KANNUR UNIVERSITY

(Abstract)

Bachelor of Computer Application (UG) programme under Choice Based Credit and Semester System (OBE)- updated Scheme and Syllabus- Implemented w.e.f 2019 admission - approved-orders issued

---

ACADEMIC C SECTION

Acad/C2/12371/2019 Dated: 11.06.2020

Read:-1. U.O No. Acad.C2/12371/2019/i dated 21/06/2019

2. Letter dated 03.03.2020 from the Chairman, BoS in Computer Science (UG)

3. The Minutes of the meeting of Board of Studies in Computer Science (UG), held on 13.03.2020

4. E-mail received from the Chairman, BoS in Computer Science,(UG), dated 27/05/2020

ORDER

1. As per paper read (1) above, the Scheme and Syllabus and Model Question papers of the Bachelor of Computer Application (BCA) programme was implemented in affiliated colleges w.e.f 2019 admission.

2. Thereafter,the Chairman, Board of Studies in Computer Science(UG) vide paper read (2) requested to convene a meeting of the Board of Studies in Computer Science (UG) to incorporate some modifications in the BCA Syllabus, based on the suggestions and recommendations received from the experts in the field of IT and Academics.

3. Subsequently,the meeting of Board of Studies in Computer Science (UG) held on 13.03.2020, recommended to update the existing syllabus of the Bachelor of Computer Application (BCA) 2019 admission, vide paper read (3) above and the Chairman submitted the updated Syllabus of the BCA programme(2019 admission onwards),vide the paper read(4) above,as recommended by the Board of Studies.

4. The Following modifications were recommended by the Board of studies in Computer Science (UG) in the BCA Syllabus.

(i) To include '**Generic Elective: Open**' in the Introduction

(ii) Updated the following syllabus

- **2B05BCA (Lab II: Programming in C++)**
- **3A12BCA (Data structure)**
- **4A14BCA (Discrete Mathematical Structures)**
- **4A15BCA (Lab III: Data Structure and DBMS)**
- **4B11BCA (Lab IV: Java Programming, shell programming & Linux Administration)**
- **5D03BCA (Database Management System)**

(iii) The Core Course **VIII- 4B08 BCA Operating System** changed to **4B08BCA Software Engineering** and update the syllabus

(iv) The Core Course **XII- 5B12BCA Software Engineering** changed to **5B12BCA Operating System** and also updated the syllabus.

5. The Vice Chancellor, after examining the matter in detail and in exercise of the powers of the Academic Council as per section 11(1) Chapter III of Kannur University Act 1996 has accorded sanction ***to implement the aforesaid modifications as detailed in para(4), in the Scheme and Syllabus of the BCA(Bachelor of Computer Application) programme under CBCSS (OBE) with effect from 2019 admission,*** subject to reporting before the Academic Council.

6. The U O read vide paper (1) above, stands modified to this extent.

Orders are issued accordingly.

Sd/-
BALACHANDRAN V K
DEPUTY REGISTRAR (ACAD)
For REGISTRAR

To: 1.The Principals of Colleges of offering Bachelor of Computer Application BCA) programme.
2.The Examination Branch (through the PA to CE)

Copy To: 1. The Chairman BoS in Computer Science(UG)
2. PS to VC/ PA to PVC/ PA to Registrar
3.DR/AR I Academic/ES I Section
4. The Computer Programmer
(For uploading in the University Website)
5. SF/DF/FC

Forwarded / By Order

SECTION OFFICER

KANNUR UNIVERSITY
CIVIL STATION P.O.
KANNUR
Pin-670 002
THAVAKKARA

KANNUR UNIVERSITY

BOARD OF STUDIES-COMPUTER SCIENCE (UG)

SYLLABUS FOR
BACHELOR OF COMPUTER APPLICATIONS
CORE AND GENERIC ELECTIVE COURSES

CHOICE BASED CREDIT SEMESTERSYSTEM
(OBE-Outcome Based Education System)

(2019 ADMISSION ONWARDS)

