

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 3rd semester effective from academic session 2015 and onwards

Semester-III						
Course Code	Course name	Paper category	Hours / Week			Credits
			L	T	P	
MCA14301CR	Design and Analysis of Algorithms DAA	Core	3	0	0	3
MCA14302CR	Artificial Intelligence	Core	3	0	0	3
MCA14303CR	Lab for DAA	Core	0	0	6	3
MCA14304CR	Lab for Artificial Intelligence (through Mat lab)	Core	0	0	6	3
MCA14305EA	Modeling & Simulation	Elective (Allied)	3	0	0	3
MCA14306EA	Object Oriented Modeling Analysis and Design	Elective (Allied)	3	0	0	3
MCA14307EA	Data Mining	Elective (Allied)	3	0	0	3
MCA14308EA	Computer Networks	Elective (Allied)	3	0	0	3
MCA14309EA	e-Commerce	Elective (Allied)	3	0	0	3
MCA14310EO	Open elective (To be selected from outside department)	Elective (Open)	4	0	0	4
MCA14311EO	Open elective (Offered for students from outside department)	Elective (Open)	4	0	0	4
24 Credits=31 Contact Hours						

3rd Semester

Core:

MCA14301CR: Design and Analysis of Algorithms(DAA)

MCA14302CR: Artificial Intelligence

MCA14303CR: Lab for DAA

MCA14304CR: Lab for Artificial Intelligence (through Mat lab)

Electives: (any 4)

MCA14305EA: Modeling & Simulation

MCA14306EA: Object Oriented Modeling Analysis and Design

MCA14307EA: Data Mining

MCA14308EA: Computer Networks

MCA14309EA: e-Commerce

MCA14310EO: Open elective (To be selected from outside department)

MCA14311EO: Open elective(Offered for students from outside department)

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Course No.: MCA14301CR

Course Title: Design and Analysis of Algorithms

Unit I

Introduction to Algorithms, Analysis of algorithms, Designing Algorithms, Growth of Functions, Asymptotic notations, Recurrences , Substitution method , Iteration method, Recursion trees , The Master Method, Time and Space Complexity study of some basic algorithms.

Unit II

Randomized Algorithms: Identifying the repeated element, Primality testing, Advantages and Disadvantages.

Divide and Conquer, General method, Binary search, Quick sort.

Greedy Method, General method, Knapsack problem, Single source shortest paths.

Unit III

Dynamic programming, General methods, All pair shortest paths, Traveling salesman problems.

Backtracking, General method, 8-Queen problem, Sum of subsets, Knapsack problem.

Branch and Bound, General method, Least Cost Branch and Bound, 8-Queen Problem, Traveling salesperson problem.

Unit IV

Lower boundary theory, Lower bound theory through reductions, P and NP problems. NP hard and NP complete problems. Approximate Algorithms and their need, The vertex Cover Problem, The traveling salesman problem, The subset sum problem.

Text Book:

Pearson Horowitz, Sahni, “ Fundamentals of Computer Algorithms”, Galgotia Publications
Goodrich and Tamassia “ Algorithm design”

Reference Books:

Coremen, Leiserson, Rivest, Stein, “Introduction to Algorithms”, 2nd edition, PHI.

Aho, Hopcroft and Ullman, “The Design and Analysis of Computer Algorithms”, Pearson.

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Course No: MCA14302CR

Artificial Intelligence

Unit I

Introduction to AI, Search for solutions , Heuristic search, Genetic Algorithms, cross over, mutation, Fuzzy logic, fuzzification, fuzzy sets, hedges, max-product inferencing, max-min inferencing, multiple premise inference, multiple rule inference, defuzzification.

Unit II

First order logic, Inference in first order logic– Propositional versus first order logic, Expert Systems, Forward chaining , Backward chaining – Resolution , Knowledge representation , Uncertainty theory.

Unit III

Knowledge in learning, Inductive learning , Learning decision trees , Ensemble learning, Support vector machines, linearly separable hyper plane, non-linear cases, Statistical learning methods, Reinforcement learning.

Unit IV

Neural Computing, network architectures and learning paradigms , Single-layer perceptrons and their limitations , The Multilayer Perceptron : The sigmoid output function, Training by error back propagation, The Hopfield Model , Self-Organizing Nets : The Kohonen self-organising feature map.

TEXT BOOK

Russell, S. and Norvig, P., “Artificial Intelligence-A Modern Approach”, 2nd Edition, Pearson Education / Prentice Hall of India, 2004.

Neural Computing: An Introduction; R Beale and T Jackson; Institute of Physics Publishing.

References :

Patterson ,” Introduction to Artificial intelligence and expert systems” , Pearson Education

Elaine Rich and Kevin Knight, “Artificial Intelligence”, 2nd Edition, Tata McGraw-Hill, 2003.

