

BIKANER TECHNICAL UNIVERSITY, BIKANER



PROGRAMME SCHEME & SYLLABUS

Integrated MCA Syllabus 2024-25

I & II Semester

Bikaner Technical University, Bikaner

Integrated MCA Syllabus 2024-25

Note - Admission rules and other conditions to the course will be as per Government / University policy declared for undergraduate/postgraduate programs from time to time.

FIRST YEAR													
	Serial Number, Code & Nomenclature of Paper			Teaching Hrs/ Week				Distribution of Marks			Min. Pass Marks (%)		
Year/Semester	SubjectCode	CourseType	Nomenclature	L	T	P	C	InternalAssessment	SemesterAssessment	TotalMarks	InternalAssessment	SemesterAssessment	
I Year I Semester	IMCA-101	DCC	Introduction to Computer Organization	3			3	30	70	100	36%	36%	
	IMCA-102	DCC	Web Designing	3			3	30	70	100	36%	36%	
	IMCA-103	DCC	Programming with C Language	3			3	30	70	100	36%	36%	
	IMCA-104	DCC	Basic Mathematics for IT	3			3	30	70	100	36%	36%	
	IMCA-105	DCC	Office Application Lab			2	2	30	70	100	36%	36%	
	IMCA-106	DCC	Computer Organization Lab			2	2	30	70	100	36%	36%	
	IMCA-107	DCC	Web Designing Lab			2	2	30	70	100	36%	36%	
	IMCA-108	SEC	Communication Skills Lab			2	2	30	70	100	36% NonCGPA S/NS*		

I Year II Semester	IMCA-201	DCC	Data Structure	3			3	30	70	100	36%	36%
	IMCA-202	DCC	Python Programming	3			3	30	70	100	36%	36%
	IMCA-203	DCC	Object-oriented Programming with C++	3			3	30	70	100	36%	36%
	IMCA-204	DCC	Operating System	3			3	30	70	100	36%	36%
	IMCA-205	DCC	Python Programming Lab			2	2	30	70	100	36%	36%
	IMCA-206	DCC	Object-oriented Programming with C++ Lab			2	2	30	70	100	36%	36%
	IMCA-207	DCC	Data Structures Lab			2	2	30	70	100	36%	36%
	IMCA-208	AECC	Environmental Studies			2	2	30	70	100	36% Non CGPA S/NS*	

Note – 1 Practical Lab = 2 hours

AECC subject is Compulsory for all candidates. The passing mark will be 36%. Its marking will be S/NS* = Satisfactory or Unsatisfactory. It is a Non-CGPA Subject.

** A candidate shall be required to obtain 36% marks to pass in theory, practical, and internals separately.

- For Internal Evaluation of 30 Marks overall (no bifurcation into theory and practical)-please decide on criteria (Suggestive: 10 Marks for theory paper, 05 Marks for practical paper, 05 Marks for assignment/ seminar, and 10 Marks for Logical thinking/application of knowledge and skills)
- Each practical exam is to be conducted by two examiners one External and one Internal. The external examiner should be a senior lecturer from the jurisdiction of BTU, Bikaner. External Examiner will prepare question paper for Practical Examination. Students have to perform exercises on the computer. Exercise must be written in answer books in proper documentation.
- Bifurcation of 70 marks for Practical paper will be as follows- 3 practical questions: 30 marks, each Lab File: 10 marks, viva voce: 30 marks

Scheme of end-of-semester examination:

The Integrated MCA is a full-time program. The program will have core courses, core electives, skill development, and elective open papers, dissertation/project/training/review/clinical project/internship/case study, and a combined practical paper based on theory papers each semester.

The dissertation/project/training/review/clinical project/internship/case study will be evaluated by an external examiner.

1. English shall be the medium of instruction and examination.
2. There will be a semester-end examination. The semester-end examinations, evaluation, publication of results, award of marks statements, and award of Degrees shall be undertaken by BTU, Bikaner.
3. Any student who fails to participate in classes, viva voce, or practical work will be debarred from appearing in the end-semester examination.
4. The duration of the written examination for each paper shall be three hours and the practical examination shall be for one-day duration.
5. The minimum attendance required by a candidate will be as per the University rules.
6. With regards to the Dissertation/project/training/review/clinical project/internship/case study, the scheme of evaluation shall be that the candidate has to submit a report/thesis/dissertation/case study in a spiral/bound form min three copies which would be evaluated by an external examiner. Total marks for project/case studies/training/dissertation/internship shall be _
7. Award of degree, grading, scope for improvement/appeal – as per Bikaner Technical University rules and regulations/ordinances (CBCS/Semester). Pass Criteria
8. For passing in each theory examination, a candidate is required to obtain 36% marks in all theory papers and 36% marks separately in the practical examination and internal and dissertation.

