List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : Computer Science and Information Technology

Programme Name : M.C.A

Academic Year : 2016-17

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
1.	MCA-103	Programming in C Language
2.	MCA-202	Object oriented programming with C++
3.	MCA-204	Web Technology
4.	MCA-301	Programming in JAVA
	MCA-303	Relational Database Management System
	MCA-501	Soft Computing Techniques
	MCA-502	Interactive Computer Graphics
	MCA-503	Data Mining and Data Warehousing
	MCA-504	Network Security
	MCA-506	Advanced JAVA Programming
	MCA-507	Minor Project
	MCA-601	Major Project

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

Department of Computer Science & Information TechnologyGuru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)
SYLLABUS FOR MCA COURSE UNDER CHOICE BASED CREDIT SYSTEM (CBCS) *

MCA

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

Semester 1

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MCA-101	Introduction to Information Technology	4		40	60	4
2	MCA-102	Programming Based Numerical Analysis	4		40	60	4
3	MCA-103	Programming in 'C' Language	4		40	60	4
4	MCA-104	Data Structure	4		40	60	4
5	MCA-105	Computer Organization	4		40	60	4
6	MCA-106	LAB-I:Programming in C		1		100	1
7	MCA-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	MCA-201	Principles of Operating system	4		40	60	4
2	MCA-202	Object Oriented Programming with C++	4		40	60	4
3	MCA-203	Discrete Mathematics	4		40	60	4
4	MCA-204	Elective I(Web Technology)	4		40	60	4
5	MCA-205	Elective II(Theory of Computation)	4		40	60	4
6	MCA-206	Lab based on C++		1		100	1
7	MCA-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	MCA-301	Programming in JAVA	4		40	60	4
2	MCA-302	Artificial Intelligence and Expert Systems	4		40	60	4
3	MCA-303	Relational Data Base Management System	4		40	60	4
4	MCA-304(Elective-I)	Elective I (Compiler Design)	4		40	60	4
5	MCA-305(Elective-II)	Elective II(Computer Network)	4		40	60	4
6	MCA-306	Lab based on JAVA		1		100	1
7	MCA-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	MCA-401	Analysis and Design of Algorithm	4		40	60	4
2	MCA-402	Software Engineering	4		40	60	4
3	MCA-403	Operation Research	4		40	60	4
4	MCA-404(Elective-I)	Elective I(E-Commerce)	4		40	60	4
5	MCA-405(Elective-2)	Elective II(C# and .net framework)	4		40	60	4
6	MCA-406	Lab based on C#		1		100	1
7	MCA-407	LAN Based Mini Project		1		100	1
		Total	20	02	200	500	22

Semester 5

MCA-Vth Semester									
S.No.	Subject Code	Subject	Period / Week			Scheme of Exam Theory / Practical			Total Marks
			L	T	P	E.S.E.	IA	Test	
1.	MCA-501	Soft Computing Techniques	4	1	--	60	10	30	100
2.	MCA-502	Interactive Computer Graphics	4	1	--	60	10	30	100
3.	MCA-503	Data Mining & Data Warehousing	4	1	--	60	10	30	100
4.	MCA-504	Network Security	4	1	--	60	10	30	100
5.	MCA-505	Analysis & Design of Algorithm	4	1	--	60	10	30	100
6.	MCA-506	LAB1: - Advanced Programming Tools – JAVA	--	--	3	100	--	--	100

7.	MCA-507	Minor Project	--	--	3	100	--	--	100
		TOTAL	20	5	6	500	50	150	700

Semester 6

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MCA-601	Major Project	-	-	-	500	15
		Total	-	-	-	-	15

Total Course Credits – 125

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

MCA-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.**
3. **The C Programming Language "Kemigham and Ritche [Prentice Hall]"**
4. **Programming in C Language, "Dr Amit Saxena" Ananya Publication**
5. **Programming in C Language "Bala Gurusamy" Fourth Edition**
6. **Theory and Problems of Programming with C, Byron S. Gottfreid, McGraw-Hill**
7. **Graphics Under C "Yashvant Kanetkar" BPB Publication**

MCA-202

Object Oriented Programming with C++

1. **Principles 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.**
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**

MCA-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 ,XML quires 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.

MCA-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
4. Core JAVA for beginners By Rashmi Kanta Das ,Vikas Publication.
5. Core JAVA : A Comprehensive Study by Mahesh P. Matha , PHI publication.

MCA - 303

Relational Data Base Management System

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). BoyceCodd 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.**
6. **An Introduction to database systems By Bipin Desai, 2011 ed.,Galgotia Publication.**
7. **Database Management System By A. K. Majumdar & P.Bhattacharya, TMH**

MCA-501

Soft Computing Techniques

1. **Introduction -What is soft computing, important soft computing techniques**

2. **Artificial Neural Network :Biological neural network Vs Artificial neural network, Neuron Model and Neural Network Architectures, ANN terminologies, ANN benefits, Supervised learning network :Error back propagation network, Perceptron learning (single layer only), Unsupervised learning network :Kohonen self organizing feature maps (SOM)**

3. **Fuzzy Logic-Crisp set Vs Fuzzy set, Operations on Fuzzy sets, Fuzzy relation, Membership function, Fuzzy arithmetic and Fuzzy measures**

4. **Genetic Algorithm – Introduction, representations of GA by binary and real-valued numbers, Genetic Operators and Parameters: Selection, crossover, mutation, elitism, Genetic Algorithms in Problem Solving**

5 **Swarm Intelligence: Meaning, Particle Swarm Optimization: basics, terminology, problem solving using PSO**

READINGS:

