

**Post Graduate Department of Computer Sciences,
The University of Kashmir,
Srinagar - 190006
Proposed
Credit Based Choice Based Curriculum
for
Master of Computer Applications
(MCA) Programme
2015 - 2016 – 2017**

Semester-III(24 Credit unit Semester)						
Course Code	Course name	Paper category	Hours / Week			Credits
			L	T	P	
12 Core Credit Units						
MCA15301CR	Design and Analysis of Algorithms	Core	3	0	2	4
MCA15302CR	Advanced Computer Networks	Core	4	0	0	4
MCA15303CR	Advanced Software Engineering	Core	3	0	2	4
6 Elective Credit Units						
MCA15304DCE	Organizational Behavior	DCE	3	0	0	3
MCA15305DCE	Data Warehousing	DCE	3	0	0	3
MCA15306DCE	Cloud Computing	DCE	3	0	0	3
MCA15307DCE	Advanced Web Programming	DCE	3	0	0	3
6 credit units to be taken from outside departments						

Electives for students from outside Department

Electives for students from outside Department (available every semester)						
(2 Credit course each)						
Course Code	Course name	Paper category	Hours / Week			Credits
			L	T	P	
MCA15308GE	Computer Fundamentals	Generic/Open Elective	1	0	0	2
MCA15309GE	Pseudo-code Development	Generic/Open Elective	1	0	0	2
MCA15310OE	Matlab Concepts	Generic/Open Elective	1	0	0	2
MCA15311OE	SPSS Concepts	Generic/Open Elective	1	0	0	2

Semester - III
Course No.: MCA15301CR
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,

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:

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

Reference Books:

1. Cormen, Leiserson, Rivest, Stein, “Introduction to Algorithms”, 2nd edition, PHI.
2. Aho, Hopcroft and Ullman, “The Design and Analysis of Computer Algorithms”,
Pearson.

Course No.: MCA15302CR

Course Title : Advanced 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.

Course No.: MCA15303CR
Course Title: Advanced Software Engineering

UNIT I: TESTING BASICS & TEST CASE DESIGN

Software Testing Techniques Classification. Test case design strategies. Evaluating test adequacy criteria. White Box Testing: Static white box testing, dynamic white box testing. Structural Testing - Control Flow Testing and its techniques. Data Flow Testing and its techniques. Mutation testing and its techniques. Automated code coverage analysis. Test Adequacy Criteria, Additional white box test design approaches. Black Box Testing: Static black box testing, dynamic black box testing, Functional testing and its techniques, Random testing and its techniques. Additional black box test design approaches, Black box testing and COTS.

UNIT II: SOFTWARE TESTING EXECUTION & TESTING TOOLS

Unit test – Unit test planning – Designing the unit tests – The class as a testable unit – The test harness – Running the unit tests and recording results – Integration tests – Designing integration tests – Integration test planning – System test – The different types – Regression testing – Alpha, beta and acceptance tests.

UNIT III: SOFTWARE RELIABILITY

Introduction to Software Reliability: Basic Concepts, Software Reliability, Hardware Reliability, System Reliability, Software Reliability metrics, Operational Profile, Reliability Modelling, General Model Characteristics, Execution Time Component, Calendar Time Component, Calendar Time to Execution Time Relationship, Markovian Models: Poisson Type Models, Binomial Type Models, Poisson Type Models versus Binomial Type Models, Numerical examples.

UNIT IV: SOFTWARE RELIABILITY MODELS

Specific Models: Finite and Infinite Poisson Type Models, Musa Basic Model versus Logarithmic Poisson Model. Numerical examples. Parameter Estimation: Maximum Likelihood Estimation versus Least Squares Estimation. Comparison of SRGMs: Comparison criteria, Calendar Time Modelling and its Estimation.