Pattern of Examination

A course will contain 5 units. The question paper shall contain three sections. Section A (10 marks) shall contain 10 questions two from each Unit. Each question shall be of 1 mark. All the questions are compulsory. The answers should not exceed 50 words.

Section B (25 marks) shall contain 5 questions (two from each unit with internal choice). Each question shall be of 5 marks. The candidate is required to answer all 5 questions. The answers should not exceed 200 words.

Section C (30 marks) shall contain 5 questions, one from each unit. Each question shall be of 10 marks. The candidate is required to answer any three questions by selecting these three questions from different units. The answers should not exceed 500 words.

Model Paper for 70 marks Theory Paper

Integrated MCA

Semester I

Duration: 3 Hours Maximum Marks: 70

Exam- 2024-25

Instructions: The question paper shall contain three sections. Section A (10 marks) shall contain 10 questions two from each Unit. Each question shall be of 1 mark. All the questions are compulsory. The answers should not exceed 50 words. Section B (30 marks) shall contain 5 questions (two from each unit with internal choice). Each question shall be of 6 marks. The candidate is required to answer all 5 questions. The answers should not exceed 200 words. Section C (30 marks) shall contain 5 questions, one from each Unit. Each question shall be of 10 marks. The candidate is required to answer any three questions by selecting these three questions from different units. The answers should not exceed 500 words.

Section – A

[1 x 10 =10]

1. (a) from unit 1
- (b)from unit 1
- (c)from unit 2
- (d)from unit 2.....
- (e)from unit 3.....
- (f)from unit 3.....
- (g)from unit 4.....
- (h)from unit 4.....
- (i)from unit 5.....
- (j)from unit 5.....

Section – B

[6 x 5=30]

2.from unit 1..... or

3.....from unit 1.....

4.from unit 2.....

or

5.....from unit 2.....

6.....from unit 3.....

or

7.....from unit 3.....

8.....from unit 4.....

or

9.....from unit 4.....

10.....from unit 5.....

or

11.....from unit 5.....

Part - C

[10 x 3=30]

12.from unit 1.....

13.from unit 2.....

14.....from unit 3.....

15.from unit 4.....

16.from unit 5.....

FIRST YEAR												
	SerialNumber, Code & Nomenclature of Paper			TeachingHrs/ Week				Distribution of Marks			Min.PassMarks (%)	
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	IMCA-106	DCC	Office application Lab			2	2	30	70	100	36%	36%
	IMCA-107	DCC	Web Designing Lab			2	2	30	70	100	36%	36%
	IMCA-108	SEC	Communication Skills Lab			2	2	30	70	100	36% NonCGPA S/NS*	

IMCA-101 Introduction to Computer Organization

Unit I

Components of Computer Systems, Concepts of Hardware and Software, Concept of Computing, Data and Information, What is an Operating System, Basics of Popular Operating Systems, The User Interface, Operating System Simple Setting, File and Directory Management, Common Utilities, Basic of Computer Networks, Internet, World Wide Web (WWW), Web Browsing Software, Search Engines, Understanding URLs, Surfing the Web. Basics of Electronic Mail, Using Emails, Document Collaboration, Instant Messaging.

Unit II

Computer Organization: Evolution of Computers, Von Neumann Architecture, Digital Computers - Logic Gates - Boolean Algebra - Map Simplification - Product - of - Sums Simplification - Don't - Care Conditions - Combinatorial Blocks : Gates, Half Adder, Full Adder, Multiplexers, Decoders, Encoders; Sequential Building blocks : Flip Flops, Registers, Counters, Information representation: codes, fixed and floating point representation

Unit III

Architecture of a Simple Processor: Architecture of 8086/8088 microprocessor, instruction set, Addressing Modes. Instruction: Microinstructions: Register Transfer, Arithmetic, Logical and Shift, Types of Instructions, Instruction Cycle. Interrupt: Types, Interrupt Cycle I/O organization: Strobe based and Handshake based communication, DMA based data transfer;

Unit IV

Memory System: Memory Hierarchy, Semiconductor Memories, RAM(Random Access Memory), Read Only Memory (ROM), Types of ROM, Cache Memory, Performance considerations, Virtual memory, Paging, Secondary Storage, RAID. I/O interface, Programmed IO, Memory Mapped IO, Interrupt Driven IO, DMA.

Unit V

System Maintenance: Introduction to various physical components of a computer, Physical Inspection and Diagnostics on PC, Functional description of various Internal and External cards; Viruses: Types of Computer Viruses, Detection, prevention and protection from Viruses.

