Deccan Education Society's
FERGUSSON COLLEGE, PUNE
(AUTONOMOUS)

SYLLABUS UNDER AUTONOMY

FIRST YEAR B.Sc. COMPUTER SCIENCE
SEMESTER – I

SYLLABUS OF COMPUTER SCIENCE

Academic Year 2016-2017

Deccan Education Society's
Fergusson College (Autonomous), Pune
Faculty of Science
F.Y. B.Sc. (Computer Science)

Syllabus of Computer Science

	Paper Code	Paper Title	Number of Lectures	Credits
SEMESTER – I	CSC1101	Programming Fundamentals using C	36	2
	CSC1102	Database Management Systems - I	36	2
	CSC1103	Basic C: Lab	10 sessions	2
	CSC1104	Database: Lab	10 sessions	Grade

	Paper Code	Paper Title	Number of Lectures	Credits
SEMESTER – II	CSC1201	Advanced Programming using C	36	2
	CSC1202	Database Management Systems (SQL / PLSQL)	36	2
	CSC1203	Advanced C: Lab	10 sessions	2
	CSC1204	Database (SQL / PLSQL): Lab	10 sessions	Grade

Paper I: CSC1101 Programming Fundamentals using C

Course Objectives:

Students successfully completing this course will be able:

1. To understand and design algorithm development for problem solving

2. To learn block structured programming concepts.

3. To understand and develop programming skills using C programming language.

PAPER CODE: CSC1101 PAPER –I: PROGRAMMING FUNDAMENTALS USING C [Credit -2 No. of Lectures - 36]		
	Title and Contents	**No. of Lectures**
Unit –I	**Programming Languages and Tools** 1.1 Machine language , Assembly language High level languages 1.2 Programming environment 1.3 Algorithms & Flowcharts	**5**
Unit -II	**Introduction to C** 2.1 C as procedure oriented programming language & its applicability 2.2 Structure of a C program 2.3 C Program development life cycle 2.4 Sample programs	**3**
Unit –III	**C Tokens** 3.1 Keywords, Identifiers, Variables 3.2 Constants – character, integer, float, string, escape sequences 3.3 Data types – built-in and user defined(enumerated) 3.4 Operators and Expressions Operator types (arithmetic, relational, logical, assignment,	**5**

		bitwise, conditional, other operators), precedence and associativity rules	
Unit –IV	**Control Structures** 4.1 Decision making structures if, if-else, switch 4.2 Loop Control structures while, do-while and for 4.3 Nested structures 4.4 break, continue and goto		**9**
Unit –V	**Functions** 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		**6**

References:
1. Brian W. Kernighan and Dennis M. Ritchie : The C programming language Second edition, Prentice Hall Publication
2. Behrouz A. Forouzan and Richard F. Gilberg: Computer Science A Structured programming approach using C Third edition, Thomson Course Technology publication
3. Yashavant Kanetkar : Let Us C Seventh edition   PBP Publications
4. E Balagurusamy : Programming in ANSI C Fourth edition TMH

Paper II: CSC1102 Database Management Systems - I

Course Objectives:

Students successfully completing this course will be able :

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs and understand, database modelling.
3. To understand and learn Structured Query language and data manipulation language.
4. To develop an understanding of essential DBMS concepts.

PAPER CODE: CSC1102 PAPER –II: DATABASE MANAGEMENT SYSTEM - I [Credit -2 No. of Lectures - 36]		
	Title and Contents	**No. of Lectures**
Unit –I	**Introduction to DBMS** 1.1 File system Vs DBMS 1.2Describing & storing data(Data models (relational, hierarchical, network)) 1.3 Levels of abstraction 1.4 Data independence 1.5 Structure of DBMS 1.6 Users of DBMS 1.7 Advantages of DBMS	**4**
Unit –II	**Database design and ER Model**: 2.1Overview 2.2 ER-Model, Constraints,ER-Diagrams, ERD Issues, weak entity sets, Codd's rules 2.3Relational database model: Logical view of data, keys, integrity rules. 2.4Relational Database design: Features of good relational database design, Atomic domain and Normalization 1NF, 2NF, 3NF, BCNF	**12**
Unit –III	**Structured Query Language** Introduction 3.1 Basic structure 3.2 Set operations 3.3 Aggregate functions 3.4 Null values 3.5 Nested Subqueries 3.6 Modifications to Database 3.7 DDL commands with examples	**13**

