UNIVERSITY ⚜ OF MYSORE

Estd. 1916

VishwavidyanilayaKaryasoudha
Crawford Hall, Mysuru- 570 005

No.AC2(S)/151/2020-21

Dated: 10.10.2022

Notification

Sub:- Syllabus and Examination Pattern of Computer Science (UG)
(III & IV Semester) with effective from the Academic year
2022-23 as per NEP-2020.

Ref:-
1. Decision of Board of Studies in of Computer Science (UG) meeting held on 26-08-2022.
2. Decision of the Faculty of Science & Technology Meeting held on 15-09-2022.
3. Decision of the Academic Council meeting held on 23-09-2022.

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The Board of Studies in Computer Science (UG) which met on 26-08-2022 has recommended & approved the syllabus and pattern of Examination of Computer Science Course (III & IV Semester) with effective from the Academic year 2022-23 as per NEP -2020.

The Faculty of Science & Technology and Academic Council at their meetings held on 15-09-2022 and 23-09-2022 respectively has also approved the above said syllabus and hence it is hereby notified.

The syllabus and Examination pattern is annexed herewith and the contents may be downloaded from the University Website i.e., www.uni-mysore.ac.in.

Draft Approved by the Registrar

Deputy Registrar(Academic)
Deputy Registrar (Academic)
University of Mysore
Mysore-570 005

To:-

1. All the Principal of affiliated Colleges of University of Mysore, Mysore.
2. The Registrar (Evaluation), University of Mysore, Mysuru.
3. The Chairman, BOS/DOS, in Computer Science, Manasagangothri, Mysore.
4. The Dean, Faculty of Science & Technology, DoS in Earth Science, MGM.
5. The Director, Distance Education Programme, Moulya Bhavan, Manasagangotri, Mysuru.
6. The Director, PMEB, Manasagangothri, Mysore.
7. Director, College Development Council , Manasagangothri, Mysore.
8. The Deputy Registrar/Assistant Registrar/Superintendent, Administrative Branch and Examination Branch, University of Mysore, Mysuru.
9. The PA to Vice-Chancellor/ Registrar/ Registrar (Evaluation), University of Mysore, Mysuru.
10. Office Copy

Curriculum for BCA

Semester	Core Courses	Hour / Week Theory	Lab	DS Elective Courses	Hours/ Week
III	Database Management Systems	3			
	C# and .NET Technologies	3			
	Computer Networks	3			
	DBMS Lab		4		
	C# and .NET Technologies Lab		4		
IV	Python Programming	3			
	Multimedia Animation	3			
	Operating System Concepts	3			
	Multimedia Animation Lab		4		
	Python Programming Lab		4		

Course Title: **Open Source Tools**	Course Credits: 2 (1L+0T+2P)
Semester: III	Duration of SEE: 01 Hour
Total Contact Hours: 13 hours of theory and 26-28 hours of practicals	SEE: 30 Marks IA: 20 Marks

Course Outcomes (COs):

- Recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves
- Use appropriate open source tools based on the nature of the problem
- Write code and compile different open-source software.

Course Content (Open Source Tools)

Module	Details of topic	Duration
Module 1: **Open Source** **Softwares**	i. Introduction to Open sources, Need of Open Sources, Open Source –Principles, Standard Requirements, Advantages of Open Sources. ii. Free Software – FOSS iii. Licenses – GPL, LGPL, Copyrights, Patents, Contracts & Licenses and Related Issues iv. Application of Open Sources. Open Source Operating Systems : FEDORA, UBUNTU	06 hours
Module 2: **Programming** **with case** **studies**	i. Usage of design Tools like Argo UML or equivalent ii. Version Control Systems like Git or equivalent iii. Bug Tracking Systems (Trac, BugZilla) iv. BootStrap v. Apache vi. Berkeley Software Distribution vii. Mozilla (Firefox) viii. Wikipedia ix. Joomla x. GNU Compiler Collection xi. Libre Office	07 hours

Text Book:

1. Kailash Vadera, Bhavyesh Gandhi, "Open Source Technology", Laxmi Publications Pvt. Ltd 2012, 1st Edition.

Reference Book:

1. Fadi P. Deek and James A. M. McHugh, "Open Source: Technology and Policy", Cambridge Universities Press 2007.

<mark>Model Syllabus for BCA (Basic and Honors), Semesters III and IV</mark>

<mark>**Semester: III**</mark>

Course Title: Database Management Systems	Course code: CAC07
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Explain the various database concepts and the need for database systems.

- Identify and define database objects, enforce integrity constraints on a database usingDBMS.

- Demonstrate a Data model and Schemas in RDBMS.

- Identify entities and relationships and draw ER diagram for a given real-worldproblem.

- Convert an ER diagram to a database schema and deduce it to the desired normalform.

- Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.

- Explain the transaction processing and concurrency control techniques.

Unit	Description	Hours
1	**Database Architecture:** Introduction to Database system applications. Characteristics and Purpose of database approach. People associated with Database system. Data models. Database schema. Database architecture. Data independence. Database languages, interfaces, and classification of DBMS. **E-R Model:** Entity-Relationship modeling: E – R Model Concepts: Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute, and domain of an attribute. Relationships between the entities. Relationship types, roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E -R diagram.	14
2	**Relational Data Model:** Relational model concepts. Characteristics of relations. Relational model constraints: Domain constrains, key constraints, primary & foreign key constraints, integrity constraints and null values **Relational Algebra:** Basic Relational Algebra operations. Set theoretical operations on relations. JOIN operations Aggregate Functions and Grouping.Nested Sub Queries-Views.	14

3	**Data Normalization:** Anomalies in relational database design. Decomposition. Functional dependencies – Axioms, minima and maxima cover. Normalization. First normal form, Second normal form, Third normal form. Boyce-Codd normal form. **Query Processing Transaction Management:** Introduction Transaction Processing. Single user & multiuser systems. Transactions: read & write operations. Need of concurrency control: The lost update problem, Dirty read problem. Types of failures. Transaction states. Desirable properties(ACID properties) of Transactions.	14

References:

1. Fundamentals of Database Systems, Ramez Elamassri, Shankant B. Navathe, 7th Edition, Pearson, 2015

2. An Introduction to Database Systems, Bipin Desai, Galgotia Publications, 2010.

3. Introduction to Database System, C J Date, Pearson, 1999.

4. Database Systems Concepts, Abraham Silberschatz, Henry Korth, S.Sudarshan, 6th Edition, McGraw Hill, 2010.

5. Database Management Systems, Raghu Rama Krishnan and Johannes Gehrke, 3rd Edition, McGraw Hill, 2002

Course Title: DBMS Lab	Course code: CAC07P
Total Contact Hours: 52	Hours/week : 04
Formative Assessment Marks: 25	Course Credits: 02
Exam Marks: 25	Duration of Exam: 03 Hours

Course Outcomes (COs):

Student would be able to create tables, execute queries

1. Execute a single line query and group functions.
2. Execute DDL Commands.
3. Execute DML Commands
4. Execute DCL and TCL Commands.
5. Implement the Nested Queries.
6. Implement Join operations in SQL
7. Create views for a particular table
8. Implement Locks for a particular table

Activity 1:
Database: Student (DDL, DML Statements)
Table: Student

Name	RegNo	Class	Major
Smith	17	1	CS
Brown	8	2	CS

Table: Course

CourseName	CourseNumber	CreditHours	Department
Introduction to Computer Science	CS1310	4	CS
Data Structure	CS3320	4	CS
Discrete Mathematics	MATH2410	3	MATH
Database Management Systems	CS3380	3	CS