Reference Books:

1. M. Moris Mano (2006), Computer System Architecture, 3rd edition, Pearson/PHI, India.
2. Carl Hamacher, ZvonksVranesic, SafeaZaky (2002),
3. Computer Organization, 5th edition, McGraw Hill, New Delhi, India.
4. William Stallings (2010), Computer Organization and Architecture- designing for performance, 8th edition, Prentice Hall, New Jersey.
5. Anrew S. Tanenbaum (2006), Structured Computer Organization, 5th edition, Pearson Education Inc, 4. John P. Hayes (1998),
6. Computer Architecture and Organization, 3rd edition, Tata McGrawHill

IMCA-102 Web Designing

UNIT-I

Internet Basics: Introduction to Internet, History of Internet, Internet Working, Modes of Connecting to Internet, Internet Service Providers (ISPs), Differentiate between Internet, Intranet and Extranet.

World Wide Web: Introduction to www, Miscellaneous Web Browser details, searching www: Search engines and meta search engines, search fundamentals, search strategies, working of search engines, Telnet, FTP, HTTP, Introduction to Web Browsers.

Introduction to Domain Names, Domain Name Servers and DNS Lookup Process, ICANN and domain registration.

Web Hosting Fundamentals: Introduction to Web Hosting, Different Hosting Packages, Domain Registration, Configuring Name Servers, Navigating Control Panels, Setting Up Email Accounts in cPanel, Utilizing FTP Clients, Website Maintenance

UNIT-II

Introduction to HTML: Overview of HTML, History of HTML, HTML Editors, HTML Document Structure, DOCTYPE declaration, Anatomy of an HTML Tag, HTML Elements-Nested HTML Elements, Empty HTML Elements, HTML Attributes, HTML Character & Symbol Entities, Comments Tags;

Text Formatting: Headings, Paragraphs, Line Breaks, Emphasis (Bold, Italics), Quotations, Citations, Preformatted text, Colors and Styles; Links: Anchor tags, Absolute and Relative URLs, Link attributes;

Images: Images and Image Mapping, Image attributes; **Lists:** Ordered and Unordered Lists, Definition Lists, Nesting lists, List attributes; **Tables:** Table structure, Table tags, Table attributes, HTML Layout Elements and Techniques; **Forms and IFrame:** Form tags, Input types, Form attributes, Form validation, embedding content with IFrame; HTML Graphics; HTML Media: Audio and Video tags, Embedding media, Media attributes, Controls, Accessibility;

Updates in HTML5. Meta tags and Open Graph Tags. Introduction to Onsite SEO – Optimizing keywords, page performance metrics, internal/external links, markup standards, URL structure, device responsiveness.

UNIT-III

Introduction to CSS: What is CSS, Importance of CSS, How CSS works, Inline CSS, Internal CSS, External CSS, CSS Color, Font, Sizes, CSS Border, CSS Padding, CSS Margins, Block Level Elements and Inline Elements, Class, ID, DIV, SPAN, Gradients, animations, transitions. CSS3 and new features: CSS Variables and Various measurement units. Flexbox, Media Queries. Building responsive and personalized user experiences through CSS. Optimizing CSS rendering. Introduction to CSS Sprites. Introduction to CSS Frameworks and Component Libraries, Comparison between Bootstrap and Tailwind. Introduction to SCSS

UNIT-IV

JavaScript Essentials: Overview of Client-Side Scripting and JavaScript, Basics of JavaScript including Comments, Variables, and Global Variables. Data Types, Operators, and Conditional Statements (If, If Else, Switch). JavaScript Loops: For Loop, While Loop, Do While Loop. JavaScript Interactions: Popup Boxes (Alert, Prompt, Confirm), Events, Arrays, and Objects. The JavaScript Object Model, Form Development and Validation, Managing Cookies, and JavaScript Security. Frame Management in JavaScript. JavaScript APIs: Utilizing Web Storage, Geolocation, and Web SQL Databases.

UNIT-V

Introduction to API First Development: HTTP Headers & Methods, Introduction to RESTful Framework, Examples of public RESTful APIs. Sending queries to RESTful APIs through Browser Developer Tools and third-party tools (such as Postman). Overview of Microservices architecture.

Asynchronous execution in JavaScript: Introduction to promises and workers, async-await, service workers, cache. Reading data from server through JavaScript asynchronous methods – XMLHttpRequest and Fetch.

Introduction to Ajax: Introduction, advantages & disadvantages, Purpose of it, ajax based web application, alternatives of AJAX

Java Script & AJAX: Introduction to array-operators, making statements-date & time-mathematics strings-Event handling-form properties. AJAX. Introduction to jQuery. to modern frontend JS frameworks, Comparison between ReactJS and AngularJS.

