List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Computer Science and Information Technology*

Programme Name : *B.Sc.(CS)*

Academic Year : 2016-17

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	PCSC-302	Introduction to C Language
02.	PCSC-401	Database Management System
03.	PCSC-501	Internet Application
04.	PCSC-502	Object Oriented Concepts
05.	PCSC-601	Introduction to JAVA
06.	PCSC-605	Major Project

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DEPT OF CSIT
G.G.V. BILASPUR (C.G.)

Department of Computer Science & Information technology
Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.

SYLLABUS FOR UG/PG INTEGRATED (CS) COURSE UNDER *CHOICE BASED CREDIT SYSTEM* (CBCS)

Semester 1

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-101	Computer Science - I	2		20	30	2
2	PCSC-102	Computer Science - II	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Hindi	2		40	60	2
8		English	2		40	60	2
9	PCSC-103	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			18	4	260	390	22

Semester 2

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-201	Computer Science - I	2		20	30	2
2	PCSC-202	Computer Science - II	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Hindi	2		40	60	2
8		English	2		40	60	2
9	PCSC-203	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			18	4	260	390	22

Semester 3

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-301	Computer Science - I	2		20	30	2
2	PCSC-302	Computer Science - II	2		20	30	2
3		Maths-I	3		30	45	3

4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Environment - I	3		40	60	3
8	PCSC-303	Lab based on Computer Science		2	20	30	2
9		Lab based on Physics/Electronics		2	20	30	2
			17	4	220	330	21

semester 4

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-401	Computer Science - I	2		20	30	2
2	PCSC-402	Computer Science - II	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Environment - I	3		40	60	3
9	PCSC-403	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			17	4	220	330	21

Semester 5

Sno	Subject Code	Title	Credit		Marks		Remarks
			L	P	Internal	External	
1	PCSC -501	Programming with Visual Basic	4		20	30	4
2	PCSC-502	Object Oriented Concepts	4		20	30	4
3	PCSC-503	Linux Operating System and ShellProgramming	4		20	30	4
4	PCSC-504	Introduction to Artificial Neural Network	4		20	30	4
5	PCSC-505	Web Based Mini Project		4		100	4
		Total	16	4	80	220	20

emester 6

Sno	Subject Code	Title	Credit		Marks		Remarks
			L	P	Internal	External	
1	PCSC -601	Introduction to JAVA	4		20	30	4
2	PCSC-602	Software Testing	4		20	30	4
3	PCSC-603	Introduction to Data Structure	4		20	30	4
4	PCSC-604	Management Information System	4		20	30	4

5	PCSC-605	Major Project		4		100	4
		Total	16	4	80	220	20

Examination Scheme and Syllabus of Integrated UG/PG- CS

1st Sem

S.NO	Paper Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	P CSC-101	Fundamentals of computer	50	30	20
2	P CSC-102	Introduction to Programming Methodology	50	30	20
3	P CSC-103	LAB 1	50	30	20
		TOTAL	150	90	60

2nd Sem

S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	P CSC-201	Introduction to Logics of Computer	50	30	20
2	P CSC-202	System Analysis and Design	50	30	20
3	P CSC-203	LAB 2	50	30	20
		TOTAL	150	90	60

3rd Sem

S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	P CSC-301	Introduction to Operating system	50	30	20
2	P CSC-302	Introduction to C Language	50	30	20
3	P CSC-303	LAB 3	50	30	20
		TOTAL	150	90	60

4th Sem

S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	P CSC-401	Database Management System.	50	30	20
2	P CSC-402	Computer B ased Numerical Method.	50	30	20
3	P CSC-403	LAB 4	50	30	20
		TOTAL	150	90	60

5th Sem

S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	PCSC -501	Internet Application	50	30	20
2	PCSC-502	Objected Oriented Concepts	50	30	20
3	PCSC-503	System Software	50	30	20
4	PCSC-504	Introduction to Artificial Neural Network	50	30	20

5	PCSC-505	Minor Project	100	100	------
		TOTAL	300	220	80

6th Sem					
S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	PCSC -601	Introduction to JAVA	50	30	20
2	PCSC-602	Software Testing	50	30	20
3	PCSC-603	Introduction to Data Structure	50	30	20
4	PCSC-604	Management Information System	50	30	20
5	PCSC-605	Major Project	100	100	------
		TOTAL	300	220	80

Subject -Introduction to C Language
Paper code – PCSC-302

Origin & Introduction to C : About C, Evolution of C, Programming languages, Structure of a C program, Compiling a C program, Simple C program, Character set in C, Keywords in C, Basic data types, Qualifiers used with basic data types, Variables in C, Type declaration, Input function, Output function and format specifiers, arithmetic operators, Unary operators, Relational and logical operators, address operator, conditional operator, Hierarchy o f operators.

