

Kurukshetra University, Kurukshetra
(Established by the State Legislature Act XII of 1956)
(‘A+’ Grade, NAAC Accredited)

॥ योगस्थः कुरु कर्माणि ॥
समबुद्धि व योग युक्त होकर कर्म करो
(Perform Actions while Stead fasting in the State of Yoga)



Syllabus of Examination (2nd Semester) for Under-Graduate Programmes
Subject: Computer Applications
according to
Curriculum Framework for Under-Graduate Programmes
As per NEP-2020 (Multiple Entry-Exit, Internships and Choice Based Credit
System)
DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS
(For the Batches Admitted From 2023-2024)

**DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS
KURUKSHETRA UNIVERSITY, KURUKSHETRA**

Session: 2023-24			
Part A - Introduction			
Subject	COMPUTER APPLICATIONS		
Semester	II		
Name of the Course	Logical Organization of Computer		
Course Code	B23-CAC-201		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/ VAC)	CC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	Basic Knowledge of Mathematics (10 th Level)		
Course Learning Outcomes(CLO):	<p>After completing this course, the learner will be able to:</p> <ol style="list-style-type: none"> 1. understand number systems, error detecting correcting code, and representations of numbers in a computer system. 2. understand computer arithmetic and Boolean algebra and simplification of Boolean expressions. 3. understand the working of logic gates and design various combinational circuits using these logic gates. 4. understand the working of different types of flip-flops and design different types of registers. <hr/> <p>5*. to understand the practical aspects of the logical organization of computers.</p>		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks:100(70(T)+30(P)) Internal Assessment Marks:30(20(T)+10(P)) End Term Exam Marks: 70(50(T)+20(P))		Time: 3 Hrs.(T), 3Hrs.(P)	
Part B- Contents of the Course			
<u>Instructions for Paper-Setter</u>			
<p>The examiner will set a total of nine questions. Out of which the first question will be compulsory. The remaining eight questions will be set from four units selecting two questions from each unit. The examination will be of three-hour duration. All questions will carry equal marks. The first question will comprise of short answer-type questions covering the entire syllabus.</p>			

The candidate must five questions in all, selecting one question from each unit. The first question will be compulsory.

The practicum will be evaluated by an external and an internal examiner. The examination will be of three-hour duration.

Unit	Topics	Contact Hours
I	Number Systems: Binary, Octal, Hexadecimal, etc. Conversions from one number system to another, BCD Number System. BCD Codes: Natural Binary Code, Weighted Code, Self-Complimenting Code, Cyclic Code. Error Detecting and Correcting Codes. Character representations: ASCII, EBCDIC, and Unicode. Number Representations: Integer numbers - sign-magnitude, 1's & 2's complement representation. Real Numbers normalized floating point representations.	11
II	Binary Arithmetic: Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division using 1's and 2's Compliment representations, Addition and subtraction with BCD representations. Boolean Algebra: Boolean Algebra Postulates, basic Boolean Theorems, Boolean Expressions, Boolean Functions, Truth Tables, Canonical Representation of Boolean Expressions: SOP and POS, Simplification of Boolean Expressions using Boolean Postulates & Theorems, Karnaugh-Maps (up to four variables), Handling Don't Care conditions.	11
III	Logic Gates: Basic Logic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates – XOR, XNOR, etc. Their symbols, truth tables, and Boolean expressions. Combinational Circuits: Design Procedures, Half Adder, Full Adder, Half Subtractor, Full Subtractor, Multiplexers, Demultiplexers, Decoder, Encoder, Comparators, Code Converters.	11
IV	Sequential Circuits: Basic Flip-Flops and their working. Synchronous and Asynchronous Flip-Flops, Triggering of Flip-Flops, Clocked RS, D Type, JK, T type, and Master-Slave Flip-Flops. State Table, State Diagram, and State Equations. Flip-flops characteristics & Excitation Tables. Sequential Circuits: Designing registers –Serial-In Serial-Out (SISO), Serial-In Parallel-Out (SIPO), Parallel-In Serial-Out (PISO) Parallel-In Parallel-Out (PIPO) and shift registers.	12
V*	Practicum: Students are advised to do laboratory/practical practice not limited to but including the following types of problems: Number System: <ul style="list-style-type: none"> • Problems based on Number System and their conversion. • Programs based on Number System conversion. Binary Arithmetic <ul style="list-style-type: none"> • Problems based on Binary Arithmetic. • Programs based on Binary Arithmetic. • Problems based on Boolean Expression and their simplification 	30

	<p>Logic Gates</p> <ul style="list-style-type: none"> • Understanding working of logic Gates. <p>Combinatorial Circuits:</p> <ul style="list-style-type: none"> • Designing and understanding various combinational circuits. <p>Sequential Circuits:</p> <ul style="list-style-type: none"> • Designing and understanding various sequential circuits. 	
Suggested Evaluation Methods		
<p>Internal Assessment:</p> <p>➤ Theory</p> <ul style="list-style-type: none"> • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 <p>➤ Practicum</p> <ul style="list-style-type: none"> • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA 	<p>End Term Examination: A three-hour exam for both theory and practicum. End Term Exam Marks: 70(50(T)+20(P))</p>	
Part C-Learning Resources		
<p>Recommended Books/e-resources/LMS:</p> <ul style="list-style-type: none"> • M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd. • V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall. • Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd. • Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill. 		