Reference Books:

- 1.HTML, DHTML, JavaScript, Perl, CGI, Ivan Bayross, BPB Publication.
- 2.HTML Complete Reference, BPB Publication.
3. Ajax: The Definitive Guide, O'Reilly, Anthony T. Holdener III
- 4.Internet for everyone, Alexis Leon and Mathew Leon, Leon Tech world.
5. Fundamentals of the Internet and the World Wide Web, Raymond Greenlaw and Ellen Hepp – 2001, TMH
6. Internet & World Wide Programming, Deitel,Deitel & Nieto, 2000, Pearson Education

IMCA-103 Programming with C Language

Unit-I Logic Development: Data Representation, Flowcharts, Problem Analysis, Decision Trees/Tables, Pseudo code and algorithms. Fundamentals: Character set, Identifiers and Key Words, Data types, Constants, Variables, Expressions, Statements, Symbolic Constants. Operations and Expressions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators, Library functions.

Unit-II Data Input and Output: formatted & unformatted input output. Control Statements: While, Do-while and For statements, Nested loops, If-else, Switch, Break – Continue statements.

Unit-III Functions: Brief overview, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion. Arrays: Defining, processing arrays, passing arrays to a function, multi- dimensional arrays. Strings: String declaration, string functions and string manipulation Program Structure Storage Class: Automatic, external and static variables.

Unit-IV Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, unions.

Unit-V Pointers: Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialization of Pointer Variables, Accessing a Variable through its Pointer, Pointers and Arrays File Handling: File Operations, Processing a Data File

Reference Books:

1. Programming in ANSI C, E. Balagurusami, Fourth Edition, Tata McGraw Hill.
2. Programming in C, Third Edition, Stephen G Kochan, Pearson.
3. The C Programming Language, Kernighan & Richie, Second Edition, PHI Publication.
4. Let us C, Yashvant P Kanetkar, Seventh Edition, BPB Publications, New Delhi
5. Programming in C, Byron S. Gottfried, Second Edition, McGraw Hills.
6. Problem Solving and Programming in C, R.S. Salaria, Second Edition

IMCA-104 Basic Mathematics for IT

Unit I

Sets : Definition of sets, representation of sets, type of sets. Operations on sets, Sub sets, Power set, Universal set, Complement of a set, Union and Intersection of two sets. Venndiagrams, Principles of Inclusion and Exclusion.

Unit II

Relations : Cartesian product of sets, Definition of relation. Types of relation – reflexive, symmetric anti-symmetric, transitive, equivalence. Functions :

Definition, Domain & Range of a functions, one to one and onto functions. Bijective functions, composite functions, inverse of functions. Type of functions – constant, identity, polynomial and logarithmic

Unit III

Matrices : Definition and Types of Matrices, Addition, Subtraction and Multiplication of Matrices, Non-commutativity of multiplication of matrices, Scalar Multiplication, Transpose of a Matrix. Determinant : Determinant of a square matrix (up to 3 x 3 matrices), properties of determinants, minors, cofactors, expansion of determinant, application of determinants in finding the area of a triangle. Adjoint and Inverse of a matrix, Solution of system of linear equations by inverse matrix method and Cramer's Rule.

Unit IV

Analytical Geometry: Distance formulae, section formulae, shifting of origin. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axes, point slope form, slope-intercept form, two-point form, intercepts form and normal form. General equation of a line. Equation of family of lines passing through the point of intersection of two lines. Distance of a point from a line.

Unit V

Statistics : Data collection methods, Data classification, Frequency Distribution, Graphical representation of frequency distribution. Measures of Central Tendency – Mean Median, Mode, Measures of Dispersion – Mean Deviations, Standard Deviations, Variance and Skewness.

Reference Books:

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
2. S.K. Sarkar, "Discrete Maths"; S. Chand & Co., 2000
3. Basic Statistics ,B.L.Agarwal, New Age International (P) Limited.

IMCA-105 PROGRAMMING IN C – LAB

I/O Statements Entering input data, writing output data, gets and puts functions – operators – expressions.

Control Statements Implementation of programs using control statements.

Functions and Arrays Accessing a function – passing arguments to a function – recursive function. Processing an array – passing arrays to a function. – processing of strings.

Structure and File Handling Accessing a structure – processing using structure – Opening and closing a data file – creating a data file – processing a data file – unformatted data files.

At least 4 programs must be given as lab exercise from topic 1 to topic 4.

IMCA-106 Office Application Lab

List of Assignments (Word Processing)