Generic Elective: Open

KANNUR UNIVERSITY

BCA PROGRAMME

WORK AND CREDIT DISTRIBUTION STATEMENT

Semester	Course Title*	Credits	Hours per week	Total Credits	Total Hours
I	Common Course – English I	4	5	19	25
	Common Course – English II	3	4		
	Common Course – Additional Language I	4	5		
	General Awareness Course I – 1A11BCA Informatics for Computer Applications	2	3		
	Core Course I – 1B01BCA Programming In C	2	2		
	Core Course IV – 2B04BCA Lab I: Programming In C*	0	2		
	Complementary Elective (Mathematics I)	4	4		
II	Common Course – English III	4	5	22	25
	Common Course – English IV	3	4		
	Common Course – Additional Language II	4	5		
	Core Course II – 2B02BCA Digital Systems	3	3		
	Core Course III – 2B03BCAObject Oriented Programming Using C++	2	2		
	Core Course IV – 2B04BCA Lab I: Programming In C*	1	0		
	Core Course V – 2B05BCA Lab II: Programming In C++*	1	2		
	Complementary Elective (Mathematics II)	4	4		
III	General Awareness Course II – 3A12BCA Data Structures	4	4	18	25
	General Awareness Course III – 3A13BCA Database Management System	4	4		
	Core Course VI – 3B06BCAIntroduction to Microprocessors	3	4		
	Core Course VII – 3B07BCAJava Programming	3	4		
	General Awareness Course V – 4A15BCA Lab III: Data Structure and DBMS**	0	3		
	Core Course XI – 4B11BCA Lab IV: Java Programming, Shell Programming & Linux Administration**	0	2		
	Complementary Elective (Mathematics III)	4	4		
IV	General Awareness Course IV – 4A14BCA Discrete Mathematical Structures	4	4	21	25
	Core Course VIII – 4B08BCA Software Engineering	3	4		

	Core Course IX – 4B09BCAComputer Organization	3	4		
	Core Course X – 4B10BCA Linux Administration	3	4		
	General Awareness Course V – 4A15BCA Lab III: Data Structure and DBMS**	2	2		
	Core Course XI – 4B11BCA Lab IV: Java Programming, Shell Programming & Linux Administration **	2	3		
	Complementary Elective (Mathematics IV)	4	4		
V	Core Course XII – 5B12BCA Operating Systems	3	3	16	25
	Core Course XIII – 5B13BCAEnterprise Java Programming	4	4		
	Core Course XIV – 5B14BCA- Python Programming	2	2		
	Core Course XV – 5B15BCAWeb Technology	2	2		
	Core Course XVI – 5B16BCA Discipline Specific Elective I	3	4		
	Core Course XXI– 6B21BCA Lab V: Enterprise Java Programming***	0	3		
	Core Course XXII– 6B22BCA Lab VI: Python Programming***	0	3		
	Core Course XXIII– 6B23BCA Lab VII: Web Technology***	0	2		
	General Elective Course	2	2		
VI	Core Course XVII – 6B17BCA Design and Analysis of Algorithm	4	4	24	25
	Core Course XVIII – 6B18BCA Introduction to Compiler	3	4		
	Core Course XIX – 6B19BCA Data Communication & Networks	3	3		
	Core Course XX – 6B20BCA Discipline Specific Elective II	3	3		
	Core Course XXI– 6B21BCA Lab V: Enterprise Java Programming***	2	2		
	Core Course XXII– 6B22BCA Lab VI: Python Programming***	3	2		
	Core Course XXIII– 6B23BCA Lab VII: Web Technology***	2	2		
	Core Course XXIV – 6B24BCA Project	4	5		
Total				120	150

*External examination will be conducted at the end of second semester

**External examination will be conducted at the end of fourth semester

***External examination will be conducted at the end of sixth semester

Complementary Elective: Mathematics

PART A

BCA CORE COURSES
WORK AND CREDIT DISTRIBUTION

(2019 ADMISSION ONWARDS)

