ShriVaishnavVidhyapeethVishvavidhyalaya, Indore

Institute of Computer Applications

Name of Prgram: BCA + MCA

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
							TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
BCCA301	Compulsory	Computer Organization & Architecture	3	1	0	4	60	20	20	0	0

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.

*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

Course Education Objectives (CEOs):

a) To introduce the fundamental knowledge needed for the design of computer systems.
b) Explain in detail the logical operation of the most common standard digital components.
c) To show how the various data types found in digital computers are represented in binary form in computer registers.
d) To introduce a register transfer language and show how it is used to express micro operations in symbolic form.
e) To present the organization and design of a basic digital computer.
f) To deal with the central processing unit (CPU).
g) To understand the concepts in modern computer architecture.

Course Outcomes (COs):
Students will have thorough knowledge about:

a) The logical operation of the most common standard digital components.
b) The design of computer systems.
c) The various data types found in digital computers and how are they represented in binary form in computer registers.
d) Register transfer language and will be able to show how it is used to express micro operations in symbolic form.
e) The concepts in modern computer architecture.

Unit-I
Number System: Binary, Octal, Hexadecimal; Character Codes: BCD, ASCII, EBCDIC; Logic gates, Boolean Algebra, Canonical and Standard Forms, K-map simplification, Half Adder, Full Adder, Half Subtractor, Full Subtractor.

Unit-II
Combinational logic Design: Binary Parallel Adder, Carry look ahead adder, BCD Adder, Decoders, Encoders, Multiplexers, Demultiplexers; Sequential Logic: Flip-Flops – RS, JK, D and T Flip Flops.

UNIT-III
Register Transfer and Micro-operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro operations, Arithmetic logic shift unit.

UNIT-IV
Basic Computer Organizations and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Register reference instructions, Input-Output Instructions,

UNIT-V
Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Difference between RISC and CISC.

Suggested Readings:
1. M. Morris Mano, "Computer System Architecture", 3e, Pearson Education, Inc. 2007
2. William Stallings, "Computer Organization and Architecture", 8e, Pearson, 2010
3. Subrata Ghoshal, "Computer Architecture and Organization" , 1e, Pearson, 2011
4. Malvino, "Digital Computer Electronics: An Introduction to Microcomputers", 2e, McGraw Hill Education, 1984

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BCCA302	Compulsory	Mathematical Foundation of Computer Science – III	3	1	0	4	60	20	20	0	0

Course Education Objectives (CEOs):

- To introduce the students with the optimization techniques of the Operation Research

Course Outcomes (COs): After the successful completion of this course students will be able to:

- understand and apply the optimization techniques in the LPP.

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Indore

- find solution by the simplex method.
- apply the optimization techniques.
- formulate and solve queue model.
- understand and apply the advanced optimization techniques.

UNIT – I
Introduction to the Operation Research, Models in OR, Linear Programming

UNIT – II
Simplex Method, Computational problems, Computer solution of linear programs

UNIT – III
Network analysis – Assignment problems, Maximal flow problem, Shortest route problem, Minimal Spanning tree problem,

UNIT – IV
Queuing Models – M/M/1 model, Limited queue capacity, Multiple Servers,

UNIT – V
Reliability Models, Inventory Models – EOQ, Non zero lead time, Dynamic Programming – Developing an optimal decision policy, multiple state variables, Curse of dimensionality

Suggested Readings:
1. TahaHamdy A: Operation Research; an introduction, Sixth ed., PHI, 2001
2. Gillett Billy E: Introduction to Operation Research, Tata-Mcgraw Hill, 1979

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							\multicolumn{3}{THEORY}		PRACTICAL	
BCCA303	COMPULSORY	Data Base Management Systems	3	1	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
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Course Educational Objectives (CEOs):
- To provide a sound introduction to the discipline of database management as a subject in its own right, rather than a compendium of techniques and product specific tools.

- To understand the different issues involved in the design and implementation of a database system.
- To introduce to systematic database design: physical and logical database designs, database modeling, different database models
- To present SQL and procedural interfaces to SQL to query, update and manage a database
- To give an an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
- To introduce the concepts of transactions and transaction processing.