1. Create a news-paper document with at least 200 words, a. Use margins as, top:1.5, bottom:2, left:2, right:1 inches. b. Use heading “Gandhi Jayanti”, font size: 16, font color: red, font face: Arial Black. c. With first letter “dropped” (use drop cap option) of the first paragraph containing a picture at the right side d. Use three columns from the second paragraph onwards till the half of the page. e. Then use heading “Computer basics” f. Create paragraph using two columns till the end of the page.
2. Create a flowchart using, a. Proper shapes like ellipse, arrows, rectangle, and parallelogram. b. Use grouping to group all the parts of the flowchart into one single object.
3. Create a table using table menu with, a. At least 5 columns and 10 rows. b. Merge the first row into one cell. c. Merge the second row into one cell, then split the second row into three cells. d. Use proper table border and color. e. Insert proper content into the table with proper text formatting.
4. Create two letters with the following conditions in Ms Word and find the difference. a. Write a personal letter to your friend using at least 100 words and two paragraphs. The date must be in top-right corner. Use „justify“ textalignment and 1.5 line spacing for the body of the letter. Letter must contain proper salutation and closing. Use step by step mail-merge wizard to design a letter. (Mailing select start from a template letters step mail merge wizard OK) create new document select proper template letters template
5. Create a letter, which must be sent to multiple recipients. a. Use Mail-Merge to create the recipient list. Total Period 60 Examination 3hr Lab. periods 4P/Week Term Work 25 Maximum Marks 50 End Semester Examination 25 23 b. Use excel sheet to enter the recipient. c. Start the mail merge using letter and directory format. State the difference.

List of Assignments (Spreadsheet)

1. Create a table “Student result” with following conditions. a. The heading must contain, Sl. No., Name, Mark1, Mark2, Mark3, Total, average and result with manual entry. b. Use formulas for total and average. c. Find the name of the students who has secured the highest and lowest marks. d. Round the average to the nearest highest integer and lowest integer (use ceiling and floor function respectively).
2. Do as directed a. Create a notepad file as per the following fields Slno name th1 th2 th3 th4 th5 total % grade from text“ option. b. Import this notepad file into excel sheet using „data c. Grade is calculated as, i. If %>=90, then grade A ii. If %>=80 and =70 and =60 and =1000 with red color (use conditional formatting).

List of Assignments (Presentation)

1. Create a power-point presentation with minimum 5 slides. a. The first slide must contain the topic of the presentation and name of the presentation. b. Must contain at least one table. c. Must contain at least 5 bullets, 5 numbers. d. The heading must be, font size:32, font-face: Arial Rounded MT Bold, font-color: blue. e. The body must be, font size: 24, font-face: Comic Sans MS, font-color: green. f. Last slide must contain „thank you“.
2. Create a power-point presentation with minimum 10 slides 24 a. Use word art to write the heading for each slides. b. Insert at least one clip-art, one picture c. Insert at least one audio and one video d. Hide at least two slides
3. Create a power-point presentation with minimum 5 slides a. Use custom animation option to animate the text; the text must move left to right one line at a time. b. Use proper transition for the slides

IMCA-107 WEB DESIGN LAB

Objective: This course highlights the basic concepts of HTML and helps the student to equip with the programming skills in implementing and developing web based applications.

HTML:

1. Basics Elements & Attributes, HTML Formatting tags, Links,
2. Images, Tables, Forms Elements
3. HTML5 Audio and Video, HTML5 Input Types & Attributes
4. CSS Syntax, CSS Attribute Selectors
5. CSS properties: Fonts, Background, Colors, Links, Lists,
6. CSS Box Model, Display, Opacity, Float, Clear
7. CSS Layout, CSS Navigation Bar,
8. CSS Rounded Corners, CSS Border Images, CSS Animations
9. Implement HTML5 specific tags like <article>, <section>, <nav>, and <footer>.
10. Use meta tags and Open Graph tags to enhance webpage metadata.

JavaScript:

1. Displaying Output, Declaring Variables, Operators, Arithmetic, Data Types, Assignment,
2. JavaScript Functions, Booleans, Comparisons, Conditional,
3. JavaScript Switch, Loops, Break, Type,
4. JavaScript Objects, Scope,
5. Strings and String Methods
6. Numbers and Number Methods, Math, JavaScript Dates: Formats and Methods.
7. JavaScript Events, API and Validation, Objects,
8. JavaScript Functions, JavaScript DOM, JavaScript Validation, Browser BOM
9. Create forms and validate them using JavaScript.
10. Make calls to RESTful APIs using fetch and AJAX.
11. Implement promises, async-await, and service workers in web applications.

Web Hosting and Maintenance:

1. Set up a domain, configure name servers, and navigate a hosting control panel.
2. Use FTP clients for website maintenance and email setup.

Capstone Project: Implement a comprehensive web application to apply all web programming learnings, such as creating a "Community Event Planner" or an "Online Bookstore" using HTML, CSS, JavaScript, and API integrations.

IMCA-107 Communication Skills Lab

PART I: SELF DEVELOPMENT

Self-Management: Self-Evaluation, Self-Discipline, Self-Criticism, Self Awareness, Positive Thinking, Perceptions and Attitudes, Values and Belief Systems, Personal success factors, Handling failure, Knowing Yourself, identifying one's strengths and weaknesses.

Activity:

1. Student will describe about him/herself along with their strength and weakness.
2. Students should write their short term and long term goals.

