Chhattisgarh Swami Vivekanand Technical University, Bhilai

Scheme of Teaching and Examination

M.Tech. (Information Technology)

Semester – I

S. No.	Board of Study	Subject Code	Subject	Periods			Scheme of Examination Theory/Practical			Total Marks	Credit L(T+P)/2
				L	T	P	ESE	CT	TA		
1	Information Tech.	533111 (33)	Distributed Operating System	3	1	-	100	20	20	140	4
2	Information Tech.	533112 (33)	Information Technology Management	3	1	-	100	20	20	140	4
3	Information Tech.	533113 (33)	Software Engineering & TQM	3	1	-	100	20	20	140	4
4	Information Tech.	533114 (33)	Advanced Image Technology	3	1	-	100	20	20	140	4
5	Information Tech.		**Elective –I**	3	1	-	100	20	20	140	4
6	Information Tech.	533121 (33)	Digital Image Processing-Lab	-	-	3	75	-	75	150	2
7	Information Tech.	533122 (33)	Software Testing Lab	-	-	3	75	-	75	150	2
Total				**15**	**5**	**6**	**650**	**100**	**250**	**1000**	**24**

L-Lecture, T- Tutorial, P - Practical, ESE- End Semester Examination, CT- Class Test, TA- Teacher's Assessment

Note: Duration of all theory papers will be of Three Hours.

Elective-I			
S.No.	Board of Study	Subject Code	Subject Name
1	Information Technology	533131 (33)	Cloud Computing
2	Electronics and Telecommunication	533132 (28)	Advanced Digital Communication Systems
3	Computer Science & Engg.	533133 (22)	Advanced Computer Architecture

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Semester: I   **Branch: Information Technology.**
Subject: DISTRIBUTED OPERATING SYSTEM   **Code: 533111 (33)**
Total Theory Periods: 40   **Total Tutorial Periods: 12**
Total Marks in End Semester Exam:100
Minimum number of class tests to be conducted: 02.

UNIT I:
Introduction: Distributed Computing Models, Software Concepts, Issues in Designing Distributed systems, Client Server Model. Case studies. Review of network communication, Protocols for distributed system.

UNIT II:
Interprocess communication: Remote Procedure Call (RPC),Life Cycle of Thread, Architecture of RMI, CORBA, Remote Object Invocation ,Message Oriented Communication, Stream Oriented Communication, Message passing: case study , Multithreaded Communication: case study

UNIT III:
Synchronization: Introduction ,Clock synchronization, Logical clocks, Mutual Exclusion, Election Algorithm., Distributed Transactions, SEMAPHORE in Distributed System.

UNIT IV:
Distributed Shared Memory : Introduction, Design and Implementation issues, Sequential Consistency , Release Consistency **Security In Distributed Systems** : Introduction, Overview of Security techniques, Cryptographic Algorithms, Digital Signature

UNIT V:
Distributed File System: Introduction , File Service Architecture, Sun Network File System(NFS), Coda File System, Comparison Of Distributed File System.
Naming : Naming Entities ,Locating Mobile Entities, Removing Unreferenced Entities

TEXT BOOKS:
1) George Coulouris, Jean Dollimore, Tim Kindberg,   "Distributed Systems: Concepts & Design"
2) Andrew S. Tanenbaum ,Maarten Van Steen ,"Distributed Systems: Principles and paradigms"

REFERENCE BOOKS:
1) Jose Garrido. Schlesiger Hongson, "Principle Modern Operating Systems" , Pub: Jones & Bartlet Learning (VIVA Books)
2) Tang, "Security Scrategies in Linux Platforms and applications". Pub: Jones & Bartlet Learning (VIVA)
3) Soloman, "Security Strategies in Windows Platforms and Application", Pub: Jones & Bartlet Learning (VIVA)

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Semester: I   Branch: Information Technology
Subject: Information Technology & Management   Code: 533112 (33)
Total Theory Periods: 40   Total Tutorial Periods: 12
Total Marks in End Semester Exam: 100
Minimum number of class tests to be conducted: 02.

Unit- I:
IT Strategy: Information revolution, Business and strategy. IT Strategy, Strategy and Success, Design Parameters, Strategic positioning, Evolution of strategy sequences and getting the right, development of a strategy, types of strategy, context and Strategy.