Table: Section

Section_Identifier	CourseNumber	Year	Instructor
85	MATH2410	98	King
92	CS1310	98	Andreson
102	CS3320	99	Knuth
112	MATH2410	99	Chang
119	CS1310	99	Andreson
135	CS3380	99	Stone

Table: Grade_Report

RegNo	Section_Identifier	Grade
17	112	B
17	119	C
8	85	A
8	92	A
8	102	B
8	135	A

- Create Tables using create statement
- Insert rows to individual tables using insert statement
- Alter table section add new field section and update the records
- Delete brown's grade report
- Drop the table section

Activity 2: (Select clause, Arithmetic Operators)

Database: Employee

Create Following **tables** and insert **tuples** with suitable constraints

Table: Employee

Emp_Id	First_Name	Last_Name	Hire_Date	Address	City
1001	George	Smith	11-May-06	83 first street	Paris
1002	Mary	Jones	25-Feb-08	842 Vine Ave	Losantiville
1012	Sam	Tones	12-Sep-05	33 Elm St.	Paris
1015	Peter	Thompson	19-Dec-06	11 Red Road	Paris
1016	Sarath	Sharma	22-Aug-07	440 MG Road	New Delhi
1020	Monika	Gupta	07-Jun-08	9 Bandra	Mumbai

Table : Empsalary

Emp_Id	Salary	Benefits	Designation
1001	10000	3000	Manager
1002	8000	1200	Salesman
1012	20000	5000	Director
1015	6500	1300	Clerk
1016	6000	1000	Clerk
1020	8000	1200	Salesman

Write queries for the following

1. To display FIRSTNAME, LASTNAME, ADDRESS AND CITY of all employees living in PARIS.

2. To display the content of employee table in descending order of FIRSTNAME

3. Select FIRSTNAME and SALARY of salesman

4. To display the FIRSTNAME, LASTNAME, AND TOTAL SALARY of all employees from the table EMPLOYEE and EMPSALARY. Where TOTAL SALARY is calculated as SALARY+BENEFITS

5. List the Names of employees, who are more than 1 year old in the organization

6. Count number of distinct DESINGATION from EMPSALARY

7. List the employees whose names have exactly 6 characters

8. Add new column PHONE_NO to EMPLOYEE and update the records

9. List employee names, who have joined before 15-Jun-08 and after 16-Jun-07

10. Generate Salary slip with Name, Salary, Benefits, HRA-50%, DA-30%, PF-12%, Calculate gross. Order the result in descending order of the gross.

3

Activity 3: (Logical, Relational Operators)

Database: Library
Create Following **tables** and insert **tuples** with suitable constraints

Table: Books

Book_Id	Book_Name	Author_Name	Publishers	Price	Type	Quantity
C0001	The Klone and I	Lata Kappor	EPP	355	Novel	5
F0001	The Tears	William Hopkins	First Publ	650	Fiction	20
T0001	My First C++	Brain & Brooke	ERP	350	Text	10
T0002	C++ Brainwork's	A.W.Rossaine	TDH	350	Text	15
F0002	Thunderbolts	Ana Roberts	First Publ.	750	Fiction	50

Table: Issued

Book_Id	Quantity_Issued
T0001	4
C0001	5
F0001	2
T0002	5
F0002	8

Write queries for the following

1. To show Book name, Author name and price of books of **First Publ**. publisher

2. Display Book id, Book name and publisher of books having quantity more than 8 and price less than 500

3. Select Book id, book name, author name of books which is published by other than ERP publishers and price between 300 to 700

4. Generate a Bill with Book_id, Book_name, Publisher, Price, Quantity, 4% of VAT "Total"

5. Display book details with book id's C0001, F0001, T0002, F0002 (Hint: use IN operator)

6. Display Book list other than, type Novel and Fiction

7. Display book details with author name starts with letter 'A'

8. Display book details with author name starts with letter 'T' and ends with 'S'

9. Select Book_Id, Book_Name, Author Name , Quantity Issued where Books.Books_Id = Issued.Book_Id

10. List the book_name, Author_name, Price. In ascending order of Book_name and then on descending order of price

Activity 4: (Date Functions)

Database: Lab

Create Following **table** and insert **tuples** with suitable constraints

Table: Equipment_Details

No.	ItemName	Costperitem	Quantity	Dateofpurchase	Warranty	Operational
1	Computer	30000	9	21/5/07	2	7
2	Printer	5000	3	21/5/06	4	2
3	Scanner	8000	1	29/8/08	3	1
4	Camera	7000	2	13/6/05	1	2
5	UPS	15000	5	21/5/08	1	4
6	Hub	8000	1	31/10/08	2	1
7	Plotter	25000	2	11/1/09	2	2

(Use date functions and aggregate functions)

1. To select the ItemName purchase after 31/10/07

2. Extend the warranty of each item by 6 months

3. Display ItemName , Dateof purchase and number of months between purchase date and present date

4. To list the ItemName in ascending order of the date of purchase where quantity is more than 3.

5. To count the number, average of costperitem of items purchased before 1/1/08

6. To display the minimum warranty , maximum warranty period

7. To Display the day of the date , month , year of purchase in characters

8. To round of the warranty period to month and year format.

9. To display the next Sunday from the date '07-JUN-96'

10. To list the ItemName, which are within the warranty period till present date

Activity 5: (Numeric, character functions)
Use Functions for the following

1. Find the mod of 165,16

2. Find Square Root of 5000

3. Truncate the value 128.3285 to 2 and -1 decimal places

4. Round the value 92.7683 to 2 and -1 decimal places

5. Convert the string 'Department' to uppercase and lowercase

6. Display your address convert the first character of each word to uppercase and rest are in lowercase

7. Combine your first name and last name under the title Full name

8. A) Take a string length maximum of 15 displays your name to the left. The remaining space should be filled with '*'

9. Take a string length maximum of 20 displays your name to the right. The remaining space should be filled with '#'

10. Find the length of the string 'JSS College, Mysore'

11. Display substring 'BASE' from 'DATABASE'

12. Display the position of the first occurrence of character 'o' in Position and Length

13. Replace string Database with Data type

14. Display the ASCII value of ' ' (Space)

15. Display the Character equivalent of 42

Activity 6:

Database: Subject

Create Following **table** and insert **tuples** with suitable constraints

Table - Physics

Regno	Name	Year	Combination
AJ00325	Ashwin	First	PCM
AJ00225	Swaroop	Second	PMCs
AJ00385	Sarika	Third	PME
AJ00388	Hamsa	First	PMCs

Table – Computer Science

Regno	Name	Year	Combination
AJ00225	Swaroop	Second	PMCs
AJ00296	Tajas	Second	BCA
AJ00112	Geetha	First	BCA
AJ00388	Hamsa	First	PMCs

1. Select all students from physics and Computer Science

2. Select student common in physics and Computer Science

3. Display all student details those are studying in second year

4. Display student those who are studying both physics and computer science in second year

5. Display the students studying only physics

6. Display the students studying only Computer Science

7. select all student having PMCs combination

8. select all student having BCA combination

9. select all student studying in Third year

10. Rename table Computer Science to CS

Database: Railway Reservation System

Create Following **table** and insert **tuples** with suitable constraints

Table: Train Details

Train_No	Train_Name	Start_Place	Destination
RJD16	Rajdhani Express	Bangalore	Mumbai
UDE04	Udhyan Express	Chennai	Hyderabad
KKE55	Karnataka Express	Bangalore	Chennai
CSE3	Shivaji Express	Coimbatore	Bangalore
JNS8	Janashatabdi	Bangalore	Salem

Table: Availability

Train_No	Class	Start_Place	Destination	No_of_seats
RJD16	Sleeper Class	Bangalore	Mumbai	15
UDE04	First Class	Chennai	Hyderabad	22
KKE55	First Class AC	Bangalore	Chennai	15
CSE3	Second Class	Coimbatore	Bangalore	8
JNS8	Sleeper Class	Bangalore	Salem	18