Course Outcomes (COs): After completion of the course students will be able to
- Understand the database systems concepts
- Design any Desktop application using an entity relationship diagrams (ERD) to express requirements and demonstrates skills to model data requirements and create data models.
- To learn and understand various Database Architectures and Applications.
- apply the knowledge of the subject to any particular database implementation using SQL.
- Apply the normalization concepts to use the database efficiently
- Handle prescribed business problem:

UNIT-I
Introduction: Data and Information ,Data Base, Advantage of DBMS approach, various views of data, data independence, schema and subschema, data models, Database languages, DBA and users, Data Dictionary, Database system architecture.

UNIT-II
ER model: basic concepts, design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER schema, from ER schema to tables.

UNIT-III
Domains, Relations and Keys: domains, relations, kind of relations, relational database, various types of keys, candidate, primary, alternate and foreign keys.
Relational Algebra and SQL: The structure, relational operations, modifications of database, idea of relational calculus, basic structure of SQL, set operations, aggregate functions, null values, nested sub queries, derived relations, views, join relations, SQL-DDL, DML and DCL.

UNIT-IV
Dependencies and Normal Forms: Basic definitions, dependencies, closure set of dependencies trivial, non trivial, irreducible set of dependencies, introduction to normalization, non loss decomposition, Functional Dependency diagram, Different dependencies and Normal forms up to fifth normal form, dependency preservation.
Database Integrity: General idea. Integrity rules, domain rules, attribute rules, relation rules, Database rules, assertions, triggers, integrity and SQL.

UNIT-V

Transaction, Concurrency and Recovery: Basic concepts, ACID properties, Transaction states, Implementation of atomicity and durability, concurrent executions, basic idea of serializability, concurrency control, deadlock, failure classification, storage structure types, stable storage implementation, data access, recovery and atomicity- log based recovery, deferred Database modification, immediate Database modification, checkpoints.

Distributed Database: Basic idea, distributed data storage, data replication, data fragmentation horizontal, vertical and mixed fragmentation.

Suggested Readings:

1. A Silberschatz, H.F Korth, Sudersan, "Database System Concepts", MGH Publication.
2. C.J. Date "An introduction to Database Systems"
3. Elmasri & Navathe, "Fundamentals of Database Systems", III ed. Morgan Kauffman
4. B.C. Desai. "An Introduction To Database Systems", BPB
5. Raghurama Krishnan "Database Systems", TMH

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA304	COMPULSORY	Operating Systems	3	1	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

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Course Educational Objectives (CEOs): The course is designed to make students:
- Familiar with design of operating systems as resource manager of a computer system
- Aware about the basic concepts of operating system architecture
- Understand about the concepts of processor management and memory management techniques
- Familiar with deadlock handling and inter-process communication
- Understand the device management.

Course Outcomes (Cos):
- The student will be able to understand the internal design of operating system.
- The student will be able to demonstrate operating system structure.
- The student will be able to demonstrate the scheduling and memory management techniques.
- The student will be able to understand the IPC and other techniques.
- The student will be able to understand device management system of computer.

UNIT I

Introduction to Operating System:- Objectives, functions and the services provided by Operating System. Evolution of operating system:-Batch processing, Multiprogramming, Multithreading, Time-sharing systems, Real Time, Distributed systems. Operating system structure:-System calls and system programs.

UNIT II

Process Management: -Process concept, Process Control Block, Process states, Process scheduling, CPU scheduling: - Basic concept and scheduling criteria, Long term, medium term , short term schedulers, various Scheduling algorithms, Measurement of performance of processor.

UNIT III

Memory management:-Logical and physical address spaces, Memory management without Swapping or Paging, Swapping and paging, Contiguous, allocation and its drawbacks, Non-contiguous allocation. Virtual memory: - Demand paging and its need, Performance of demand paging, Page replacement and its need, Thrashing and allocation of frames.

UNIT IV

Process synchronization: - Critical section problem, Mutual exclusion and synchronization, Concept of semaphores, Classical IPC problems. Deadlocks: - Characterization of deadlock, Methods of handling prevention, detection and avoidance, Recovery from deadlock.