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HRS	MARKS (INTERNAL + EXTERNAL)
1A11BCA	INFORMATICS FOR COMPUTER APPLICATIONS	1	3	2	3	10+40
1B01BCA	PROGRAMMING IN C	1	2	2	3	10+40
2B02BCA	DIGITAL SYSTEMS	2	3	3	3	10+40
2B03BCA	OBJECT ORIENTED PROGRAMMING USING C++	2	2	2	3	10+40
2B04BCA	LAB I: PROGRAMMING IN C	2	I SEM 2 II SEM 0	1	3	5+20
2B05BCA	LAB II: PROGRAMMING IN C++	2	2	1	3	5+20
3A12BCA	DATA STRUCTURES	3	4	4	3	10+40
3A13BCA	DATABASE MANAGEMENT SYSTEM	3	4	4	3	10+40
3B06BCA	INTRODUCTION TO MICROPROCESSORS	3	4	3	3	10+40
3B07BCA	JAVA PROGRAMMING	3	4	3	3	10+40
4A14BCA	DISCRETE MATHEMATICAL STRUCTURES	4	4	4	3	10+40
4B08BCA	SOFTWARE ENGINEERING	4	4	3	3	10+40
4B09BCA	COMPUTER ORGANIZATION	4	4	3	3	10+40
4B10BCA	LINUX ADMINISTRATION	4	4	3	3	10+40
4A15BCA	LAB III: DATA STRUCTURES AND DBMS	4	III SEM 3 IV SEM 2	2	3	5+20
4B11BCA	LAB IV: JAVA PROGRAMMING, SHELL PROGRAMMING & LINUX ADMINISTRATION	4	III SEM 2 IV SEM 3	2	3	5+20
5B12BCA	OPERATING SYSTEMS	5	3	3	3	10+40
5B13BCA	ENTERPRISE JAVA PROGRAMMING	5	4	4	3	10+40
5B14BCA	PYTHON PROGRAMMING	5	2	2	3	10+40
5B15BCA	WEB TECHNOLOGY	5	2	2	3	10+40
5B16BCA	DISCIPLINE SPECIFIC ELECTIVE I	5	4	3	3	10+40
5D--BCA	GENERIC ELECTIVE COURSE	5	2	2	2	5+20
6B17BCA	DESIGN AND ANALYSIS OF ALGORITHM	6	4	4	3	10+40
6B18BCA	INTRODUCTION TO COMPILER	6	4	3	3	10+40

6B19BCA	DATA COMMUNICATION & NETWORKS	6	3	3	3	10+40
6B20BCA	DISCIPLINE SPECIFIC ELECTIVE II	6	3	3	3	10+40
6B21BCA	LAB V: ENTERPRISE JAVA PROGRAMMING	6	V SEM 3 VI SEM 2	2	3	5+20
6B22BCA	LAB VI: PYTHON PROGRAMMING	6	V SEM 3 VI SEM 2	3	3	5+20
6B23BCA	LAB VII: WEB TECHNOLOGY	6	V SEM 2 VI SEM 2	2	3	5+20
6B24BCA	PROJECT	6	5	4	-	20+80
*AN INDUSTRIAL VISIT (STUDY TOUR) IS RECOMMENDED FOR THE PROJECT WORK						

LIST OF DISCIPLINE SPECIFIC ELECTIVE COURSES

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HRS
5B16BCA-E01	INFORMATION SECURITY	5	4	3	3
5B16BCA-E02	MOBILE COMMUNICATIONS	5	4	3	3
5B16BCA-E03	C# AND .NET PROGRAMMING	5	4	3	3
5B16BCA-E04	BIO-INFORMATICS	5	4	3	3
6B20BCA-E01	DATA MINING AND DATA WAREHOUSING	6	3	3	3
6B20BCA-E02	NETWORK PROGRAMMING	6	3	3	3
6B20BCA-E03	DIGITAL IMAGE PROCESSING	6	3	3	3
6B20BCA-E04	CLOUD COMPUTING	6	3	3	3

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	80%
INTERNAL	20%

CORE COURSE V: 2B05BCA LAB II- PROGRAMMING IN C++

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2B05BCA	2	1	3

Program List

Students have to practice all programs . All programs must be based on OOP concepts.