***Applicable for courses having practical components.**

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS
KURUKSHETRA UNIVERSITY, KURUKSHETRA

Session: 2023-24			
Part A – Introduction			
Subject	COMPUTER APPLICATIONS		
Semester	II		
Name of the Course	Data Base Management Systems		
Course Code	B23-CAC-202		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/ VAC)	DSEC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)			
Course Learning Outcomes(CLO):	After completing this course, the learner will be able to: <ol style="list-style-type: none"> 1. learn basic concepts of database along with its functions and components 2. understand data models. 3. understand SQL as a query language and Learn the concept of relational algebra and calculus. 4. acquire knowledge of advanced concepts of DBMS. <hr style="width: 80%; margin-left: 0;"/> 5*. to implement the queries based on database management.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Max. Marks:100(70(T)+30(P)) Internal Assessment Marks:30(20(T)+10(P)) End Term Exam Marks: 70(50(T)+20(P))		Time: 3 Hrs.(T), 3Hrs.(P)	
Part B- Contents of the Course			
<u>Instructions for Paper-Setter</u>			
<p>The examiner will set a total of nine questions. Out of which, the first question will be compulsory. The remaining eight questions will be set from four units selecting two questions from each unit. The examination will be of three-hour duration. All questions will carry equal marks. The first question will comprise short answer-type questions covering the entire syllabus. The candidate must five questions in all, selecting one question from each unit. The first question will be compulsory.</p>			

The practicum will be evaluated by an external and an internal examiner. The examination will be of three-hour duration.

Unit	Topics	Contact Hours
I	<p>Basic Concepts: Data, Information, Records, Files, Schema and Instance etc. Limitations of File-Based Approach, Characteristics of Database Approach, Database Management System (DBMS), DBMS Functions and Components, Database Interfaces, Advantages and Disadvantages of DBMS.</p> <p>Database Users: Data and Database Administrator, Role and Responsibilities of Database Administrator, Database Designers, Application Developers etc.</p> <p>Database System Architecture: 1-Tier, 2-Tier & Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances, Data Independence – Logical and Physical Data Independence</p>	11
II	<p>Data Models: Hierarchical, Network, and Relational Data Models.</p> <p>Entity-Relationship Model: Entity, Entity Sets, Entity Type, Attributes: Type of Attributes, Keys, Integrity Constraints, Designing of ER Diagram, Symbolic Notations for Designing, ER Diagram</p>	11
III	<p>SQL: Meaning, Purpose, and Need of SQL, Data Types, SQL Components: DDL, DML, DCL and DQL, Basic Queries, Join Operations and Sub-queries, Views, Specifying Indexes. Constraints and its Implementation in SQL.</p> <p>Relational Algebra: Basic Operations: Select, Project, Join, Union, Intersection, Difference, and Cartesian Product, etc.</p> <p>Relational Calculus: Tuple Relational and Domain Relational Calculus. Relational Algebra Vs. Relational Calculus.</p>	12
IV	<p>Relational Model: Functional Dependency, Characteristics, Inference Rules for Functional Dependency, Types of Functional Dependency, Normalization: Benefits and Need of Normalization, Normal Forms Based on Primary Keys- (1NF, 2NF, 3NF, BCNF), Multi-valued Dependencies, 4 NF, Join dependencies, 5 NF, Domain Key Normal Form.</p>	11
V*	<p>Practicum: Students are advised to do laboratory/practical practice not limited to but including the following types of problems:</p> <ul style="list-style-type: none"> • Write a SQL query for creating and describing a table of the salesman in a company. • Write a query to insert data into a table. • Write a SQL statement to display all the information of all salesmen. • Write a query that will retrieve the value of the salesman if of all salesman, getting orders from the customers in the orders table without any repeats. 	30