Text Book:

1. Roger S. Pressman - Software Engineering - A Practitioner's Approach, Sixth edition,
2. J.D. Musa, A. Iannino, K. Okumoto "Software Reliability: Measurement, Prediction and Application" Tata McGraw Hill
3. PankajJalote - An Integrated approach to Software Engineering, 3rd edition, Narosa Publication.
4. Sommerville - Software Engineering. Pearson , 7/e , 2006.
5. SCHAUM'S Outlines, TMH.
6. James F. Peters Software Engineering – An Engineering Approach, Wiley& Sons

Course No: MCA15304DCE

Course Title : Organizational Behaviour

Unit – I

Basic Concepts of Management, Definition, Need and Scope, Different schools of management – Behavioral Scientific System, Contingency.

Management theories by - F. W. Taylor, Henry Fayol and Elton Mayo.

Introduction to OB, significance of OB, Emerging challenges, Characteristics historical evolution and competencies of OB. Perception.

Unit - II

Individual Behavior: Managerial implications of Learning, Personality, Motivation and Job Stress. Managerial Skill and Functions - Level of Management- Functions of Management

Unit – III

Personality – Development of personality, Attributes of personality.

Leadership – Definition, Importance, qualities of leaders, types of leaders– autocratic, democratic.

Group Behavior: Group Dynamics and Team Behavior, Organizational Conflict, Communication, Leadership, Managerial Implications of Group Behavior.

Unit – IV

Organizational Behavior: Organizational Structure, Organizational Power and Politics.

Total Quality Management, Case Study.

Organizational Culture, Organizational Change and Development.

Recommended BOOKS :

1. Stephen Robbins, “Organizational Behavior”. Prentice Hall India Pvt. Ltd New Delhi.
 2. Don Hellriegel, John Slocum, Richard Woodman, “Organizational Behavior” South-Western Thompson Learning.
 3. Fred Luthans, “Organizational Behavior”. McGraw Hill Book Company.
 4. Keith Davis, “Organizational Behavior”, Tata McGraw Hill Publishing Co. Ltd.
 5. Ricky Griffin & Georgy Moorehead, “organizational Behavior”, Hough Co. Boston.
 6. Steven McShane & Van Glinar, “Organizational Behavior”, Tata McGraw Hill Publishing Co. Ltd.
- Stephen R. Covey, “The seven Habits of Highly Effective people”, Simon & Schuster.

Course No: MCA15305DCE
Course Title: Data Warehousing

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

Text Book: Paulraj Pooniah , “ 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

Course No: MCA15306DCE
Course Title: Cloud Computing

UNIT I

FUNDAMENTALS OF GRID COMPUTING The Grid – Past, Present and Future – Applications of Grid Computing Organizations and their Roles.

GRID COMPUTING ARCHITECTURE Grid Computing Anatomy – Next Generation of Grid Computing Initiatives – Merging the Grid Services Architecture with Web Services Architecture.

UNIT II

GRID COMPUTING TECHNOLOGIES

OGSA – Sample Use Cases that drive OGSA Platform Components – OGSF and WSRF – OGSA Basic Services – Security Standards for Grid Computing – High Level Grid Services.

UNIT III

FUNDAMENTALS OF CLOUD COMPUTING

Fundamentals – Short history of cloud computing – Cloud Architecture – Cloud Storage – Cloud Service – Pros and Cons of cloud computing – Benefits from cloud computing.

UNIT IV

CLOUD SERVICES

Need for Web-Based Application – The cloud Service Development – Cloud Service, Development Types – Cloud Service development tools.

TEXT BOOKS

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education, 2004.
2. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que, 2008.

REFERENCES

1. Fran Berman, Geoffrey Fox, J.G. Anthony Hey, “Grid Computing : Making the Global Infrastructure a reality”, John Wiley & sons, 2003.
2. Hmar Abbas, “Grid Computing: A Practical Guide to technology and Application Charles River media, 2003.

Course No: MCA15307DCE
Course Title: Advanced Web Programming

Unit - I

What is Internet?, Introduction to internet and its applications, E- mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address World Wide Web (WWW) : World Wide Web and its evolution, uniform resource locator (URL), browsers -Search engine, web saver - apache, IIS, proxy server, HTTP protocol.