1. Program to add one day to a given date.
2. Program to find the trace and transpose of a matrix.
3. Create a class time comprises hr, min and sec.as member data and add() and display() as member functions. Use constructor to initialise the object. Write a main function to add two time objects, store it in another time object and display the resultant time (constructors)
4. Program to find biggest, smallest, sum and difference of two numbers using inline function.
5. Program to find the area and volume of respective figures using function overloading.
6. Program to add the elements of an array to the corresponding elements of another array
7. Program to negate the elements of an array. Use operator overloading function with the operator -. (operator overloading – unary)
8. Program to compare two strings. Use operator overloading (==). Do not use any built in functions. (operator overloading – binary)
9. Program for Addition / Subtraction / Multiplication of complex numbers using classes. (operator overloading)
10. Define a class student with name, reg.no, date of birth and name of college as member data and functions to get and display these details. Design another class Test with subjects of study and grade for each subject as member data and corresponding input and output functions. Derive a class Result from both Student and Test classes and Print the Result of each student with relevant information. (inheritance)
11. Start with an array of pointers to strings representing the days of the week. Provide functions to sort the strings into alphabetical order. Use pointers (array of pointers)
12. Design two classes A and B with member data a and b respectively. Set values for the data member. Write a program to increment the interchange the values of both A and B. Use friend function. (friend functions)
13. Design a class employee with relevant details. Read the details of n employees from the keyboard and write it into a File named 'EmpDataFile'. Also read the details back from the same file and display. Use separate functions to write and read into and out of the file. (can use object pointers)
14. Define a class to represent a bank account. Include the following members :
    - Data Members:

1. Name of the depositor.
2. Account number.
3. Type of account.
4. Balance amount in the account.
   - Member Functions
5. To assign initial values.
6. To deposit an amount.
7. To withdraw an amount after checking the balance.
8. To display name and balance.
   - Use appropriate main program. (application level calsspgm)

15. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called TRIANGLE and RECTANGLE from the base SHAPE. Add to the base lass, a member function get_data() to initialize base class data members and another member function display_area() to compute and display the area of figures. Make display_area() as a virtual function and redefine this function in the derived class to suite the requirements (virtual functions)

GENERAL AWARENESS COURSE II : 3A12BCA DATA STRUCTURES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
III	3A12BCA	4	4	3

COURSE OUTCOME

CO1: Understand the concept of data structures and its relevance in computer science.
CO2: Familiarize with selected linear and nonlinear data structures.
CO3: Enhance skill in programming.

Unit I:

Data structures: Definition and Classification. Array: - Operations; Number of elements; Array representation in memory. Polynomial representation with arrays; Polynomial addition. Sparse matrix: Addition of sparse matrices. The concept of recursion: types, example: factorial and Tower of Hanoi problem . (12 Hrs)

Unit II:

Sorting algorithms: Insertion, bubble, selection, quick and merge sort; Comparison of Sort algorithms. Searching techniques: Linear and Binary search. (12 Hrs)

Unit III:

Stack: Operations on stack; array representation. Application of stack- i. Postfix expression evaluation. ii. Conversion of infix to postfix expression. Queues: Operation on queue. Circular queue; Dequeue, and priority queue. Application of queue: Job scheduling. (15 Hrs)

Unit IV:

Linked list – Comparison with arrays; representation of linked list in memory. Singly linked list- structure and implementation; Operations – traversing; Add new node; Delete node; Reverse a list; Search and merge two singly linked lists. Stack with singly linked list. Circular linked list – advantage. Queue as Circular linked list. Doubly linked list – structure; Operations – Add/delete nodes; Advantages. (15 Hrs)

Unit V:

Tree and Binary tree: Basic terminologies and properties; Linked representation of Binary tree; Complete and full binary trees; Binary tree representation with array. Tree traversal: in order, pre order and post order traversals. Binary Search Tree. Application of binary tree: Huffman Code.
(10 Hrs)

Books for Study:

1. Classic Data structures, Samanta, Second Edition, PHI

Books for Reference:

1. Data Structures and Algorithms: Concepts, Techniques and Applications; GAV Pai, Mc Graw Hill, 2008
2. Fundamentals of Data structures in C++ , 2nd Edn, Horowitz Sahni, Anderson, Universities Press

GENERAL AWARENESS COURSE IV : 4A14BCA DISCRETE MATHEMATICAL STRUCTURES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4A14BCA	4	4	3

COURSE OUTCOME

CO1: Fundamental mathematical concepts and terminology for Computer Science
CO2: Acquire knowledge in Mathematical Logic
CO3: Gain knowledge in Boolean Algebra
CO4: Awareness about the importance of Graph Theory in Computer Science

Unit I :
Set Theory: Basic concepts- Venn diagram- Cartesian product. Functions: injective, subjective, bijective. Mathematical Logic - Propositional Calculus - Statement, Connectives, negation, conjuction, disjunction, conditional, biconditional, statement & equivalence formula- Well Formed Formula (WFF)- Tautologies, Normal Forms, Rules of inference. (15 Hrs)

Unit II:
Functions and Relations: Functions – Types of Functions, Composition of Functions and Inverse Functions. Relations - Relations and Their Properties, Functions as relations, Closure of Relations, Composition of relations, Equivalence Relations and Partitions. Partial Ordering, Hasse Diagram.The Pigeonhole Principle. (15 Hrs).