	<ul style="list-style-type: none"> • Write a SQL statement to display the name and city of the salesman, who belongs to the city of Paris. • Write a SQL statement to display all the information for those customers with a grade of 200. • Write a SQL statement to delete a particular record from a table • Write an SQL statement that selects the highest grade for each of the cities of customers using the GROUP BY clause. • Write an SQL statement that selects the particular record using the ORDER BY clause. • Write a SQL statement to prepare a list with the salesman's name, the customer's name, and their cities for the salesman and customer who belong to the same city, • Write a SQL statement to know which salesman is working for which customers. • Write an SQL statement to create a view of the table. • Write an SQL statement to rename, update, and delete a view. • Write an SQL statement to update the record in a table. • Write a SQL statement to drop and truncate a table. • Understanding relational model concepts • Converting a table into various normal forms. • Understanding various concepts of databases 	
Suggested Evaluation Methods		
<p>Internal Assessment:</p> <p>➤ Theory</p> <ul style="list-style-type: none"> • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 <p>➤ Practicum</p> <ul style="list-style-type: none"> • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA 	<p>End-Term Examination: A three-hour exam for both theory and practicum.</p> <p>End Term Exam Marks: 70(50(T)+20(P))</p>	
Part C-Learning Resources		
<p>Recommended Books/e-resources/LMS:</p> <ul style="list-style-type: none"> • Elmasri & Navathe: Fundamentals of Database Systems, Pearson Education. • Thomas Connolly Carolyn Begg: Database Systems, Pearson Education. • Korth & Silberschatz: Database System Concept, McGraw Hill International Edition. • Raghu Ramakrishnan & Johannes Gehrke: Database Management Systems, McGraw Hill. • Ivan Bayross: SQL, PL/SQL- The Program Language of ORACLE, BPB Publication. 		

*Applicable for courses having practical components.

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS
KURUKSHETRA UNIVERSITY, KURUKSHETRA

Session: 2023-24			
Part A - Introduction			
Subject	COMPUTER APPLICATIONS		
Semester	II		
Name of the Course	Programming Methodologies		
Course Code	B23-CAC-203		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/ VAC)	CC-M		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)			
Course Learning Outcomes (CLO):	After learning this course students will be able: <ol style="list-style-type: none"> 1. To understand the concept of problem-solving using algorithms and flowcharts. 2. To understand the concept of program and debugging. 3. To learn the basic programming constructs. 4. To understand various programming methodologies. 5. To understand the various programming methodologies by implementing these practically. 		
Credits	Theory	Practical	Total
	1	1	2
Contact Hours	1	2	3
Max. Marks:50(30(T)+20(P))		Time: 3 Hrs.(T), 3Hrs.(P)	
Internal Assessment Marks:15(10(T)+5(P))			
End Term Exam Marks:35(20(T)+15(P))			
Part B-Contents of the Course			
<u>Instructions for Paper-Setter</u>			
Unit	Topics		Contact Hours
I	Problem Solving: Understanding the problem, Analyzing the problem, and Identifying the solution. Tools for Problem-Solving: Flowcharts and its Symbols. Algorithm designing. Examples of Algorithms with flow chart. Decision Table.		4

II	<p>Program: Concept of a program, Need for writing programs, Characteristics of a good program, Programming style, Documentation, and Program Maintenance.</p> <p>Debugging Programs: Syntax Errors, Run-Time Errors, Logical Errors.</p> <p>Process of conceptualizing a solution to a problem and moving from algorithm to programming.</p>	4
III	<p>General Concepts: Clarity and Simplicity of Expressions, Use of proper names for Identifiers, Comments, Indentation; and Documentation.</p> <p>Programming Constructs: Sequence, Selection, and Iteration; Simulation (dry run) of the program for better understanding of algorithm; Comparison and Analysis of Algorithms through simulations.</p>	4
IV	<p>Methodologies: Structured programming, Top-down approach, Bottom-up approach, Functional programming, Modular programming, and Object-oriented programming.</p>	3
V*	<p>Practicum: Students are advised to do laboratory/practical practice not limited to but including the following types of problems:</p> <ul style="list-style-type: none"> • Draw a flowchart and design an algorithm that calculates simple interest using principle, rate, and time. • Draw a flowchart and write an algorithm to swap the values of two variables. • Draw a flowchart and design an algorithm to check whether the given number is even or odd. • Draw a flowchart and design an algorithm that inputs three numbers and displays the largest number. • Draw a flowchart and design an algorithm to find the smallest from n numbers. • Draw a flowchart and design an algorithm to find the greatest from n numbers. • Draw a flowchart and design an algorithm to find the sum and average of n input numbers. • Draw a flowchart and design an algorithm to find the sum of the digits of the input number. • Identify the requirements for a college system computerization. • Identify the various modules in a banking system. • Identify the complete design of a general grocery store. • Draw the decision table for finding the greatest of three numbers. • Draw to decision table for checking eligibility for admission to college in an undergraduate programme taking your own assumptions. 	30
Suggested Evaluation Methods		

<p>Internal Assessment:</p> <p>➤ Theory</p> <ul style="list-style-type: none"> • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.: NA • Mid-Term Exam: 6 <p>➤ Practicum</p> <ul style="list-style-type: none"> • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam: NA 	<p>End Term Examination: A three-hour exam for both theory and practicum. End Term Exam Marks:35(20(T)+15 (P))</p>
<p>Part C-Learning Resources</p>	
<p>Text /Reference Books:</p> <ul style="list-style-type: none"> • Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB. • Dromey, R.G., How to Solve It by Computer, PHI. • Norton, Peter, Introduction to Computer, McGraw-Hill. • Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World. • Rajaraman, V., Fundamentals of Computers, PHI. 	