Decision Making, looping & Branching: Control statements, if statement, if else statement, for statement, while loop, do while loop, switch statement, break statement, continue statement, goto statement.

Arrays & String Handling : Introduction to arrays, advantages of arrays, single dimensional arrays, multidimensional arrays, array declaration, array initialization, accessing data from array, Character arrays, String Variables, Reading & writing strings, string handling functions.

Pointers & User Defined Functions : Introduction to pointers, pointer variables, pointers and arrays, pointers to pointers, array of pointers, 2 dimensional arrays and pointers, Introduction to functions, advantages of functions, declaring a function, calling a function, passing arguments to a function.

Structure, Union & Enum : Structure: Array of structure, array within structure, Nested structure, passing arguments and returning structure for functions. **Union**: declaring union and its usage. **Dynamic memory allocation functions** – malloc, calloc, realloc and free.

File Management in C : Defining & opening a file, closing a file, I/O operations on file, error handling during I/O operations.

Readings:

1. A. K. Saxena, Programming Language C : Anamaya Publishers, New Delhi.
2. Y. Kanetkar, Let Us C, BPB Publicat ion.
3. B.S. Gottfried, Schaum's outline of Theory and Problems o f Programming with C, McGraw-Hill.

Subject – Database Management System

Paper code – PCSC-401

Introduction : Purpose of Database System, Concept of database & its evaluation, Views of Data, Types of DBMS, DBMS architecture, Data Independency, Data Models, Data Dictionary.

E-R Model : Basic Concept, Design Issues, Entity Sets, Attributes & its Types, E-R Diagram, Design of an E-R Database Schema , Keys.

Normalization : Purpose of Normalization , Functional Dependencies, 1 NF, 2 NF and 3 NF.

SQL : Introduction to SQL, DDL, DML & DCL statements, Basic Operations, Aggregate function, Modification of Database, other SQL features.

Relational Model : Structure of Relational Model, The Relational algebra (Selection, Projection, Union, Intersection, Cartesian product, Join), Tuple relational calculus.

Readings:

1. Database system concepts By H.Korth and A. Silberschatz ,S.Sudarshan,TMH Publication , 2010.
2. An introduction to Database Systems by Bipin Desai, Galgotia Publications, 2003 edition.
3. An Introduction to Database Systems, C.J.Date, A.Kannan, S. Swamynathan, Pearson Publication, Eight edition, Database Management System C.J.Data

Subject – Internet Application

Paper code – PCSC-501

Max Marks-30
Min Marks-12

Basic of Internet: Basic concept, History, Hardware & software requirement, Client server architecture model, IP Address and Domain Name System, Use of Web Browsers, Customizing the browser, Finding information on the Internet, Search Engines, and Basic Protocols: HTTP, FTP, Telnet etc.

Working with Internet: Uploading and Downloading Text and Images, Web Pages and Web sites, Downloading software with the Browser, Installing, Downloading software , Advanced Software Downloading.

Services of Internet: E-mail, Outlook express, Eudora and Netscape Messenger, Advanced E-mail Facilities, Newsgroups: Use and Advantages, Online and e-mail Gaming, Chatting, Videoconferencing, World Wide Web(WWW).

HTML: Benefit and drawbacks, Tables, Frames, Image and Form, Introduction to CGI scripting.

Web Pages: Developing Web page withHTML.

Readings:

1. How to do Everything with the Internet: Dennis Jones.
2. The Internet: Douglas E. Coiner, Prenlicc- Hall, India.
3. Internet & Intranet Engineering : Daniel Minoli, TataMcGraw-Hill.
4. Introduction to Data Communication & Networking : Forouzan.

Subject – Object Oriented Concepts

Paper code – PCSC- 502

Overview of Object Oriented: Need of Object Oriented, Procedural Vs Object Oriented approach, Benefits, C++ and other languages.

