F.Y.B.Sc.(Computer Science)

Semester-I
&
Semester-II

Credit Structure & Syllabus

(Academic Year 2019-2020, Autonomous)

Course Structure for F. Y. B. Sc. (Computer Science)
Subject: Computer Science

Sem	Paper Code	Title of Paper	No. of Credits	Exam	Marks
I	CSCO1101	Basic Programming using C	2	I / E	60 + 40
	CSCO 1102	DBMS – I	2	I / E	60 + 40
	CSCO1103	Lab Course – I Basics on C	2	I / E	60 + 40
	CSCO1104	Lab Course – II Based on DBMS I	Grade	I/E	60 +40
II	CSCO 1201	Advanced Programming using C	2	I / E	60 + 40
	CSCO 1202	DBMS – II	2	I / E	60 + 40
	CSCO 1203	Lab Course – I Advanced C Prog.	2	I / E	60 + 40
	CSCO1204	Lab Course– II DBMS II (PL/PgSql)	Grade	I/E	60 + 40
		Physical Education	2	----	----

Class   : F.Y. B. Sc.(Computer Science) (Semester- I)
Subject   : Computer Science   Paper Code : CSCO1101
Title of Paper: Basic Programming Using C   Paper : I
Credit: 2   No. of lectures: 36

Learning Objectives: Students successfully completing this course will be able:

1. To understand and design algorithm for problem solving
2. To develop Problem Solving abilities using computers
3. To develop skills for writing programs using 'C'

Learning Outcome: Problem solving and programming capability.

Chapter	Topic Contents	No. of Lectures
Unit – I	**Problem-Solving Using Computer** 1.1 Problem Solving 1.2 Algorithms & Flowcharts (More Problems covered) 1.3. Programming Languages Machine language Assembly language High level languages	8
Unit – II	**Introduction to C** 2.1 History 2.2 Structure of a C program 2.3 Application Areas 2.4 C Program development life cycle 2.5 Sample programs	2
Unit – III	**C Tokens** 3.1 Keywords 3.2 Identifiers 3.3 Variables 3.4 Constants – character, integer, float, string, escape sequences 3.5 Data types – built-in and user defined 3.6 Operators and Expressions Operator types (arithmetic, relational, logical,assignment, bitwise, conditional , other operators), precedence and associatively rules.	5
Unit – IV	**Control Structures** 4.1 Decision making structures If, if-else, switch 4.2 Loop Control structures While, do-while, for 4.3 Nested structures 4.4 break, continue and goto	8

Unit – V	**Functions in C** 5.1 What is a function 5.2 Advantages of Functions 5.3 Standard library functions 5.4 User defined functions :Declaration, definition, function call, parameter passing (by value), return keyword 5.5 Scope of variables, storage classes 5.6 Recursion	8
Unit – VI	**Arrays** 6.1 Array declaration, initialization 6.2 Types – one, two and multidimensional 6.3 Passing arrays to functions	5

References:

1. Yashavant Kanetkar : Let Us C 7th Edition, PBP Publications
2. E Balaguruswamy : Programming in ANSI C 4th Edition, Tata Mc-Graw Hill Publishing Co.Ltd.-New Delhi
3. Brian W. Kernighan and Dennis M. Ritchie : The C Programming Language 2nd Edition, Prentice Hall Publication
4. The Complete Reference to C, Herbert Schildt
5. Problem Solving with C, Harrow
6. Yeshwant Kanitkar :Graphics using C- BPB Publication.

F.Y. B. Sc.(Computer Science) (Semester- I) (wef. 2019-20)

Subject : Computer Science   **Paper Code**: CSCO1102

Title of Paper: DBMS-I   **Paper** : II

Credit: 2   **No. of lectures**: 36

Learning objective : Students successfully completing this course will be able to:
- Understand design and implementation of a database system.
- Study the physical, logical database designs and database modeling.
- Understanding and development for essential DBMS concepts.
- Understand creations, manipulation and querying of data in databases.

Learning Outcomes:
- Master the basics of database concepts and database management system
- Model an application's data requirements using conceptual modeling tools like ER model, relational model.
- Write SQL commands to create tables, insert, update, delete and querying data.