1. Create view **sleeper** to display train no, start place, destination which have sleeper class and perform the following

    a. insert new record

    b. update destination='Manglore' where train no='RJD16'

    c. delete a record which have train no='KKE55'

2. Create view **details** to display train no, train name, class

3. Create view **total_seats** to display train number, start place, use count function to no of seats , group by start place and perform the following

    a. insert new record

    b. update start place='Hubli' where train no='JNS8'

    c. delete last row of the view

4. Rename view sleeper to class

5. Delete view details

Activity 8 (group by, having clause)

Database: Bank system

Create Following **table** and insert **tuples** with suitable constraints

Table: Account

Account_No	Cust_Name	Brach_ID
AE0012856	Reena	SB002
AE1185698	Akhil	SB001
AE1203996	Daniel	SB004
AE1225889	Roy	SB002
AE8532166	Sowparnika	SB003
AE8552266	Anil	SB003
AE1003996	Saathwik	SB004
AE1100996	Swarna	SB002

Table: Branch

Branch_ID	Branch_Name	Branch_City
SB001	Malleshwaram	Bangalore
SB002	MG Road	Bangalroe
SB003	MG Road	Mysore
SB004	Jainagar	Mysore

Table: Depositor

Account_No	Branch_Id	Balance
AE0012856	SB002	12000
AE1203996	SB004	58900
AE8532166	SB003	40000
AE1225889	SB002	150000

Table: Loan

Account_No	Branch_Id	Balance
AE1185698	SB001	102000
AE8552266	SB003	40000
AE1003996	SB004	15000
AE1100996	SB002	100000

1. Display Total Number of accounts present in each branch
2. Display Total Loan amount in each branch
3. Display Total deposited amount in each branch by descending order
4. Display max , min loan amount present in each city.
5. Display average amount deposited in each branch , each city
6. Display maximum of loan amount in each branch where balance is more than 25000
7. Display Total Number of accounts present in each city
8. Display all customer details in ascending order of brachid
9. Update Balance to 26000 where accno=AE1003996
10. Display Customer Names with their branch Name

Evaluation Scheme for Lab Examination:

Assessment Criteria	Marks
Writing 2 Programs	10
Execution of 1 Program	10
Viva and Record	05
Total	25

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Course Title: C# and .Net Technologies	Course code: CAC08
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Describe Object Oriented Programming concepts like Inheritance and Polymorphismin C# programming language.

- Interpret and Develop Interfaces for real-time applications.

- Build custom collections and generics in C#.

Unit	Description	Hours
1	**Introduction to .Net Technologies:** Introduction to Web Technologies. HTML Basics, Scripts. Sample Programs. Advantages and Disadvantages of Client-side and Server-side Scripts. Overview of Client-side Technologiesand Server-side Technologies. **Introduction to C#:**Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Control Structures-Methods, Arrays, Strings, Structures, Enumerations.	14
2	**OOPS with C#:** Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading Delegates, Events, Errors and Exceptions. **Introduction to VB.NET**: Introduction VB.NET -IDE – Creating a shortcut to start VB.NET. Maneuverings the Toolbar Auto-hide, Docking and Undocking, Placing and Resizing the Windows, Forms, Properties Window and Solution Explorer. Writing and Event Procedure. Execution Basic Keywords. Data Types. VB.NET statements. Conditional statements: If Else, Select Case, Switch and Choose Loops: Do, For Next, For Each Next, While loop. Arrays.	14
3	**Application Development on .NET:**C#.NET: Building Windows Applications, VB.NET: Windows Forms. Working with Controls, Timer, Picture-box, Group-box, Combo-box, Horizontal and Vertical Scrollbar, Numeric-up-down, Track-bar, and Progress-bar. Subroutines and Functions inVB.NET. Database applications **ADO .NET Connectivity:** Introduction to ADO.NET, ADO vs ADO.NET. Architecture: Data reader, Data adopter, Accessing Data with ADO.NET. Programming Web Applications with Web Forms. ASP .NET applications with ADO.NET	14

References:

1. "Programming in C#", E. Balagurusamy, 4th Edition, Tata McGraw-Hill, 2017.

2. "Visual Basic.NET", Shirish Chavan, 3rd Edition, Pearson Education, 2009.

3. "ASP.NET and VB.NET Web Programming", Matt J. Crouch, Edition 2012.

4. "Computing with C# and the .NET Framework", Arthur Gittleman, 2nd Edition, Jones & Bartlett Publishers, 2011

Course Title: C# and .Net Technologies Lab	Course code: CAC08P
Total Contact Hours: 52	Hours/week : 04
Formative Assessment Marks: 25	Course Credits: 02
Exam Marks: 25	Duration of Exam: 03 Hours

Practicals:

1. Develop a C# .NET console application to demonstrate the conditional statements.
2. Develop a C# .NET console application to demonstrate the control statements.
3. Develop an application in C#.NET that demonstrates the windows controls
4. Demonstrate Multithreaded Programming in C#.NET
5. Demonstrate subroutines and functions in C#.NET
6. Develop an application for deploying various built-in functions in VB.NET
7. Develop an MDI application for Employee Pay-roll transactions in VB.NET
8. Construct a console application to demonstrate the OOP Concepts
9. Develop a web application in VB.NET for dynamic Login Processing
10. Develop a Windows application with database connectivity for core-banking transactions

Evaluation Scheme for Lab Examination:

Assessment Criteria	Marks
Writing 2 Programs	10
Execution of 1 Program	10
Viva and Record	05
Total	25

Course Title: Computer Networks	Course code: CAC09
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Explain the transmission technique of digital data between two or more computersand a computer network that allows computers to exchange data.

- Apply the basics of data communication and various types of computer networks inreal world applications.

- Compare the different layers of protocols.

- Compare the key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI.

Unit	Description	Hours
1	**Introduction:** Computer Networks and its applications, Network structure, network architecture, Topologies, LAN, WAN, MAN, The OSI reference model, The TCP/IP reference model. **The Physical Layer:** Transmission Media – Twisted pair, coaxial cable, optical fiber, radio transmission, microwaves and infrared transmission, Switching – message switching, Multiplexing.	14
2	**The Data Link Layer:** Data Link Layer design issues, Error detection – Single parity checking, Checksum, polynomial codes – CRC, Error correction- Hamming code, Elementary data link protocols, sliding window protocols **The Network Layer:** Network layer design issues, Routing algorithms – Flooding, Distance vector routing, Hierarchical routing, Link state routing, Congestion, control algorithms – Leaky bucket, token bucket algorithm, admission control, Hop by Hop choke packets.	14
3	**The Transport Layer, Presentation Layer and Application Layer:** Elements of Transport service, Elements of Transport, protocols, Internet transport protocols (TCP & UDP), Presentation Layer – Introduction, protocol, Application Layer DNS, Electronic Mailing, and World Wide Web.	14

References:

1. Computer Networks, Andrew S. Tanenbaum, 5th Edition, Pearson Education, 2010.

2. Data Communication & Networking, Behrouza A Forouzan, 3rd Edition, Tata McGraw Hill,2001.

3. Data and Computer Communications, William Stallings, 10th Edition, Pearson Education, 2017.

4. Data Communication and Computer Networks, Brijendra Singh, 3rd Edition, PHI, 2012.

5. Data Communication & Network, Dr. Prasad, Wiley Dreamtech.

6. http://highered.mheducation.com/sites/0072967757/index.htmls

Course Title: Python Programming	Course code: CAC10
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Explain the basic concepts of Python Programming.
- Demonstrate proficiency in the handling of loops and creation of functions.
- Identify the methods to create and manipulate lists, tuples and dictionaries.
- Discover the commonly used operations involving file handling.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Develop the emerging applications of relevant fields using Python.

