

Annexure to Notification No.F(Pres-Syllabi.PG-CBCS)Acad/KU/14 dated 15-05-2014
Syllabus for MCA 1st to 6th semester

Choice based Credit System (CBCS)

Scheme and course structure for

MCA 5th semester effective from academic session 2016 and onwards

Semester-V						
Course Code	Course name	Paper category	Hours / Week			Credits
			L	T	P	
MCA14501CR	Java Programming	Core	3	0	0	3
MCA14502CR	System Programming	Core	3	0	0	3
MCA14503CR	Lab for Java Programming	Core	0	0	6	3
MCA14504CR	Lab for System Programming	Core	0	0	6	3
MCA14505EA	Minor Project (Research Topics[Topic1 or Topic 2 or Topic 3 or Topic 4])/ (Software Development)	Elective (Allied)	3	0	0	3
MCA14506EA	Software Project Management	Elective (Allied)	3	0	0	3
MCA14507EA	Compiler construction	Elective (Allied)	3	0	0	3
MCA14508EA	C# Programming	Elective (Allied)	3	0	0	3
MCA14509EA	Wireless communication	Elective (Allied)	3	0	0	3
MCA14510EA	Bio-Informatics	Elective (Allied)	3	0	0	3
MCA14511EO	Open elective (To be selected from outside department)	Elective (Open)	4	0	0	4
24 Credits=31 Contact Hours						

Core:

MCA14501CR: Java Programming

MCA14502CR: System Programming

MCA14503CR: Lab for Java Programming

MCA14504CR: Lab for System Programming

Electives:(any 4)

(Any one of the following)

MCA14505EA: Minor Project (Research Topics[Software Engineering]) / Minor Project (Research Topics[Artificial Intelligence]) / Minor Project (Research Topics[Computer networks]) / Minor Project (Research Topics[Database Systems]) / Minor Project (Software Development)

(Any three of the following)

MCA14506EA: Software Project Management

MCA14507EA: Compiler construction

MCA14508EA: C# programming

MCA14509EA: Wireless communication

MCA14510EA: Bio-Informatics

MCA14511EO: Open elective (To be selected from outside department)

Annexure to Notification No.F(Pres-Syllabi.PG-CBCS)Acad/KU/14 dated 15-05-2014
Syllabus for MCA 1st to 6th semester

Course No: MCA14501CR

Course Title: Java Programming

Unit I

Java Program Development , Java Source File Structure , Comparison with other languages (C & C++), Java and Internet, Features of Java, Java Virtual machine, ByteCode , Lexical Tokens, Identifiers, Keywords, Literals, Comments , Primitive Datatypes, Variables: Assignment, Initialization and Conversions, Operators: Arithmetic, Assignment, Modulus, Relational, Boolean, Bitwise., Precedence Summary ,Unicode Character Set , Arrays: Single and Multidimensional. Control Statements and Looping Structures

Unit II

Class Fundamentals , Object reference , Garbage Collection, Constructors, Access Control, Modifiers, methods , Nested , Inner Class & Anonymous Classes , Abstract Class, Argument Passing Mechanism , Method Overloading, Recursion , Dealing with Static Members. Finalize() Method, Native Method. Use of “this “ reference , Cloning Objects, Generic Class Types, Inheritance in Java , Overriding Super Class Methods, Use of “super”, Polymorphism in inheritance , Type Compatibility and Conversion ,Packages & Interfaces: Defining and importing packages , Understanding Class path , Implementing interfaces.

Unit III

Exceptions & Errors ,Types of Exception ,Control Flow In Exceptions , Use of try, catch, finally, throw, throws in Exception Handling ,In-built and User Defined Exceptions, Checked and UnChecked Exceptions, Operation on String ,Mutable & Immutable String , Using Collection Bases Loop for String , Tokenizing a String ,Creating Strings using StringBuffer , Multi-Threaded Programming ,Thread Life-Cycle , Thread Priorities , Synchronizing Threads , Inter -communication of Threads, DeadLock. Applet & Application , Applet Architecture, Parameters to Applet , Embedding Applets in Web page. Utility Methods for Arrays , Observable and Observer Objects , Date & Times , Using Scanner.

