

Integral University, Lucknow
Department of Computer Application
STUDY & EVALUATION SCHEME
Choice Based Credit System

Master of Computer Application (MCA)
w.e.f. Session 2018-19

Year IIIrd, Semester Vth

S. No.	Course Category	Subject Code	Name of the Subject	Periods				Evaluation Scheme				Subject Total
								Sessional (CA)			End Sem. Exam	
				L	T	P	C	CT	TA	Total	ESE	
1.	Core	CA601	Web Technology	3	1	0	4	25	15	40	60	100
2.	Elective - VI			3	1	0	4	25	15	40	60	100
3.	Core	CA607	.NET Framework and C#	3	1	0	4	25	15	40	60	100
4.	Elective - VII			3	1	0	4	25	15	40	60	100
5.	Core	CA613	Artificial Intelligence	3	1	0	4	25	15	40	60	100
6.	Core	CA614	Cyber Law and E-Security	3	1	0	4	25	15	40	60	100
7.	Core	CA615	Web Technology Lab	0	0	3	1	30	30	60	40	100
8.	Core	CA616	.NET Framework and C# Lab	0	0	3	1	30	30	60	40	100
9.	Core	CA617	Colloquium	0	0	2	1	50	50	100		100
Total				18	6	8	27					900

L - Lecture **T** – Tutorial **P** – Practical **C** – Credit **CT** – Class Test **TA** – Teacher Assessment
Sessional Total (CA) = Class Test + Teacher Assessment

Subject Total = Sessional Total (CA) + End Semester Examination (ESE)

Elective – VI

CA602 Internet of Things
CA603 High Performance Computing
CA604 Animation and Gaming
CA605 Neural Network
CA606 Soft Computing

Elective – VII

CA608 Digital Image Processing
CA609 Human Computer Interaction
CA610 Mobile Computing
CA611 Research Methodology and Tools
CA612 Green Computing and E-Waste Management

CA601 WEB TECHNOLOGY

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: CA615

L	T	P
3	1	0

UNIT-I

History and Growth of Web, Concept of WWW, Protocols Governing the Web, Introduction to Cyber Laws, Concept of Effective Web Design.

Web Project, Web Team, Team dynamics, Multi-departmental and Large Scale Website, Technological Advances and Impact on Web Team. [6]

UNIT-II

HTML: Basics of HTML, Structure of HTML, Formatting tags, Links, List, Tables, Frames, Images, HTML forms, Overview and Features of HTML5

DHTML and CSS: Introduction to CSS, Structure and Syntax of CSS, Internal CSS, External CSS, Inline CSS, Using CSS, Background Images, Colors and Properties, Manipulating Texts, using Fonts, Borders, Padding lists. [9]

UNIT-III

JavaScript: Introductions to JavaScript, Features, Variables, Documents, Forms, Statements, Functions, Object in JavaScript, Event and Event Handling, DOM, Manipulations using DOM, Form Validation using JavaScript, Combining HTML, CSS and JavaScript. [9]

UNIT-IV

XML: Introduction, Displaying an XML document, Data Interface with an XML document, Document Type Definitions, Internal and External DTD, Parsers using XML, Client side usage, Server side usage. [8]

UNIT-V

PHP: Introduction and basic Syntax of PHP, Operator, Variable, String, Decision Making and Looping with examples, PHP and HTML, Basic example of PHP.

AJAX: Introduction to AJAX, AJAX Internals, AJAX Framework.

Introduction to COM /DCOM, ASP. [8]

REFERENCES:

1. Burdman, "Collaborative Web Development", Addison Wesley.
2. Sharma & Sharma, "Development of E-Commerce Sites," Addison Wesley.
3. Ivan Bayross, "Web Technologies Part II", BPB Publications.
4. Steven Holzer, "HTML Black Book", Dreamtech Press.
5. Kogent Learning Solutions Inc., "Web Technologies Black Book", Dreamtech Press.

CA602 INTERNET OF THINGS

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE

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3	1	0

UNIT-I

Introduction: Basics of IoT, History of IoT, Overview and Motivations, Characteristics of IoT, Physical and Logical Design of IoT.

Definitions and Frameworks: IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities. [8]

UNIT-II

Fundamental IoT Mechanisms and Key Technologies: Identification of IoT Objects and Services, Structural Aspects of IoT, Environment Characteristics, Traffic Characteristics, Scalability, Interoperability, Security and Privacy, Open Architecture, Key IoT Technologies, Device Intelligence, Communication Capabilities, Mobility Support, Device Power, Sensor Technology, Satellite Technology.