Units	Title & Content	No. Of lecture
Unit I	**1. Introduction to File organization & DBMS** 1.1 Introduction 1.2 Types of file organization 1.3 File system Vs DBMS 1.4 Data models 1.5 Levels of abstraction 1.6 Data independence 1.7 Structure of DBMS 1.8 Users of DBMS 1.9 Advantages of DBMS	04
Unit II	**2. Conceptual Design (E-R model)** 2.1 Overview of DB design 2.2 ER data model (entities , attributes, entity sets, relations,relationship sets) 2.3 Additional constraints (Key constraints, Mapping constraints), 2.4 Conceptual design using ER modelling 2.4 Case studies	10
Unit III	**3. Relational data model** 3.1 Structure of Relational Databases (concepts of a table, a row, a relation, a Tuple and a key in a relational database) 3.2 Conversion of ER to Relational model 3.3. Integrity constraints (primary key, referential integrity, unique constraint, Null constraint, Check constraint)	04
Unit IV	**4. Relational algebra** 4.1 Preliminaries 4.2 Relational algebra (selection, projection set operations, renaming, joins, division) 4.3 Problems.	04
Unit V	**5. Introduction to SQL** 5.1 Introduction 5.2 Basic structure 5.3 Set operations 5.4 Aggregate functions 5.5 Null values 5.6 PL/PgSqL: Data types, Language structure	08

	6. Operations with SQL 6.1 Nested Subqueries 6.2 Modifications to Database **Unit VI** 6.3 DDL and DML commands with examples 6.4 SQL mechanisms for joining relations (inner joins, outer joins and their types) 6.5 Examples on SQL (case studies)	**06**

References

1. Shamkant B. Navathe, Ramez Elmasri, Database Systems, ,ISBN:9780132144988, PEARSON HIGHER EDUCATION

2. Richard Stones, Neil Matthew, Beginning Databases with PostgreSQL: From Novice to Professional, ISBN:9781590594780, Apress

3. Korry Douglas,PostgreSQL, ISBN:9780672327568, Sams

4. ,JohnWorsley, Joshua Drake , Practical PostgreSQL(BCD),ISBN:9788173663925 Shroff/O'reilly

5. Joshua D. Drake, John C Worsley , Practical Postgresql , **(O'Reilly publications)**

6. Bipin C Desai , "An introduction to Database systems" , Galgotia Publications

7. Henrey Korth, Sudarshan, Silberschatz "Database System Concepts" (4th Ed), McGraw Hill,.

Subject	: Computer Science	Paper Code	: CSCO1103
Title of Paper: Lab Course – I (Basic C)		Paper	: III (Lab Course-I)
Credit: 2		No. of Practical	: 10 /Semester

Learning Objectives: Students successfully completing this course will be able to:

1. Design and implement a 'C' programs for different problems
2. Understand appropriate use of language structure.

Learning Outcome: Problem solving and programming capability.

Semester I (Credits – 02) No. of Practicals – 10)	
	Title of Experiment/ Practical
1	Assignment to demonstrate use of data types, simple operators & expressions.
2	Assignment to demonstrate decision making statements (if and if-else, nested structures)
3	Assignment to demonstrate decision making statements (switch - case)
4	Assignment to demonstrate use of simple loops
5	Assignment to demonstrate use of nested loops
6	Assignment to demonstrate menu driven programs.
7	Assignment to demonstrate writing C programs in modular way (use of user defined functions)
8	Assignment to demonstrate recursive functions.
9	Assignment to demonstrate use of arrays (1-d arrays) and functions
10	Assignment to demonstrate use of arrays (1-d arrays) and functions

F.Y. B. Sc.(Computer Science) **Semester I (wef. 2019-20)**

Subject   : Computer Science   Paper Code   : CSCO1104 **(Grade)**

Title of Paper : Lab Course – II (**DBMS I**)   Paper   : IV(Lab Course-II)

Credit   : **Grade**   No. of Practical   : 10 /Semester

Learning Objectives: Students successfully completing this course will be able to:

- Define & manipulate the database Concepts.
- Understand SQL with DDL and DML Commands.