	3.8 SQL mechanisms for joining relations (inner joins, outer joins and their types)	
	3.9 Examples on SQL (case studies)	
Unit –IV	**Relational algebra:**	**7**
	4.1Introduction	
	4.2 Basic operations : Selection and projection, set operations, renaming, Joins, Division	

References:

1. Henry F. Korth, Abraham Silberschatz, S. Sudarshan Database System Concepts, , ISBN:9780071289597,Tata McGraw-Hill Education

2. Korry Douglas , PostgreSQL, , ISBN:9780672327568

3. John Worsley, Joshua Drake Practical PostgreSQL (B/CD), ISBN:9788173663925 Shroff/O'reilly

4. Joshua D. Drake, John C Worsley Practical Postgresql , O'Reilly

5. Richard Stones , Neil Matthew Beginning Databases with PostgreSQL, From Novice to Professional, 2nd Edition Apress

6. Elmasri and Navathe Fundamentals of Database Systems 4th Edition

7. S. K. Singh , Database Management System : Concepts, design & applications Pearson publication

	PAPER CODE: CSC1103 **PAPER – III: BASIC C: LAB** **[Credit -2 No. of Sessions - 10]**
	Title of Experiment / Practical
1	Use of data types, simple operators
2	Decision making statements (if-else and switch case)
3	Use of loops.
4	Menu driven programs using standard library functions
5	Use of user defined functions
6	Recursive functions
7	Use of arrays (1-d arrays) and functions
8	Use of arrays (2-d arrays) and functions
9	Exercise using if and nested loops
10	Exercise using nested loops and array

	PAPER CODE: CSC1104 **PAPER – IV: DATABASE: LAB** **[No. of Sessions - 10]**
	Title of Experiment / Practical
1	Using basic Linux commands
2	Using vi editor
3	To create simple tables , with only the primary key constraint (as a table level constraint & as a field level constraint) (include all data types) and create more than one table, with referential integrity constraint, PK constraints
4	To create one or more tables with Check ,unique and not null constraint And To drop a table from the database and to alter the schema of a table in the Database
5	To insert / update / delete records using tables created in previous Assignments. (use simple forms of insert / update / delete statements)
6	To query the tables using simple form of select statement
7	To query table, using set operations (union, intersect)
8	To query tables using simple and nested queries (use of 'Except', exists, not exists)
9	Simple query handling
10	Nested query handling

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FIRST YEAR B.Sc. COMPUTER SCIENCE
SEMESTER – II

SYLLABUS OF COMPUTER SCIENCE

Academic Year 2016-2017

PAPER CODE: CSC1201
PAPER – I: ADVANCED PROGRAMMING USING C
[Credit -2   No. of Lectures - 36]

	Title and Contents	**No. of Lectures**
Unit -I	**Application of array** 　　　　1.1 Sorting techniques (bubble, insertion, 　　　　　　selection) 　　　1.2 Searching techniques (linear search, binary 　　　　　　search)	**6**
Unit -II	**Pointers** 　　　2.1 Pointer declaration, initialization 　　　2.2 Dereferencing pointers 　　　2.3 Pointer arithmetic 　　　2.4 Pointer to pointer 　　　2.5 Arrays and pointers 　　　2.6 Functions and pointers – passing pointers to 　　　　　functions, function returning pointers 　　　2.7 Dynamic memory allocation	**8**
Unit –III	**Strings** 　　　3.1 Declaration and initialization, string 　　　　　input/output, format specifiers 　　　3.2 Standard library functions 　　　3.3 Strings and pointers 　　　3.4 Array of strings 　　　3.5 Command Line Arguments	**6**
Unit –IV	**Structures and Unions** 　　　4.1 Creating structures 　　　4.2 Accessing structure members (dot Operator) 　　　4.3 Structure initialization 　　　4.4 Array of structures 　　　4.5 Passing structures to functions 　　　4.6 Nested structures 　　　4.7 Pointers and structures 　　　4.8 Self referential structure 　　　4.9 Unions 　　　4.10 Difference between structures and unions	**10**