Unit II

HTML Tag Reference, Global Attributes, Event Handlers, Document Structure Tags, Formatting Tags, Text Level formatting, Block Level formatting, List Tags, Hyperlink tags, Image and Image maps, Table tags, Form Tags, Frame Tags, Executable content tags. Imagemaps , Tables as a design tool, Forms : Creating Forms. Style Sheets : What are style sheets?, Why are style sheets valuable? Different approaches to style sheets, Using Multiple approaches, Linking to style information in s separate file, Setting up style information.

Unit III

Java Script : Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security, Operators : Assignment Operators, Comparison Operators, Arithmetic Operators, Logical Operators, Short-Circuit Evaluation, String Operators, Special Operators, ? (Conditional operator), ,(Comma operator), delete, new, this, void Statements : Break, comment, continue, delete, do ... while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while, with, Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, regExp Document and its associated objects : document, Link, Area, Anchor, Image, Applet, Layer Events and Event Handlers : General Information about Events, Defining Event Handlers and events

Unit IV

PHP : Why PHP and MySQL?, Server-side web scripting, Installing PHP, Adding PHP to HTML, Syntax and Variables, Passing information between pages, Strings, Arrays and Array Functions, Numbers, Basic PHP errors / problems. Advanced PHP and MySQL : PHP/MySQL Functions, Displaying queries in tables, Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, Type and Type Conversions, E-Mail

References :

1. Web Design The complete Reference, Thomas Powell, Tata McGrawHill
2. HTML and XHTML The complete Reference, Thomas Powell, Tata McGrawHill
3. JavaScript 2.0 : The Complete Reference, Second Edition by Thomas Powell and Fritz Schneider
4. PHP : The Complete Reference By Steven Holzner, Tata McGrawHill

Course Code: MCA15308GE
Course Title: Computer Fundamentals

Unit-I: Computer Appreciation, Introduction, Characteristics of computer, History of Computers, Classification of Computers of Size, Architecture and Chronology, Applications of Computers, Commonly used Terms: Hardware, Software, Firmware, Units of Measurement of Storage, Input/output Devices, Secondary Storage Devices, Generation of Languages, Types of Software, Flowcharts and Algorithms, Translators-Interpreters, Compilers and Assemblers. Introduction to Internet & E-Mail.

Introduction to Operating System : Functions of Operating System, evaluation, Batch Processing, Multiprogramming, Multiprocessing, Time Sharing, Real-Time Processing, Advantages and Disadvantages, Single User, Multi-User O.S. Viruses: Types and Control Measures.

Profiling an Operating System: Booting sequence, Operating System, File and Command Processor File, Definition of File, File Naming, Booting from Floppy and HDD, Warm and Cold Reboot, Types of Dos Commands, Internal and External, Introduction of Autoexec.bat, Attrib, Backup, Restore, Find Sys, Filter Commands, General Commands, Types, Data, Time, Prompt, Disk Organization and Disk Storage, Disk Management, Format, CHKDSK, DISK COPY, LABEL, VOL, DISKCOMP, COMP, RECOVER, Redirecting Commands Input and Output.

Reference Books:

- Computer today, Donald H. Sanders, McGraw Hill Publishing Company.
- Microcomputers Software and Applications, Dennis P. Curtin and Leslie R. Portel, PHI.
- Data Processing: An Introduction, Donald P. Spencer and Charles R. Merrill Pub. And Co.
- Computers and Their Applications, Larry Joel Goldstein, PHI.
- Computers in Business, Donald H. Sanders. McGraw Hill Publishing Company.
- Access-2000, Simpson, Bpb Publications.

Course Code: MCA15309GE
Course Title: Pseudo-code Development

Unit I: Learning and writing flowcharts and algorithms:

Introduction, conversions, Programming and Problem Solving: The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, documentation. Algorithms for Problem Solving: Exchanging values of two variables, summation of a set of numbers, Decimal Base to Binary Base conversion, Reversing digits of an integer, GCD (Greatest Common Division) of two numbers, Test whether a number is prime, Organize numbers in ascending order, Find square root of a number, factorial computation, Fibonacci sequence, Evaluate 'sin x' as sum of a series, Reverse order of elements of an array, Find largest number in an array, Print elements of upper triangular matrix, multiplication of two matrices, Evaluate a Polynomial.
file.