Unit IV

Streams, Input and Output Classes, The Standard Streams, File Object , File I/O Basics , Reading and Writing to Files ,Buffer and Buffer Management, Read/Write Operations with File Channel , Serializing Objects , The Collection Framework , Collection Types , Sets , Sequence , Map , Hashing ,Use of Array List & Vector , Event-Driven Programming ,The Event Delegation Model , Event Classes, Event Sources , Event Listeners , Adapter Classes, Anonymous Inner classes , Keyboard and Mouse Event Handling , Avoiding Deadlocks in GUI Code ,Networking Basics , Client-Server Architecture , Socket Overview, Networking Classes and Interfaces , Network Protocols ,Developing Networking Applications in Java

Suggested Readings:

Herbert Schildt, “The Complete Reference Java-2 “ ,Sixth Edition 2004,Tata McgrawHill.
Dietel & Dietel, “Java: How to Program Java 2, Sixth Edition, 2006, Pearson Education.
Horstmann & Cornell, “Java2 Vol-1 & Vol-2”,Seven Indian Reprint 2006, Pearson Education.
E. BalaGurudamy “ Programming with java A Primer” 3rd edition

Annexure to Notification No.F(Pres-Syllabi.PG-CBCS)Acad/KU/14 dated 15-05-2014
Syllabus for MCA 1st to 6th semester

Course No.: MCA14502CR

Course Title: System Programming

Unit I

Introduction, Machine Structure , Evolution of the Components of programming system
Evolution of Operating Systems, General Machine Structure , General Approach to a New
Machine , Machine Structure 360-370, Machine Language. Assembly Language

Unit II

General Design Procedure, Assemblers, Design of an single pass assembler and multi pass
assembler, Macros: two pass algorithm, single pass algorithm, Implementation of macro calls
within macros

Unit III

Loaders and Linkers, Loader Schemes, subroutine linkages, relocating loaders, Linking
loaders, Design of an absolute loader, Design of a direct linking loader.

Unit IV

Formal Systems and Programming Languages: Formal specification, Hierarchy of Languages,
BNF, Canonic Systems and Formal Systems.

Compilers, Statement of problem, phases of Compiler-Lexical phase, syntax phase
Interpretation phase, optimization, storage assignment code generation and assembly phase,
Passes of a compiler.

Text Book: John J. Donovan, "Systems Programming", Tata McGrawHill

Reference Books:

Leland L.Beck. "System Software" 4th edition Pearson 1997

Barron.D.W. "Assemblers and Loaders" Mc Donald and Javes 1978

Ullman.J.D. "Fundamentals of Programming System" Addison and Wesley

D.M.Dhamdhere. "System Programming and Operating Systems" 2nd edition

Course No.: MCA14503CR

Course Title: Lab for Java Programming

Course No.: MCA14504CR

Course Title: Lab for Java Programming

Course No.: MCA14505EA

**Course Title: Minor Project (Research in SE/AI/CN/
DBMS)/(Software Development)**

Annexure to Notification No.F(Pres-Syllabi.PG-CBCS)Acad/KU/14 dated 15-05-2014
Syllabus for MCA 1st to 6th semester

Course No: MCA14506EA

Course Title: Software Project Management

UNIT I

INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning. Strategic Assessment – Technical Assessment – Cost Benefit Analysis

UNIT II

PROJECT EVALUATION

–Cash Flow, Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation. Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

UNIT III

MONITORING AND CONTROL

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT IV

MANAGING PEOPLE AND ORGANIZING TEAMS Introduction – Understanding Behavior – Organizational Behavior: A Background –Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation– The Old man – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

TEXT BOOK:

1. Bob Hughes, Mikecoterell, “Software Project Management”, Third Edition, Tata McGraw Hill, 2004.

REFERENCES:

1. Ramesh, Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Walker Royce, “Software Project Management - A Unified Framework”, Pearson Education,2004.
3. Jalote, “Software Project Manangement in Practive”, Pearson Education, 2002.
2. Humphrey Watts, “Managing the Software Process”, Addison Wesley, 1989.