Unit	Description	Hours
1	**Introduction** to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode and Python IDEs; Simple Python Program. **Python Basics:** Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples. Python Control Flow: Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range () and exit () functions. **Exception Handling:** Types of Errors; Exceptions; Exception Handling usingtry, except and finally. **Python Functions:** Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Recursive Functions; Scope and Lifetime of Variables in Functions.	14
2	**Strings:** Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods. **Lists:** Creating Lists; Operations on Lists; Built-in Functions on Lists; Implementation of Stacks and Queues using Lists; Nested Lists. Dictionaries: Creating Dictionaries; Operations on Dictionaries; Built-in Functions on Dictionaries; Dictionary Methods; Populating and Traversing Dictionaries. **Tuples and Sets:** Creating Tuples; Operations on Tuples; Built-in Functions on Tuples; Tuple Methods; Creating Sets; Operations on Sets; Built-inFunctions on Sets; Set Methods	14 15

	File Handling: File Types; Operations on Files– Create, Open, Read, Write, Close Files; File Names and Paths; Format Operator.	
3	**Object Oriented Programming:** Classes and Objects; Creating Classes and Objects; Constructor Method; Classes with Multiple Objects; Objects as Arguments; Objects as Return Values; Inheritance- Single and Multiple Inheritance, Multilevel and Multipath Inheritance; Encapsulation- Definition, Private Instance Variables; Polymorphism- Definition, Operator Overloading. **GU Interface:** The tkinter Module; Window and Widgets; Layout Management- pack, grid and place. **Python SQLite:** The SQLite3 module; SQLite Methods- connect, cursor, execute, close; Connect to Database; Create Table; Operations on Tables- Insert, Select, Update. Delete and Drop Records. **Data Analysis:** NumPy- Introduction to NumPy, Array Creation using NumPy, Operations on Arrays; Pandas- Introduction to Pandas, Series and DataFrames, Creating DataFrames from Excel Sheet and .csv file, Dictionary and Tuples. Operations on DataFrames. **Data Visualisation:** Introduction to Data Visualisation; Matplotlib Library; Different Types of Charts using Pyplot- Line chart, Bar chart and Histogram and Pie chart.	14

References:

1. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition, Green Tea Press. Freely available online @ https://www.greenteapress.com/thinkpython/thinkCSpy.pdf, 2015.

2. Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019.

3. Python Data Analytics: Data Analysis and Science Using Pandas, matplotlib, and the Python Programming Language, Fabio Nelli, Apress®, 2015

4. Advance Core Python Programming, MeenuKohli, BPB Publications, 2021.

5. Core PYTHON Applications Programming, Wesley J. Chun, 3rd Edition, Prentice Hall, 2012.

6. Automate the Boring Stuff, Al Sweigart, No Starch Press, Inc, 2015.

7. Data Structures and Program Design Using Python, D Malhotra et al., Mercury Learning and Information LLC, 2021.

8. http://www.ibiblio.org/g2swap/byteofpython/read/

9. https://docs.python.org/3/tutorial/index.html

Course Title: Python Programming Lab	Course code: CAC10P
Total Contact Hours: 52	Hours/week : 04
Formative Assessment Marks: 25	Course Credits: 02
Exam Marks: 25	Duration of Exam: 03 Hours

Programs for Practical Component:

Part-A
1. Check if a number belongs to the Fibonacci Sequence
2. Solve Quadratic Equations
3. Find the sum of n natural numbers
4. Display Multiplication Tables
5. Check if a given number is a Prime Number or not
6. Implement a sequential search
7. Create a calculator program
8. Explore string functions

9. Implement Selection Sort
10. Implement Stack
11. Read and write into a file

Part-B
1. Demonstrate usage of basic regular expression
2. Demonstrate use of advanced regular expressions for data validation.
3. Demonstrate use of List
4. Demonstrate use of Dictionaries
5. Create SQLite Database and Perform Operations on Tables
6. Create a GUI using Tkinter module
7. Demonstrate Exceptions in Python
8. Drawing Line chart and Bar chart using Matplotlib
9. Drawing Histogram and Pie chart using Matplotlib
10. Create Array using NumPy and Perform Operations on Array
11. Create DataFramefrom Excel sheet using Pandas and Perform Operations on DataFrames

Note: A minimum of 10 Programs should be done in each Part.

Evaluation Scheme for Lab Examination:

Assessment Criteria	Marks
Writing 2 Programs	10
Execution of 1 Program	10
Viva and Record	05
Total	25

Course Title: Multimedia Animation	Course code: CAC11
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Write a well-designed, interactive Web site with respect to current standards and practices.
- Demonstrate in-depth knowledge of an industry-standard multimedia development tool and its associated scripting language.
- Determine the appropriate use of interactive versus standalone Web applications.

Unit	Description	Hours
1	Web Design: Origins and evolution of HTML, Basic syntax, Basic text markup, Images, Lists, Tables, Forms, Frame, Overview and features of HTML5. CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The <span> and <div> tags; Overview and features of CSS3. JavaScript: Object orientation and JavaScript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input. Introduction to Animation: Definition, The Start and End States, Interpolation, Animations in HTML.	14
2	CSS Animations, Creating a Simple Animation, CSS Animation Property, Keyframes, Declaring Multiple Animations, Wrap-up. CSS Transitions, Adding a Transition, Transitions in Detail, The Longhand Properties, Longhand Properties vs. Shorthand Properties, Working with Multiple Transitions. HTML5 − SVG: Viewing SVG Files, Embedding SVG in HTML5, HTML5 − SVG Circle, HTML5 − SVG Rectangle, HTML5 − SVG Line, HTML5 − SVG Ellipse, HTML5 − SVG Polygon, HTML5 − SVG Polyline, HTML5 − SVG Gradients, HTML5 − SVG Star.	14
3	HTML5 – CANVAS: The Rendering Context, Browser Support, HTML5 Canvas Examples, Canvas - Drawing Rectangles, Canvas - Drawing Paths, Canvas - Drawing Lines, Canvas - Drawing Bezier Curves, Canvas - Drawing Quadratic Curves, Canvas - Using Images, Canvas - Create Gradients, HTML5 - Styles and Colors, Canvas - Text and Fonts, Canvas - Pattern andShadow, Canvas - Save and Restore States, Canvas - Translation, Canvas - Rotation, Canvas - Scaling, Canvas - Transforms, HTML5 Canvas - Composition, Canvas – Animations.	14

References:

1. The Complete Reference HTML and CSS, 5th Edition, Thomas A Powell, 2017

2. Animation in HTML, CSS, and JavaScript, Kirupa Chinnathambi, Createspace Independent Pub, 2013.

3. https://www.w3.org/Style/CSS/current-work#CSS3

4. http://bedford-computing.co.uk/learning/cascading-style-sheets-css/

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Course Title: Multimedia Animation Lab	Course code: CAC11P
Total Contact Hours: 52	Course Credits: 02
Formative Assessment Marks: 25	Duration of SEE/Exam: 03 Hours
Summative Assessment Marks: 25	

List of Lab programs

Part-A

1. Write an HTML program tocreate and display navigations menus using list tags and anchor tag
2. Write an HTML program to display Multi-mediadata (text, images, audios, videos, gifs, etc) on a webpage
3. Write an HTML program to create student Registrations form on submitting the form check whether fields are empty or not using JavaScript. If any fields are empty display an error message
4. Write an HTML program to create bio-data(CV or Resume) and to change the following CSS properties
   - Font
   - Text
   - Background
5. Write an HTML program to create div and apply the following CSS properties on created div
   - Margin
   - Padding
   - Border
   - Box shadow
6. Write an HTML program to create a box and using CSS transform and transition properties move the box to the center of the web page on loading web-page
7. Write an HTML program to create a circle and create an animation of bouncing of the circle for 10 sec
8. Write an HTML program to create page loading animations