Unit-II:
IT Management and IT Governance Strategy: IT management and its roles, IT governance, IT governance and strategy, Technology management process, Technology selection, Strategic aspects of technology. IT and Business alignment, Risk Management, Exploiting IT Capabilities, Deploying IT in strategic manner, Strategic planning for information technology and frameworks, Measuring IT, Performance Measures: Balanced Score Card.

Unit-III:
E- Strategy in Current IT Scenario: Overview of e-strategy, E-business and E-strategy, E business objectives, E-Commerce and E-Business, strategy work, E-strategy and the E-economy. IT strategies for IT companies: Project Vs Product Companies Strategies aspects for an IT product company, IT Strategic perspective for product company ,IT Strategies for Product company information Technology Strategy development, Product life cycle and
Project life cycles.

Unit-IV:
IT strategies for Knowledge Management: Knowledge Management, Knowledge Management and IT strategies, role of Knowledge Management in IT strategies for IT companies, knowledge industry and knowledge strategy knowledge workers, IT strategic services, product and Consulting. IT strategies for non –IT companies : Role of IT in non –IT companies , IT Investment decision, measurement of IT, IT strategies for Non-IT companies, IT supply chain management and constraint management, IT enabled supply chain management.

Unit-V:
IT Strategies in specific scenario :   Enterprise resource planning implementation, mapping IT strategies initiatives to ERP , supply chain contribution and business strategy, IT strategies for business process outsourcing, IT strategy implementation : IT strategy implementation, Development and need of it strategic plan ,IT strategy implementation to gain competitive advantage, IT strategy and leadership, IT strategy and differentiation , Execution and IT strategy.

TEXT BOOK:
1. Parag Kulkarni,Pradip K Chande "IT Strategy for Business", OXFORD University Press.
2. Ramesh Behl, "Information Technology for Management", TATA MC GRAW HILL, 2009

REFERENCE BOOKS:
1. Earl. M, "Management Strategies for Information Technology", Prentice Hall.
2. Gottschalk, P "Strategic Knowledge Managements Technology "IGPUSA
3. Hill, C and G Jones "Strategic management "Houghton Miffen USA
4. Honeycutt J "Knowledge management Strategies", Microsoft Press USA.

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Semester: Ist
Subject: **SOFTWARE ENGINEERING & TQM**
Total Theory Periods: 40
Total Marks in End Semester Exam: 100
Minimum number of class tests to be conducted: 02.

Branch: **Information Technology.**
Code : **533113 (33)**
Total Tutorial Periods: 12

UNIT I: System Analysis and Design
Overview of System Analysis & Design , Business System Concept, System Development Life Cycle, Waterfall Model , Spiral Model, Feasibility Analysis, Technical Feasibility, Cost-Benefit Analysis, COCOMO model. System Requirement Specification – DFD, Data Dictionary, ER diagram, Process Organization & Interactions. System Design – Problem Partitioning, Top-Down and Bottom-Up design; Decision tree, decision table and structured English; Functional vs. Object- Oriented approach.

UNIT II: Coding, Documentation &Testing
Coding & Documentation – Structured Programming, Object Oriented Programming, Information Hiding, Reuse, System Documentation. Testing – Levels of Testing, Integration Testing, Test case Specification, Reliability Assessment, Validation & Verification Metrics, Monitoring & Control
Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues – unit testing – integration tests – validation testing – system testing and debugging.

UNIT III: Software Project Management and Planning
Introduction, Management Approaches, Team Approaches, Critical Practices, Capability maturity Model, Personal Software Process, Earned value Analysis, Error tracking, Reviews. Project Planning, Work Breakdown Structure, PERT-Program Evaluation and Review Technique, Software Cost Estimation Risk Analysis: Risk Identification, Risk estimation, Exposure, Mitigation, and Management Plans

UNIT IV: Project Management Issues
Issues in Project Management, Management Functions, Software Project Management Plan, Software Management Structure, Personnel Productivity, Software Project Complexity, Software Metrics – Basic Consideration, Size Oriented and Function Point Oriented; Software Cost Estimation Techniques, Algorithmic Cost Modeling, Project Scheduling, Software Project Planning, Scheduling Risk Management.

UNIT V: Quality Assurance
Introduction, Formal Inspection and technical reviews, Software Reliability, Statistical Quality Assurance. CASE TOOLS: Concepts, use and applications.