Features of Object Oriented: Class, Objects, Polymorphism, Inheritance, Message Passing, Abstraction, Encapsulation.

Class and Object: Definition, Construction of class, Creation of objects, Pointer to Object, Array of Object, Comparison of Class with Union & Structure.

Polymorphism : Type of Polymorphism, Methods Overloading, Operator overloading.

Inheritance : Types of Inheritance, Single Level, Multi Level, Multiple & Hybrid Inheritance, Advantage of Inheritance, Base Class & Derived Class, C++ & VB: Introduction, Basic Data Type, Writing Simple Program.

Readings:

1 Object Oriented Programming: E. Balaguru Swamy, Tata Mc. Graw Hill
2 Object Oriented Programming & C++: By R. Raja Raman
3 Visual C++ Programming: Yeshwant P. Kanitkar

Subject- Introduction to Java

PCSC – 601

Introduction: Genesis of java, importance to the Internet, overview and features.

Language Basics: Constants, Variables and Primitive Data types, Operators and Expression, Decision Making and Branching statement, Decision Making and Looping, Classes, Objects and Methods, Arrays, Strings and Vectors.

Inheritance: Definition, Types, Method overloading and Method Overriding, super and this keywords,
Interfaces: Defining Interface, Extending Interfaces Implementing Interface.

Packages: Defining Packages, Java API Packages, Naming Conventions, Creating Packages, Accessing Packages, Adding class to Package, CLASS PATH.
Exception handling: Exception Types, Try, Catch & finally Blocks, Throw and Throws keywords. Creating user defined Exception.

Multithreaded Programming: Thread Model, Creating Threads, Thread Priority , Thread Exception, Synchronization.

Input/output: Basic Streams, Byte and Character Stream, predefined streams, reading and writing from console and files.

Java Collection: Introduction, Overview of Interfaces, Overview of Classes.

Introduction to AWT: Window fundamentals, creating windowed programs working with graphics, Using AWT controls, Delegation event model, handling mouse and keyboard event

Readings:

1. Naughton P and schildt H. Java: The complete reference, Osborne Mcgra-Hill, Berkeley, USA, 1997.
2. Rodgers Cadenhead, Laura Lemay, Sams Teach Yourself Java 2 in 21 Days, Sams Publishing.
3. E. Balagurusamy, Programming with Java, Tata McGraw Hill.
4. Bruce Eckel, Thinking in Java, Pearson Education.
5. Peter Van Der Linden, Just Java 2, Sun Microsystems/Prentice Hall.
6. Simply JAVA :An Introduction to JAVA programming By James R. Levenick ,Firewall Media New,Delhi
7. Java Programming - Khalid Mughal.
8. Core JAVA An Integrated Approach By Dr. R. Nageswara Rao dremtech Publicatio.

Department : *Computer Science and Information Technology*

Programme Name : *M.Sc.(CS)*

Academic Year : 2016-17

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	MSC-103	Programming in C Language
02.	MSC-202	Object Oriented Programming with C++
03.	MSC-204	Web Technology
04.	MSC-301	Programming in JAVA
05.	MSC-303	Relational Database Management System
06.	MSC-306	Lab based on JAVA
07.	MSC-307	Lab based on RDBMS
08.	MSC-401	Major Project

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SYLLABUS FOR M.Sc.-CS COURSE UNDER CHOICE BASED CREDIT SYSTEM (CBCS) *

Session 2015-2016

M.Sc- Computer Science

Note: The decision of the GG Vishwavidyalaya for implementing CBCS system on this course shall be final, rest willremain the same.

Semester 1

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-101	Introduction to Information Technology	4		40	60	4
2	MSC-102	Programming Based Numerical Analysis	4		40	60	4
3	MSC-103	Programming in 'C' Language	4		40	60	4
4	MSC-104	Data Structure	4		40	60	4
5	MSC-105	Computer Organization	4		40	60	4
6	MSC-106	LAB-I:Programming in C		1		100	1
7	MSC-107	LAB-II: Data Structure Using C		1		100	1
		Total	20	02	200	500	22

Semester 2

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-201	Principles of Operating system	4		40	60	4
2	MSC-202	Object Oriented Programming with C++	4		40	60	4
3	MSC-203	Discrete Mathematics	4		40	60	4
4	MSC-204	Elective I(Web Technology)	4		40	60	4
5	MSC-205	Elective II(Theory of Computation)	4		40	60	4
6	MSC-206	Lab based on C++		1		100	1
7	MSC-207	Lab Based on Elective-I		1		100	1
		Total	20	02	200	500	22

