learning outcomes:

1. To learn the fundamentals of data structures.
2. To learn the programming skills.
3. To gain knowledge of software development.

Unit-1

Arrays (1D and 2D) – Declaration and Initialization. Pointers - Accessing array through pointers
Structures - Declaring, Initializing and Accessing a Structure, Array of structures, Passing Structures to functions, Accessing structure through pointers, Self Referential Structures.
Union – Initialization and Accessing members of a Union. 15 Hours

Unit-2

Introduction to Data Structures, Classification of Data Structures, Advantages and Applications of data structures, Data Structure Operations (Traversing, Inserting, deleting, Searching, Sorting). Implementation of data structure operations on array, Dynamic memory allocation (malloc(), calloc(), realloc()), Garbage Collection, Time and Space Complexity of algorithms. 15 Hours

Unit-3

Searching – Linear Search, Binary Search.
Sorting Techniques - Bubble Sort, Insertion Sort, Selection Sort.
Stacks: Introduction, Implementation of stacks, Operations on Stack (PUSH, POP).
Queues: Introduction, Implementation, Operations on Queue(Insert and Delete).
Concept of Overflow and Underflow. 15 Hours

Unit-4

Linked Lists – Definition, Types of link list (Single, Double, Circular), Representation of link list in memory, Advantages and Disadvantages of link list, Implementing a single link list, Traversing a single link list, Searching a single link list, Insertion into a single link list, Deletion from a single link list, Applications of link list.
15 Hours

Suggested Readings:

1. G. A. V. Pai, "Data Structures and Algorithms: Concepts, Techniques and Applications", Tata McGraw-Hill, July 2017.
2. Vishal Goyal, "A Simplified Approach to Data Structures", Shroff Publishers Pvt. Ltd, 2014.
3. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, "Fundamentals of Data Structures in C", Universities Press, 2nd Edition 2008.
4. J. P. Tremblay and P. G. Sorenson, "Introduction to Data Structures with Applications", TMH, 2007.
5. Seymour Lipschutz, "Theory and Problems of Data Structures", Sehaum's Outline Series in Computers Tata McGraw-Hill, 2006.
6. M. Tannenbaumand M.J. Augenstein and Y. Langsam, "Data Structures with C", PHI, 2006.

CA (Arts and Science) - FOURTH SEMESTER

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

Course Title: Data Structure using C
Course Code: UMJCAT401
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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Section A shall consists 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 consists Eight (8) long answer questions having two questions from each unit. The students are requiredto 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

Pattern for external practical examination

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

Pattern for external tutorial examination

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

CA (Arts and Science) - FOURTH SEMESTER

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

Course Title: Operating System
Course Code: UMJCAT402
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

Course objectives & learning outcomes:

1. To have a basic understanding of the features of an Operating System.
2. To understand the services provided by the OS to users, processes and other systems.
3. To learn to work on an open-source Operating System through command mode.

UNIT-I

Operating system Definition, Generation of Operating System, Types of Operating System, Services of Operating System, OS structure: Layered, Monolithic, Microkernel. Concept of System Calls, System Programs and System Boot, Concept of Virtual Machine. 15 Hours

UNIT-II

Process Management: Definition, Process states, Process state transitions, Process control block.

Process scheduling: Definition, Scheduling objectives, Types of Schedulers, Scheduling Criteria: CPU utilization, Throughput, Turnaround time, Waiting time, Response time, Scheduling algorithms: Preemptive and Non-preemptive, FCFS, SJF, RR. 15 Hours

UNIT-III

Deadlock: Definition, Characteristics, Concept of Deadlock Prevention, Avoidance, Detection and Recovery.

Memory Management: Contiguous Memory Allocation-Fixed and variable partition, Fragmentation, Paging. Demand Paging, Replacement policies: First In First Out (FIFO), Not Recently Used (NRU) and Least Recently Used (LRU), Optimal (OPT) 15 Hours

UNIT-IV

File concept: File Structure, File types, File Access Mechanism, Allocation Methods (contiguous, linked, indexed)

Linux/Unix Environment, The Login Prompt, General Features of Linux/Unix commands, command structure. Understanding of some basic commands such as cd, cp, mv, rm, mkdir, more, less, cat, grep, find, cut, wc, echo, ls, kill, ps, sort, who, date, passwd, cal, sleep etc.Combining commands, redirections, pipes, filters, Linux/Unix administrator. Root login, Super user login: su command. 15 Hours

Suggested Readings:

1. Abraham Silberschartz,Peter Baer Galvin and Greg Gagne, "Operating system Principles", WSE Wiley,2006.
2. Andrew. S. Tanenbaum and Herbert Bos, "Modern Operating Systems",Pearson Prentice Hall,2015.
3. Harvey M. Deitel, "An Introduction to Operating System",Addison-Wesley publications, 1984.
4. William Stallings,"Operating Systems Internals and Design Principles",Pearson Education. 5th Edition,2005.
5. Milenkovic M,"Operating system-concepts and design". McGraw Hill.

CA (Arts and Science) - FOURTH SEMESTER

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

Course Title: Operating System
Course Code: UMJCAT402
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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(4 x 12 = 48 marks)

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	15Marks

Pattern for external tutorial examination

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

CA (Arts and Science)–FOURTH SEMESTER

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

Course Title: Computer Networks
Course Code: UMJCAT403
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

Course objectives & learning outcomes:

1. To learn the fundamentals of Internet.
2. To understand basic web fundamentals.
3. To gain knowledge on network protocols and their applications.
4. To brief the students about various network devices and network security.