Text Book:
1. R. G. Pressman, "Software Engineerin", 4th Edition TMH

2. Ian Sommerville, "Software engineering", Pearson education Asia, 6th edition, 2000.
Reference Books:
1. Kane ,"IEEE Standards on Software Engineering, Software Defect Prevention", SPD
2. Behforooz, "Software Engineering Fundamentals", OUP
3. Ghezzi, "Software Engineering", PHI
4. SCHACH ,"Object Oriented & Classical Software Engineering(Fifth Edition)" ,TMH
5. Vans Vlet, "Software Engineering" , SPD

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Semester: I **Branch: Information Technology**
Subject: ADVANCED IMAGE TECHNOLOGY **Code: 533114 (33)**
Total Theory Periods: 40 **Total Tutorial Periods: 12**
Total Marks in End Semester Exam: 100
Minimum number of class tests to be conducted: 02.

Unit-I
Digital Image Fundamentals:
Image model and it's Applications, Relationship between pixels, Fundamental Steps in Image Processing, Elements of Digital image processing systems some basic relationships like neighbours, Imaging Geometry Camera model, Sampling and Quantization,

Unit-II
Image Transformation
Introduction to FT, DFT & FFT, 2D-DFT, DLT, KLT, DWT, Slant, Harr, Walsh transformation, Hadamard transformation, Hotelling transformation, Histogram, Sub-band coding, some properties of the two dimensional Fourier transform.
Wavelet Transform for Image Processing:
Continuous wavelet transform, discrete wavelet transform, multi-resolution analysis, image compression.

Unit-III
Image Smoothing
Neighborhood averaging, Median filtering low pass filters, average of multiple images, Image sharpening by differentiation technique, High pass filtering
Image Restoration
Degradation models for continuous function, effect of diagonalization. On degradation, Algebraic approach to restoration. Interactive restoration, gray level interpolation, Inverse filtering, Wiener filter, Constrained Least SquareRestoration, Interactive Restoration, Restoration in Spatial Domain.

Unit-IV
Image Segmentation and Edge Detection: Region Operations, Crack Edge Detection
Edge Following, Gradient operator s, Compass and Laplace operator s. Threshold detection methods, optimal thresholding, multispectral thresholding, thresholding in hierarchical data structures; edge based image segmentation- edge image thresholding, edge relaxation, border tracing, border detection Filtering: Median, Gradient.

Unit-V
Image compression:
Lossy and lossless techniques, standards of image compression, video compression, standards of video compression, motion compensation, Error free comparison

Text Books:
1.Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing" 2/E Prentice Hall
2.A.K Jain, "Digital Image Processing", PHI, Edition 1995.
3.Rosefield&Kak, "Digital Picture Processing" 2nd Edition, Academic Press, 1982

Reference Books:
1. S.Annadurai & R.Shanmugalakshmi, "Fundamentals of Digital Image Processing" Pearson Education,

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Semester: I   **Branch: Information Technology.**
Subject: Advanced Digital Communication System (Elective-1)   **Code: 533132 (28)**
Total Theory Periods:40   **Total Tutorial Periods:12**
Total Marks in End Semester Exam: 100
Minimum number of class tests to be conducted: 02.

UNIT-I
Digital Transmission - Introduction, Sampling Theorem & its techniques , Nyquist Rate & Nyquist Interval , Quantization, Pulse Modulation, Pulse Code Modulation , Signal to quantization Noise Ratio, Robust Quantization, linear Vs Non linear PCM Codes, VOCODERS, Delta modulation PCM, adaptive delta modulation , Deferential PCM, Pulse transmission, Signal power in binary digital signals. Frequency Division Multiplexer, Time Division Multiplexing,Multiple Access Techniques

UNIT-II
Information Theory - Uncertainty, information & entropy, joint and conditional entropy Mutual information, Channel capacity : Noise free Channel, Symmetric channel, BSC, casecaded channel, BEC, Binary channel, Shannon's theorem, continuous channel, capacity of Gaussian channel: Shanon - Hartley Theorem, trade- off between B/W & S/N Ratio.

UNIT-III
Error control coding - Linear block codes, Huffman coding, error correcting codes, cyclic codes, convolution codes, properties of convolution codes. Vertebi decoding algorithm, turbo code concept, trellises codes.