Part-B

1. Write an HTML program to draw line, polyline and rectangle and fill rectangle with red color using svg tag.
2. Write an HTML program to draw star and multiple circle and with different color using svg tag Write an HTML program to create logo with linear gradient properties using svg tag.
3. Write an HTML program to draw Square and Rectangle using canvas tag and JavaScript
4. Write an HTML program to draw bezier curve using canvas tag and JavaScript
5. Write an HTML Program to import an external image into a canvas and then to draw on that image
6. Write an HTML program to draw a rectangle box using canvas and to change background color to red, scale of the rectangle to 2 on move-over (hover)properties.
7. Write an html program to draw a circle using canvas and to apply the rotations animations on loading the page

Evaluation Scheme for Lab Examination:

Assessment Criteria	Marks
Writing 2 Programs	10
Execution of 1 Program	10
Viva and Record	05
Total	25

Course Title: Operating System Concepts	Course code: CAC12
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:
- Explain the fundamentals of the operating system.
- Comprehend multithreaded programming, process management, process synchronization, memory management and storage management.
- Compare the performance of Scheduling Algorithms
- Identify the features of I/O and File handling methods.

Unit	Description	Hours
1	**Introduction to Operating System:** Definition, History and Examples of Operating System; Computer System organization; Types of Operating Systems; Functions of Operating System; Systems Calls; Operating System Structure. **Process Management:** Process Concept- Process Definition, Process State, Process Control Block, Threads; Process scheduling- Multiprogramming, Scheduling Queues, CPU Scheduling, Context Switch; Operations on Processes- Creation and Termination of Processes; Inter process communication (IPC)- Definition and Need for Inter process Communication; IPC Implementation Methods- Shared Memory and Message Passing; **CPU Scheduling**: Basic concepts; Scheduling Criteria; Scheduling Algorithms; Multiple-processor scheduling; Thread scheduling; Multiprocessor Scheduling; Real-Time CPU Scheduling.	14
2	**Multithreaded Programming**: Introduction to Threads; Types of Threads; Multithreading- Definition, Advantages; Multithreading Models; Thread Libraries; Threading Issues. **Process Synchronization:** Introduction; Race Condition; Critical Section Problem and Peterson's Solution; Synchronization Hardware, Semaphores; Classic Problems of Synchronization- Readers and Writers Problem, Dining Philosophers Problem; Monitors. **Deadlocks:** System Model; Deadlocks Characterization; Methods for Handling Deadlocks; Deadlock Prevention; Deadlock Avoidance; Deadlock Detection; and Recovery from Deadlock.	14

3	**Memory Management:** Logical and Physical Address Space; Swapping; Contiguous Allocation; Paging; Segmentation; Segmentation with Paging. **Virtual Memory:** Introduction to Virtual Memory; Demand Paging; Page Replacement; Page Replacement Algorithms; Allocation of frames, Thrashing. **File System:** File Concepts- Attributes, Operations and Types of Files; File System; File Access methods; Directory Structure; Protection; File System Implementation- File System Structure, Allocation Methods, Free Space Management	14

References:
1. Operating System Concepts, Silberschatz' et al., 10th Edition, Wiley, 2018.
2. Operating System Concepts - Engineering Handbook, Ghosh PK, 2019.
3. Understanding Operating Systems, McHoes A et al., 7th Edition, Cengage Learning, 2014.
4. Operating Systems - Internals and Design Principles, William Stallings, 9th Edition, Pearson.
5. Operating Systems – A Concept Based Approach, Dhamdhere, 3rd Edition, McGraw Hill Education India.
6. Modern Operating Systems, Andrew S Tanenbaum, 4th Edition, Pearson.

Program: B.Sc. (Basic and Honors)   **Subject: Computer Science**

1. Computer Science as MAJOR with another Subject as MINOR (Table IIA of Model Curriculum)

2. Computer Science as MAJOR with another Subject also as MAJOR (Table IIIA of Model Curriculum)

3. Computer Science as MINOR with another Subject as MAJOR (As per Table IIA of Model Curriculum)

Sem	Discipline Specific Core Courses(DSC)	Hour / Week		DS Elective Courses	Hours/ Week
		Theory	Lab		
III	**DSC-3:** Object Oriented Programming in JAVA	4			
	DSC-3 Lab: JAVA Programming Lab		4		
IV	**DSC-4:** Database Management Systems	4			
	DSC-4 Lab: DBMS Lab		4		

Course Title: Object Oriented Programming in Java	Course code: DSC3
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:
- Explain the object-oriented concepts and JAVA.
- Write JAVA programs using OOP concepts like Abstraction, Encapsulation, Inheritance and Polymorphism.
- Implement Classes and multithreading using JAVA.
- Demonstrate the basic principles of creating Java applications with GUI.

Unit	Description	Hours
1	**Introduction to Java:** Basic OOPs concepts, Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods,Overloading, Math class, Arrays in java. **Objects and Classes:** Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers.	13
2	Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference. **Inheritance and Polymorphism:** Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.	13
3	**Event and GUI programming:** Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Exception handling mechanism.	13
4	**I/O programming:** Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. Multithreading in java: Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try catch-finally, Collections in java, Network Programming	13

References:

1. Object Oriented Programming with Java: Somashekara M.T., Guru, D.S., Manjunatha K.S, 1st Edition, PHI Learning2017.

2. Programming with Java, By E Balagurusamy – A Primer, 4th Edition, McGraw Hill Publication.

3. Core Java Volume I – Fundamentals, By Cay S. Horstmann, Prentice Hall.

4. Java 2 - The Complete Reference, Herbert Schildt, 5th Edition, McGraw Hill Publication, 2017.

5. Java - The Complete Reference, Herbert Schildt, 7th Edition, McGraw Hill Publication, 2017.

Course Title: Java Programming Lab	Course code: DSC3 Lab
Total Contact Hours: 52	Hours/week : 04
Formative Assessment Marks: 25	Course Credits: 02
Exam Marks: 25	Duration of Exam: 03 Hours

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Implement Object Oriented programming concept using basic syntaxes of control Structures

- Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem

- Demonstrates how to achieve reusability using inheritance

- Demonstrate understanding and use of interfaces, packages, different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.

- Identify and describe common user interface components to design GUI in Java using Applet & AWT along with response to events

Java Programming Lab

PART A: Fundamentals of OOPs in Java

1. Program to assign two integer values to X and Y. Using the 'if' statement the output of the program should display a message whether X is greater than Y.

2. Program to list the factorial of the numbers 1 to 10. To calculate the factorial value, use while loop. (Hint Fact of 4 = 4*3*2*1)

3. Program to add two integers and two float numbers. When no arguments are supplied, give a default value to calculate the sum. Use function overloading.

4. Program to perform mathematical operations. Create a class called AddSub with methods to add and subtract. Create another class called MulDiv that extends from AddSub class to use the member data of the super class. MulDiv should have methods to multiply and divide A main function should access the methods and perform the mathematical operations.

5. Program with class variable that is available for all instances of a class. Use static variable declaration. Observe the changes that occur in the object's member variable values.

6. Program
a. To find the area and circumference of the circle by accepting the radius from the user.
b. To accept a number and find whether the number is Prime or not

7. Program to create a student class with following attributes; Enrollment No: Name, Mark3of sub1, Mark of sub2, mark of sub3, Total Marks. Total of the three marks must be calculated only when the

student passes in all three subjects. The pass mark for each subject is 50. If a candidate fails in any one of the subjects his total mark must be declared as zero. Using this condition write a constructor for this class. Write separate functions for accepting and displaying student details. In the main method create an array of three student objects and display the details.