Unit III:
Boolean algebra: Definition, laws, Boolean functions and expressions- representation of Boolean expressions- applications of Boolean algebra. (10 Hrs).

Unit IV:
Graph theory 1:Basic concepts- path- circuit- subgraph- bipartite graph- complete bipartite graph- Isomorphic graph-. Trees: Definition- spanning tree- minimal spanning tree (MST)- DFS- BFS- incidence matrix - Traveling salesman's problem. (12 Hrs).

Unit V:
Graph theory ll: Planar graph- Shortest Paths in Weighted Graphs- Euler's Paths and Circuits, Hamiltonian Paths and Circuits. Storage representation and manipulation of graphs. Coloring chromatic number. (12 Hrs).

Books for Study:

1. Discreate Mathematics and Its Applications with Combinatorics and Graph Theory, Kamala Krithivasan, McGraw Hill Education, 2011 (Seventh Edition).

Books for Reference:

1. J. K. Sharma, *Discrete Mathematics*, Macmillan Publishers India Limited, ISBN: 1403924759.

2. Alan Doerr and Kenneth Levassur, *Applied Discrete Structure for Computer Science*, Galgotia Publications Pvt. Ltd, ISBN: 9780574217554.

3. Discreate Mathematics , N Ch S N Iyengar, V M Chandrasekharan, KA Venkatesh, PS Arunachalam, Vikas Publishing , 2003.

4. C Liu and D. Mohapatra, *Elements of Discrete Mathematics - A Computer Oriented Approach,* TMH, ISBN: 1259006395.

GENERAL AWARENESS COURSE V: 4A15BCA LAB -III DATA STRUCTURES & DBMS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4A15BCA	III SEM 3 Hrs, IV SEM 2 Hrs	2	3

Program List

Section A: DATA STRUCTURE

1. Add two polynomials.
2. Sequential and binary search : Print number of comparison in each case for given datasets.
3. Insertion sort: number of comparisons and exchanges for given data sets.
4. Bubble sort: Print number of comparisons and exchanges for given data sets.
5. Selection sort: Print number of comparisons and exchanges for given data sets .
6. Quick sort.
7. Stack operation: addition and deletion of elements

8. Queue operation: addition and deletion of elements

9. Conversion of infix expression to postfix.

10. Menu driven program: to add / delete elements to a circular queue. Include necessary error messages.

11. Singly linked list operations : add a new node at the beginning, at the end, after ith node, delete from beginning, end, print the list.

12. Circular linked list : add a new node at the beginning, at the end, after ith node, delete from beginning, end, print the list.

13. Doubly linked list : add a new node at the beginning, at the end, after ith node, delete from beginning, end, print the list.

14. Implement tree traversal.

15. Merge two sorted linked list.

Section B: DBMS

Minimum 10 exercises covering SQL related topics. Sample exercises are given below:

SQL -1

Create table students with fields sno, sname, sex, mark with sno as primary keyand assign suitable constraints for each attribute.Insert five records into the table.

1. Alter the table by adding one more field rank.
2. Display all boy students with their name.
3. Find the Average mark
4. Create a query to display the sno and sname for all students who got More than the
5. average mark. Sorts the results in descending order of mark.
6. Display all girl student names for those who have marks greater than 20 and less than 40.

SQL -2

Create a table department with fields ename, salary, dno, dname, place with dno asprimary key.Insert five records into the table.

1. Rename the field 'place' with 'city'
2. Display the employees who got salary more than Rs.6000 and less than10000 /-
3. Display total salary of the organization
4. Display ename for those who are getting salary in between 5000 and 10000.
5. Create a view named 'Star' with field ename, salary & place
6. Display ename and salary with salary rounded with 10 digits'*'

SQL -3

Create a table department with fields dno, dname, dmanager and place with dno asprimary key.