UNIT I:

FUNDAMENTALS OF COMMUNICATION AND NETWORK TOPOLOGIES

Basics of Communication: Analog and Digital, Data and Signal, Point to Point and Multi-Point Connections, Network Topologies, Transmission Modes, Inter-networking, LAN Technologies and Protocols, Modulation and its type, Overview of switching techniques

UNIT II:

IP ADDRESSES AND PROTOCOLS

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

UNIT III

NETWORK PROTOCOLS AND SECURITY

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

UNIT IV

INTRODUCTION TO SCRIPTING LANGUAGES

Server-side and Client-side Scripting Languages Concepts, Introduction to JavaScript, Data Types, Variables, Conditional and Loop Control Statements, Functions, String Manipulation, Mathematical Functions

Suggested Readings:

1. Andrew.S. Tannenbaum, "Computer Networks", Pearson.
2. Williams Stallings, "Data and Computer Communication", Pearson.
3. Forouzan, "Data Communication and Networking", McGraw Hill Professional Publication.
4. Douglas E. Comer, "The Internet Book", Prentice Hall.

CA (Arts and Science)–FOURTH SEMESTER

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

Course Title: Computer Networks
Course Code: UMJCAT403
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

NOTE FOR PAPER SETTERS FOR EXAMINATIONS -

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(4 x 12 = 48 marks)

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	15Marks

Pattern for external tutorial examination

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

CA (Arts and Science) - FOURTH SEMESTER

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

Course Title: Mathematical Foundation of Computer Science
Course Code: UMJCAT404
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

Course objectives & learning outcomes:

1. To learn the basics of mathematics.
2. To understand and develop the sense of logic.
3. To gain knowledge of probability.

Unit-1

Mathematical Logic: Propositional Logic – Proposition, Connectives, Well formed formulas, Truth Tables, Tautology, Converse, Inverse and Contrapositive, Logical Equivalence, Implication, Normal forms.

Predicate Logic – Statement Functions, Variables and Quantifiers (Universal and Existential), Free and Bound variables, Inference Theory for Predicate Calculus.

Unit-2

Set Theory – Definition of Set, Representation of set (Roaster method, Set builder notation), Properties of set, Types of set (Empty set, Finite set, Equivalent set, Subset, Universal set, Superset, Infinite set, Equal sets, Disjoint sets, Power set, Singleton set), Basic Set Operations (Union, Intersection, Difference and Complement), Venn diagrams to represent union, intersection and complement, De Morgan's Law, Applications of set theory.

Unit-3

Relations: Definition, Domain and range of a relation, Properties of Relations, Matrix representation of relations, Closure of relations, Equivalence relations, Types of Relations (Empty, Universal, Identity, Inverse, Reflexive, Symmetric, Transitive), Operations on Relations, Binary Relations.

Functions – Definition, Representation of functions, Properties of functions, Types of functions (One-to-One function, Many to one function, Onto function, One-One correspondence function), Inverse function.

Unit-4

Probability – Definition of probability, Experiment, Sample Space, Favorable Outcome, Trial, Random variable, Random experiment, Events and its types (Independent, Disjoint), Equally Likely Events, Exhaustive Events, Mutually Exclusive Events, Probability of an event, Conditional Probability, Probability Formula, Coin Toss probability (Tossing a coin, Tossing two coins, Tossing three coins), Dice Roll Probability(Rolling one dice, Rolling two dice), Properties of Probability, Applications of probability in real life.

Suggested Readings:

1. Pure mathematics for beginners, Steve Warner
2. Donald F. Stanat and David F. McAllister, Discrete mathematics in Computer Science.
3. Sheldon M. Ross, Introduction to Probability Models, Elsevier.
4. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
5. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rdEdition, Tata McGraw Hill

CA (Arts and Science) - FOURTH SEMESTER

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

Course Title: Mathematical Foundation of Computer Science
Course Code: UMJCAT404
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

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(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	15Marks

Pattern for external tutorial examination

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

CA (Arts and Science)–FOURTH SEMESTER

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

Course Title: Computer Networks
Course Code: UMICAT405
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

Course objectives & learning outcomes:

1 To learn the fundamentals of Internet.
2 To understand basic web fundamentals.
3 To gain knowledge on network protocols and their applications.

UNIT I

FUNDAMENTALS OF COMMUNICATION AND NETWORK TOPOLOGIES

Basics of Communication: Analog and Digital, Data and Signal, Point to Point and Multi-Point Connections, Network Topologies, Transmission Modes, Inter-networking, LAN Technologies and Protocols, Modulation and its type, Overview of switching techniques

UNIT II

IP ADDRESSES AND PROTOCOLS

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

UNIT III

NETWORK PROTOCOLS AND SECURITY

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

UNIT IV

INTRODUCTION TO SCRIPTING LANGUAGES

Server-side and Client-side Scripting Languages Concepts, Introduction to JavaScript, Data Types, Variables, Conditional and Loop Control Statements, Functions, String Manipulation, Mathematical Functions

Suggested Readings:

5. Andrew.S. Tannenbaum, "Computer Networks", Pearson.
6. Williams Stallings, "Data and Computer Communication", Pearson.
7. Forouzan, "Data Communication and Networking", McGraw Hill Professional Publication.
8. Douglas E. Comer, "The Internet Book", Prentice Hall.

CA (Arts and Science)–FOURTH SEMESTER

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

Course Title: Computer Networks
Course Code: UMICAT405
Mid Semester assessment: 15 Marks of 1.5 hours duration
End Semester assessment: 60 Marks of 3.0 hours duration
Practical: 25 Marks

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

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(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	15Marks

Pattern for external tutorial examination

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