8. In a college first year class are having the following attributes Name of the class (BCA, BCom, BSc), Name of the staff No of the students in the class, Array of students in the class

9. Define a class called first year with above attributes and define a suitable constructor. Also write a method called best Student () which process a first-year object and return the student with the highest total mark. In the main method define a first-year object and find the best student of this class

10. Program to define a class called employee with the name and date of appointment. Create ten employee objects as an array and sort them as per their date of appointment. ie, print them as per their seniority.

PART B: Exception Handling & GUI Programming

1. Program to catch Negative Array Size Exception. This exception is caused when the array is initialized to negative values.

2. Program to handle Null Pointer Exception and use the "finally" method to display a message to the user.

3. Program which create and displays a message on the window

4. Program to draw several shapes in the created window

5. Program to create an applet and draw grid lines

6. Program which creates a frame with two buttons father and mother. When we click the father button the name of the father, his age and designation must appear. When we click mother similar details of mother also appear.

7. Create a frame which displays your personal details with respect to a button click

8. Create a simple applet which reveals the personal information of yours.

9. Program to move different shapes according to the arrow key pressed.

10. Demonstrate the various mouse handling events using suitable example.

Note: Student has to execute a minimum of 8 programs in each part to complete the Lab course.

Evaluation Scheme for Lab Examination:

Assessment Criteria	Marks
Writing 2 Programs	10
Execution of 1 Program	10
Viva and Record	05
Total	25

4

Course Title: Database Management System	Course code: DSC4
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Explain the various database concepts and the need for database systems.
- Identify and define database objects, enforce integrity constraints on a database usingDBMS.
- Demonstrate a Data model and Schemas in RDBMS.
- Identify entities and relationships and draw ER diagram for a given real-worldproblem.
- Convert an ER diagram to a database schema and deduce it to the desired normalform.
- Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.
- Explain the transaction processing and concurrency control techniques.

Unit	Description	Hours
1	**Database Architecture:** Introduction to Database system applications. Characteristics and Purpose of database approach. People associated with Database system. Data models. Database schema. Database architecture. Data independence. Database languages, interfaces, and classification of DBMS. **E-R Model:** Entity-Relationship modeling: E – R Model Concepts: Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute, and domain of an attribute.	13
2	Relationships between the entities. Relationship types, roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E-R diagram. **Relational Data Model:** Relational model concepts. Characteristics of relations. Relational model constraints: Domain constrains, key constraints, primary & foreign key constraints, integrity constraints and null values. Relational Algebra: Basic Relational Algebra operations. Set theoretical operations on relations. JOIN operations Aggregate Functions and Grouping. Nested Sub Queries-Views.	13

3	**Data Normalization:** Anomalies in relational database design. Decomposition. Functional dependencies - Axioms, Minima and Maxima covers. Normalization. First normal form, Second normal form, Third normal form. Boyce-Codd normal form.	13
4	**Query Processing Transaction Management:** Introduction Transaction Processing. Single user & multiuser systems. Transactions: read & write operations. Need of concurrency control: The lost update problem, Dirty read problem. Types of failures. Transaction states. Desirable properties(ACID properties) of Transactions.	13

References:

1. Fundamentals of Database Systems, Ramez Elamassri, Shankant B. Navathe, 7th Edition, Pearson, 2015

2. An Introduction to Database Systems, Bipin Desai, Galgotia Publications, 2010.

3. Introduction to Database System, C J Date, Pearson, 1999.

4. Database Systems Concepts, Abraham Silberschatz, Henry Korth, S.Sudarshan, 6th Edition, McGraw Hill, 2010.

5. Database Management Systems, Raghu Rama Krishnan and Johannes Gehrke, 3rd Edition, McGraw Hill, 2002.

Course Title: DBMS Lab	Course code: DSC4 Lab
Total Contact Hours: 52	Hours/week : 04
Formative Assessment Marks: 25	Course Credits: 02
Exam Marks: 25	Duration of Exam: 03 Hours

Course Outcomes (COs):

Student would be able to create tables, execute queries

1. Execute a single line query and group functions.
2. Execute DDL Commands.
3. Execute DML Commands
4. Execute DCL and TCL Commands.
5. Implement the Nested Queries.
6. Implement Join operations in SQL
7. Create views for a particular table
8. Implement Locks for a particular table

Activity 1:
Database: Student (DDL, DML Statements)
Table: Student

Name	Reg. No	Class	Major
Smith	17	1	CS
Brown	8	2	CS

Table: Course

Course Name	Course Number	Credit Hours	Department
Introduction to Computer Science	CS1310	4	CS
Data Structure	CS3320	4	CS
Discrete Mathematics	MATH2410	3	MATH
Database Management System	CS3380	3	CS

Table: Section

Section Identifier	Course Number	Year	Instructor
85	MATH2410	98	King
92	CS1310	98	Andreson
102	CS3320	99	Knuth
112	MATH2410	99	Chang
119	CS1310	99	Andreson
135	CS3380	99	Stone

Table: Grade_Report

Reg. No	Section_Identifier	Grade
17	112	B
17	119	C
8	85	A
8	92	A
8	102	B
8	135	A

- Create Tables using create statement
- Insert rows to individual tables using insert statement
- Alter table section add new field section and update the records
- Delete brown's grade report
- Drop the table section

Activity 2: (Select clause, Arithmetic Operators)

Database: Employee

Create Following **tables** and insert **tuples** with suitable constraints

Table: EMPLOYEE

EMPID	FIRSTANAME	LASTNAME	Hire_Date	ADDRESS	CITY
1001	George	Smith	11-May-06	83 first street	Paris
1002	Mary	Jones	25-Feb-08	842 Vine Ave	Losantiville
1012	Sam	Tones	12-Sep-05	33 Elm St.	Paris
1015	Peter	Thompson	19-Dec-06	11 Red Road	Paris
1016	Sarath	Sharma	22-Aug-07	440 MG Road	New Delhi
1020	Monika	Gupta	07-Jun-08	9 Bandra	Mumbai

Table: EMPSALARY

EMPID	SALARY	BENEFITS	DESIGNATION
1001	10000	3000	Manager
1002	8000	1200	Salesman
1012	20000	5000	Director
1015	6500	1300	Clerk
1016	6000	1000	Clerk
1020	8000	1200	Salesman

Write queries for the following

1. To display FIRSTNAME, LASTNAME, ADDRESS AND CITY of all employees living in PARIS.

2. To display the content of employee table in descending order of FIRSTNAME

3. Select FIRSTNAME and SALARY of salesman

4. To display the FIRSTNAME, LASTNAME, AND TOTAL SALARY of all employees from the table EMPLOYEE and EMPSALARY. Where TOTAL SALARY is calculated as SALARY+BENEFITS

5. List the Names of employees, who are more than 1 year old in the organization

6. Count number of distinct DESINGATION from EMPSALARY

7. List the employees whose names have exactly 6 characters

8. Add new column PHONE_NO to EMPLOYEE and update the records

9. List employee names, who have joined before 15-Jun-08 and after 16-Jun-07

10. Generate Salary slip with Name, Salary, Benefits, HRA-50%, DA-30%, PF-12%, Calculate gross. Order the result in descending order of the gross.