RFID: Introduction, Principle of RFID, Components of an RFID system, Issues. [8]

UNIT-III

EPC Global Architecture Framework: EPCIS and ONS, Design Issues, Technological Challenges, Security Challenges, IP for IoT, Web of Things.

Wireless Sensor Networks: History and Context, WSN Architecture, Connecting Nodes, Networking Nodes, Securing Communication.

WSN Specific IoT Applications and Challenges: Security, QoS, Configuration, Various Integration Approaches, Data Link Layer Protocols, Routing Protocols and Infrastructure Establishment. [8]

UNIT-IV

Resource Management in IoT: Clustering, Software Agents, Clustering Principles in IoT Architecture, Design Guidelines and Software Agents for Object Representation, Data Synchronization, Identity Portrayal.

Identity Management Models: Identity Management, Local, Network, Federated and Global Web Identity, User-Centric Identity Management, Device-Centric Identity Management and Hybrid-Identity Management, Identity and Trust. [8]

UNIT-V

IoT Privacy, Security and Governance: Vulnerabilities of IoT, Security Requirements, Threat Analysis, Use Cases and Misuse Cases, IoT Security Tomography and Layered Attacker Model, Identity Establishment, Access Control, Message Integrity, Non-Repudiation and Availability, Security Model for IoT.

IoT Application: Smart Metering, Advanced Metering Infrastructure, E-Health Body Area Networks, City Automation, Automotive Applications, Home Automation, Smart Cards. [8]

REFERENCES:

1. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications.
2. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3642-19156-5 e-ISBN 978-3-642-19157-2, Springer.
3. Parikshit N. Mahalle and Poonam N. Railkar, "Identity Management for Internet of Things", River Publishers, ISBN: 978-87-93102-90-3 (Hard Copy), 978-87-93102-91-0 (ebook).
4. Hakima Chaouchi, "The Internet of Things Connecting Objects to the Web", ISBN: 978-184821-140-7, Willy Publications.
5. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things: Key Applications and Protocols", ISBN: 978-1-119-99435-0, 2nd Edition, Willy Publications.
6. Daniel Kellmerein, Daniel Obodovski, "The Silent Intelligence: The Internet of Things", Lightning Source Inc; 1 edition (15 April 2014). ISBN-10: 0989973700, ISBN-13: 9780989973700.
7. Fang Zhaho, Leonidas Guibas, "Wireless Sensor Network: An Information Processing Approach", Elsevier, ISBN: 978-81-8147-642-5.

CA603 HIGH PERFORMANCE COMPUTING

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE **L** **T** **P**
3 1 0

UNIT-I

Modern Processor: Stored Program Computer Architecture, General Purpose Cache based Microprocessor, Memory Hierarchies, Multicore Processors, Multithreaded Processors, Vector Processors.

Basic Optimization Techniques for Serial Code: Scalar Profiling, Simple Measures and Large Impact, Role of Compilers. [8]

UNIT-II

Data Access Optimization: Balance Analysis and Light Speed Estimates, Storage Order, Case Study, Algorithm Classification and Access Optimizations.

Parallel Computers: Shared Memory Computers, Distributed Memory Computers, Hierarchical Systems. [8]

UNIT-III

Basics of Parallelization: Reasons for Parallelization, Parallelism, Parallel Scalability.

Shared Memory Parallel Programming with OpenMP: Introduction to OpenMP, Parallel Jacobi Algorithm, Wavefront Parallelization. [8]

UNIT-IV

Efficient OpenMP Programming: Profiling OpenMP Programs, Performance Pitfalls.

Locality Optimization on ccNUMA Architectures: Locality of Access on ccNUMA, ccNUMA Optimization of Sparse MVM, Placement Pitfalls. [8]

UNIT-V

Distributed Memory Parallel Programming with MPI: Message Passing, Introduction to MPI, MPI Parallelization of a Jacobi Solver.

Hybrid Parallelization with MPI and OpenMP: MPI/OpenMP Programming Models, MPI Taxonomy of Thread Interoperability, Hybrid Decomposition and Mapping, Merits and Demerits of Hybrid Programming. [8]

REFERENCES:

1. Georg Hager and Gerhard Wellein, "Introduction to High Performance Computing for Scientists and Engineers", CRC press.
2. Kevin Dowd and Charles Severance, "High Performance Computing", O'REILLY Media.
3. John Lévesque, "High Performance Computing", CRC Press.