UNIT V

I/O system: - Various I/O devices, Device drivers, structure of I/O software, Transforming I/O request of h/w operation. Secondary storage structure:- Disk structure, Disk Scheduling algorithms (First come first serve, shortest seek time first, SCAN, C-SCAN, LOOK and C-LOOK algorithms), Disk management, Swap space management and Disk reliability.

Suggested Readings:
1. Silberschatz Galvin, Operating System concept, 5th edition.
2. D. M. Dhamdhare, System Programming and operating system, Tata McGraw Hill,2nd edition.
3. Milan Milenkovi'c, Operating System concept and design, Tata McGraw Hill.
4. Tanenbaum, A.S. "Modern Operating System", Prentice Hall of India Pvt. Ltd..
5. William Stallings "Operating Systems" , Prentice Hall of India Pvt. Ltd.
6. Joshi R.C. "Operating System" Wiley India.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA306	COMPULSORY	Lab-1 (DBMS Lab)	0	0	4	2	0	0	0	30	20

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*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):
- To provide a sound introduction to the discipline of database management as a subject in its own right, rather than a compendium of techniques and product specific tools.
- To understand the different issues involved in the design and implementation of a database system.
- To introduce to systematic database design: physical and logical database designs, database modeling, different database models
- To present SQL and procedural interfaces to SQL to query, update and manage a database
- To give an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
- To introduce the concepts of transactions and transaction processing.

Course Outcomes (COs):After completion of the course students will be able to
- Understand the database systems concepts
- Design any Desktop application using an entity relationship diagrams (ERD) to express requirements and demonstrates skills to model data requirements and create data models.
- To learn and understand various Database Architectures and Applications.
- apply the knowledge of the subject to any particular database implementation using SQL.
- Apply the normalization concepts to use the database efficiently
- Handle prescribed business problem:

List of Experiments:
1. To study Basic SQL commands (create database, create table, use, drop, insert) and execute the following queries using these commands:
- Create a database named 'Employee'.

- Use the database 'Employee' and create a table 'Emp' with attributes 'ename', ecity', 'salary', 'enumber', 'eaddress', 'depttname'.
- Create another table 'Company' with attributes 'cname', 'ccity', 'empnumber' in the database 'Employee'.

2. To study the viewing commands (select, update) and execute the following queries using these commands:

- Find the names of all employees who live in Delhi.
- Increase the salary of all employees by Rs. 5,000.
- Find the company names where the number of employees is greater than 10,000.
- Change the Company City to Gurgaon where the Company name is 'TCS'.

3. To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands:

- Add an attribute named ' Designation' to the table 'Emp'.
- Modify the table 'Emp', Change the datatype of 'salary' attribute to float.
- Drop the attribute 'depttname' from the table 'emp'.
- Delete the entries from the table ' Company' where the number of employees are less than 500.

4. To use (and, or, in , not in, between , not between , like , not like) in compound conditions and execute the following queries using them:

- Find the names of all employees who live in ' Gurgaon' and whose salary is between Rs. 20,000 and Rs. 30,000.
- Find the names of all employees whose names begin with either letter 'A' or 'B'.
- Find the company names where the company city is 'Delhi' and the number of employees is not between 5000 and 10,000.
- Find the names of all companies that do not end with letter 'A'.

5. Using aggregate functions execute the following queries:

- Find the sum and average of salaries of all employees in computer science department.
- Find the number of all employees who live in Delhi.
- Find the maximum and the minimum salary in the HR department.

6. To execute the following queries using study the grouping commands (group by, order by)

- List all employee names in descending order.
- Find number of employees in each department where number of employees is greater than 5.
- List all the department names where average salary of a department is Rs.10,000.

7. To write SQL queries to

- Alter table 'Emp' and make 'enumber' as the primary key.
- Alter table 'Company' and add the foreign key constraint.
- Add a check constraint in the table 'Emp' such that salary has the value between 0 and Rs.1,00,000.
- Alter table 'Company' and add unique constraint to column cname.
- Add a default constraint to column ccity of table company with the value 'Delhi'.

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- Rename the name of database to 'Employee1'.
- Rename the name of table 'Emp' to 'Emp1'.
- Change the name of the attribute 'ename' to 'empname'.