Luger, G.F., “Artificial Intelligence , Structures and Strategies for Complex Problem Solving”, Pearson Education / Prentice Hall of India, 2002.

**Course No.: MCA14303CR Lab for
DAA**

**Course No.: MCA14304CR Lab for
Artificial Intelligence (through Mat
Lab)**

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Course No: MCA14305EA

Course Title: Modeling & Simulation

Unit I

Concepts of Systems, Models, and Simulation. Distributed Lag Model, Cobweb Models, The process of a simulation Study, Exponential Growth Models, Exponential Decay Models, Type of simulation, Discrete-Event Simulation: Time-Advance Mechanisms, Components and Organization of a Discrete-Event Simulation Model. Monte Carlo Method. Simulation of Single-Server Queuing System, Simulation of an Inventory System

Unit II

Continuous Simulation: Pure-pursuit Problem.

Random Number Generators: Linear Congruential Generators, Other kinds of Generators, Testing Random-Number Generators.

Generating Random Variates: General Approaches, Continuous and Discrete distributions.

Unit III

Introduction to GPSS, General Description, GPSS block-diagram, Simulation of a Manufacturing Shop. SNA, Function, Simulation of a Supermarket, GPSS Model of a Simple Telephone System

Unit IV

Output Data Analysis for a Single System: Transient and Steady-State Behavior of a Stochastic Process, Type of Simulations with regard to output Analysis and Statistical Analysis for Testing Simulation. Verification and Validation of Simulation. An introduction of different types of simulation languages.

Reference Books:

G. Gordon. "System Simulation", (3rd Edition) Pearson Education, 2000.

Law and Kelton, "Simulation Modeling and Analysis", McGraw Hill, 2001.

N. Deo, "System Simulation with Digital Computer", Prentice Hall of India 1979

Fred Maryanski, "Digital Computer Simulation", CBSPD 1987

James A. Pyne, "Introduction to Simulation- Programming Techniques and Methods of Analysis", McGraw Hill 1988

Zeigler and Kim, "Theory of Modeling and Simulation", Academic Press, 2002

Banks et al, "Discrete event Simulation", Pearson Education, 2001

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Course No.: MCA14306EA

Course Title: Object Oriented Modeling, Analysis & Design

Unit 1

OOAD – Introduction , Applying UML and Patterns in OOAD , Assigning Responsibilities , What is analysis and Design , An Example , The UML , Iterative Development –an Unified Process idea , Additional UP Best Practices and Concepts , The UP Phases and Schedule oriented Terms , The UP disciplines. Process Customization and the development case. The Agile UP. The Sequential Waterfall Lifecycle. Inception. Artifacts that may start in inception, Understanding requirements, types of requirements.

Unit 2

Use –case Model , Writing requirements in context , goals and stories , background , use cases and adding value , use cases and functional requirements , use case types and formats . Goal and scope of a use case , Finding primary actors , goals and use cases , writing use cases in an essential UI-free style , Actors , Use Case Diagrams , Use Cases within the UP , Case Study. Identifying other requirements. From inception to elaboration.

Unit 3

Use Case Model: Drawing System Sequence Diagrams. Example of an SSD. Inter System SSDs , SSDs and Use Cases , System Events and the System Boundary , Name System Events and Operations , Showing Use Case Text , SSDs within the UP. Domain Model : Visualizing Concepts , Domain Models , Conceptual Class Identification , Candidate Conceptual classes , Adding Associations , The UML association notation , NextGen POS Domain Model Associations , NextGen POS Domain Model , Adding Attributes , Non Primitive Data Type Classes , Adding Detail with Operation Contracts , Contract Sections , Post Conditions , Contracts , Operations and the UML. Operation Contracts within the UP.

Unit 4

From Requirements to Design , Interaction Diagram Notation , Sequence and Collaboration Diagrams , GRASP , Responsibilities and methods , interactions diagrams , Patterns , GRASP : Pattern of General Principles in Assigning Responsibilities , Information Expert , creator , Low Coupling , High Cohesion , Controller , Object Design and CRC Cards , Design Model : Use Case Realization with GRASP Patterns , Determining Visibility , Creating Design Class Diagrams , Mapping Design to Code. GRASP : More Patterns , Polymorphism , Pure Fabrication , Indirection , Protected Variations , GoF Design Patterns : Adapter , Factory , Singleton , Strategy , Façade , Observer / Publish-Subscribe / Delegation Event Model ,Relating Use Cases , Modeling Generalization , Refining the Domain Model , Adding New SSDs and Contracts , Modeling Behaviour in Statechart Diagrams , Designing Architecture with Patterns , Organizing the Design and Implementation Model Packages , Introduction to Architecture Analysis and the SAD.

Reference Books:

James Rumbaugh, “Object Oriented Models and Design” Pearson Education 2/e Harrington.”
C & Object Oriented Paradigm” John Viley & sons Publication
Ali Bahrani “Object Oriented Systems Development” McGraw -Hill 1999
Lafore Robert, “Object Oriented Programming in C++”, Galgotia Publications.
Balagurusami, E, “Object Oriented with C++”, Tata McGraw-Hill.