CA604 ANIMATION AND GAMING

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE **L T P**
3 1 0

UNIT -I

Introduction: Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Hardware and Software for Computer Graphics, Conceptual Framework for Interactive Graphics Overview, Converting Lines, Converting Circles, Converting Ellipses. [8]

UNIT-II

Animation: Introduction to Animation, Digital, Painting, 2D Animation Concepts, Story Boarding and Animatics, Design Portfolio, Clay Modeling and Animation, 3D Basics, Modeling to Animation, Modeling with 3D, Lights, Camera and Materials, 3D Motion Graphics and FX, Rendering with V-Ray, Digital Compositing, 3D Printing Concepts, 3D Animation Portfolio. [8]

UNIT-III

Animation Modeling: 3D Modeling, Rigging, Character Animation, Texturing, Lighting and Rendering FX, Dynamics and Simulation, Crowd Simulation, Working with Arnold Renderer. 3D Projection Mapping, Portfolio Demo Reel. [8]

UNIT-IV

An Introduction to Game Theory: Definition of Game, Backward Induction: Strategies and Strategy Profiles, Games in Strategic Form, Symmetric Games: Dominance and Elimination of Dominated Strategies, Nash Equilibrium, Reduced Strategies, Sub Game Perfect Nash Equilibrium (SPNE), Commitment Games. [8]

UNIT-V

Introduction to Gaming: 3D Game Programming Concepts, Creating Effective Game Play, Level Design, Obstacles, Puzzles and Challenges, Game Art, Textures and Tools, Creating Game Interfaces (GUI), Introduction to 3D Modeling, Creating Game Characters, Story Writing as used in Games, Creating Sound and Music for Games, Building Environments, Sky and Weather. [8]

REFERENCES:

1. Foley, Van Dam, Feiner, Hughes, "Computer Graphics Principles and Practice", Addison Wesley.
2. Luke Ahearn, "3D Game Environments", Focal Press.
3. Hannes Rall, "Animation", CRC Press.

CA605 NEURAL NETWORK

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE

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UNIT-I

Neural Networks: Terminology, Neural Network Architecture, Perceptrons, Linear Separability.
Perceptron Training Algorithm: Termination Criteria, Choice of Learning Rate, Non-numeric Input.

Modifications: Pocket Algorithm, Adalines. [8]

UNIT-II

Supervised/Unsupervised Learning: Prediction Networks, Winner-Take-All Networks, Hamming Networks, Max Net, Simple Competitive Learning, Counter Propagation, Neo Cognition.

Associative Models: Hopfield Network, Brain-State-in-a-Box Network, Boltzmann Machines. [8]

UNIT-III

Multilayered Network Architecture, Back Propagation Algorithm, Heuristics for Making BP-Algorithm.

Accelerated Learning BP: Recursive Least Square, Quick Prop, RPROP Algorithm, Approximation Properties of RBF Networks, Comparison with Multilayer Perceptron. [8]

UNIT-IV

Recurrent Network, Temporal Feed-forward Network, Implementation with BP, Self Organizing Map and SOM Algorithm, Properties of Feature Map and Computer Simulation, Principal Component, Independent Component Analysis, Application to Image and Signal Processing. [8]

UNIT-V

Complex Valued NN, Complex Valued BP, Analyticity of Activation Function, Application in 2D Information Processing, Complexity Analysis of Network Models, Soft Computing, Neuro-Fuzzy-Genetic Algorithm Integration. [8]

REFERENCES:

1. K. Mehrotra, Mohan, Ranka "Elements of Artificial Neural Networks", Penram International Publishing.
2. J.A. Anderson, "An Introduction to Neural Networks", MIT.
3. Hagen Demuth Beale, "Neural Network Design", Cengage Learning.
4. Laurene V. Fausett, "Fundamentals of Neural Networks: Architectures, Algorithms and Applications", Pearson India.
5. Kosko, "Neural Network and Fuzzy Sets", PHI.
6. Hagan, "Neural Network Design w/CD", Cengage Learning.