Semester 3

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-301	Programming in JAVA	4		40	60	4
2	MSC-302	Artificial Intelligence and Expert Systems	4		40	60	4
3	MSC-303	Relational Data Base Management System	4		40	60	4
4	MSC-304(Elective-I)	Elective I(Compiler Design)	4		40	60	4
5	MSC-305(Elective-II)	Elective II(Computer Network)	4		40	60	4
6	MSC-306	Lab based on JAVA		1		100	1
7	MSC-307	Lab Based on RDBMS		1		100	1
		Total	20	02	200	500	22

Semester 4

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-401	Major Project	-	-	-	500	15
		Total	-	-	-	-	15

Total Course Credits – 81

Note: Electives to be decided at the start of the respective semester

MSC-103

Programming in 'C' Language

1. **Fundamentals of C Programming:** Overview of C, History of 'C', Structure of 'C' program. Keywords, Tokens, Data types, Constants, Literals and Variables.
   Operators and Expressions: Arithmetic operators, Relational operator, Logical operators, operator precedence and associativity, Type casting, Expressions, Console I/O formatting, Unformatted I/O functions.
   Control Constructs: If-else, switch-case and break, branching statements

   Loops: for, do while, while, Nested loops, break and continue, goto, exit function.

2. **Arrays, Strings and Functions**: **Array:** Numeric and character arrays, Multidimensional arrays.
   String: String manipulation with/without using library function.
   Functions: Call by value and call by reference, Recursive function
   Command line arguments.

   Structure, Union & Enum: Structure: Array of structure, array within structure, Nested structure, passing arguments and returning structure for functions.declaring union and its usage.

3. **Dynamic Data Structures in 'C' - Pointers**: * and & operators. void pointer, pointer to pointer,pointer arithmetic, pointer comparison, Pointers to functions, function returning pointer, passing function as argument to function,Pointer to structure.
   Dynamic memory allocation functions – malloc, calloc, realloc and free.

4. **File Handling and Miscellaneous Features:** Basics**,** file pointer, File accessing Functions, File handling through command line argument**.**
   Introduction to C preprocessor: #include, #define, conditional compilation directives: #if, #else, #elif,#endif, #ifndef etc.

5. **Graphics in C:** Detection, initialization, and loading of graphics driver for the programs. Constant, Data types and global variables used in graphics. Library functions used in drawing, union REGS, General 8086 software interrupts interfaces, int86, int86x, GUI interaction within the program.

Readings:

1. Programming in C "Yashvant Kanetkar", BPB Publications,Tenth Edition.
2. Programming with C "Venugopal", TMHOutline Series,Third Edition.

MSC-202

Object Oriented Programming with C++

1. **Principal of OOP**
   Procedure oriented Vs Object oriented, OOP paradigm, Features of OOP ,Basic Data types Tokens, Keywords, Constant ,Variables, Operator I/O statements , Structure of C++ program, Arrays, pointers, Object modeling technique (OMT).

2. **Function, Object and Class**
   Defining class, Abstract class ,Function prototype, Function with parameter ,Passing object as a parameter, Constructor function ,Types of constructor, Destructor Friend function , Friend class, Dynamic allocation operator new and delete.

3. **Polymorphism and Inheritance**
   Types of polymorphism, Constructor overloading ,Operator overloading, Template function Template class, Types of inheritance ,Private ,protected and public derivation of class ,Resolving ambiguity Pointer to object, This pointer ,Virtual class , virtual function.

4. **Input - output and File handling**
   I/O classes ,File and stream classes ,Opening and closing file Detecting end of file, String I/O**,** Char I/O, Object I/O, I/O with multiple object ,File pointer, Disk I/O**.**

5. **Exception handling ,Name spaces and Standard Template library (STL)**
   Need of Exception handling ,try ,catch and throws keywords , defining namespace ,benefit of namespace, Component of STL.