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Course No: MCA14307EA

Course Title: Data Mining.

Unit I

Data warehouse: Definitions, features, building blocks/ components, data marts, Meta data in data warehouse; planning a data warehouse, The project team, project management considerations, Business requirements; data design, the architectural plan, Data storage specifications, Information delivery strategy.

Unit II

Architecture and Infrastructure: Concept of data warehouse architecture, operational infrastructure, physical infrastructure, hardware and operating systems, database software, tools.

The role of metadata, metadata types, metadata requirements.Principles of dimensional modeling: Dimensional modeling basics, Use of CASE tools, The STAR schema, The Snowflake Schema.

Unit III

Data Extraction, Data Transformation, Data Loading.

Data Quality: Need, Data Quality Challenges, Data Quality Tools.

Information access and delivery, Information delivery tools.

Online Analytical Processing (OLAP): Features, functions, OLAP models,

Implementation considerations, OLAP platforms, OLAP tools and products.

Unit IV

Introduction to Data Mining: definitions, Data mining techniques, applications.

Physical Design in data warehouse: Steps, Physical Design considerations, Physical storage.

RAID technology, estimating storage sizes, Indexing the data warehouse: B-Tree Index, Bitmapmed Index, Clustered Index

Performance Enhancement Techniques: Data Partitioning, Data Clustering, Parallel processing, data arrays.Data warehouse deployment.

Text Book: PaulrajPooniah , “ Data Warehousing Fundamentals “ Wiley

Reference:

Alex Berson , Stephen J. Smith “ Data Warehousing , Data Mining and OLAP , Tata McGraw Hill , 2004 Tenth reprint 2007.

Sam Anahory , Dennis Murray ,” Data Warehousing in the real world “ , Pearson Education

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Course No: MCA14308EA

Course Title: Computer Networks

Unit I

Goals and applications of networks. LAN, MAN & WAN architectures. Concept of WAN subnet. Overview of existing networks. OSI Reference Model Architecture, TCP/IP Model and their comparison.

Unit II

Internetworking concept and architectural model. Connection-oriented and connection-less approaches. Concept of Autonomous systems and Internetwork Routing. Classful IP addresses. Subnetting, IP Multicasting. Internet Protocol (IP): connectionless delivery of datagrams (MTU, fragmentation, reassembly).

Unit III

Internet control protocols: ICMP, ARP and RARP. Routing algorithms: Interior (OSPF), Exterior (BGP). Transport Layer: UDP and TCP concepts. Socket API for Network Programming. Network Byte Ordering.

Unit IV

Client-Server application development using TCP & UDP sockets. Basic Server Architectures. Network Security: Firewalls and their components; Encryption techniques and examples of encryption standards.

Reference Books:

1. Andrew Tanenbaum, "Computer Networks", 4th Edition by Pearson.
2. Douglas Comer, "Internetworking with TCP/IP, Volume 1", Pearson.
3. W. Richard Stevens, "UNIX Network Programming", Pearson.
4. Maufer, "IP Fundamentals", Pearson.
5. Douglas Comer, "Client-Server Programming with TCP/IP, Volume 3", Pearson.

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Course No: MCA14309EA

Course Title: e-Commerce

Unit I :

Introduction: Definition of Electronic Commerce, E-Commerce: technology and prospects, incentives for engaging in electronic commerce, needs of E-Commerce, advantages and disadvantages, framework, Impact of E-commerce on business, E-Commerce Models.

Network Infrastructure for E- Commerce:

Internet and Intranet based E-commerce- Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY). Mobile Commerce: Introduction, Wireless Application Protocol, WAP technology, Mobile Information device.

Unit II

Web Security: Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging client server, Security Threats, Network Security, Factors to consider in Firewall design, Limitation of Firewalls.

Unit III

Encryption: Encryption techniques, Symmetric Encryption: Keys and data encryption standard, Triple encryption, Secret key encryption; Asymmetric encryption: public and private pair key encryption, Digital Signatures, Virtual Private Network.

Unit IV

Electronic Payments: Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking. EDI Application in business, E- Commerce Law, Forms of Agreement, Govt. policies and Agenda.

References:

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison- Wesley.
2. Pete Lohsin , John Vacca "Electronic Commerce", New Age International
3. Goel, Ritendra "E-commerce", New Age International
4. Laudon, "E-Commerce: Business, Technology, Society", Pearson Education
5. Bajaj and Nag, "E-Commerce the cutting edge of Business", TMH
6. Turban, "Electronic Commerce 2004: A Managerial Perspective", Pearson Education

**Course No.: MCA14310EO Open
Elective (to be selected from outside
department)**

**Course No.: MCA14311EO Open
Elective (to be selected from outside
department)**