CA606 SOFT COMPUTING

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE **L** **T** **P**
3 **1** **0**

UNIT-I

Fuzzy Set Theory: Introduction to Neuro, Fuzzy and Soft Computing, Fuzzy Sets, Basic Definition and Terminology, Set-theoretic Operations, Member Function Formulation and Parameterization, Fuzzy Rules and Fuzzy Reasoning, Extension Principle, Fuzzy Relations, Fuzzy If-Then Rules, Fuzzy Inference Systems, Mamdani Fuzzy Models, Sugeno Fuzzy Models, Tsukamoto Fuzzy Models, Input Space Partitioning, Fuzzy Modeling. [8]

UNIT-II

Optimization :Derivative-based Optimization, Descent Methods, Steepest Descent Method, Classical Newton’s Method , Step Size Determination, Derivative-free Optimization, Simulated Annealing, Random Search, Downhill Simplex Search. [8]

UNIT-III

Neural Networks: Supervised Learning Neural Networks, Perceptrons, Adaline, Back Propagation Multilayer Perceptrons, Radial Basis Function Networks, Unsupervised Learning Neural Networks, Competitive Learning Networks, Kohonen Self-Organizing Networks, Learning Vector Quantization, Hebbian Learning. [8]

UNIT-IV

Neuro Fuzzy Modeling: Adaptive Neuro, Fuzzy Inference Systems, Architecture, Hybrid Learning Algorithm, Learning Methods that Cross-fertilize ANFIS and RBFN, Coactive Neuro Fuzzy Modeling, Framework Neuron Functions for Adaptive Networks, Neuro Fuzzy Spectrum. [8]

UNIT-V

Genetic Algorithm: Fundamentals of Genetic Algorithms, Basic Concepts, Working Principle, Procedure of GA, Flow chart of GA, Genetic Representations, Encoding, Application of GA. [8]

REFERENCES:

1. J.S.R. Jang, C.T. Sun and E. Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2004, Pearson Education 2004.
2. Davis E. Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y., 1989.
3. S. Rajasekaran and G.A.V. Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003.
4. K. Mehrotra, Mohan, Ranka “Elements of Artificial Neural Networks”, Penram International Publishing.
5. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.

CA608 DIGITAL IMAGE PROCESSING

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE L T P
3 1 0

UNIT-I

Introduction and Fundamentals: Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization,

Image Enhancement in Spatial Domain: Introduction, Basic Gray Level Functions.

Piecewise-Linear Transformation Functions: Contrast Stretching, Histogram Specification, Histogram Equalization, Local Enhancement, Enhancement using Arithmetic/Logic Operations, Image Subtraction, Image Averaging, Basics of Spatial Filtering, Smoothing, Mean filter, Ordered Statistic Filters, Sharpening, Laplacian Filter. [8]

UNIT-II

Image Enhancement in Frequency Domain: Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Low-pass Filter, High-pass Filter, Correspondence between Filtering in Spatial and Frequency Domain, Smoothing Frequency Domain Filters, Gaussian Lowpass Filters, Sharpening Frequency Domain Filters, Gaussian Highpass Filters, Homomorphic Filtering.

Image Restoration: A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only Spatial Filtering.

Mean Filters: Arithmetic Mean Filter, Geometric Mean Filter, Order Statistic Filters, Median Filter, Max and Min Filters, Periodic Noise Reduction by Frequency Domain Filtering, Bandpass Filters, Minimum Mean Square Error Restoration. [8]

UNIT-III

Color Image Processing: Color Fundamentals, Color Models, Converting Colors to different Models, Color Transformation, Smoothing and Sharpening, Color Segmentation.

Morphological Image Processing: Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms, Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening. [8]

UNIT-IV

Registration: Introduction, Geometric Transformation, Plane to Plane Transformation, Mapping, Stereo Imaging, Algorithms to Establish Correspondence, Algorithms to Recover.

Depth Segmentation: Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-Based Approach.

Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection. [8]

UNIT-V

Feature Extraction: Representation, Topological Attributes, **Geometric Attributes**

Description: Boundary-Based Description, Region-Based Description, Relationship, **Object**

Recognition: Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching. [8]

REFERENCES:

1. Rafael C. Gonzalvez and Richard E. Woods, "Digital Image Processing", Pearson Education.
2. R.J. Schalkoff, "Digital Image Processing and Computer Vision", John Wiley and Sons.
3. A.K. Jain, "Fundamentals of Digital Image Processing", Prentice Hall.