Readings:

1. Object oriented programming with C++ by E.Balagurusamy II nd edition Tata Mc-Graw Hill.
2. Object Oriented Programmin By McGregor and Sykes S A, 1992 Van Nostrand.
3. The C++ Programming Language By Strustrp B,Addision Wasley.
4. Object Oriented Programming in C++ By Lafore R, Galgotia Publications.
5. Introduction to Object Oriented Programming By Witt KV, Galgotia Publications.
6. Object Oriented Programming By Blaschek G, Springer Verlag

MSC-204

Web Technology (Elective-I)

1 **Internet Concept**: Fundamental of Web ,History of Web, Web development overview, Domain Name System (DNS),DHCP,and SMTP and other servers ,Internet service provider (ISP), Concept of IP Address, Internet Protocol, TCP/IP Architecture ,Web Browser and Web Server.

2. **HTML and DHTML:-** HTML Tag, Rules of HTML, Text Formatting and Style, List, Adding Graphics to Html Document, Tables and Layout , Linking Documents, Frame, Forms, Project in HTML, Introduction to DHTML, CSS, Class and DIV, External Style Sheet.

3. **Scripting Languages:**Java Script (JS) in Web Page, Advantage of Java Script, JS object model and hierarchy ,Handling event ,Operators and syntax of JS, JS Function, Client side JS Vs Server side JS ,JS security, Introduction to VB Script, Operator and Syntax of VB Script, Dialog Boxes, Control and Loop, Function in VBS.

4. **XML:**Introduction to XML, XML in Action, Commercial Benefits of XML, Gaining Competitive advantage with XML, Programming in XML, XML Schema ,XSLT ,DOM structure model ,XMLquires and transformation.

5. **Active Server Page (ASP):** Introduction ,Internet Information System (IIS),ASP object ,Server object, File system object, session ,Accessing data base with an ASP page ,ODBC – ADO connection object, common methods and properties, ADO record set object .Introduction to ASP.Net.

Readings:

1. The complete Reference By Thomos A. Powell ,TMH publication
2. Web Technology :A Developers Perspective ,N.P.Gopalan ,J.Akilandeswani,PHI Publication.
3.Java Script :The definite Guide By Flangam , O'Reilly
4. Java Script :Developers Resource by Kamran Husain and Jason Levitt PTR-PHI publication.
5."Mastering VB Script" BPB Publication.
6.World Wide Web design with HTML by Xavier Tata McGraw Hill Publication .
7. XML By Example, Sean Mc Grath Pentice Hall Publication.
8. Web Technology : A Developments Perspective , N.P. Gopalan, J. Akilandeswari, PHI Publication.

MSC-301

Programming in JAVA

1. **Overview of JAVA** : The genesis of java, An overview of java, java virtual machine (JVM) ,Java development kit (JDK) ,Java Vs C++, Data types, Literals, Variables, and Arrays, Operators, Control statements, Introducing Class, closer look at Methods and class ,Nested and inner class ,Exploring Java.lang, String handling ,Constructor ,Garbage collection and finalize() method. Writing simple JAVA program.

2. **Inheritance, Packages and interface-** Types of inheritance ,Access specifier ,using super, method overriding , Abstract class ,constructor in multilevel inheritance ,using final with inheritance ,Dynamic method dispatch , Defining package, CLASSPATH, Access protection ,Importing package ,Defining and implementing interface , Extending interface, Nested interface.

3. **Exception handling and Multithreading:** Using try and catch ,multiple catch classes, Nested try statements , throw ,throws and finally ,Built in exception ,Uncaught exception , Creating own exception class , Java Thread Model: Main thread ,Creating own Thread ,Life cycle of thread, Thread priorities ,Synchronization and messaging, Interthread communication ,Suspending ,Resuming and stopping thread.

4. **Input Output and Networking :**I/O classes: Byte stream and character stream ,Predefined stream ,reading console input, writing consol output,PrintWriter class ,Reading and writing files. **Networking** : classes and interface ,Socket and overview, TCP/IP client socket and server socket ,Inet address ,URL Connection, Datagram.

5. **Applet ,AWT,Swing, Event handling and Advance JAVA–** Applet life cycle, Creating an applet,

   Using image and sound in applet ,passing parameter.Exploring AWT and introduction to Swing.Event handling – The delegation-event model , Event classes ,Source of event, Event listener interfaces ,handling mouse and keyboard event ,Adapter class.
   Advance JAVA : JDBC API. Servlet – Overview of servelet,Life cycle of servlet, JAVA servlet architecture Generic servlet and http servlet ,The servlet interface, Request and response.