PART II: COMMUNICATION SKILLS

Communication: Significance of Communication, types, barriers of communication, effective communication, Verbal and non-verbal Communication. Listening Skills: Virtues of Listening, Barriers and filter; Fundamentals of Good Listening. Reading Skills: Comprehension, reading research papers; Communication in Digital World. Speaking Skills: Importance of speaking effectively, speech process, Style, conversation and oral skills, fluency and self expression, body language phonetics and spoken English, speaking techniques, word stress, voice quality, correct tone, positive image projection techniques, Public Speaking, Group discussion.

Activity:

1. Group discussion on current affairs. (at least 2 topics)
2. Students have to listen carefully each discussion and prepare a summary for it.

PART III: LANGUAGE AND WRITING SKILLS

Business Writing: Note Making, Letter writing, Writing Formal Letters. Technical Report Writing, Agenda and Minutes of a Meeting, E-Mail. Employment Communication: Job Application, Preparation of CV and Resume writing. Presentation skills: Professional Presentation, Planning a Presentation, Preparing the Presentation, Delivering the Presentation.

Activity:

1. Prepare a report for an IT project.
2. Write a job application and prepare your resume for the same.

PART IV: LEADERSHIP AND TEAM BUILDING

Leader and Leadership, Culture and Leadership: Salient Features of Corporate Culture, Leadership Styles, Leadership Trends, team Building: Team Development Stages, Managing self – emotions, ego, pride, stress; Confidence building emotional empathy and emotional intelligence.

Activity:

1. Teacher should split students into small groups and have them develop a product, logo, brand name and marketing strategy.
2. Students have to write down 5 positive points in their personality.

PART V: INTERVIEW AND MEETING SKILLS

Interview Skills: concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conferencing and video-conferencing. Meetings: making meeting effective, chairing a meeting, decision-making, seeking opinions, interrupting and handling interruptions, clarifications, and closure.

Activity:

1. Organizing mock interviews for the students.
2. Organizing mock meetings for the students.

SEMSTER II

I Year II Semester	IMCA-201	DCC	Data Structure	3		3	30	70	100	36%	36%
	IMCA-202	DCC	Python Programming	3		3	30	70	100	36%	36%
	IMCA-203	DCC	Object-oriented Programming with C++	3		3	30	70	100	36%	36%
	IMCA-204	DCC	Operating System	3		3	30	70	100	36%	36%
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	IMCA-206	DCC	Object-oriented Programming with C++Lab		2	2	30	70	100	36%	36%
	IMCA-207	DCC	Data Structures Lab		2	2	30	70	100	36%	36%
	IMCA-208	AECC	Environmental Studies		2	2	30	70	100	36% Non CGPA S/NS*	

IMCA-201 Data Structure**Unit-I**

Introduction to Data Structures: Algorithms and Flowcharts, Basics Analysis on Algorithm, Complexity of Algorithm, Introduction and Definition of Data Structure, Classification of Data, Arrays, Various types of Data Structure, Static and Dynamic Memory Allocation, Function, Recursion. Arrays, Pointers and Strings: Introduction to Arrays, Definition, One Dimensional Array and MultiDimensional Arrays, Pointer, Pointer to Structure, various Programs for Array and Pointer. Strings. Introduction to Strings, Definition, Library Functions of Strings.

Unit-II

Stacks and Queue Introduction to Stack, Definition, Stack Implementation, Operations of Stack, Applications of Stack and Multiple Stacks. Implementation of Multiple Stack Queues, Introduction to Queue, Definition, Queue Implementation, Operations of Queue, Circular Queue, De-queue and Priority Queue.

Unit-III

Linked Lists and Trees Introduction, Representation and Operations of Linked Lists, Singly Linked List, Doubly Linked List, Circular Linked List, And Circular Doubly Linked List. Trees Introduction to Tree, Tree Terminology Binary Tree, Binary Search Tree, Strictly Binary Tree, Complete Binary Tree, Tree Traversal, Threaded Binary Tree, AVL Tree B Tree, B+ Tree.

Unit-IV

Graphs and Searching Graphs: Introduction, Representation to Graphs, Graph Traversals Shortest Path Algorithms. Searching: Searching, Types of Searching,

Unit-V

Sorting and Hashing Sorting: Searching, Types of Searching, Sorting, Types of sorting like quick sort, bubble sort, merge sort, selection sort.