Annexure to Notification No.F(Pres-Syllabi.PG-CBCS)Acad/KU/14 dated 15-05-2014
Syllabus for MCA 1st to 6th semester

Course No.: MCA14507EA
Course Title: Compiler Construction

UNIT 1:INTRODUCTION

Introduction to compilers, translators, structure of a compiler. Programming languages: high level programming languages, lexical and syntactic structure of a language, parameter transmission, storage management.

UNIT 2: AUTOMATA

Finite automata and lexical analysis: role of lexical analyzer, design of lexical analyzers, regular expression, finite automata, minimizing number of states of DFA.

Syntactic specification of programming languages: context free grammars, derivation and parse tree, capabilities of CFG's.

UNIT 3:

Basic parsing techniques: parsers, shift reduce parsers, operator precedence parsing, top down parsing, predictive parsers, LR parsers, SLR parsers.

UNIT 4: IMPLEMENTATION

Syntax directed translation: schemes, implementation, intermediate code, postfix notation, parse and syntax tree, three address code, quadruples and triples. Symbol tables, error detection and recovery, code optimization, loop optimization, code generation.

BOOKS RECOMMENDED:

A. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools , Addison-Wesley, 1988.

Dhamdhare. Compiler Construction, McMillan India. Holmes. Object Oriented Compiler Construction, Prentice Hall.

References:

Fraser and Hanson. A Retargetable C Compiler: Design and Implementation , Addison-Wesley
Holmes. Building your own Compiler with C++, Prentice Hall. Wirth. Compiler Construction, Addison-Wesley.

Annexure to Notification No.F(Pres-Syllabi.PG-CBCS)Acad/KU/14 dated 15-05-2014
Syllabus for MCA 1st to 6th semester

Course No: MCA14508EA

Course Title: C# Programming

Unit I

Introduction to windows Programming. .Net Architecture and Platform, The relationship of C# to .net, The Common Language Runtime, A Closer Look at Intermediate Language , Distinct Values and Reference types, Use of Attributes, Assemblies , Private Assemblies , Shared Assemblies, Creating .net applications using C#, Creating windows forms ,Windows controls, The role of C# in the .net enterprise architecture. C# IDE.

Unit II

Variables and Data Types, Program Flow Control in C#, Arrays, Using statement, Namespace , Aliases , The Main() Method, Passing Arguments to main() . Console I/O, Using Comments, Operators and Casts, Error and Exception Handling.
C# IDE, Basic Window Controls: Text Box, Label, Check Box, List Box, Checked List Box, Radio Buttons, Buttons, Tree View and List View Controls,

Unit III

Objects and Type: Classes and Structs, Partial classes , static classes ,Function Overloading, Operator Overloading, Inheritance : Types of inheritance, virtual methods, hiding methods , Sealed classes and methods, Interfaces, Derived interfaces.
Type safety, Type conversions, Boxing and unboxing , comparing objects for equality , Operator overloading , User defined casts. Delegates and Events, Strings and regular expressions, Collections, Array Lists, The Stack, Queue, and Sorted List class, Hash Tables.

Unit IV

Multi Threading in C#, ADO.NET overview, Using Database Connections ,Executing commands , The Data Reader, The Dataset Class Populating a Dataset , Persisting Dataset Changes , viewing .net data using Data Grid.

Text Book: Professional C# 2008 by Christian Nagel , Bill Evgen , Jay Glynn Wrox Publications , 2008.

Reference

Dietel & Dietel , “C# , How to Program”,Pearson Education.
Visual C#.Net by John Sharp & John Jagger, PHI, New Delhi.
Visual Studio .Net by Francisco, Microsoft Publication.

Annexure to Notification No.F(Pres-Syllabi.PG-CBCS)Acad/KU/14 dated 15-05-2014
Syllabus for MCA 1st to 6th semester

Course No: MCA14509EA

Course Title: Wireless Communications

Unit I

Classification and types of Wireless telephones. Introduction to Cordless, Fixed Wireless(WLL), Wireless with limited mobility(WLL-M) and (Fully)Mobile Wireless phones. Introduction to various generations of mobile phone technologies and future trends. Wireline vs. Wireless portion of mobile communication networks. Mobile-Originated vs. Mobile-Terminated calls. Mobile-Phone numbers vs. Fixed-Phone numbers; Billing Issues.