Readings:

1. Java: The complete reference By Naughton P and schildt H. ,Osborne Mcgraw-Hill, Berkeley, USA, 1997.
2. Simply JAVA :An Introduction to JAVA programming By James R. Levenick ,Firewall Media publication New,Delhi
3. Java Programming By E.Balguruswami

MSC - 303

RDBMS

1. **Overview of Database Management** :Data, Information and knowledge, Increasing use of data as a corporate resource, data processing verses data management, file oriented approach verses database oriented approach to data management; data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases.

2. **Relational Model :** Entity - Relationship model as a tool for conceptual design-entities attributes and relationships. ER diagrams; Concept of keys: candidate key, primary key, alternate key, foreign key; Strong and weak entities, Case studies of ER modeling Generalization; specialization and aggregation. Converting an ER model into relational Schema. Extended ER features.

3. **Structured Query Language :**Relational Algebra: select, project, cross product different types of joins (inner join, outer joins, self join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages, Introduction to SQL constructs (SELECT…FROM, WHERE… GROUP BY… HAVING… ORDERBY….), INSERT, DELETE, UPDATE, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces.

4. **Relational Database Design :**Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design; Concepts of indexes, File organization for relational tables, De-normalization.

5. **Introduction to Query Processing and Protecting the Database & Data Organizations :** Parsing, translation, optimization, evaluation and overview of Query Processing. Protecting the Data Base - Integrity, Security and Recovery. Domain Constraints, Referential Integrity, Assertion, Triggers, Security & Authorization in SQL.

Readings:

1. Database system concept By H. Korth and A. Silberschatz, TMH.
2. Data Base Management System By Alexies & Mathews , Vikas publication.
3. Data Base Management System By C. J. Date ,Narosha Pub.
4. Data Base Management System By James Matin .
5. Principles of Database System By Ullman.

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Semester 1

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2	MSC-102	Programming Based Numerical Analysis	4		40	60	4
3	MSC-103	Programming in 'C' Language	4		40	60	4
4	MSC-104	Data Structure	4		40	60	4
5	MSC-105	Computer Organization	4		40	60	4
6	MSC-106	LAB-I:Programming in C		1		100	1
7	MSC-107	LAB-II: Data Structure Using C		1		100	1
		Total	20	02	200	500	22

Semester 2

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-201	Principles of Operating system	4		40	60	4
2	MSC-202	Object Oriented Programming with C++	4		40	60	4
3	MSC-203	Discrete Mathematics	4		40	60	4
4	MSC-204	Elective I(Web Technology)	4		40	60	4
5	MSC-205	Elective II(Theory of Computation)	4		40	60	4
6	MSC-206	Lab based on C++		1		100	1
7	MSC-207	Lab Based on Elective-I		1		100	1
		Total	20	02	200	500	22

Semester 3

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-301	Programming in JAVA	4		40	60	4
2	MSC-302	Artificial Intelligence and Expert Systems	4		40	60	4
3	MSC-303	Relational Data Base Management System	4		40	60	4
4	MSC-304(Elective-I)	Elective I(Compiler Design)	4		40	60	4
5	MSC-305(Elective-II)	Elective II(Computer Network)	4		40	60	4
6	MSC-306	Lab based on JAVA		1		100	1
7	MSC-307	Lab Based on RDBMS		1		100	1
		Total	20	02	200	500	22

Semester 4

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-401	Major Project	-	-	-	500	15
		Total	-	-	-	-	15

Total Course Credits – 81

Note: Electives to be decided at the start of the respective semester

MSC-202

Object Oriented Programming with C++

1. **Principal of OOP**
   Procedure oriented Vs Object oriented, OOP paradigm, Features of OOP ,Basic Data types Tokens, Keywords, Constant ,Variables, Operator I/O statements , Structure of C++ program, Arrays, pointers, Object modeling technique (OMT).

2. **Function, Object and Class**
   Defining class, Abstract class ,Function prototype, Function with parameter ,Passing object as a parameter, Constructor function ,Types of constructor, Destructor Friend function , Friend class, Dynamic allocation operator new and delete.

3. **Polymorphism and Inheritance**
   Types of polymorphism, Constructor overloading ,Operator overloading, Template function Template class, Types of inheritance ,Private ,protected and public derivation of class ,Resolving ambiguity Pointer to object, This pointer ,Virtual class , virtual function.