1. **Principles of soft computing , S.N.Shivanandan and S.N. deepa Wiley India publication ,First Indian edition ,2008.**
2. **A Comprehensive Foundation to Neural Networks , Simon Haykins , Prentice Hall**
3. **Fuzzy Sets and Fuzzy Logic: Theory and Applications , G. J. Klir, and B. Yuan, PHI learning ,2011.**
4. **Dr.G.Canon, Fuzzy Logic and Fuzzy Decision Making: Concepts and Applications, Galgotia Publication.**
5. **D. E. Goldberg, Genetic Algorithms in Search, Optimization, and Machine Learning, Addison-Wesley, 1989.**
6. **Jang,Sun and Mizutani :Neuro-Fuzzy and soft computing :A computational Approach to learning and machine intelligence ,PHI learning ,2011.**
7. **N.K. Sinha & M. M. Gupta(Eds), Soft Computing and Intelligent Systems: Theory & Applications, Academic Press, 2000.**

MCA- 502

Interactive Computer Graphics

1. **Basics and Interactive Graphics : Origin of graphics, Working of interactive graphics, Random scan methods, Raster scan methods, Pixels and frame buffer, Color display techniques, Graphics Primitives, Display file structure, CRT, Graphical input devices, Graphical input techniques, Event handling, Input functions.**

2. **Output primitives and Segmented display file: Points & lines, Line drawing DDA algorithm, Bresenhams line drawing algorithm, Circle generation algorithm, Character generation, Text display, Filling polygon., Segments, Functions for segmenting the display file, Posting and un-posting a segment, Segment naming schemes, Appending to segment.**

3. **Display description: Line and polygon clipping, Viewing algorithms- Windows and viewpoints, windowing, Zooming and panning, Homogeneous co-ordinate, Two dimensional and three dimensional transformation, Concatenation.**

4. **Three dimensional graphics: Geometric models, Introduction to realism, Perspective depth, Introductionto shading and illumination: Phong shading, Gouraud shading, Projection, Types of projection.**

5. **Hidden Surface elimination, Curves and surfaces: Back face removal and algorithm, Depth buffer algorithm, Area Subdivision algorithm, Scan line algorithm, Parametric functions, Cubic spline Bezier methods, B- Spline Methods, Displaying curves and surfaces.**

READINGS:

1. William M. Newman and Robert F. Sproull, '' Principles of Interactive Computer Graphics '', Tata McGraw- Hill Edition.

2. Steven Harrington '' Computer Graphics '' , 2nd Edition, Tata McGraw-Hill Edition.

3. Foley, van Dam, Feiner and Hughes, ''Computer Graphics (Principles and Practice)'' ,Indian Edition, Addison Wesley Publication.

4. D Hearn and P M Baker ,''Computer Graphics '', Printice Hall of India (Indian Edition).

5. D F Rogers ,''Mathematical Elements for Computer Graphics '', 2nd Edition,Tata McGraw-Hill

MCA-503

Data Mining & Data Warehousing

1. Data Mining: Meaning, necessity, steps, Normal searching Vs. knowledge extraction

2. Data Mining on different types of databases: Relational, Data Warehouses, Transactional, Object oriented, Object relational, Spatial, Temporal and time series, Text and multimedia (i) Heterogeneous and legacy.

3. Data Warehouse: Meaning, definition, OLTP Vs. OLAP, Data cube, star, snow flake, constellations, basic concepts in writing of DMQL, Three Tier Architecture, Indexing.

4. Data Preprocessing : Noisy data, Inconsistent data, Data integration, Data transformation, Dimensionality reduction, Data compression.

5. Classification, Clustering and Prediction: Meaning, Neural network based classification, k-nearest neighbourhood (kNN) classifiers, Clustering, Types of Clustering, Partioning Method: k-means clustering, Prediction using Regression and Neural Network, Performance Measures.

BOOKS RECOMMENED

1. Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishes nd
(Elsevier, 2 edition), 2006
2. Data Mining Methods for Knowledge Discovery , Cios, Pedrycz, Swiniarski,Kluwer Academic Publishers, London – 1998.

MCA-504

Network Security

1. Foundations of Cryptography and security

Security trends, The OSI Security architecture Security attack, services and mechanism Ciphers and secret messages, Mathematical tools for cryptography: substitution techniques, modular arithmetic, Euclid's algorithm, finite fields, polynomial arithmetic.

2. Symmetric Cipher

Symmetric cipher model, Design Principles of Block Ciphers, Theory of Block Cipher Design, Feistel cipher network structure, Data Encryption Standard (DES), Strength of DES Triple DES ,Modes of operation. Advance encryption Standard (AES)- Evaluation criteria of AES,AES cipher ,key distribution.

3. Public Key cryptography and Hash function

Prime numbers and testing for primarily, factoring large numbers, Principles of public key cryptosystem, RSA algorithm. Key management: Diffie-Helman Key exchange, elliptic curve arithmetic, elliptic curve cryptography, Hash and Message authentication Code (MAC), Hash and MAC algorithms, Digital signature and Authentication protocol.

4. IP and Web security protocols:

Authentication application: Kerberos, Public key infrastructure .E-mail: Pretty Good Privacy (PGP), S/MIME. IP security, Web Security: Secure Socket layer (SSL) and Transport layer security, Secure Electronic Transaction (SET).

5. System Security: Firewall, and Intrusion Detection system (IDS), Malicious Software.

READINGS:

1. Cryptography and Network Security By William Stallings, 4th Edition Pearson Publication
2. Applied cryptography - protocols and algorithm By Buce Schneier, Springer Verlag 2003
3. Cryptography and Network Security By Atul Kahate , TMH Publication.
4. Cryptography and Network Security By Behrouz A. Forouzan, First Edition, TMH Publication.
5. Network Security:Private Communication in Public World By Charlie Kaufman,Radia Perlman and Mike Speciner ,PHI Publication.