Unit II

Electromagnetic spectrum, its use and allocation to well-known bands. Concept of cells, sectorization, coverage area, frequency reuse, cellular networks & handoffs.

Unit III

Wireless Transmission concepts; types of antennas, signal propagation, multipath propagation. Comparison of FDM, TDM and CDM techniques. Basic concepts of Spread Spectrum(SS) technique; Direct Sequence SS versus Frequency Hopping SS.

Unit IV

Simplified implementation of IS-95 CDMA using chip sequences. Concept of CDMA(PCS& Cellular) channel; Forward and Reverse CDMA channel for a cell/sector. Concept of(Walsh)Code Channels within a CDMA Channel. Purpose of Pilot, Sync, Paging, Forward Traffic Channels. Purpose of Access & Reverse TCs. Comparison of Cellular and PCS CDMA networks; frequencies and cell-sizes. Advantages/Disadvantages of smaller cell size. Concept of Voice Coding . Components of Mobile Network Infrastructure: MS, BTS, BSC, MSC; their basic functions and characteristics. Types of handoffs in GSM. Use of HLR and VLR in mobile networks.

References Books:

Andy Dornan, "The Essential Guide to Wireless Communications Applications", Pearson.

Jochen Schiller, "Mobile Communications", Pearson.

K.Pahlavan, P.Krishnamurthy, "Principles of Wireless Networks", Pearson Education.

Andrew Tanenbaum, "Computer Networks(4th Edition)", Pearson Education.

T. Rappaport, "Wireless Communications, Principles and Practice" (2nd Edition). Pearson Education

Annexure to Notification No.F(Pres-Syllabi.PG-CBCS)Acad/KU/14 dated 15-05-2014
Syllabus for MCA 1st to 6th semester

Course No: MCA14510EA
Course Title: Bioinformatics

Unit I

Introduction to bioinformatics, Definitions and concepts, Biological complexity, The role of bioinformatics. Types of biological data, types of Biological Databases – flat file databases, relational databases, object-oriented databases, XML representation of biological databases, Sequence databases (EMBL, GenBank, DDBJ, SWISS-PROT, PIR, TrEMBL), Protein family/domain databases (PROSITE, PRINTS, Pfam, SMART, etc), Protein structure and fold classification databases (PDB, CATH, SCOP), pathway databases, PubMed database.

Unit II

Search engines - SRS, Entrez; BLAST, FASTA, Data Submission Tools: Nucleotide Sequence Submission Tools, Protein submission tools, Command line Tool for GenBank; Data Analysis Tools: Tools for Nucleotide Sequence Analysis, Tools for Protein sequence Analysis; Prediction tools: Phylogenetic trees and phylogenetic Analysis, Gene Prediction, Protein structure and Function prediction; Modeling tools: Tools for 2D Protein Modeling, Tools for 3D protein Modeling

Unit III

Ontologies in Bioinformatics: The need for ontologies (Gene naming, functional classifications, references schemes), Classification of ontologies – one dimensional, 2 dimensional, three dimensional, Gene ontology, EcoCyc etc.
Introduction to Markup Languages for biological data: BioML, ProML, CML, GAME, AGAVE

Unit IV

Querying and Integration of Biological Databases: Warehouse Integration, mediator-wrapper based integration, navigational integration. Existing systems and their drawbacks. XPath query language for querying biological data.

Reference Books:

Developing Bioinformatics Computer Skills, Cynthia Gibas & Per Jambeck, O'Reilly
Bioinformatics – Databases, Tools and Algorithms, Orpita Basu, Simminder Kaur Thukral, Oxford Higher Education.

Introduction to bioinformatics, T. K. Attwood & D J Parry-Smith, Pearson Education
Bioinformatics – A beginner's Guide, Jean-Michel Claveriw, Cerdric Notredame, WILEY
DreamTech India Pvt.
Krane ,”Bioinformatic”, Pearson Education.

**Course No.MCA14511EO Open
elective (to be selected from outside
department)**