4. **Input - output and File handling**
   I/O classes ,File and stream classes ,Opening and closing file Detecting end of file, String I/O**,** Char I/O, Object I/O, I/O with multiple object ,File pointer, Disk I/O**.**

5. **Exception handling ,Name spaces and Standard Template library (STL)**
   Need of Exception handling ,try ,catch and throws keywords , defining namespace ,benefit of namespace, Component of STL.

Readings:

1. Object oriented programming with C++ by E.Balagurusamy II nd edition Tata Mc-Graw Hill.
2. Object Oriented Programmin By McGregor and Sykes S A, 1992 Van Nostrand.
3. The C++ Programming Language By Strustrp B,Addision Wasley.
4. Object Oriented Programming in C++ By Lafore R, Galgotia Publications.
5. Introduction to Object Oriented Programming By Witt KV, Galgotia Publications.
6. Object Oriented Programming By Blaschek G, Springer Verlag

MSC-205

Theory of Computation (Elective-II)

1 **Theory of Automata:** Definition of an automaton, Transition system, Acceptability of a string by FA, Nondeterministic finite state machine, Designing of DFA and NFA ,Equivalence of DFA and NFA, Conversion of NFA to DFA, M Minimization of finite automata, Mealy and Moore models, Minimization of finite automata.

2 **Formal Languages, Regular Sets and Regular Grammars:** Definition, Languages and their relation, Chomsky classification of language, Regular expression, and Finite automaton, Pumping Lemma for regular sets, Application of Pumping lemma, Closure property of regular sets, Regular sets and regular grammar.

3 **Context-free Language**: Context fee language and derivation trees, Ambiguity in context free languages, Simplification of context free languages: (left recursion, Unit production elimination, Eliminating null values) Normal forms of context free languages.

4 **Pushdown Automation**: Definition, Acceptance by PDA, Designing PDA, Push down automation and Context free languages, Parsing and Pushdown automata.

5 **Turing Machine:** Turing Machines model, Representation of TM, Languages acceptability by TM, Design of TM, Introduction: Universal Turing Machines and Halting problem, Introduction: Linear bounded automata and languages.

Readings:

1. K L P Mishra “Theory of Computation”,3rd Edition PHI Publication.
2. J.E.Hopcroft, R.Motwani and J.D Ullman, “Introduction to Automata Theory, Languages andComputations”, Second Edition, Pearson Education, 2003
3. G.PSaradhiVarma and B. ThirupathiRao , “ Theory and Computation Formal Languages and Automata Theory”,2005, SCITECH publication.
4. H.R.Lewis and C.H.Papadimitriou, “Elements of The theory of Computation”, Second Edition, Pearson Education/PHI, 2003
5. J.Martin, “Introduction to Languages and the Theory of Computation”, Third Edition, TMH, 2003.

MSC - 303

RDBMS

1. **Overview of Database Management** :Data, Information and knowledge, Increasing use of data as a corporate resource, data processing verses data management, file oriented approach verses database oriented approach to data management; data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases.

2. **Relational Model :** Entity - Relationship model as a tool for conceptual design-entities attributes and relationships. ER diagrams; Concept of keys: candidate key, primary key, alternate key, foreign key; Strong and weak entities, Case studies of ER modeling Generalization; specialization and aggregation. Converting an ER model into relational Schema. Extended ER features.

3. **Structured Query Language :**Relational Algebra: select, project, cross product different types of joins (inner join, outer joins, self join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages, Introduction to SQL constructs (SELECT…FROM, WHERE… GROUP BY… HAVING… ORDERBY….), INSERT, DELETE, UPDATE, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces.

4. **Relational Database Design :**Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design; Concepts of indexes, File organization for relational tables, De-normalization.

5. **Introduction to Query Processing and Protecting the Database & Data Organizations :** Parsing, translation, optimization, evaluation and overview of Query Processing. Protecting the Data Base - Integrity, Security and Recovery. Domain Constraints, Referential Integrity, Assertion, Triggers, Security & Authorization in SQL.

Readings:

1. Database system concept By H. Korth and A. Silberschatz, TMH.
2. Data Base Management System By Alexies & Mathews , Vikas publication.
3. Data Base Management System By C. J. Date ,Narosha Pub.
4. Data Base Management System By James Matin .