Learning Outcome: To know the DBMS Concepts and to operate Database
Software.

	Semester I No. of Practicals – 10
	Title of Experiment/ Practical
1	Create simple tables , with only the primary key Constraint
2	Create more than one table with integrity constraint
3	Create more than one table, with referential integrity constraint.
4	Drop a table from database, Alter the table.
5	Insert/Update/Delete statements.
6	Query for the tables using simple form of Select Statement
7	Query solving for tableoperations(Aggregate function)
8	Nested Query solving for tableoperations(Union, Intersect, Except)
9	Nested Query solving for tableoperations(Set membership, Cardinality, Comparison)
10	To Small Case Studies.

Class : F.Y. B. Sc. (Computer Science) (Semester- II)
Subject : Computer Science   Paper Code: CSCO1201
Title of Paper: Advanced Programming using C   Paper   : I
Credit: 2   No. of lectures: 36

Learning Objectives: Students successfully completing this course will be able to:
1. Understand and design Programs through advanced C Concepts
2. Design graphics Programming.

Learning Outcome: To develop advanced as well as Graphics programming capability.

Units	Topics Contents	No. of Lectures
Unit – I	**Pointers** 1.1 Pointer declaration, initialization 1.2 Dereferencing pointers 1.3 Pointer arithmetic 1.4 Pointer to pointer 1.5 Arrays and pointers 1.6 Functions and pointers – passing pointers to functions, function returning pointers 1.7 Dynamic memory allocation	8
Unit – II	**Strings** 2.1 Declaration and initialization, format specifiers 2.2 Standard library functions 2.3 Strings and pointers 2.4 Array of strings 2.5 Command Line Arguments	6
Unit – III	**Structures and Unions** 3.1 Creating structures 3.2 Accessing structure members (dot Operator) 3.3 Structure initialization 3.4 Typedef 3.5 Array of structures 3.6 Passing structures to functions 3.7 Nested structures 3.8 Pointers and structures 3.9 Self referential structure 3.10 Unions 3.11 Difference between structures and unions	10
Unit – IV	**File Handling** 4.1 Streams 4.2 Types of Files 4.3 Operations on files 4.4 Random access to files	6

Unit – V	**C Preprocessor** 4.1 Format of Preprocessor directive 4.2 File Inclusion directive 4.3 Macro substitution, nested macro, augmented macro	2
Unit – VI	**Graphics programming using C** 6.1 Graphics driver and mode 6.2 Drawing simple graphical objects – line, circle, rectangle etc. 6.3 Outputting text, curves & Polygons	4

References:
1. Yashavant Kanetkar : Let Us C 7th Edition, PBP Publications
2. E Balaguruswamy : Programming in ANSI C 4th Edition, Tata Mc-Graw Hill Publishing Co. Ltd.-New Delhi
3. Brian W. Kernighan and Dennis M. Ritchie : The C Programming Language 2nd Edition, Prentice Hall Publication
4. Herbert Schildt,The Complete Reference to C,
5. Harrow , Problem Solving with C

Class   : F.Y. B. Sc.(Computer Science) (Semester- II)
Subject   : Computer Science   Paper Code : CSCO1202
Title of Paper: DBMS-II   Paper   : II
Credit: 2   No. of lectures: 36

Prerequisites: Knowledge of DBMS

Learning Objectives:-Students successfully completing this course will be able to:

- Understand fundamental concepts of RDBMS (PL/PgSQL)
- Understand data security and its importance
- Understand client server architecture

Learning Outcomes:

- Develop the database design by normalization.
- Knowing functional dependencies and design of the relational database.
- Design concept of Transaction and Query processing.