CA609 HUMAN COMPUTER INTERACTION

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE

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UNIT-I

Introduction: A Brief History of Human Computer Interaction, Needs, Advantages, Disadvantages, User Interface: Types of User Interface, Importance of Good Design, Benefits of Good Design, Rational of WIMP (Window, Icon, Menus & Pointing Devices) Interfaces, Human Input-Output Channels, Human Memory, Thinking, Design of Interactive System, Computer Input-Output Devices for Interactive Users, A Brief History of Screen Design. [8]

UNIT-II

Virtual Reality System: Introduction, Devices for Virtual Reality and 3D Interaction, Sensors and Special Devices, Interaction, Model of Interaction, Human Factors, Interaction Styles, Interactivity, Paradigms for Interaction, Multi-model Interaction.

Guidelines in HCI: Shneiderman's Eight Golden Rules, Norman's Seven Principles, Norman's Model of Interaction, Nielsen's Ten Heuristics with Example of its Use, Heuristic Evaluation.[8]

UNIT-III

Design Process: Interaction Design, Process of Design, User Focus, Navigation Design.

HCI in the Software Process: Software Life Cycle, Usability Engineering, Prototyping, Techniques for Prototyping, Design Rationale, Design Rules.

Implementation Supports: Elements of Windowing System, User Interface Management System. [8]

UNIT-IV

Evaluation: Goal of Evaluation, Types of Evaluation, Evaluation Techniques, User Support System, Requirements of User Supports, Approaches to User Support, Adaptive Help Systems, Techniques for Knowledge Representation.

Models: Cognitive Model, Hierarchical Model, Linguistic Model, Physical and Device Model, Organizational Issues, Capturing Requirements, Fitts' Law and Hick-Hyman's Law. [8]

UNIT-V

Communication and Collaboration Model: Conversation, Text Based Communication, Task Analysis, Knowledge-Based Analysis, Sources of Information and Data Collection, Uses of Task Analysis, Dialogs Design Notation, Diagrammatically Notation, Textual Dialog Notation, Dialogs Semantics, Dialog Analysis and Design, Hypertext, Multimedia and World Wide Web. [8]

REFERENCES:

1. Alan Dix, Janet Finlay, Abowd, "Human Computer Interaction", Pearson Education.
2. Soren Lauesen , "User Interface Design", Pearson Education.
3. Wilbert O Galitz , "The Essential Guide to User Interface Design", Wiley DreamTech.
4. Ben Shneidermann, "Designing the User Interface", Pearson Education.

CA610 MOBILE COMPUTING

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE **L T P**
3 1 0

UNIT-I

Introduction to Mobile Communications and Computing: Introduction to Mobile Computing, Applications, Limitations, and Architecture.

Cellular Overview: Cellular Networks, Cellular Concept, Channel Allocation, Location Management, Handoff.

GSM: Air-interface, Mobile Services, System Architecture: Radio Subsystem, Network and Switching Subsystem, Operation Subsystem.

Protocols: Localization and Calling, Handover. [8]

UNIT-II

Wireless LANs and Application: WLAN, Wireless Standards, Wireless LAN, Infrared Vs Radio Transmission, Infrastructure Networks, Adhoc Networks, Wireless Applications, Mac Issues, Mobile IP.

Wireless Application Protocol: Architecture, Protocol Stack, Application Environment, IEEE Applications.

Access Technologies: Bluetooth, GPRS, 802.11, CDMA.

Mobile Phone Technologies: 1G, 2G, 2.5G, 3G. [8]

UNIT-III

Database Issues: Hoarding Techniques, Caching Invalidation Mechanisms, Client Server Computing with Adaptation, Power-aware and Context-aware Computing, Transactional Models, Query Processing, Recovery, Quality of Service Issues. [8]

UNIT-IV

Mobile Ad-Hoc Networks (MANET): Characteristics, Performance Issues, TCP Issues, Disconnected Operations, Data Broadcasting and Mobile Agents, Routing in Mobile Hosts.

Routing Protocols: Global State Routing (GSR), Destination Sequenced Distance Vector Routing (DSDV), Dynamic Source Routing (DSR), Ad Hoc on Demand Distance Vector Routing (AODV), Temporary Ordered Routing Algorithm (TORA), QoS in Ad Hoc Networks, Applications. [8]

UNIT-V

Platform/Operating Systems for Application Development: Introduction to Palm OS, Windows CE, Embedded Linux, J2ME, Symbian.