References:

1. 2. P.K. Sinha and P. Sinha, "Foundation of Computers" BPB Publishers
2. R.G. Dromey, "How to solve it by Computer"

Course Code: MCA153010GE

Course Title : Matlab Concepts

Unit I

Introduction, Using variables, Introduction to MATLAB commands, Introduction to arrays, Array operations, Indexing, Entering external data, Introduction to Cells, Introduction to Structures. Introduction to branching, If statements, While Loops, Solving Linear Equations, Use of matrices to solve equations, Introduction to Statistical Operations. Introduction to Plotting ,Introduction to Curve Fitting section, Introduction to Curve Fitting section , Linear Regression section , Error Analysis , Estimation , Polynomial Curve fitting , Splines .

References and Resources

1. The MathWorks. The official website for MATLAB is at <http://www.mathworks.com>.
2. Hart, David and Clinton Wolfe, 1999. "Getting Started with MATLAB," Indiana University, <http://www.indiana.edu/~statmath/support/bydoc/>
3. Miranda, Mario J. and Paul L. Fackler, 2002. ,Applied Computational Economics and Finance , Cambridge, MA: MIT Press A textbook discussing computational methods and solutions to dynamic problems generally, as well providing MATLAB tools in the CompEcon Toolbox, <http://www4.ncsu.edu/~pfackler/compecon/toolbox.html>
4. LeSage, James P. Econometrics Toolbox. (<http://www.spatial-econometrics.com/>) This website provides a MATLAB toolbox implementing a variety of functions for econometric analysis, including spatial econometrics.
5. Applied Econometrics Using MATLAB. This book/working paper provides general guidance for using MATLAB in econometric applications. The link for the book is: <http://www.spatial-econometrics.com/html/mbook.pdf>
6. Frain, John C., 2010. "An Introduction to MATLAB for Econometrics," TEP Working Paper No. 0110. This guide describes the use of MATLAB in econometric applications, and discusses LeSage's Econometrics Toolbox in particular <http://www.tcd.ie/Economics/staff/frainj/main/MSc%20Material/MATLAB/matlab.pdf>

Course Code: MCA153011GE
Course Title : SPSS Concepts

Unit I

Descriptive v. Inferential Data Analysis, Measuring Variables (validity, reliability, replicability), Types of Variables (nominal, ordinal, interval), Common Terms (dataset, population sample, parameter, statistic) Misuses of Data (examples), Univariate (Descriptive) Statistics, Sample Size (N) , Range , Frequency Distributions, Histograms, Other Charts, Measures of Central Tendency and Dispersion , Means, medians, modes ,Variance, standard deviation , Introduction to SPSS for Windows ,Starting an SPSS Session ,Creating a New Dataset , Using an Existing Dataset ,Manipulating and Merging Datasets ,Importing and Exporting Data , Printing Datasets , Descriptive Statistics in SPSS (mean, standard deviation, variance, range, frequencies) Manipulating Data in SPSS ,Recoding and Transforming Variables ,Graphs and Charts , Scatter plots , Histograms ,Box Plots and Other Charts , Cross-tabulations ,Printing and Saving Output ,Probabilities and Sampling, Binomial and Normal Random Variables, Z-scores ,Using the Normal Table ,Other distributions ,Methods of Sampling ,Systematic Sampling, Random Sampling ,Sampling Error,

References and Resources

1. Joseph F. Healey, Statistics—A Tool for Social Research(Belmont, CA: Wadsworth Publishing, 1996).
2. Jane Fielding and Nigel Gilbert, Understanding Social Statistics, (London: Sage Publications, 2000).
3. Stephen Van Evera, Guide to Methods for Students of Political Research (Ithaca, NY: Cornell University Press, 1997).
4. Zina O'Leary, The Essential Guide to Doing Research(London, Thousand Oaks, New Delhi: Sage Publications, 2004).
5. Laurence F. Jones and Edward C. Olson, Researching the Polity: A Handbook of Scope and Methods(Cincinnati, OH: Atomic Dog Publishing, 2005).
6. SPSS Instruction Manual, Department of Statistics and Actuarial Science, University of Waterloo, September 1, 1998.