Unit	Title & Content	No. Of lecture
Unit I	**1. Relational Database Design** 1.1 Preliminaries 1.2 Normalization (1NF,2NF,3NF,BCNF,4NF, 5 NF) 1.3 Controlling the program flow, conditional statements, loops 1.4 Handling errors and exceptions, Cursors 1.5 Views, Stored Functions, Stored Procedures, Triggers	**12**
Unit II	**2 Transaction Concepts and concurrency control** 2.1 Transaction, properties of transaction, state of the transaction. 2.2 Executing transactions concurrently associated problem in concurrent execution. 2.3 Schedules, types of schedules,Serializability, precedence graph for Serializability. 2.4 Ensuring Serializability by locks, different lock modes, 2PL and its variations. 2.5Basic timestamp method for concurrency, Thomas Write Rule. 2.6Locks with multiple granularity, dynamic database concurrency (Phantom Problem). 2.7 Timestamps versus locking. 2.8 Deadlock handling methods 2.8.1 Detection and Recovery (Wait for graph). 2.8.2 Prevention algorithms (Wound-wait, Wait-die)	**10**
Unit III	**3 Database Integrity and Security Concepts** 3.1 Domain constraints 3.2 Referential Integrity 3.3 Introduction to database security concepts 3.4 Methods for database security 3.4.1Discretionary access control method 3.4.2Mandatory access control and role base access control for multilevel security. 3.5 Use of views in security enforcement. 3.6 Overview of encryption technique for security. 3.7 Statistical database security.	**06**
Unit IV	**4 Crash Recovery** 4.1 Failure classification 4.2 Recovery concepts 4.3 Log base recovery techniques (Deferred and Immediate update) 4.4 Checkpoints	**04**

	4.5 Recovery with concurrent transactions (Rollback, checkpoints, commit) 4.6 Database backup and recovery from catastrophic failure.	
Unit V	**5. Client-Server Technology** 5.1 Describe client-server computing. 5.2 Evolution of Client - Server information systems. 5.3 Client – Server Architecture benefits. 5.4 Client Server Architecture - Components, Principles, Client Components, Communication middleware components, Database middleware components, Client Server Databases	**04**

References:-

1. Elmasri and Navathe,Fundamentals of Database Systems (4th Ed)

2. Henrey Korth, Sudarshan, Silberschatz,Database System Concepts (4th Ed)

3. Practical PostgreSQL O'REILLY

4. Richard Stones , Neil Matthew,Beginning Databases with PostgreSQL, From Novice to Professional, 2ndEdition, Apress

Class   : F.Y. B. Sc.(Computer Science) **Semester II**

Subject   : Computer Science   Paper Code   : CSCO1203

Title of Paper: Lab Course –I (Advanced C)   Paper   : III (Lab Course-I)

Credit: 2   No. of Practicals   : 10 /Semester

Learning Objectives: Students successfully completing this course will be able to:
1.   Design and implement a 'C' programs for different problems
2. Understand use of appropriate Graphics Functions.

Learning Outcome: Problem solving and programming capability and develop
Advanced as well as Graphics programming capability.

Semester II (Credits – 02) No. of Practicals – 10)	
	Title of Experiment/ Practical
1	Assignment to demonstrate use of pointers.
2	Assignment to demonstrate concept of strings (string & pointers)
3	Assignment to demonstrate array of strings.
4	Assignment to demonstrate use of bitwise operators.
5	Assignment to demonstrate structures and unions.
6	Assignment to demonstrate structures (using array and functions).
7	Assignment to demonstrate command line arguments and preprocessor directives.
8	Assignment to demonstrate file handling (text files & binary files)
9	Assignment to demonstrate graphics programming.
10	C Programming – Case study (Menu Driven Application Base) in Groups

Class : F.Y. B. Sc.(Computer Science) **Semester II**

Subject : Computer Science   Paper Code : CSCO1204 (Grade)

Title of Paper :Lab Course – II (**DBMS II**)   Paper : IV (Lab Course-II)

Credit : Grade   No. of Practicals: 10 /Semester

Learning Objectives: Students successfully completing this course will be able to:

- Understand SQL with DDL and DML Commands.
- Understand RDBMS concepts.

Learning Outcome: To know the RDBMS Concepts and to operate Database
Software.

	Semester II No. of Practicals – 10
	Title of Experiment/ Practical
1	Simple Queries
2	Nested Queries
3	Queries using aggregate functions
4	Queries using Views
5	Cursors
6	Exception Handling
7	Stored Function
8	Triggers
9	Case Study(1)
10	Case Studies (2)