Android Application Development: Overview of Android, Devices Running Android, Development Tools for Android, Features of Android, Architecture of Android, Libraries, Software Development Kit. [8]

REFERENCES:

1. J. Schiller, "Mobile Communications", Addison Wesley Publication.
2. A. Mehrotra, "GSM System Engineering", Addison Wesley Publication.
3. M. Heijden, M. Taylor, "Understanding WAP", Artech House Publication.
4. Reto Meier, "Professional Android Application Development", Wrox Publications.
5. Ed Burnette, "Hello Android, Introducing Google's Mobile Development Platform", Pragmatic Programmers.
6. Lauren Dercy and Shande Conder, "Sams Teach Yourself Android Application Development", Sams Publishing.
7. Asoke K Talukdar, Roopa R. Yavagal, "Mobile Computing", Tata McGraw Hill.
8. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer.

CA611 RESEARCH METHODOLOGY AND TOOLS

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE **L T P**
3 1 0

UNIT-I

Meaning, Characteristics, Objectives, Limitations and Motivation of Research, Types of Research and Research Process, Importance and Challenges of Research, Criteria of Good Research. [8]

UNIT-II

Literature Review Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, Meaning of Research Design, Need for Research Design, Features of a Good Design, Different Research Designs. [8]

UNIT-III

Sampling Design, Steps in Sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs, Measurement and Scaling Techniques. Methods of Data Collection from Primary Source: Observation Method, Interview Method, Questionnaires Method, Schedules Method, Collection of Data from Secondary Source. [8]

UNIT-IV

Statistics in Research, Measures of Central Tendency, Measures of Dispersion, Measures of Asymmetry (Skewness), Measures of Relationship, Simple Regression Analysis, Multiple Correlation and Regression, Partial Correlation, Introduction of SPSS. [8]

UNIT-V

Hypothesis, Concepts of Testing of Hypothesis, Formulation of Hypothesis, t-test, z-test, χ^2 - test on Goodness of fit, Application of z-test, t-test, F-test and Chi-Square test, Limitations of the Tests of Hypothesis, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Precautions for Writing Research Reports. Introduction of Latex. [8]

REFERENCES:

1. Kothari, C. R., "Research Methodology: Methods and Techniques", New Age International (p) Limited.
2. Sinha, S. C. and Dhiman, A. K., "Research Methodology", Ess Ess Publication.
3. Garg, B. L., Karadia, R., Agarwal, F. and Agarwal, U. K., "An Introduction to Research Methodology", RBSA Publishers.

CA612 GREEN COMPUTING AND E-WASTE MANAGEMENT

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE **L T P**
3 1 0

UNIT-I

Introduction : Environmental Impacts of IT, Holistic Approach to Greening IT, Green IT Standards and Eco-Labeling, Enterprise Green IT Strategy, Hardware: Life Cycle of a Device or Hardware, Reuse, Recycle and Dispose. Software: Introduction, Energy-Saving Software Techniques, Evaluating and Measuring Software Impact to Platform Power. [8]

UNIT-II

Software Development and Data Centers: Sustainable Software, Software Sustainability Attributes, Software Sustainability Metrics, Sustainable Software Methodology, Data Centres and Associated Energy Challenges, Data Centre IT Infrastructure, Data Centre Facility Infrastructure: Implications for Energy Efficiency, IT Infrastructure Management, Green Data Centre Metrics.

Data Storage and Communication: Hours Storage Media Power Characteristics, Energy Management Techniques for Hard Disks, System-Level Energy Management, Objectives of Green Network Protocols, Green Network Protocols and Standards. [8]

Unit-III

Managing And Regulating Green IT: Strategizing Green Initiatives, Implementation of Green IT, Information Assurance, Communication and Social Media, The Regulatory Environment and IT Manufacturers, Nonregulatory Government Initiatives, Industry Associations and Standards Bodies, Green Building Standards.

Information Systems, Green IT Strategy and Metrics : Approaching Green IT Strategies, Business Drivers of Green IT Strategy, Business Dimensions for Green IT Transformation, Multilevel Sustainable Information, Sustainability Hierarchy Models, Product Level Information, Individual Level Information, Measuring the Maturity of Sustainable ICT. [8]

Unit-IV

Green IT Services and Roles: Factors Driving the Development of Sustainable IT, Sustainable IT Services (SITS), SITS Strategic Framework, Sustainable IT Roadmap, Organizational and Enterprise Greening, Information Systems in Greening Enterprises, Greening the Enterprise: IT Usage and Hardware, Inter-organizational Enterprise Activities and Green Issues, Enablers and Making the Case for IT and the Green Enterprise. [8]

Unit-V

Introduction to E-Waste Management: Reusing, Recycling and Electronic Waste, E-Waste Processing Techniques, Regulatory Framework and Compliance Requirement, Composition of E-Waste, Environmental and Health Issues, E-Waste Collection System,

Recycling E-Waste: Practices and Challenges, Refurbishing Discarded Electronic Devices, Procedures for setting up E-Waste Recycling Facilities, Approach towards Effective Management Systems for E-Waste, Case studies.