Create a table emp with fields eno, ename, job, dno, salary, with eno as primary key.Set dno as foreign key.

Insert five records into each table.

1. Display the ename and salary, salary with ascending order
2. Display ename and salary for eno=20,
3. Display the manager for the accounting Department
4. Display the name,salary and manager of all employees who are getting salary > 5000
5. Write the queries using various group functions.
6. Write the queries using various Number functions.

SQL -4

Create a table emp with fields eno,ename, job, manager and salary, with eno as primary key. Insert values into the table.

1. Display ename, salary from emp who are getting salary more than average salary of
2. the organization.
3. ADD 20% DA as extra salary to all employees. Label the coloumn as 'New Salary'
4. Create a query to display the eno and ename for all employees who earn more thanthe average salary. Sort the results in descending order of salary.
5. Create a view called emp_view based on the eno, ename from emp table change theheading for the ename to 'EMPLOY'.
6. Write a query that will display the eno and ename for all employees whose namecontains a 'T'.

SQL -5

Create a table department with fields dno, ename, salary, Designation, dname and place with dno as primary key. Insert values into the table.

1. Write the queries using various Character functions in ename field.
2. Create a query to display the employee number and name for all employees who earnmore than the average salary. Sort the results in descending order of salary.
3. Display all employees who got salary between 5000 &10000
4. Display ename, salary, Designation for those who got salary more than 5000 or hisDesignation is 'clerk'.
5. Display ename and designation those who are not a clerk or manager.
6. Display the names of all employees where the third letter of their name is an 'A'

SQL -6

Create a table Customer with fields cid, cname, date_of_birth and place
Create table loan with fields loanno, cid and bname assigning suitable constraints.
Create table depositor with fields accno, cid, balance and bname assigning suitable constraints.
Insert 5 Records into each table.

1. Add one more field amount to loan table. Update each record. Display cname forcid=2.
2. Calculate Rs 150 extra for all customers having loan.The added loan amount will
3. display in a new coloumn.
4. Display loanno, cname and place of a customer who is residing in Kannur city.
5. Display all information from loan table for loanno 2,8,10.
6. Display all customers who have both loan and deposit.

CORE COURSE XI: 4B11BCA LAB- IV: JAVA PROGRAMMING, SHELL PROGRAMMING & LINUX ADMINISTRATION

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4B11BCA	III SEM 2 Hrs, IV SEM 3 Hrs	2	3

Program List

Java Programming Lab cycle – maintained as it is
Shell Programming Lab cycle – maintained as it is

LINUX ADMINISTRATION - (Lab cycle for Linux configuration part)

1. Linux installation, up gradation, Installation and removal of packages and Installation of a peripheral devices (Printer) – Installation steps and configuration
2. Starting and stopping services in run level. The service command
3. Managing process- viewing status, killing, restarting etc using ps.
4. Adding and deleting user accounts, changing passwords.
5. Changing the environment variables like PATH
6. Scheduling jobs using cron
7. Mounting and unmounting external file systems
8. Setting the value of umask, changing the permissions, changing owner and groups
9. Archiving and Backup using tar. Restoring backup
10. Compressing and uncompressing files using any one tool

GENERIC ELECTIVE COURSE: 5D03BCA DATABASE MANAGEMENT SYSTEM

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5D03BCA	2	2	2

COURSE OUTCOME

CO1: To understand the fundamentals of database management system

CO2: To develop Skill in designing database

CO3: To understand the concept of SQL commands

CO4: To develop Skill in writing queries

Unit I

Introduction–Field, Record, Entity, Attribute, Relation, Domain, Tuple- advantages of database systems- data models (Network model, Hierarchical Model, DBTG CODASYL model, Relational Model(E-R) - system structure. (8 hrs)

Unit II:

Database administrator- data base users, Constraints (Primary, Foreign, Candidate, Unique)- (6 hrs)

Unit III

Relational Algebra (Union, Intersection, Difference, Product, Project, Selection). (6 hrs)

Unit IV:

SQL: Introduction to SQL, database languages, DDL(create, alter, Drop), DML(Insert , Select, Update, Delete) and DCL commands. Data Types in SQL (8 hrs)

Unit V:

