



Shri Vaishnav Vidhyapeeth Vishwavidhyalaya, Indore

Institute of Computer Applications

Name of Program: BCA + MCA

Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teacher Assessment	End Sem University Exam	Teacher Assessment				
BCCA301	Compulsory	Computer Organization & Architecture	60	20	20	0	0	4	1	5	

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):

- To understand the concepts in modern computer architecture.
- To learn the design of Control Unit and ALU of a typical computer.
- To learn about the memory, input-output organization of a typical computer.
- To learn the concepts of pipelining and vector processing.

Course Outcomes (COs):

Students will have thorough knowledge about:

- Basic structure and operation of a digital computer.
- Arithmetic operations of binary number system.
- The organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit.

UNIT-I

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-II

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, Design of Accumulator Logic.



Shri Vaishnav Vidhyapeeth Vishwavidyalaya, Indore

Institute of Computer Applications

UNIT-III

Design of Micro-programmed Control Unit

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

Pipeline and Vector Processing: Arithmetic and Instruction pipeline, Vector operations, Matrix Multiplication, memory interleaving.

UNIT-IV

Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, for fixed point-members.

Input-Output Organization: Peripheral Devices, Input-Output Interfaces, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA).

UNIT-V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

References

1. Morris Mano, Computer System Architecture, 3rd Edition, Prentice-Hall of India Private Limited, 1999.
2. William Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hall of India Private Limited, 2001
3. Subrata Ghosal, "Computer Architecture and Organization", Pearson 2011
4. Malvino, "Digital Computer Electronics: An Introduction to Microcomputers", McGraw Hill



Shri Vaishnav Vidhyapeeth Vishwavidyalaya, Indore

Institute of Computer Applications

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

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.
- 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

References



Shri Vaishnav Vidhyapeeth Vishwavidhyalaya, Indore

Institute of Computer Applications

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

Name of Program: BCA + MCA

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BCCA303	COM PULS ORY	Data Base Management Systems	60	20	20	0	0	4	1	0	5

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

***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 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



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Institute of Computer Applications

- 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-III

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.

UNIT-IV

Database Integrity: general idea. Integrity rules, domain rules, attribute rules, relation rules, Database rules, assertions, triggers, integrity and SQL.

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

UNIT-V

Emerging Fields in DBMS: Object Oriented Databases-basic idea and the model, object structure, object class, inheritance, multiple inheritance, object identity, **Distributed Database:** basic idea, distributed data storage, data replication, data fragmentation horizontal, vertical and mixed fragmentation

Basics of Data Warehousing and Mining - terminology, definitions, characteristics, data mining and it's overview, Database on www, multimedia Databases-difference with conventional DBMS, issues, similarity based retrieval, continuous media data, multimedia data formats, video servers.

Network and hierarchical models: basic idea, data structure diagrams, DBTG model, implementations, tree structure diagram, implementation techniques, comparison of the three models.



Shri Vaishnav Vidhyapeeth Vishwavidhyalaya, Indore

Institute of Computer Applications

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BCCA304	COMPULSORY	Operating Systems	60	20	20	0	0	4	1	0	5

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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***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): 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-



Shri Vaishnav Vidhyapeeth Vishwavidyalaya, Indore

Institute of Computer Applications

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.

References:

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.



Shri Vaishnav Vidhyapeeth Vishwavidhyalaya, Indore

Institute of Computer Applications

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BBAI501	Human Values and Professional Ethics	60	20	20	-	-	3	1	-	4

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Course Educational Objectives (CEOs):

The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of “right” and “good” in individual, social and professional context

Course Outcomes (Cos):

1. Help the learners to determine what action or life is best to do or live
2. Right conduct and good life
3. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect business.

UNIT - 1 Human Values

Values; Types, Features and Classification
Sources of Value System
Values across Cultures.

Unit 2 Morality

Norms, Beliefs, Attitude
Moral Norms, Moral Values
Moral Standards

UNIT 3 Professional Ethics

Ethics; Nature, Characteristics and Needs
Ethics V/s Morals and Values
Ethico-Moral Action
Ethical Codes, Ethical Practices



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Institute of Computer Applications

Unit 4 Nature and Dimensions of Attitude

Components of Attitude
Attitude Formation
Functions of Attitude
Changing Attitude

Unit 5 Moral Values and Character Building

Character; Meaning, Important
Components of Character
Character Development

Suggested Readings

1. Beteille Andre (1991), Society and Politics in India, Athlone Press, , Latest edition
2. Chakraborty S. K. (1999), Values and Ethics for Organizations, oxford university press ,Latest edition
3. Fernando, A.C.(2009), Business Ethics - An Indian Perspective, Pearson Education, India, , Latest edition
4. Charles D. Fleddermann (2012), "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, (Indian Reprint) , , Latest edition
5. Boatright John R (2012), "Ethics and the Conduct of Business", Pearson Education, New Delhi, , Latest edition
6. Crane, Andrew and Matten Dirk (2015), Business ethics, Oxford University Press Inc., New York. ,Latest edition
7. Murthy, C.S.V.(2016), Business Ethics – Text and Cases, Himalaya Publishing House Pvt. Ltd., Latest Edition
8. Naagrajan,R.R (2016), Professional Ethics and Human Values, New Age International Publications, , Latest edition
9. Campbell, V., & Bond, R. (1982). Evaluation of a character education curriculum. In D. McClelland, Education for values. New York: Irvington Publishers, Latest Edition.
10. R. S. Dwivedi (1995), “Human Relations and Organizational Behavior: A Global perspective”, Macmillan Latest Edition



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			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BCCA306	COMPULSORY	Lab-1 (DBMS Lab)	0	0	0	30	20	0	0	6	3

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- 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.



Shri Vaishnav Vidhyapeeth Vishwavidhyalaya, Indore

Institute of Computer Applications

- 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'.
 - 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 number of all employees who live in Delhi and whose company is in Gurgaon or if both conditions are true.
 - List the number 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 than 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.



Shri Vaishnav Vidhyapeeth Vishwavidhyalaya, Indore

Institute of Computer Applications

- Create a trigger on table company for deletion where the whole table is displayed when delete operation is performed.

References

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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
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BCCA307	COMPULSORY	Lab-2 (Visual Basic Programming)	0	0	0	30	20	0	0	4	2

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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 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.



Shri Vaishnav Vidhyapeeth Vishwavidyalaya, Indore

Institute of Computer Applications

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 FrmMDI , splash form and CountNumbers form and a menu that display the option Form and an Exit .

References

- 1 Steven Holzner -Visual Basic 6 Black Book, The Coriolis Group.
- 2 Evangelos Petroustos ,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.