Current and Future Research Directions: Current gaps in the E-Waste Database, Future Research Direction. [8]

REFERENCES:

1. San Murugesan, G. R. Gangadharan, "Harnessing Green IT", WILEY 1st Edition-2013.
2. Bud E. Smith, "Green Computing: Tools and Techniques for Saving Energy, Money, and Resources", CRC Press, 2013, First Edition
3. Jason Harris, "Green Computing and Green IT Best Practices on Regulations and Industry Initiatives, Virtualization, Power Management, Materials Recycling and Telecommuting", Emereo Pty, Limited, First Edition
4. Hu, Wen-Chen, "Sustainable ICTs and Management Systems for Green Computing", IGI Global, 2012.
5. Wu-chunFeng, "The Green Computing Book: Tackling Energy Efficiency at Large Scale", CRC Press, 2014.
6. Bruce Fowler, "Electronic Waste", Academic Press, 1st Edition.

CA613 ARTIFICIAL INTELLIGENCE

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE

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UNIT -I

Introduction to AI: Application of AI, Problem, Problem Space and Searches: Problem Characteristics, Simple Problem Solving, Examples, Searching for Solution.

Uninformed Search Strategies: Breadth- First Search, Depth-First Search, Depth Limited Search and Iterative Deepening Search.

Informed Search Strategies: BFS, A* Algorithms, RBFS, Hill-Climbing, Constraint Satisfaction Problem (CSP), Mean-End-Analysis, Optimal Decision in Games. [8]

UNIT-II

Knowledge Representation Concept: Representation and Mapping, Approaches to Knowledge Representation.

First Order Predicate Logic: Representing Simple Facts in Logic, Computable Functions and Predicates, Rules of Interface, Resolution, Unification and Lifting, Forward and Backward Chaining.

Weak Slot-and-Filler Structure: Semantic Nets Partitioned Nets, Minsky Frames. [8]

UNIT -III

Natural Language Processing: Introduction, Overview of Linguistics, Grammar and Languages, Parsing Techniques, Semantic Analysis and Representation Structure, Natural Language Generation, Natural Language Systems, Introduction to Learning, Introduction to Expert System. [8]

UNIT -IV

Machine Learning: Supervised and Unsupervised Learning, Decision Trees, Statistical Learning models, Learning with Complete Data: Naive Bayes Models, Learning with Hidden Data: EM algorithm, Reinforcement Learning.

Game Playing: Overview, MiniMax, Alpha-Beta Cut-off, Refinements, Iterative deepening. [8]

UNIT-V

Pattern Recognition: Introduction, Design Principles of Pattern Recognition System, Statistical Pattern Recognition, Parameter Estimation Methods: Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA).

Introduction to Prolog: Syntax and Numeric Function, Basic List Manipulation Functions in Prolog, Functions, Predicates and Conditional, Input, Output and Local Variables, Iteration and Recursion, Property Lists and Array. [8]

REFERENCES:

1. Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Pearson Education.

2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw-hill Education Pvt. Ltd.
3. E. Charniak and D McDermott, "Introduction to Artificial Intelligence", Pearson Education.
4. Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall of India.

CA614 CYBER LAW AND E-SECURITY

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE **L T P**
3 1 0

UNIT-I

Introduction to Information Systems: Types of Information Systems, Development of Information Systems, Introduction to Information Security, Need for Information Security, Threats to Information Systems, Information Assurance, Cyber Security and Security Risk Analysis.