Reference Books:

1. Data structure using C and C ++ Langsam, Augenstein, Tenenbaum PHI publishers
2. Algorithm + data structure = Program by Niklaus Wirth Prentice Hall Publishers
3. Data structure using C Robert Kruse
4. Data structure with C++ by Drozdek
5. Data Structures-Lipschutz, Schaum's Outline Series

IMCA-202 Python Programming

Unit I

Python Basics: Python interpreter, Python idle dynamically typed and strongly typed features basic data types, variables, expressions, statements, operators, flow of execution, Input and Output statements, Conditionals: Boolean values and operators, conditional (if) alternative (if-else) chained conditional (if –elif-else), Iteration: while, for, break, continue. pass, Implementing `_for` through `ranger *in` and `*not in` operators for sequence traversal. Creating and executing: py scripts

Unit II

Data Structures: Lists: append, extend, insert, Index, remove, pop, count, sort, reverse, slicing, list comprehension, Copying a list deep copy, shallow copy. Tuples- index, count. Usage, use of tuples as a swap function. Dictionaries keys, values, tuples, nested dictionaries dictionary comprehension, Strings- single line and multi-line strings, formatter, isdigit, isalpha, isalnum, islower, isupper, isspace, title, lower, Upper, strip, split. splitlines join etc. Sets union, intersection, Subset superset, difference Symmetric difference, copy, add, remove, discard Etc.

Unit III

Functions & File Handling: built Functions- id, len, chr, ord etc defining and calling function, arguments, global versus local variables, defining and using lambda functions. map(), filter(), reduce() functions. Working with files: read, write and append modes: r, w, a, r+, w+, a+, reading-read(), readline(), readlines(), writing-write(), writelines(), seek(), tell(). Word count, copy file scripts through file handling concepts.

Unit IV

Classes, modules and exceptional handling: Classes: Introduction, Member variables and defining methods, constructor, destructor, data encapsulation, inheritances, multiple inheritances, diamond problem solving technique of python. Modules inbuilt modules- sys, random, time etc. import, from import, from import * Constructing packages role of `_init_.py`. Exceptional Handling: The Try-except else-finally block, the raise statement, the hierarchy of exceptions, adding exceptions.

Unit V

Database & GUI Programming: importing SQLite, connecting to database, creating table, insert, select, update, delete. Drop tables, accessing and modifying tables through python. Graphical user interfaces: event-driven programming paradigm, Tkinter module, creating simple GUI: buttons, labels, entry fields. Dialogs: widget attributes – sizes, fonts, colors layouts, nested frames

Reference Books:

1. Introduction to Programming Using Python, 1 st Edition, Liang Y. Daniel, Pearson, 2017
2. An Introduction To Computer Science Through Python, 1 st Edition, Charles Dierbach, Wiley India, 2015
3. Python Programming: A modular approach, 1 st Edition, Kumar Naveen, Taneja Sheetal, Pearson India, 2017
4. “The Complete Reference Python”, Indian Edition, Brown Martin C., TataMcGraw Hill, 2019
5. Learn Python the Hard Way”, Zed Shaw's Hard Way Series

IMCA-203 Object-oriented Programming with C++

Unit I

Principles of Object Oriented Programming: Procedure Oriented Programming – OOP Paradigm-Basic concepts of OOP-Benefits of OOP-Object Oriented Language Applications of OOP. Beginning with C++, Tokens, Expressions and Control Structure. Functions in C++: Introduction-Main function prototyping-call by, return by reference inline functions-default, constant arguments-Function overloading-friend and virtual functions.

Unit II

Classes and Objects. Constructors and Destructors. Constructors-Parameterized, Multiple Constructors-constructors with default arguments-Dynamic initialization of objects-copy, dynamic constructors-destructors.

Unit-III

Operator overloading and Type Conversions, Inheritance: Extending classes. Pointers, virtual functions and polymorphism, Managing console I/O Operations:

Unit-IV

C++ streams-C++ stream classes-Unformatted I/O Operations-Formatted console I/O Operations, Working with files: classes for file stream operations-opening and closing a file-EOF-File modes-File pointers-sequential I/O Operations

Unit-V

Files: File stream classes, file modes ,Sequential Read / Write operations, Binary and ASCII Files, Random Access Operation, Templates, Exception Handling, String, Declaring and Initializing string, objects – String Attributes, Miscellaneous functions .

Reference Books:

1. E. Balagurusamy, Object-Oriented Programming with C++, TATA Mc Graw- Hill publishing.
2. Herbert Schildt, C++ The Complete Reference, Fourth Edition, Tata McGraw Hill Publication.
3. Deitel and Deitel, C++ How to Program, Third Edition, Pearson Publication.
4. Joyce Farrell, Object-oriented programming using C++, Fourth Edition, Cengage Learning.
5. K.R.Venugopal: Mastering C++, McGraw-Hill Education

IMCA-204 Operating System

Unit I

Introduction: What is an operating system – operating system concepts – system calls – operating system structure.

Unit II

Processes and Threads: Process – Inter process communication – Scheduling; Deadlocks: Resources – Introduction to deadlocks – Deadlock detection and recovery – deadlock avoidance – Deadlock Prevention.

Unit III

Memory management: Basic memory management – Swapping – Virtual Memory – Page replacement algorithms – Implementation Issues – Segmentation.