MSC-304

Compiler Design (Elective-I)

1. **Basics of Compilers and Lexical Analysis:** Compilers and Translators, Bootstrap compiler, Phases of Compiler, Compiler writing tools, Bootstrapping, Overview of one pass compiler, Finite Automation, Basics of DFA, NFA, Regular sets and Regular expressions.

2. **Syntax analysis & Parsing techniques:** Basics of context free grammars and derivation of parse trees, Top down parsing and its implementation, Operator precedence parsing, Predicative top down parser, Bottom up parsing, Handel of right sentential form, LR parser, Canonical collection of sets, Construction of parsing action and GOTO table, Construction of LALR parsing table, Handling ambiguous grammar.

3. **Syntax directed definition and Translation**: L-attributed definition, Syntax directed translation scheme, Intermediate code generation**,** Representing three address statements, Syntax directed translation scheme to specify the translation of various programming language construct, Implementing increment and decrement operators, Array reference, Switch/case.

4. **Symbol table management & Error Handling**: Various approaches to symbol table organization, Representation of scope information in symbol table, Storage allocation activation of procedure and record, Static allocation and stack allocation. Error recovery, Error recovery in LR parsing, Predicative parsing error recovery.

5. **Code Optimization and Code Generation** : Introduction, Loop optimization, Eliminating induction variable, Eliminating local common sub expression, DAG, Eliminating global common sub expression, loop unrolling, loop jamming, Problems hindering code generation, Straight forward code generation, Using DAG for code generation, Peephole optimization.

Readings:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman. "Compilers Principles, Techniques and Tools". Pearson Education,2008.
2. O.G.Kakde, "Compiler Design", 2005, Laxmi Publication.
3. AdeshK.Pandey" Concepts of Compiler Design ", First Edition, S.K. Kataria& Sons Publication.
4. Steven S. Muchnick, "Advanced Compiler Design Implementation", Morgan Koffman,1997.
5. AllenHolub, "Compiler Design in C", Prentice Hall of India, 1990.

MSC 305

Computer Networks (Elective-II)

1. **Introduction and Physical Layer :Introduction:** Goal and application Network Hardware and Software , Protocol Hierarchies, Design Issue of the layers, Interfaces and services, Connection oriented and connection less services, Service Primitives, Reference Models – The OSI Reference model, The TCP/IP Model ,Types of computer Network :LAN,MAN,WAN, Topologies, Transmission mode .
   Physical Layer :Data and signal, Analog and digital Communication, Transmission Media ,Concept of data transmission, Switching Techniques ,Communication Satellites – Geosynchronous Satellite – VSAT, Low Orbit Satellites, ISDN and ATM.

2. **Data Link Layer :** Data Link Layer design issues Data link control:Framing, Flow control. Error Detection and Correction. DLC protocol :Stop and Wait Protocol, Sliding window protocol, A Simplex protocol for noisy channel, Medium access sublayer: Channel allocation :static and dynamic ,Multiple access protocol FDDI, Data Link Layer in the Internet : SLIP,PPP. Wired and Wireless LAN protocol.

3. **Network Layer :** The Network Layer Design Issue, IP addressing, Address mapping, Error reporting ,Multicasting ,Delivery, Forwarding and Routing. The Network Layer in the Internet : The IP Protocol. subnets, Internet control protocols ,internet multicasting.

4. **Transport Layer :**The Transport layer services, The concept of client and server in terms of socket addressing Quality of service, Transport service primitives and buffering, Multiplexing, Crash Recovery. The Internet Transport Protocols (TCP/IP) – The TCP Service Model, The TCP protocol, The TCP segment header, TCP connection management, TCP transmission policy, TCP congestion control, TCP timer management, UDP.

5. **Presentation and Application Layer :** Network Security, Traditional Cryptography, Private key cryptography and public key cryptography, Authentication protocols, DNS ,SNMP,E-mail, application layer protocols.

Readings:

1. Data Communications and Networking By Forouzan, Tata McGraw Hill Company.
2 Computer Networks By A.S. Tanenbaum
3. Computer Network By S.S.Shinde ,New Age International Publisher.
4. Data and computer Communication by Shashi banzal ,Firewall media .
5. Internetworking with TCP/IP :Principles, protocols, and Architecture Vol 1 5th Edition ,PHI publication
6. Data Communications and Computer Network by Prakash C Gupta, PHI Publication.

HEAD
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G.G.V. BILASPUR (C.G.)