Fundamentals of E-Commerce: Basic of E-Commerce, Types of E-Commerce, Benefits, Advantages and Disadvantages, Impact of E-Commerce on Business. [8]

UNIT-II

Application Security: Data Security Considerations, Backups, Archival Storage and Disposal of Data. Security Threats: Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail Viruses, Macro Viruses, Malicious Software, Network and Denial of Services Attack, Security Threats to E-Commerce, Electronic Payment System, E-Cash, Credit/Debit Cards, Digital Signature. [8]

UNIT-III

Internet 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, Introduction to Biometric Security and its Challenges, Finger Prints. [8]

UNIT-IV

Fundamentals of Cyber Law: Security Policies, WWW Policies, E-mail Security Policies, Corporate Policies, Publishing and Notification Requirement of the Policies. Intellectual Property Law: Copyright Act, Patent Law, Software License, Semiconductor Law and Patent Law, Cyber Laws in India: IT Act 2000 Provisions. [8]

UNIT-V

Investigation and Ethics: Cyber Crime, Cyber Jurisdiction, Cyber Crime and Evidence Act, Treatment of Different Countries of Cyber Crime, Ethical Issues in Data and Software Privacy, Plagiarism, Pornography, Tampering Computer Documents, Data Privacy and Protection, Domain Name System, Software Piracy, Issues in Ethical Hacking. [8]

REFERENCES:

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison Wesley.
2. Bajaj and Nag, "E-Commerce: The Cutting Edge of Business", TMH.
3. Harish Chander, "Cyber Law and IT Protection", PHI Publication.
4. Merkov, Breithaupt, "Information Security", Pearson Education.
5. Farooq Ahmad, "Cyber Law in India", Pioneer Books.
6. K. K. Singh, Akansha Singh "Information Security and Cyber Law", Umesh Publication.

CA615 WEB TECHNOLOGY LAB

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: CA601 **L** **T** **P**
0 **0** **3**

1. Design a web page to display your CV.
2. Design a HTML page using links, list, and table tag etc..
3. Design a HTML form for railway reservation.
4. Design a HTML form for user registration.
5. In the form mentioned in problem 3 to reserve a railway ticket add the following validations using JavaScript.
 - From City A to City B.
 - Age of passengers should not be greater than 100.
 - Name of the passenger should be a string of a maximum length 20.
6. In the form mentioned in problem 4 add validation using JavaScript.
7. Write a JavaScript to prompt for username and display a welcome message and username.
8. Write a program for illustrating client/server side scripting with help of ASP.
9. Write a code in XML for creating DTD, which specifies set of rules.
10. Create style sheets in CSS/XSL and display the document in Browser.
11. Basic programs based on PHP.
12. Basic programs based on AJAX.
13. **Mini Project:** Develop a web portal.

CA616 .NET FRAME WORK AND C# LAB

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: CA607 **L** **T** **P**
0 **0** **3**

Window Application:

1. A program of Jagged Array.
2. A program of Binary Operator Overloading
3. A program using Delegation in which Addition and Subtraction of two Integer value possible.
4. A program-using Interface.
5. A program using Multi-Threading.
6. A program using Exception Handling.
7. A program to Display the Caption, Height of Command Button into Label.
8. Design a Form to take Employee/Student Information by using Basic Controls and Display the Information on the New Form.(Use Labels, Textbox, List, Radio button, etc).
9. Creating a Window Form through which user can enter details of Employee: empid, empname, basic salary, sex, date of birth, date of joining, designation, total income, total deduction and gross salary will be calculated automatically.
10. Also in above program all details of Employee will appear in Grid and depending upon the selection particular actual record will appear on the form.

Web Application:

1. Create a Web Site of your name that takes your details as input such as name, address, hobbies, class, college etc. Use the validator control to validate the information also shows your information.
2. Create an ASP.Net Web page that lists the details of customer from customer's database table in a sortable Data Grid with paging option. The Data Grid should display three columns: for the customer's ids, names, phone numbers. The user should be able to sort the Data Grid by customer ID.
3. Write an application to create a Web Services.

CA617 COLLOQUIUM

w.e.f. Session 2018-19

PREREQUISITE: NONE

COREQUISITE: NONE **L** **T** **P**
0 **0** **2**

The aim of the subject is to develop ability of a student to carry out literature survey and independent study of advanced subject/topic/matters in the field of Computer Science and Information technology and its application. At the beginning of semester a list of colloquium topic should be displayed on the notice board by the department and/or on the institution web site. Every Student must select a topic of his choice. The student is required to conduct rigorous study/survey on the subject under the supervision of the faculty member of the department, prepare a report and present it in presence of all the students of his class at the end of semester. The comments and criticism of the topic/subject will be discussed for the benefit of all the students. The evaluation will be carried out by the department based on the presentation.