Activity 3: (Logical, Relational Operators)

Database: Library

Create Following **tables** and insert **tuples** with suitable constraints

Table: Books

Book_Id	Book_name	Author_Name	Publishers	Price	Type	Quantity
C0001	The Klone and I	Lata Kappor	EPP	355	Novel	5
F0001	The Tears	William Hopkins	First Publ	650	Fiction	20
T0001	My First C++	Brain & Brooke	ERP	350	Text	10
T0002	C++ Brainwork's	A.W.Rossaine	TDH	350	Text	15
F0002	Thunderbolts	Ana Roberts	First Publ.	750	Fiction	50

Table: Issued

Book_Id	Quantity_Issued
T0001	4
C0001	5
F0001	2
T0002	5
F0002	8

Write queries for the following

1. To show Book name, Author name and price of books of **First Publ**. publisher

2. Display Book id, Book name and publisher of books having quantity more than 8 and price less than 500

3. Select Book id, book name, author name of books which is published by other than ERP publishers and price between 300 to 700

4. Generate a Bill with Book_id, Book_name, Publisher, Price, Quantity, 4% of VAT "Total"

5. Display book details with book id's C0001, F0001, T0002, F0002 (Hint: use IN operator)

6. Display Book list other than, type Novel and Fiction

7. Display book details with author name starts with letter 'A'

8. Display book details with author name starts with letter 'T' and ends with 'S'

9. Select Book_Id, Book_Name, Author Name , Quantity Issued where Books.Books_Id = Issued.Book_Id

10. List the book_name, Author_name, Price. In ascending order of Book_name and then on descending order of price

Activity 4: (Date Functions)

Database: Lab

Create Following **table** and insert **tuples** with suitable constraints

Table: Equipment_Details

No.	ItemName	Costperitem	Quantity	Dateofpurchase	Warranty	Operational
1	Computer	30000	9	21/5/07	2	7
2	Printer	5000	3	21/5/06	4	2
3	Scanner	8000	1	29/8/08	3	1
4	Camera	7000	2	13/6/05	1	2
5	UPS	15000	5	21/5/08	1	4
6	Hub	8000	1	31/10/08	2	1
7	Plotter	25000	2	11/1/09	2	2

(Use date functions and aggregate functions)

1. To select the ItemName purchase after 31/10/07

2. Extend the warranty of each item by 6 months

3. Display ItemName , Dateof purchase and number of months between purchase date and present date

4. To list the ItemName in ascending order of the date of purchase where quantity is more than 3.

5. To count the number, average of costperitem of items purchased before 1/1/08

6. To display the minimum warranty , maximum warranty period

7. To Display the day of the date , month , year of purchase in characters

8. To round of the warranty period to month and year format.

9. To display the next Sunday from the date '07-JUN-96'

10. To list the ItemName, which are within the warranty period till present date

Activity 5: (Numeric, character functions)
Use Functions for the following

1. Find the mod of 165,16

2. Find Square Root of 5000

3. Truncate the value 128.3285 to 2 and -1 decimal places

4. Round the value 92.7683 to 2 and -1 decimal places

5. Convert the string 'Department' to uppercase and lowercase

6. Display your address convert the first character of each word to uppercase and rest are in lowercase

7. Combine your first name and last name under the title Full name

8. A) Take a string length maximum of 15 displays your name to the left. The remaining space should be filled with '*'

9. Take a string length maximum of 20 displays your name to the right. The remaining space should be filled with '#'

10. Find the length of the string 'JSS College, Mysore'

11. Display substring 'BASE' from 'DATABASE'

12. Display the position of the first occurrence of character 'o' in Position and Length

13. Replace string Database with Data type

14. Display the ASCII value of ' ' (Space)

15. Display the Character equivalent of 42

Activity 6: Database: subject

Create Following **table** and insert **tuples** with suitable constraints

Table - Physics

RegNo	Name	Year	Combination
AJ00325	Ashwin	First	PCM
AJ00225	Swaroop	Second	PMCs
AJ00385	Sarika	Third	PME
AJ00388	Hamsa	First	PMCs

Table – Computer Science

RegNo	Name	Year	Combination
AJ00225	Swaroop	Second	PMCs
AJ00296	Tajas	Second	BCA
AJ00112	Geetha	First	BCA
AJ00388	Hamsa	First	PMCs

1. Select all students from physics and Computer Science

2. Select student common in physics and Computer Science

3. Display all student details those are studying in second year

4. Display student those who are studying both physics and computer science in second year

5. Display the students studying only physics

6. Display the students studying only Computer Science

7. select all student having PMCs combination

8. select all student having BCA combination

9. select all student studying in Third year

10. Rename table Computer Science to CS

Activity 7: (views)

Database: Railway Reservation System

Create Following **table** and insert **tuples** with suitable constraints

Table: Train Details

Train_No	Train_Name	Start_Place	Destination
RJD16	Rajdhani Express	Bangalore	Mumbai
UDE04	Udhyan Express	Chennai	Hyderabad
KKE55	Karnataka Express	Bangalore	Chennai
CSE3	Shivaji Express	Coimbatore	Bangalore
JNS8	Janashatabdi	Bangalore	Salem

Table: Availability

Train_No	Class	Start_Place	Destination	No_of_Seats
RJD16	Sleeper Class	Bangalore	Mumbai	15
UDE04	First Class	Chennai	Hyderabad	22
KKE55	First Class AC	Bangalore	Chennai	15
CSE3	Second Class	Coimbatore	Bangalore	8
JNS8	Sleeper Class	Bangalore	Salem	18

1. Create view **sleeper** to display train no, start place, destination which have sleeper class and perform the following

    a. insert new record

    b. update destination='Manglore' where train no='RJD16'

    c. delete a record which have train no='KKE55'

2. Create view **details** to display train no, train name, class

3. Create view **total_seats** to display train number, start place, use count function to no of seats , group by start place and perform the following

    a. insert new record

    b. update start place='Hubli' where train no='JNS8'

    c. delete last row of the view

4. Rename view sleeper to class

5. Delete view details

Activity 8 (group by, having clause)

Database: Bank system

Create Following **table** and insert **tuples** with suitable constraints

Table: Account

Account_No	Cust_Name	Brach_ID
AE0012856	Reena	SB002
AE1185698	Akhil	SB001
AE1203996	Daniel	SB004
AE1225889	Roy	SB002
AE8532166	Sowparnika	SB003
AE8552266	Anil	SB003
AE1003996	Saathwik	SB004
AE1100996	Swarna	SB002

Table: Branch

Branch_ID	Branch_Name	Branch_City
SB001	Malleshwaram	Bangalore
SB002	MG Road	Bangalroe
SB003	MG Road	Mysore
SB004	Jainagar	Mysore

Table: Depositor

Account_No	Branch_Id	Balance
AE0012856	SB002	12000
AE1203996	SB004	58900
AE8532166	SB003	40000
AE1225889	SB002	150000

Table: Loan

Account_No	Branch_Id	Balance
AE1185698	SB001	102000
AE8552266	SB003	40000
AE1003996	SB004	15000
AE1100996	SB002	100000

1. Display Total Number of accounts present in each branch
2. Display Total Loan amount in each branch
3. Display Total deposited amount in each branch by descending order
4. Display max , min loan amount present in each city.
5. Display average amount deposited in each branch , each city
6. Display maximum of loan amount in each branch where balance is more than 25000
7. Display Total Number of accounts present in each city
8. Display all customer details in ascending order of brachid
9. Update Balance to 26000 where accno=AE1003996
10. Display Customer Names with their branch Name

Evaluation Scheme for Lab Examination:

Assessment Criteria		Marks
Writing 2 Programs		10
Execution of 1 Program		10
Viva and Record		05
	Total	25

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Semester: III/IV

Course Title: **Artificial Intelligence**	Course Credits: 2
Total Contact Hours: 13 hours of theory and 26 hours of practical	Duration of ESA: 01 Hour
Formative Assessment Marks: **25 marks**	Summative Assessment Marks: 25 marks

Course Outcomes (COs):

At the end of the course, students will be able to:

- Appraise the theory of Artificial intelligence and list the significance of AI.
- Discuss the various components that are involved in solving an AI problem.
- Illustrate the working of AI Algorithms in the given contrast.
- Analyze the various knowledge representation schemes, Reasoning and Learning techniques of AI.
- Apply the AI concepts to build an expert system to solve the real-world problems.