10. To execute following queries using appropriate SQL statements to
- Retrieve the complete record of an employee and its company from both the table using joins.
- List all the employees working in the company 'TCS'.
11. To study the various set operations and execute the following queries using these commands:
- List the enumber of all employees who live in Delhi and whose company is in Gurgaon or if both conditions are true.
- List the enumber of all employees who live in Delhi but whose company is not in Gurgaon.
12. To study the various scalar functions and string functions (power, square, substring, reverse, upper, lower, concatenation) and execute the following queries using these commands:
- Reverse the names of all employees.
- Change the names of company cities to uppercase.
- Concatenate name and city of the employee.
13. To study the commands for views and execute the following queries using these commands:
- Create a view having ename and ecity.
- In the above view change the ecity to 'Delhi' where ename is 'John'.
- Create a view having attributes from both the tables.
- Update the above view and increase the salary of all employees of IT department by Rs.1000.
14. To study the commands involving indexes and execute the following queries:
- Create an index with attribute ename on the table employee.
- Create a composite index with attributes cname and ccity on table company.
- Drop all indexes created on table company.
16. To study the conditional controls and case statement in PL-SQL and execute the following queries:
- Calculate the average salary from table 'Emp' and print increase the salary if the average salary is less that 10,000.
- Print the deptno from the employee table using the case statement if the deptname is 'Technical' then deptno is 1, if the deptname is 'HR' then the deptno is 2 else deptno is 3.

17. To study procedures and triggers in PL-SQL and execute the following queries:
- Create a procedure on table employee to display the details of employee to display the details of employees by providing them value of salaries during execution.
- Create a trigger on table company for deletion where the whole table is displayed when delete operation is performed.

Suggested Readings:
1. A Silberschatz, H.F Korth, Sudersan, "Database System Concepts", MGH Publication.
2. C.J. Date "An introduction to Database Systems"
3. Elmasri & Navathe, "Fundamentals of Database Systems", III ed. Morgan Kauffman
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							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA307	COMPULSORY	Lab-2 (Visual Basic Programming)	0	0	4	2	0	0	0	30	20

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Course Educational Objectives (CEOs):
- To familiarize the students with programming and to encourage them to develop their logic.
- To make students well versed with VB to solve problems efficiently.
- Using simple and well drawn illustrations develop their programming skills using windows concept and terminology.

Course Outcomes (COs):
Student will be able to:
- Apply the programming concepts to solve the given problems.
- Write the programs using windows concept.
- Understand and write programs using various data structures very efficiently.
- Develop the practice of writing windows applications.
- Implement and innovate commands using the basic tool kit.

List of Experiments

1. Create a VB project that displays 3 labels, 3 textboxes and 2 buttons. Calculate the sum of two numbers and display the result in the third textbox whenever the user clicks on named calculate button and Exit the program whenever the user clicks on named Exit button.
2. Create a VB project to display a message 'INDIA" using the message box.
3. Create a VB project that accepts First Name and Last Name through textboxes. Display combined name of both First Name and Last Name in a label.
4. Create a VB project to display numbers from 1 to 10 on the form on clicking the command button.
5. Create a VB project that accepts a number through a textbox. Display whether the input number is Prime number or not in the textbox.

6. Create a VB project to find the greatest among three numbers, use three textboxes to input numbers and display the greatest number in separate textbox.
7. Create a VB project to check even or odd number entered by the user and display the result in the message box.
8. Create a VB project to make a basic mathematical calculator.
9. Create a VB project to change the background color of form on clicking the command button.
10. Create a VB project that is having three forms namely Frm MDI , splash form and Count Numbers form and a menu that display the option Form and an Exit .

Suggested Readings:

1 Steven Holzner -Visual Basic 6 Black Book, The Coriolis Group.
2 Evangelos Petroutsos, Mark Ridgeway- Mastering Visual Basic, Wiley Publishing, Inc.
3 Michael Halvorson- Microsoft Visual Basic 2010 Step by Step, Microsoft Press.
4 Paul Deitel, H.M Deitel, and G. J. Ayer- Simply Visual Basic 2008, Prentice Hall.

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