	4.11 typedef 4.12 Bit-Fields	
Unit –V	**File Handling** 5.1 Introduction 5.2 Modes of file opening 5.3 Operations on files	**2**

Unit –VI	**C Preprocessor**
	      6.1 Introduction of Preprocessor directive
	6.2 File Inclusion directive
	6.3 Macro substitution, nested macro,
	      argumented macro
		4

References:
3. Brian W. Kernighan and Dennis M. Ritchie: The C programming language Second Edition, Prentice Hall Publication
4. Behrouz A. Forouzan and Richard F. Gilberg: Computer Science: A Structured Programming approach using C Third edition, Thomson Course Technology publication
3. Yashavant Kanetkar: Let Us C Seventh edition   PBP Publications
4. E Balagurusamy: Programming in ANSI C Fourth edition TMH

PAPER CODE: CSC1202
PAPER – II: DATABASE MANAGEMENT SYSTEMS
(SQL / PLSQL)
[Credit -2   No. of Lectures - 36]

	Title and Contents	**No. of Lectures**
Unit -I	**Relational Database Design** 1.1 PL/PgSqL: Datatypes, Language structure 1.2 Controlling the program flow, conditional statements, loops 1.3 Views 1.4 Stored Functions, Stored Procedures 1.5 Handling errors and exceptions 1.6 Cursors 1.7 Concepts of Triggers	**14**
Unit -II	**Transaction Concepts and concurrency control** 2.1 Describe a transaction, properties of transaction, state of the transaction. 2.2 Executing transactions concurrently associated problem in concurrent execution. 2.3Schedules, types of schedules, concept of Serializability, precedence graph for Serializability. 2.4 Ensuring Serializability by locks, different lock modes, 2PL and its variations. 2.5 Basic timestamp method for concurrency, Thomas Write Rule. 2.6 Locks with multiple granularity, dynamic database concurrency (Phantom Problem). 2.7 Timestamps versus locking. 2.8 Deadlock handling methods 2.9 Detection and Recovery (Wait for graph) 2.10 Prevention algorithms (Wound-wait, Wait-die)	**14**
Unit –III	**Crash Recovery** 3.1 Failure classification 3.2 Recovery concepts 3.3 Log base recovery techniques (Deferred and Immediate update) 3.4 Checkpoints 3.5 Recovery with concurrent transactions (Rollback, checkpoints, commit)	**8**

	3.6 Database backup and recovery from catastrophic failure.	

References:
1. Henry F. Korth, Abraham Silberschatz, S. Sudarshan Database System Concepts, , ISBN:9780071289597,Tata McGraw-Hill Education
2. Korry Douglas , PostgreSQL, , ISBN:9780672327568
3. John Worsley, Joshua Drake Practical PostgreSQL (B/CD), ISBN:9788173663925 Shroff/O'reilly
4. Joshua D. Drake, John C Worsley Practical Postgresql , O'Reilly
5. Richard Stones , Neil Matthew Beginning Databases with PostgreSQL, From Novice to Professional, 2nd Edition Apress

	PAPER CODE: CSC1203 **PAPER – III: ADVANCED C: LAB** **[Credit -2 No. of Sessions - 10]**
	Title of Experiment / Practical
1	Sorting and Searching: Applications of array
2	Use of pointers and advanced pointer concepts
3	Use of strings
4	String operations using pointers.
5	Structures with array and functions.
6	Nested structures
7	Command line arguments and pre-processor directives
8	File handling.
9	Sorting and file handling
10	Data handling using structure and files

	PAPER CODE: CSC1204 **PAPER – IV: DATABASE (SQL / PLSQL): LAB** **[No. of Sessions - 10]**
	Title of Experiment / Practical
1	Queries using Aggregate Functions
2	Nested queries
3	Control Structures
4	Stored function
5	Views
6	Exception Handling
7	Cursors
8	Triggers
9	Queries using loops and conditional statements
10	Queries using cursors and views