Course Content

Unit - 1	
Overview of AI: Definition of Artificial Intelligence, Philosophy of AI, Goals of AI, Elements of AI system, Programming a computer without and with AI, AI Techniques, History of AI. **Intelligent Systems:** Definition and understanding of Intelligence, Types of Intelligence, Human Intelligence vs Machine Intelligence.	06
Unit – 2	
AI Applications: Virtual assistance, Travel and Navigation, Education and Healthcare, optical character recognition, E-commerce and mobile payment systems, Image based search and photo editing. **AI Examples in daily life:** Installation of AI apps and instructions to use AI apps. Introduction to Robotics.	07

Laboratory Activities:	

Laboratory Activities:
- **Amazon Alexa:**
  https://play.google.com/store/apps/details?id=com.amazon.dee.app&hl=en&gl=US
- **Google Lens:**
  https://play.google.com/store/search?q=google+lens&c=apps&hl=en&gl=US
- **Image to Text to Speech ML OCR:**
  https://play.google.com/store/apps/details?id=com.mlscanner.image.text.speech&hl=en_IN&gl=US
- **Google Pay:**
  https://play.google.com/store/apps/details?id=com.google.android.apps.nbu.paisa.user&hl=en_IN&gl=US
	26

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- **Grammarly:**
  https://play.google.com/store/search?q=grammarly&c=apps&hl=en_IN&gl=
- **Google Map:**
  https://play.google.com/store/search?q=google+maps&c=apps&hl=en&gl=US
- **FaceApp:**
  https://play.google.com/store/apps/details?id=io.faceapp&hl=en_IN&gl=US
- **Socratic:**
  https://play.google.com/store/apps/details?id=com.google.socratic&hl=en_IN&gl=US
- **Google Fit: Activity Tracking:**
  https://play.google.com/store/apps/details?id=com.google.android.apps.fitness&hl=en_IN&gl=US
- **SwiftKey Keyboard:**
  https://swiftkey-keyboard.en.uptodown.com/android
- **E-commerce App:**
  https://play.google.com/store/apps/details?id=com.jpl.jiomart&hl=en_IN&gl=US

Text Books:

1. Wolfgang Ertel, "Introduction to Artificial Intelligence", 2nd Edition, Springer International Publishing 2017.
2. Michael Negnevitsky, "Artificial Intelligence A Guide to Intelligent Systems", 2nd Edition, Pearson Education Limited 2005.

References:

1. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_tutorial.pdf
2. Kevin Knight, Elaine Rich, Shivashankar B. Nair, "Artificial Intelligence", 3rd Edition, July 2017.

Reference Links:

1. Voice Assistant: https://alan.app/blog/voiceassistant-2/
2. Browse with image: https://www.pocket-lint.com/apps/news/google/141075-what-is-google-lens-and-how-does-it-work-and-which-devices-have-it
3. OCR: https://aws.amazon.com/what-is/ocr/
4. Mobile Payment system: https://gocardless.com/en-us/guides/posts/how-do-mobile-payment-systems-work/
5. Grammarly: https://techjury.net/blog/how-to-use-grammarly/#gref
6. Travel & Navigation: https://blog.google/products/maps/google-maps-101-ai-power-new-features-io-2021/
7. AI in photo editing: https://digital-photography-school.com/artificial-intelligence-changed-photo-editing/
8. AI in education: https://www.makeuseof.com/what-is-google-socratic-how-does-it-work/
9. AI in health and fitness: https://cubettech.com/resources/blog/implementing-machine-learning-and-ai-in-health-and-fitness/
10. E-commerce and online shopping: https://medium.com/@nyxonedigital/importance-of-e-commerce-and-online-shopping-and-why-to-sell-online-5a3fd8e6f416

Course Title: **Python Programming Concepts**	Course Credits: 3 (3L+0T+0P)
Semester: III/IV	Duration of SEE: 02 Hour
Total Contact Hours: 42	SEE: 60 Marks IA: 40 Marks

Course Outcomes (COs):

- Explain the fundamentals of Computers.
- Explain the basic concepts of Python Programming.
- Demonstrate proficiency in the handling of loops and the creation of functions.
- Identify the methods to create and store strings.

Unit I   Fundamentals of Computers   14 Hrs

Introduction to Computers - Computer Definition, Characteristics of Computers, Evolution and History of Computers, Types of Computers, Basic Organization of a Digital Computer; Number Systems – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples.

Python Basics: - Introduction to Features and Applications of Python; Python Versions; Installation of Python;   Python Command Line mode and Python IDEs; Simple Python Program. Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association;

Unit II   Data types and control structure   14 Hrs

Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples; Illustrative programs.

Python Control Flow: Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range() and exit () functions; Illustrative programs.

Unit III   Functions and Strings   14 Hrs

Python Functions: Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Illustrative programs.

Srings: Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods; Illustrative programs.

1

References

1. Computer Fundamentals (BPB), P. K. Sinha & Priti Sinha
2. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition, Green Tea Press. Freely available online 2015. @https://www.greenteapress.com/thinkpython/thinkCSpy.pdf
3. Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019.
4. http://www.ibiblio.org/g2swap/byteofpython/read/
5. http://scipy-lectures.org/intro/language/python_language.html
6. https://docs.python.org/3/tutorial/index.html

Course Title: **Fundamentals of Multimedia**	Course Credits: 3 (3L+0T+0P)
Semester: III/IV	Duration of SEE: 02 Hour
Total Contact Hours: 42	SEE: 60 Marks IA: 40 Marks

Course Outcomes (COs):

- Students will learn about multimedia , which is a field concerned with the computer controlled integration of text, graphics, drawings, still and moving images(video),animation, audio and any other media where every type of information can be represented, stored, transmitted and processed digitally.

Unit I   Introduction to Multimedia   14 Hrs

Concepts of Multimedia, Multimedia applications, Advantage of Digital Multimedia, Multimedia system Architecture, Objects of Multimedia. Introduction to Compression and Decompression Techniques and its types. File format standards- RTF, TIFF,RIFF, MIDI, JPEG, AVI, JPEG, TWAIN Architecture.

Unit II   Multimedia input and output technologies   14 Hrs

Key Technology Issues, Pen Input, Video and Image Display Systems, Print Output Technologies, Image Scanners, Digital Voice and Audio, Video Images and Animation, Full Motion Video.

Unit III   Secured Multimedia and Authentication: 14 Hrs

Secured Multimedia, Digital Rights Management Systems, and Technical Trends - Multimedia encryption - Digital Watermarking – Security Attacks. Multimedia Authentication - Pattern, Speaker and Behavior Recognition – Speaker Recognition - Face Recognition

References

1. Wenjun Zeng, Heather Yu and Ching – Yung Lin, "Multimedia Security technologies for Digital rights Management", Elsevier Inc 2006.

2. Chun-Shien Lu, "Multimedia Security : Steganography and Digital Watermarking techniques for Protection of Intellectual Property", Springer Inc 2007.

3. Andleigh PK and Thakrar K, "Multimedia Systems", Addison Wesley Longman, 1999.

4. Fred Halsall, "Multimedia Communications", Addison Wesley, 2000.

5. https://www.tutorialspoint.com/multimedia/multimedia_introduction.html

6. https://www.tutorialspoint.com/multimedia/multimedia_images_graphics.html