SQL Functions(Different Types of Functions), Operators (Arithmetic, Relational, Logical), Sub Quires (in Detail), Clauses (Having, Group By) (8 hrs)

Books for Study:

1. Data Base Concept 3 edition Abraham Silberschatz, Henery f Korth McGraw Hill
2. A Guide to the SQL Standard, C. J. Date and Hugh Darwen, 1997, Addison-Wesley

Books for Reference:

1. An Introduction to Database Systems, C. J. Date, 1994, Addison-Wesley
2. Understanding the New SQL, Jim Melton and Alan R. Simon, 1993, Morgan Kaufmann.
3. Principles of Database & Knowledge Jeffrey D. Ullman, Computer Science Press, 1988

4B08BCA OPERATING SYSTEMS is moved to V Semester and 5B12BCA Software Engineering to the fourth Semester (Courses interchanged maintaining the credit and hours as prescribed earlier)

The software Engineering paper can be moved to IV semester and the Operating Systems paper can be moved to V semester (please consider this as the SE concepts can be introduced before they start the project work in the fifth semester)

CORE COURSE VIII: 4B08BCA SOFTWARE ENGINEERING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4B08BCA	4	3	3

COURSE OUTCOME

CO1: Understand the basic processes in software Development lifecycle.
CO2: Familiarize with different models and theirsignificance.
CO3: Familiarize with requirement engineering and classical software designtechniques.
CO4: Familiarize with various software testing techniques andtools.

Unit I :
Introduction to software engineering-Definition, program versus software, software process, software characteristics, brief introduction about product and process, software process and product matrices; Software life cycle models – Definition, waterfall model, increment process model, evolutionary process model, selection of the life cycle model. (14Hrs)

Unit II :
Software Requirement Analysis and Specification – Requirements engineering, types of requirements, feasibility studies, requirement elicitation, various steps of requirement analysis, requirement documentation, requirement validation. (14Hrs)

Unit III :
Software design – definition, various types, objectives and importance of design phase, modularity, strategy of design, function-oriented design, IEEE recommended practice for software designdescriptions. (14Hrs)

Unit IV :
Objected Oriented Design – Analysis, design concept, design notations and specifications, design methodology. (12Hrs)

Unit V :
Software Testing – What is testing, Why should we test, who should do testing? Test case and Test suit, verification and validation, alpha beta and acceptance testing, functional testing , techniques to design test cases , Boundary value analysis, equivalence class testing, decision table based testing; structural testing , path testing , Graph matrices , Data flow testing , levels of testing ,unit testing , integration testing, system testing , validationtesting (20 hrs)

V Semester

CORE COURSE XII: 5B12BCA OPERATING SYSTEM

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5B12BCA	3	3	3

COURSE OUTCOME

CO1: Understand the basic concepts, structure and functions of operating systems.
CO2: Understand the principles behind the techniques in resource management
CO3: Knowledge about the basic design of the OS

OPERATING SYSTEMS OVERVIEW (10 hours)

Operating System Structure, Operating system operations, Functions : Process Management, Memory Management, Storage Management, Protection and Security. Operating System Services, User Operating System Interface, System Calls, OS design and implementation , Operating System Structure

UNIT II

PROCESS MANAGEMENT (14 hrs)

Processes:Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication. CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms. Deadlocks: System Model ,Deadlock Characterization , Methods for Handling Deadlocks , Deadlock Prevention, Deadlock Avoidance,Deadlock Detection, Recovery from Deadlock

UNIT III

MEMORY MANAGEMENT (12 hrs)

Main Memory : Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Tables. Virtual Memory : Background, Demand Paging, Page Replacement. OS examples

UNIT IV

STORAGE MANAGEMENT (10 hrs)

Mass Storage Structure : Overview, Disk Scheduling , Disk Management. File System Storage: File Concepts, Directory and Disk Structure, File Sharing, Protection. File System Implementation: File

System Structure, Directory Structure, Allocation Methods, Free Space Management.

UNIT V

I/O SYSTEMS (6 hrs)

I/O systems : Overview, I/O hardware, Application I/O interface. Kernel I/O subsystem, Transforming I/O Requests to Hardware Operations.

TEXT BOOK:

Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2012

REFERENCES:

- Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.
- D M Dhamdhere, "Operating Systems: A Concept-Based Approach", Second Edition, Tata McGraw-Hill Education,