***Applicable for courses having practical components.**

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS
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Session: 2023-24			
Part A - Introduction			
Subject	COMPUTER APPLICATIONS		
Semester	II		
Name of the Course	Web Technologies Fundamentals		
Course Code	B23-CAC-204		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/ VAC)	MDC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)			
Course Learning Outcomes(CLO):	After completing this course, the learner will be able to: <ol style="list-style-type: none"> 1. learn the basics of web development. 2. understand different types of web pages and websites. 3. implement HTML and CSS for web page designing. 4. Understand the design of web crawlers and search engines. <hr/> 5*. implement the programs based on various web development concepts.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:75(50(T)+25(P))		Time: 3 Hrs.(T), 3Hrs.(P)	
Internal Assessment Marks:20(15(T)+5(P))			
End Term Exam Marks: 55(35(T)+20(P))			
Part B- Contents of the Course			
Instructions for Paper-Setter			
<p>The examiner will set a total of nine questions. Out of which, the first question will be compulsory. The remaining eight questions will be set from four units selecting two questions from each unit. The examination will be of three-hour duration. All questions will carry equal marks. The first question will comprise short answer-type questions covering the entire syllabus.</p> <p>The candidate will have to attempt five questions, selecting one from each unit. The first question will be compulsory.</p> <p>The practicum will be evaluated by an external and an internal examiner. The examination will be of three-hour duration.</p>			
Unit	Topics		Contact

		Hours
I	Introduction to Internet and World Wide Web (WWW); Evolution and History of World Wide Web, Web Pages and Contents, Web Clients, Web Servers, Web Browsers; Hypertext Transfer Protocol, URLs; Searching, Search Engines and Search Tools.	7
II	Web Publishing: Hosting website; Internet Service Provider; Planning and designing website; Web Graphics Design, steps for Developing website Creating a Website and Introduction to Markup Languages (HTML and DHTML),	7
III	HTML Document Features & Fundamentals, HTML Elements, Creating Links; Headers; Text styles; Text Structuring; Text colour and Background; Formatting text; Page layouts, Images; Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with Forms and Menus; Working with Radio Buttons; Check Boxes; Text Boxes, HTML5	8
IV	Introduction to CSS (Cascading Style Sheets): Features, Core Syntax, Types, Style Sheets and HTML, Style Rule Cascading and Inheritance, Text Properties, CSS Box Model, Normal Flow Box Layout, Positioning, and other useful Style Properties; Features of CSS3. Introduction to Client-Side Programming	8
V*	<p>Practicum:</p> <p>Students are advised to do laboratory/practical practice not limited to but including the following types of problems:</p> <ul style="list-style-type: none"> • Create a web page using an ordered list and an unordered list. • Design a web page to show your institute with hyperlinks. • Design a blog-style personal website. • Create your resume on an HTML page. • Create a web page and divide the web page into four frames. In one frame create three links that will display different HTML forms in the remaining three frames respectively. • Create a web page to show the record of the college in the form of a table. • Write an HTML code to add internal CSS on a webpage • Design a web page to display your college with hyperlinks. • Write a JavaScript function to calculate the sum of two numbers. • Write a CSS file and attach it to any 3 HTML web pages. • Use Div and span in a page and color two words with the same colors. • Using HTML, and CSS create a styled checkbox with animation on state change. 	30
Suggested Evaluation Methods		

<p>Internal Assessment:</p> <p>➤ Theory</p> <ul style="list-style-type: none"> • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.:4 • Mid-Term Exam: 7 <p>➤ Practicum</p> <ul style="list-style-type: none"> • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.:5 • Mid-Term Exam: NA 	<p>End-Term Examination: A three-hour exam for both theory and practicum.</p> <p>End Term Exam Marks: 55(35(T)+20(P))</p>
<p>Part C-Learning Resources</p>	
<p>Recommended Books/e-resources/LMS:</p> <ul style="list-style-type: none"> • Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill. • Ramesh Bangia, Multimedia and Web Technology, Firewall Media. • Thomas A. Powell, Web Design: The Complete Reference, Tata McGraw-Hill • Wendy Willard, HTML Beginners Guide, Tata McGraw-Hill. • Deitel and Goldberg, Internet and World Wide Web, How to Program, PHI • David Flanagan, JavaScript: The Definitive Guide: The Definitive Guide. • Kogent Learning, Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, AJAX – Black Book, Wiley India Pvt. Ltd. 	

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