Unit IV

Input / Output: Principles of I/O hardware – Principles of I/O software – I/O software layers – Disks – Character oriented terminals – Graphical user interfaces – Network terminals.

Unit V

File Systems: Files – Directories – File System Implementation – Example file systems – Case study 1: Unix and Linux; Case Study 2 : Windows 2000.

Reference Books:

1. Andrew S.Tanenbaum, Modern Operating Systems, Pearson Education, II Edition.
2. A.Silberschatz et al, Operating System Concepts, John Wiley, VI Edition.
3. H.M.Deitel, An introduction to Operating System, Addison Wesley, II Edition.
4. Godbole, Operating Systems.

IMCA-205 Python Programming Lab

1. Create programs in Python programming language
2. Develop programs in Python using lists, tuples and strings
3. Prepare programs implementing file and function in Python
4. Implement Object Oriented concept in Python programming
5. Implement database and GUI applications in Python

IMCA-206 Object-oriented Programming with C++Lab

Objective: To gain knowledge about the object oriented programming concepts and C++ streams, templates and error handling concepts of C++ programming by implementing sample programs.

1. Classes and Objects To create a class 'staff', to create different objects and to test the functioning of member functions, constructors and Destructors.
2. Arrays of Objects To create Class 'student' To create an array of students To find out the student who get the first rank
3. Static Polymorphism: operator overloading To perform complex number arithmetic or Matrix arithmetic
4. Inheritance To create a class 'College' To create another class 'department' by using 'college' as a base class To verify the functions in the derived and base classes.
Also to verify by keeping the two functions with same name (one in the base class and another in derived class)
5. Dynamic Polymorphism: virtual function To draw various shapes viz Square, Circle, Triangle and Rectangle.
6. Formatted I/O and File operation To Test the functions and the manipulators using files Mark sheet Processing or Payroll processing of Inventory Management
7. Templates and Exception Handling.

At least three programs should be given as lab exercise in each topic.

IMCA-207 Data Structures Lab

1. Program for using Dynamic Functions (malloc(), calloc(), realloc() and free()) functions.
2. Program to insert, delete and traverse an element from an array
3. Program to merge one dimensional arrays
4. Program for addition and subtraction of two matrices.
5. Program for implementing multiplication of two matrices
6. Implement linear search using one and two dimensional array.
7. Program for implementing selection sort.
8. Program for implementing insertion sort.
9. Program for implementing quick sort.
10. Program for implementing merge sort.
11. Program for implementing Stack using array.
12. Program for implementing Stack using pointer.
13. Program for implementing multiple stack.
14. Program for converting infix to postfix form.
15. Program for implementing Queue using array.
16. Program for dynamic implementation of queue.

IMCA-208 Environmental Studies

PART I: ENVIRONMENT AND NATURAL RESOURCES

Environment meaning, structure & type of environment, components of environment. : Natural Resources: Renewable and non-renewable resources.

Activity:

1. Make a poster for renewable and non renewable resources.
2. Write down any two renewable resource used in our daily life.

PART II: ENVIRONMENT DEGRADATION AND POLLUTION

Meaning of degradation, types and process of degradation, cause of degradation. Various factors for environment degradation. Environmental Pollution: Air, water, solid, noise pollution Meaning, definition, source, types, adverse effects & methods of control.

Activity:

1. Prepare a case study on any one factor for environment degradation in your city. Also propose a solution for it.
2. Students have to make their neighbors and family aware of environment pollution and encourage them to take measure to reduce it.

PART III: ECOLOGY

Definition of ecology & ecosystem. Types of ecosystem; components and functions of ecosystem; productivity & stability of ecosystems. Environmental disasters: meaning & concepts, types of hazard & disaster, man induced & natural hazards, global warming, ozone depletion, green house effect & other major environmental problem, biodiversity.

Activity:

1. Prepare a case study on any one natural disaster in India.
2. Each student will plant a tree and will take responsibility to take care of it regularly.

PART IV: HUMAN POPULATION AND THE ENVIRONMENT

Human population growth: Impacts on environment, human health and welfare. Environmental movements. Information Technology (IT) and environment.

Activity:

1. Prepare a case study on any one environmental movement in INDIA.
2. Discuss the positive and negative impacts of IT on environment in Indian perspective.

PART V: ENVIRONMENTAL PLANNING & MANAGEMENT

Concepts, aspects and Approaches, resources management, ecological Management. Biosphere Reserves, Management of wild life. Environmental Regulation and Rules: Vision of environment by Govt. of India, Environmental Policy, waste disposal rules and laws and legislation enacted by Parliament for environmental protection.

Activity:

1. Visit to a local recycling center.
2. Summarize any two environmental laws in INDIA.

Text Books: 1. Bharucha, E. Text Book for Environmental Studies. University Grants Commission, New Delhi. 2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.

Reference Books: 1. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc