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DEPARTMENT OF COMPUTER APPLICATIONS

BCA (COMPUTER APPLICATIONS)

ELECTIVE PAPERS

BCA-2017 Regulations

CURRICULUM AND SYLLABUS

S.NO	Sub.Code	Title of the Subject	L	T	P	C
		Electives				
1.	HBCA17E01	Computer Networks	3	1	0	4
2.	HBCA17E02	Information Security	3	1	0	4
3.	HBCA17E03	Professional Ethics	3	1	0	4
4.	HBCA17E04	Software Project Management	3	1	0	4
5.	HBCA17E05	Management Information System	3	1	0	4
6.	HBCA17E06*	Mobile Computing	3	1	0	4
7.	HBCA17E07	Image Processing	3	1	0	4
8.	HBCA17E08	Introduction to Cloud Computing	3	1	0	4
9.	HBCA17E09	Open Source Programming	3	1	0	4
10.	HBCA17E10	Software Testing	3	1	0	4

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DEPARTMENT OF COMPUTER APPLICATIONS

HBCA17E01   **COMPUTER NETWORKS**   **3 1 0 4**

OBJECTIVES:

➢ To introduce the students the functions of different layers.
➢ To understand the layering concepts in computer networks.
➢ Be exposed to the required functionality at each layer.
➢ To have knowledge in different applications that use computer networks.

UNIT I   **12 Hrs**
Introduction to Computer Network - Protocols and standards - standards organizations - Topology - Transmission mode -Classification of Network - OSI Model - Layers of OSI Model.

UNIT II   **12 Hrs**
Media of Transmission - Guided Media - Unguided Media - Performance Types of Error - Error Detection - Error Corrections.

UNIT III   **12 Hrs**
Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Project 802 - Ethernet Token Bus - Token Ring.

UNIT IV   **12 Hrs**
FDDI- IEEE 802.6-Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless services.

UNIT V   **12 Hrs**
Analog and Digital Network-Access to ISDN – ISDN layers – TCP/IP Network- Transport and Application layers of TCP/IP-WWW.

                                                         Total No of Hrs : 60

TEXT BOOK :
1. Behrouz and Forouzan(2001), " Data Communication and Networks", (2nd ed), TMH.
2. Tanenbaum A.S (2003), "Computer Networks",(4th ed),PHI.

REFERENCES:
1. Jean Wairand (1998), " *Communication Networks (A first Course)* " , (2nd ed.), WCB/ McGraw Hill8.
2. Olivier Bonaventure(2011), "*Computer Networking : Principles, Protocols and Practice*", The Saylor Foundation .
3. Iresh A. Dhotre, Vilas S. Bagad (2013), "*Computer Networks An Illustrated Guide to Computer Networking*", Technical Publications.

DEPARTMENT OF COMPUTER APPLICATIONS

HBCA17E02   INFORMATION SECURITY   3   1   0   4

UNIT I   **12 Hrs**
Introduction: History, What is Information Security? Critical Characteristics of Information - NSTISSC Security Model - Components of an Information System - Securing the Components - Balancing Security and Access - The SDLC - The Security SDLC

UNIT II   **12 Hrs**
Security Investigation: Need for Security - Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III   **12 Hrs**
Security Analysis : Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV   **12 Hrs**
 Logical Design: Blueprint for Security - Information Security Poicy - Standards and Practices - ISO 17799/BS 7799 - NIST Models - VISA International Security Model - Design of Security Architecture - Planning for Continuity

UNIT V   **12 Hrs**
Physical Design : Security Technology – IDS - Scanning and Analysis Tools – Cryptography - Access Control Devices - Physical Security - Security and Personnel

Total No of Hrs : 60

TEXT BOOK:
1. Michael E Whitman and Herbert J Mattord(2003) , "*Principles of Information Security*", Vikas Publishing House, New Delhi.

REFERENCES:
1. Micki Krause, Harold F. Tipton(2004), " *Handbook of Information Security Management*", Vol 1-3 CRC Press LLC.
2. Stuart Mc Clure, Joel Scrambray, George Kurtz(2003), "*Hacking Exposed*", Tata McGraw-Hill. Matt Bishop(2002), *" Computer Security Art and Science*", Pearson/PHI.

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HBCA17E03	PROFESSIONAL ETHICS	3 1 0 4

UNIT I   **12 Hrs**
ENGINEERING ETHICS : Senses of 'engineering ethics' – variety of moral issues – types of inquiry – moral dilemmas – moral autonomy – kohlberg's theory – gilligan's theory – consensus and controversy – professions and professionalism – professional ideals and virtues – theories about right action – self-interest – customs and religion – uses of ethical theories.

UNIT II   **12 Hrs**
ENGINEERING AS SOCIAL EXPERIMENTATION: Engineering as experimentation – engineers as responsible experimenters – codes of ethics – a balanced outlook on law – the challenger case study.

UNIT III   **12 Hrs**
ENGINEER'S RESPONSIBILITY FOR SAFETY: Safety and risk – assessment of safety and risk – risk benefit analysis – reducing risk – the three mile island and chernobyl case studies.

UNIT IV   **12 Hrs**
RESPONSIBILITIES AND RIGHTS : Collegiality and loyalty – respect for authority – collective bargaining – confidentiality – conflicts of interest – occupational crime – professional rights – employee rights – intellectual property rights (ipr) – discrimination

UNIT V   **12 Hrs**
GLOBAL ISSUES : Multinational corporations – environmental ethics – computer ethics – weapons development – engineers as managers – consulting engineers – engineers as expert witnesses and advisors – moral leadership – sample code of conduct

Total No of Hrs : 60

TEXT BOOK:
1. Mike Martin and Roland SchinzingeR(1996), "*Ethics in Engineering*", McGraw Hill, New York.

REFERENCES:
1. Charles D Fleddermann(1999), *"Engineering Ethics"*, prentice Hall, New Mexico.
2. Laura Schlesinger(1996), "*How Could You Do That: The Abdication of Character, Courage, and Conscience*", Harper Collins, New York.
3. Stephen Carter(1996), "*Integrity", Basic Books*, New York.
4. Tom Rusk(1993), "*The Power of Ethical Persuasion: From Conflict to Partnership at Work and in Private Life*", Viking, New York.

DEPARTMENT OF COMPUTER APPLICATIONS

HBCA17E04 **SOFTWARE PROJECT MANAGEMENT** **3 1 0 4**

OBJECTIVES:
- To know of how to do project planning for the software process.
- To learn the cost estimation techniques during the analysis of the project.
- To understand the quality concepts for ensuring the functionality of the software.

UNIT I **12 Hrs**
Introduction to Software Projects : An Overview of Project Planning – Project Management and Evaluation.

UNIT II **12 Hrs**
Selection of an appropriate Project approach : Software effort Estimation -Activity Planning :- Project Schedules – Sequencing and Scheduling Projects – Network Planning Model – forward and backward pass-Identifying the Critical path-Activity float-Shortening Project Duration – Identifying Critical Activities-precedence networks.

UNIT III **12 Hrs**
Software quality assurance plan & Risk Management : Resource Allocation – Monitoring and Control, Reviews and Audits – Management.

UNIT IV **12 Hrs**
Models : ISO 9000 model, CMM model – Comparisons - ISO 9000 weaknesses - Managing People and Organizing Teams – Software Quality -Planning for Small Projects.

UNIT V **12 Hrs**
Case Study – PRINCE Project Management, BS 6079:1996

Total No of Hrs : 60

TEXT BOOK:
1. Mike Cotterell, Bob Hughes , "Software Project Management", Inclination/Thomas Computer Press, 4th Edition, 2004. Chapters : 1-13.

REFERENCES:
1. Darrel Ince, H.Sharp and M.Woodman," Introduction to Software Project Management and Quality Assurance", Tata McGraw Hill, 1995.
2. Philip.B.Crosby, Quality is Free: The Art of Making Quality Certain, Mass Market, 1992.

DEPARTMENT OF COMPUTER APPLICATIONS

HBCA17E05   **MANAGEMENT INFORMATION SYSTEM**   3   1   0   4

OBJECTIVES:

- To know about basics of information system and MIS.
- To understand about database storage.
- To design the system for problem identifying and solving.
- To understand the conceptual and detailed system design.

UNIT I   **12 Hrs**
Foundation of Information System : Introduction to Information System and MIS – Decision support and decision making systems - systems approach - the systems view of business - MIS organization within company - Management information and the systems approach.

UNIT II   **12 Hrs**
Information Technology : A manager's overview - managerial overviews - computer hardware and software - DBMS - RDBMS – Telecommunication.

U N I T I I I   **12 Hrs**
Conceptual system design: Define the problems - set systems objective - establish system – constraints - determine information needs determine information sources - develop alternative conceptual design and select one document the system concept - prepare the conceptual design report.

UNIT IV   **12 Hrs**
Detailed system design : Inform and involve the organization - aim of detailed design - project management of MIS detailed design - identify dominant and trade of criteria - define the sub systems - sketch the detailed operating sub systems and information flow - determine the degree of automation of each operation - inform and involve the organization again - inputs outputs and processing - early system testing – software - hardware and tools propose an organization to operate the system - document the detailed design - revisit the manager user.

UNIT V   **12 Hrs**
Implementation evaluation and maintenance of the MIS : Plan the implementation - acquire floor space and plan space layouts - organize for implementation - develop procedures for implementation - train the operating personnel - computer related acquisitions - develop forms for data collection and information dissemination - develop the files test the system - cut-over - document the system - evaluate the MIS control and maintain the system - Pitfalls in MIS development.

                                                Total no. of Hrs : 60

TEXT BOOK:
1. W. S. Jawadekar(2002), *Management Information System*, Tata McGraw Hill.

REFERENCES:
2. Robert G. Murdick, Loel E. Ross & James R. Claggett, *Information System for Modern Management* (3rd Ed), PHI.
3. Brian,O, *Management Information System,* TMH.
4. Davis Olson, *Management Information System,* McGraw Hill.

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DEPARTMENT OF COMPUTER APPLICATIONS

HBCA17E06	MOBILE COMPUTING	3 1 0 4

OBJECTIVES:

➢ Understand and identify requirements issue limitation parameters and components in computing
➢ To understand the rationale for the solution adopted in existing or emerging systems
➢ To participate in the development and proposal of future systems

UNIT I 12 Hrs
Fundamentals of Wireless Transmission: Wireless-Wireless networks in comparision to fixed networks-Mobile communication: Development – Principles of mobile communication – Overview of mobility and portability-Issues for portability- Effects of device portability – Applications-Reference model

UNIT II 12 Hrs
Radio Transmission: Frequency – Signals – antennas –Signal propagation- Multiplexing – Modulation-Spread Spectrum(DSSS,FHSS).

UNIT III 12 Hrs
Medium access control: Motivation for specialized MAC,SDMA,FDMA,TDMA,CDMA, Comparision of the Medium access mechanism-Telecommunication Networks –GSM, Satellite communication.

UNIT IV 12 Hrs
Wireless LAN:Advantages of Wireless LAN-Design goals-Wireless transmission technology-Settings for wireless LAN-IEEE 802.11: System architecture-Bluetooth

UNIT V 12 Hrs
Mobile Network Layer and Transport Layer :Mobile IP-DHCP-Traditional TCP-Congestion control – mechanism to alter the transmission - Classical TCP Improvements

Total No of Hrs : 60

TEXT BOOK:
1. Jochen Schiller (2014) *Mobile Communications*(2nd ed.), Pearson Education
2. Nithyanandam .S,Ambika.M,Gayathri K.S., "Mobile Computing", Dhanpat Rai &co.(P)Ltd

REFERENCE:
1. William C.Y.Lee(1995) *Mobile Cellular Telecommunications*(2nd ed.) , Mc-Graw- Hill.

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HBCA17E07   **IMAGE PROCESSING**   **3 1 0 4**

Objectives :

➢ To gain knowledge about the fundamentals of digital image processing
➢ To understand the techniques in digital image processing
➢ To know the methods of image restoration techniques, Image compression and Segmentation

UNIT I   **12 Hrs**
DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS: Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT.

UNIT II   **12 Hrs**
IMAGE ENHANCEMENT TECHNIQUES: Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters.

UNIT III   **12 Hrs**
IMAGE RESTORATION: Model of Image Degradation/restoration process – Noise models – Inverse filtering - Least mean square filtering – Constrained least mean square filtering – Blind image restoration.

UNIT IV   **12 Hrs**
IMAGE COMPRESSION: Lossless compression: Variable length coding – LZW coding – Bit plane coding predictive coding-DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards.

UNIT V   **12 Hrs**
IMAGE SEGMENTATION AND REPRESENTATION: Edge detection – Thresholding - Region Based segmentation – Boundary representation: chair codes- Polygonal approximation –Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors.
                                                                         Total No of Hrs : 60

TEXT BOOK:
1. Rafael C Gonzalez, Richard E Woods(2003), "*Digital Image Processing*(2nd. ed.), Pearson Education.

REFERENCES:
1. William K Pratt(2001), "*Digital Image Processing*", John Willey (2001) .

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HBCA17E08   **INTRODUCTION TO CLOUD COMPUTING**   3   1   0   4

Objectives:

- ➢ Recognize terminology and concepts related to cloud computing
- ➢ Understand cloud computing security measures
- ➢ Differentiate cloud storage options, cloud compute services, and cloud networking options
- ➢ Describe cloud resource management services and cloud based database services
- ➢ Identify virtual resource deployment and management options

UNIT 1   **12 Hrs**
Introduction and Concepts: Defining cloud computing – Cloud models- Characteristics of Cloud Computing – Cloud based services and Appliations- Cloud services and platforms: Compute Services, Storage Services, Database services, Application Services, Content Delivery Services.

UNIT II   **12 Hrs**
Cloud Application Design: Introduction- Scalibility- Reliability – Reference Architectures for Cliud Applications- Cloud Application Design Methodlogies : Service Oriented Arcitecture, Cloud Component Model, IaaS, PaaS and SaaS Services for Cloud Applications- Data Storage Approches.

UNIT III   **12 Hrs**
Phython Basics : Introduction – Installing Python – Python Data types and Data Structures- control flow – functions – modules- Python for Cloud : Phthon for Amzon Web Services , Python for Google Cloud Platform – Python for windows Azure.

UNIT IV   **12 Hrs**
Cloud Application Development in Python : Python Packages of Interest – Python Web Application Framework (Django) – Designing RESTful API - Design Approaches – Image Processing App.

UNIT V   **12 Hrs**
Advanced Topics : Multimedia Cloud - Using the Mobile Cloud – Cloud Application Benchmarking and Tuning – Cloud Security – Cloud for Industry, Healthcare and Education.

                                                                        Total No of Hrs : 60

TEXT BOOK:
1. Arshdeep Bahga & Vijay Madisetti(2016), "*Cloud Computing A Hands – on Approach*", Universities Press

REFERENCES:
2. Kris Jamsa(2013), "*Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More"*, Jones & Bartlett Learning , Publisher.
3. Barrie Sosinsky(2011), "*Cloud Computing Bible* ", Wiley Publishing.

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HBCA17E09   **OPEN SOURCE PROGRAMMING**   **3 1 0 4**

Objectives:

➢ Understand concepts, strategies, and methodologies related to open source software development.

➢ Understand the business, economy, societal and intellectual property issues of open source software.

➢ Be familiar with open source software products and development tools currently available on the market. S

UNIT I   **12 Hrs**

Introduction to Open Source: Definition, Open Source History, Initiatives , Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History : BSD, The Free Software Foundation and Open Source GNU Project.

UNIT II   **12 Hrs**

Principle and methodologies : Philosophy : Software Freedom, Open Source Development Model Licences and Patents: What Is A License, Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copylefts, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities.

UNIT III   **12 Hrs**

Case Studies : Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office. Starting and Maintaining an Open Source Project, Open Source Hardware, Open Source Design, Open source Teaching. and Open source media.

UNIT IV   **12 Hrs**

IoT : Definitions - overview, applications, potential & challenges, and architecture. IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home.

UNIT V   **12 Hrs**

INTRODUCTION TO BIG DATA: Distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

Total No of Hrs : 60

TEXT BOOK:
1. https://tavaana.org/sites/default/files/introduction_to_opensource.pdf
2. Chris Eaton, Dirk deroos et al.(2012) , "*Understanding Big data* ", McGraw Hill.

REFERENCES:
1. Greg Elmer, Ganaele Langlois , Dr. Joanna Redden(2015), " *Compromised Data: From Social Media to Big Data*", Bloomsbury Academic Publishing.

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HBCA17E10   **SOFTWARE TESTING**   3 1 0 4

- ➢ To discuss the distinctions between validation testing and defect testing.
- ➢ To describe the principles of system and component testing.
- ➢ To describe strategies for generating system test cases.
- ➢ To understand the essential characteristics of tool used for test automation.

UNIT I   **12 Hrs**
Testiing Environment And Test Processes: Introduction – World Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing : Requirement Specifications (Software, User, market, Business) – Static & Dynamic Testing : Verification & Validation - Analyzing and Reporting Test Results – Post Implementation Analysis.

UNIT II   **12 Hrs**
Developing the Test Plan : Using White Box Approach to Test design – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing : Functionality Testing - Performance Testing - Unit Testing - Integration Testing - System Testing – User Acceptance Testing - Compatibility Testing.

UNIT III   **12 Hrs**
Software Testing Life Cycle : Software Testing Life Cycle: SDLC & STLC , Stages – System Study – Test case design, Review, Approval, Execution - Test case Templates: Header - Body & Footer Templates – Traceability Matrix - Defect Tracking Templates – Postmortem Report (Achievements & Comments) – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Web Applications – Web based system – Web Technology Evolution – Testing a Data base.

UNIT IV   **12 Hrs**
TEST AUTOMATION : Introduction : Software Testing Tools (Win Runner, Load Runner) - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug.

UNIT V   **12 Hrs**
Quality Assurance & Quality Control : Complexity Metrics and Models – Quality Management Metrics - Defect Removal Effectiveness Quality Function Deployment – Taguchi Quality Loss Function.
Total No of Hrs : 60

TEXT BOOK:
1. Srinivasan Desikan and Gopalaswamy Ramesh(2007) "Software Testing – Principles and Practices",Pearson Education.

REFERENCES:
1. William Perry(2007), "*Effective Methods of Software Testing*", Third Edition,Wiley Publishing 2007
2. Naresh Chauhan(2010) , "*Software Testing Principles and Practices* " Oxford University Press , New Delhi , 2010.

DEPARTMENT OF COMPUTER APPLICATIONS

BCA (COMPUTER APPLICATIONS)

ELECTIVE PAPERS

BCA-2020 Regulations

CURRICULUM AND SYLLABUS

Elective for FIFTH Semester :

S.NO	Sub.Code	Title of the Subject	L	T	P	C
		5th SEMESTER Electives				
1.		Computer Networks	3	0	0	3
2.		Information Security	3	0	0	3
3.		Professional Ethics	3	0	0	3
4.		Software Project Management	3	0	0	3
5.		Management Information System	3	0	0	3

Elective for SIXTH Semester :

S.NO	Sub.Code	Title of the Subject	L	T	P	C
		6TH SEMESTER Electives				
6.		Mobile Computing	3	1	0	4
7.		Image Processing	3	1	0	4
8.		Introduction to Cloud Computing	3	1	0	4
9.		Open Source Technologies	3	1	0	4
10.		Software Testing	3	1	0	4

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COMPUTER NETWORKS   3 0 0 3

UNIT I   9 Hrs

Introduction to Computer Network - Protocols and standards - standards organizations - Topology - Transmission mode -Classification of Network - OSI Model - Layers of OSI Model.

UNIT II   9 Hrs

Media of Transmission - Guided Media - Unguided Media - Performance Types of Error - Error Detection - Error Corrections.

UNIT III   9 Hrs

Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Project 802 - Ethernet Token Bus - Token Ring

UNIT IV   9 Hrs

FDDI- IEEE 802.6-Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless services.

UNIT V   9 Hrs

Analog and Digital Network-Access to ISDN – ISDN layers – TCP/IP Network- Transport and Application layers of TCP/IP-WWW

Total No of Hrs : 45

TEXT BOOK :

1.   Behrouz and Forouzan(2001), " Data Communication and Networks", (2nd ed), TMH.
2.   Tanenbaum A.S (2003), "Computer Networks",(4th ed),PHI

REFERENCES:

1.   Jean Wairand (1998), " *Communication Networks (A first Course)* " , (2nd ed.), WCB/ McGraw Hill8.
2.   Olivier Bonaventure(2011), "*Computer Networking : Principles, Protocols and Practice*", The Saylor Foundation .
3.   Iresh A. Dhotre, Vilas S. Bagad (2013), "*Computer Networks An Illustrated Guide to Computer Networking*", Technical Publications.

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INFORMATION SECURITY   **3   0   0   3**

UNIT I   **9 Hrs**

Introduction: History, What is Information Security? Critical Characteristics of Information - NSTISSC Security Model - Components of an Information System - Securing the Components - Balancing Security and Access - The SDLC - The Security SDLC

UNIT II   **9 Hrs**

Security Investigation: Need for Security - Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III   **9 Hrs**

Security Analysis : Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV   **9 Hrs**

 Logical Design: Blueprint for Security - Information Security Poicy - Standards and Practices - ISO 17799/BS 7799 - NIST Models - VISA International Security Model - Design of Security Architecture - Planning for Continuity

UNIT V   **9 Hrs**

Physical Design : Security Technology – IDS - Scanning and Analysis Tools – Cryptography - Access Control Devices - Physical Security - Security and Personnel

Total No of Hrs : 45

TEXT BOOK:

1.   1.Michael E Whitman and Herbert J Mattord(2003) , "*Principles of Information Security*", Vikas Publishing House, New Delhi.

REFERENCES:

1.   Micki Krause, Harold F. Tipton(2004), " *Handbook of Information Security Management*", Vol 1-3 CRC Press LLC.
2.   Stuart Mc Clure, Joel Scrambray, George Kurtz(2003), "*Hacking Exposed*", Tata McGraw-Hill.
3.   Matt Bishop(2002), *" Computer Security Art and Science*", Pearson/PHI.

DEPARTMENT OF COMPUTER APPLICATIONS

PROFESSIONAL ETHICS   3   0   0   3

UNIT - 1   **9 Hrs**

GROUP DYNAMICS AND PSYCHOLOGY: Dynamics of working in teams and groups : Introduction to teams, Methods of Assessing and Evaluating Team Functioning - Dealing with multicultural environments: Understanding Culture and Diversity-Understanding Cohesion and Collaboration - Individual cognition : Improving Creativity and Innovation, Cognitive problem complexity - Interacting with stakeholders-Dealing with uncertainty and ambiguity-Improving Problem Solving and Decision Making-presentation skills

UNIT - 2   **9 Hrs**

PROFESSIONALISM : Accreditation-certification-licensing - Professionalism and Codes of ethics-Importance of Codes, Abuse of Codes, Limitations of Codes, Ethical Relativism, Justification of Codes - Professional conduct: Professional Rights – Employee Rights - Professional Concerns: Introduction, Environmental Ethics, Computer Ethics

UNIT - 3   **9 Hrs**

ROLE OF PROFESSIONAL SOCIETIES: Nature and role of professional societies : Professional responsibilities - Confidentiality and Proprietary Information, - Conflict of Interest, Competitive bidding, whistle-blowing .**SOFTWARE ENGINEERING STANDARDS:** Nature and role of software engineering standard: Engineering standard, the standard of care, design standard range of standard of practice

UNIT - 4   **9 Hrs**

SOFTWARE ECONOMICS : Introduction-Emphasis on Software Economics-Current status of software Economics - Software Economics Road Map-Link Between software economics and policy, Software R&D Investment Policy Framework-Monitoring & Control for Dynamic Investment - Improving Software Economics within an Enterprise- Modeling Costs, Benefits, and Value- Impact of Software Economics -Employment Contracts-Legal Issue

UNIT - 5   **9 Hrs**

TRENDS IN SOFTWARE ECONOMICS : Case Study 1- Impact of Properly Licensed Software. Case study 2: Current Growth and Impact of Software on Indian Economy

Total No of Hrs : 45

TEXT BOOKS:

1. Timothy M. Franz by "Group Dynamics and Team Interventions: Understanding and Improving Team Performance", Wiley Black-Well, April 2012.
2. Mike W.Martin, Ronald Schinzinger, "Introduction to Engineering Ethics "2nd,Edition, Tata McGraw-Hill Higher Education,2009
3. James .W. Moore ,"Road Map to Software Engineering-Standards based Guide" Wiley-IEEE Computer Society Press,2006.

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SOFTWARE PROJECT MANAGEMENT   **3 0 0 3**

UNIT I   **9 Hrs**

Introduction to Software Projects : An Overview of Project Planning – Project Management and Evaluation .

UNIT II   **9 Hrs**

Selection of an appropriate Project approach : Software effort Estimation -Activity Planning :- Project Schedules – Sequencing and Scheduling Projects – Network Planning Model – forward and backward pass- Identifying the Critical path-Activity float-Shortening Project Duration – Identifying Critical Activities- precedence networks.

UNIT III   **9 Hrs**

Software quality assurance plan & Risk Management : Resource Allocation – Monitoring and Control, Reviews and Audits – Management.

UNIT IV   **9 Hrs**

Models : ISO 9000 model, CMM model – Comparisons - ISO 9000 weaknesses - Managing People and Organizing Teams – Software Quality -Planning for Small Projects.

UNIT V   **9 Hrs**

Case Study – PRINCE Project Management, BS 6079:1996

Total No of Hrs : 45

TEXT BOOK:

1. Mike Cotterell, Bob Hughes , "Software Project Management", Inclination/Thomas Computer Press, 4th Edition, 2004. Chapters : 1-13

REFERENCES:

1. Darrel Ince, H.Sharp and M.Woodman," Introduction to Software Project Management and Quality Assurance", Tata McGraw Hill, 1995.
2. Philip.B.Crosby, Quality is Free: The Art of Making Quality Certain, Mass Market, 1992.

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MANAGEMENT INFORMATION SYSTEM   3 0 0 3

UNIT I   **9 Hrs**

Foundation of Information System : Introduction to Information System and MIS – Decision support and decision making systems - systems approach - the systems view of business - MIS organization within company - Management information and the systems approach

UNIT II   **9 Hrs**

Information Technology : A manager's overview - managerial overviews - computer hardware and software - DBMS - RDBMS - Telecommunication

U N I T III   **9 Hrs**

Conceptual system design: Define the problems - set systems objective - establish system – constraints - determine information needs determine information sources - develop alternative conceptual design and select one document the system concept - prepare the conceptual design report

UNIT IV   **9 Hrs**

Detailed system design : Inform and involve the organization - aim of detailed design - project management of MIS detailed design - identify dominant and trade of criteria - define the sub systems - sketch the detailed operating sub systems and information flow - determine the degree of automation of each operation - inform and involve the organization again - inputs outputs and processing - early system testing – software - hardware and tools propose an organization to operate the system - document the detailed design - revisit the manager user

UNIT V   **9 Hrs**

Implementation evaluation and maintenance of the MIS : Plan the implementation - acquire floor space and plan space layouts - organize for implementation - develop procedures for implementation - train the operating personnel - computer related acquisitions - develop forms for data collection and information dissemination - develop the files test the system - cut-over - document the system - evaluate the MIS control and maintain the system - Pitfalls in MIS development

Total no. of Hrs :

45TEXT BOOK:

5.   W. S. Jawadekar(2002), *Management Information System*, Tata McGraw Hill.

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DEPARTMENT OF COMPUTER APPLICATIONS

MOBILE COMPUTING   3 1 0 4

UNIT I   **12Hrs**

Fundamentals of Wireless Transmission: Wireless-Wireless networks in comparison to fixed networks-Mobile communication: Development – Principles of mobile communication – Overview of mobility and portability-Issues for portability- Effects of device portability – Applications-Reference model

UNIT II   **12 Hrs**

Radio Transmission: Frequency – Signals – antennas –Signal propagation- Multiplexing – Modulation-Spread Spectrum(DSSS,FHSS).

UNIT III   **12 Hrs**

Medium access control: Motivation for specialized MAC,SDMA,FDMA,TDMA,CDMA, Comparison of the Medium access mechanism-Telecommunication Networks –GSM, Satellite communication.

UNIT IV   **12 Hrs**

Wireless LAN: Advantages of Wireless LAN-Design goals-Wireless transmission technology-Settings for wireless LAN-IEEE 802.11: System architecture-Bluetooth

UNIT V   **12 Hrs**

Mobile Network Layer and Transport Layer :Mobile IP-DHCP-Traditional TCP-Congestion control – mechanism to alter the transmission - Classical TCP Improvements

Total No of Hrs : 60

TEXT BOOK:

1. Jochen Schiller (2014) *Mobile Communications*(2nd ed.), Pearson Education
2. Nithyanandam .S,Ambika.M,Gayathri K.S., "Mobile Computing", Dhanpat Rai &co.(P)Ltd

REFERENCE:

1. William C.Y.Lee(1995) *Mobile Cellular Telecommunications*(2nd ed.) , Mc-Graw- Hill.

DEPARTMENT OF COMPUTER APPLICATIONS

IMAGE PROCESSING   3 1 0 4

UNIT I   12 Hrs

DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS: Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT

UNIT II   12 Hrs

IMAGE ENHANCEMENT TECHNIQUES: Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters.

UNIT III   12 Hrs

IMAGE RESTORATION: Model of Image Degradation/restoration process – Noise models – Inverse filtering - Least mean square filtering – Constrained least mean square filtering – Blind image restoration –

UNIT IV   12 Hrs

IMAGE COMPRESSION: Lossless compression: Variable length coding – LZW coding – Bit plane coding predictive coding-DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards

UNIT V   12 Hrs

IMAGE SEGMENTATION AND REPRESENTATION: Edge detection – Thresholding - Region Based segmentation – Boundary representation: chair codes- Polygonal approximation –Boundary segments –boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors

Total No of Hrs : 60

TEXT BOOK:

1. Rafael C Gonzalez, Richard E Woods(2003), "*Digital Image Processing*(2nd. ed.), Pearson Education.

REFERENCES:

1. William K Pratt(2001), "*Digital Image Processing*", John Willey (2001) .

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DEPARTMENT OF COMPUTER APPLICATIONS

INTRODUCTION TO CLOUD COMPUTING   3 1 0 4

UNIT - 1   12 Hrs

Introduction : The vision of cloud computing - The cloud computing reference model - Characteristics and benefits - Historical developments - Distributed systems -Virtualization - Building cloud computing environments   - Application development - Infrastructure and system development - Computing platforms and technologies. **Principles of Parallel and Distributed Computing :** Parallel vs. distributed computing - Elements of parallel computing - Hardware architectures for parallel processing   Approaches to parallel programming - Laws of caution.

UNIT - 2   12 Hrs

Cloud Computing Architecture : Introduction - The cloud reference model - Types of clouds - Economics of the cloud. **Virtualization :** Introduction - Characteristics of virtualized environments - Taxonomy of virtualization techniques - Virtualization and cloud computing - Technology example: VMware: full virtualization.

UNIT - 3   12 Hrs

Concurrent Computing : Anatomy of the Aneka container - Introducing parallelism for single-machine computation - Programming applications with threads - Multithreading with aneka - Programming applications with aneka threads. **Cloud computing economics :** Cloud infrastructure - Economics of private clouds - Software productivity in the cloud - Economies of scale: public vs. private clouds.

UNIT – 4   12 Hrs

Multi-tenant software : Multi-entity support - Multi-schema approach - Multi-tenancy using cloud data stores - Data access control for enterprise applications. **Data in the cloud :** Relational databases - Cloud file systems: GFS and HDFS - BigTable, HBase - Cloud data stores: Datastore and SimpleDB

UNIT - 5   12 Hrs

Cloud Platforms in Industry :   Amazon web services: Compute services - Storage services - Communication services. Google AppEngine: Architecture and core concepts - Application life cycle - Cost model – Observations. Microsoft azure: Azure core concepts - SQL azure - Windows azure platform appliance. **Cloud Applications:** Healthcare, Biology and Geoscience

Total No of Hrs : 60

Text Books:

1. Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, "Mastering Cloud Computing" - Foundations and Applications Programming , MK publications, 2013.

Reference Books:

1. Gautam Shroff, "Enterprise Cloud Computing: Technology, Architecture, Applications" by Cambridge University Press, 2010.

DEPARTMENT OF COMPUTER APPLICATIONS

OPEN SOURCE TECHNOLOGIES   3 1 0 4

UNIT I   **12 Hrs**

Introduction to Open Source: Definition, Open Source History, Initiatives , Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History : BSD, The Free Software Foundation and Open Source GNU Project.

UNIT II   **12 Hrs**

Principle and methodologies : Philosophy : Software Freedom, Open Source Development Model Licences and Patents: What Is A License, Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copylefts, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities

UNIT III   **12 Hrs**

Case Studies : Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office. Starting and Maintaining an Open Source Project, Open Source Hardware, Open Source Design, Open source Teaching. and Open source media.

UNIT IV   **12 Hrs**

IoT : Definitions - overview, applications, potential & challenges, and architecture. IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home.

UNIT V   **12 Hrs**

INTRODUCTION TO BIG DATA: Distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

Total No of Hrs : 60

TEXT BOOK:

1. https://tavaana.org/sites/default/files/introduction_to_opensource.pdf
2. Chris Eaton, Dirk deroos et al.(2012) , "*Understanding Big data* ", McGraw Hill.

REFERENCES:

1. Greg Elmer, Ganaele Langlois , Dr. Joanna Redden(2015), " *Compromised Data: From Social Media to Big Data*", Bloomsbury Academic Publishing.

DEPARTMENT OF COMPUTER APPLICATIONS

SOFTWARE TESTING   3 1 0 4

UNIT I   **12 Hrs**

Testiing Environment And Test Processes: Introduction – World Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing : Requirement Specifications (Software, User, market, Business) – Static & Dynamic Testing : Verification & Validation - Analyzing and Reporting Test Results – Post Implementation Analysis

UNIT II   **12 Hrs**

Developing the Test Plan : Using White Box Approach to Test design – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing : Functionality Testing - Performance Testing - Unit Testing - Integration Testing - System Testing – User Acceptance Testing - Compatibility Testing

UNIT III   **12 Hrs**

Software Testing Life Cycle : Software Testing Life Cycle: SDLC & STLC , Stages – System Study – Test case design, Review, Approval, Execution - Test case Templates: Header - Body & Footer Templates – Traceability Matrix - Defect Tracking Templates – Postmortem Report (Achievements & Comments) – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Web Applications – Web based system – Web Technology Evolution – Testing a Data base

UNIT IV   **12 Hrs**

TEST AUTOMATION : Introduction : Software Testing Tools (Win Runner, Load Runner) - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug

UNIT V   **12 Hrs**

Quality Assurance & Quality Control : Complexity Metrics and Models – Quality Management Metrics - Defect Removal Effectiveness Quality Function Deployment – Taguchi Quality Loss Function.

Total No of Hrs : 60

TEXT BOOK:

1. Srinivasan Desikan and Gopalaswamy Ramesh(2007) "Software Testing – Principles and Practices",Pearson Education.

REFERENCES:

1. William Perry(2007), "*Effective Methods of Software Testing*", Third Edition,Wiley Publishing 2007
2. Naresh Chauhan(2010) , "*Software Testing Principles and Practices* " Oxford University Press , New Delhi , 2010.

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