UNIT-IVm
Principles of Data Transmission – Digital CW modulation, ASK, PSK, DPSK, DEPSK, QPSK baseband signal receiver, probability of error, probability of error in FSK, PSK and DPSK,. matched filter

UNIT-V
Spread Spectrum Techniques – Model of spread spectrum digital communication System, Pseudo noise sequences, Direct Sequence spread spectrum system, CDMA, FH, PN Sequence , Power Requirement , applications, ISDN.

Books –
Textbooks -
1. J. G. Proakis, "Digital Communication" ,Fourth Edition McGraw Hill Inc.
2. Simon Haykin, "Digital Communications", John Wiley and Sons.

Reference Books-
1. K Sam Shanmugam. "Digital Communications", John Wiley and Sons.
2. Leon W. Couch , "Modern communication systems :Principles and application", JI (PHI).
3. Taub & Schilling, Principles of Communication System"THM.
4. B. P. Lathi, "Digital Communication" Willey Eatern Ltd.
5. Bernard Sklar, "Digital Communication Fundamental and Applications", Second Edition, Pearson Education Asia (LPE).

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Semester: I   **Branch: Information Technology.**
Subject: Advanced Computer Architecture (Elective-1)   **Code: 533133 (22)**
Total Theory Periods:100   **Total Tutorial Periods: 40**
Total Marks in End Semester Exam:12
Minimum number of class tests to be conducted: 02.

Unit I:
Parallel Computer Models
The State of Computing: Computer Development Milestones. Elements of Modern Computers. Evolution of Computer Architecture. System Attributes to Performance. Multiprocessors and Multi computers Shared Memory Multiprocessors. Distributed-Memory Multi computers. Multi vector and SIMD Computers: Vector Super computers, SIMD Supercomputers, PRAM and VLSI Models: Parallel Random-Access Machines, VLSI Complexity Model

UNIT II:
Program and Network Properties
Conditions of Parallelism: Data and Resource Dependences, Hardware and Software Parallelism, The Role of Compilers Program Partitioning and Scheduling: Grain Sizes and Latency, Grain Packing and Scheduling, Static Multiprocessor Scheduling Program Flow Mechanisms: Control flow versus data flow. Demand-Driven Mechanisms. Comparison of Flow Mechanisms

UNIT III:
Principles of Scalable Performance
Performance Metrics and Measures: Parallelism Profile in Programs. Harmonic Mean Performance. Efficiency, Utilization, and quality. Standard Performance Measures. Parallel Processing Applications: Massive Parallelism for Grand Challenges. Application Models of Parallel computers. Standard Performance Measures. Speedup Performance Laws: Amdahl's Law for a fixed workload, Gustafson's Law for Scaled Problems, Memory –Bounded Speedup Model.

UNIT IV:
Processor & Memory Hierarchy
Advanced Processor Technology: Design space of processors. Instruction-Set Architectures. CISC Scalar Processors. RISC Scalar Processors Super scalar and Vector Processors: Super scalar Processors. The VLIW Architecture. Vector and Symbolic Processors.

UNIT V:
Pipelining and Super scalar Techniques.
Linear Pipeline Processors: Asynchronous and Synchronous Models. Clocking and Timing Control. Speedup, Efficiency, and Throughput Instruction Pipeline Design: Instruction Pipeline Design. Mechanisms for Instruction Pipelining. Dynamic Instruction Scheduling. Branch Handling Techniques. Arithmetic Pipeline Design: Computer Arithmetic Principles. Static Arithmetic Pipelines. Multifunctional Arithmetic Pipelines.

Text Books:
1. Dezso Sima , " Advanced Computer Architecture : A design space Approach" , Terence Fountain, Peter Kacsuk Pearson Education
2. Kai Hwang , "Advanced Computer Architecture: Parallelism Scalability & Programming " , McGraw Hills International.

Reference Books:
1. Linda Null & Julia Lobur , "The essentials of Computer Organization & Architecture"Narosa Publications.
2. John P. Hayes ,"Computer Architecture & Organization" 3 rd Edition.

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Semester: I   **Branch: Information Technology.**
Subject: Cloud Computing (Elective-1)   **Code: 533131 (33)**
Total Theory Periods: 40   **Total Tutorial Periods: 12**
Total Marks in End Semester Exam: 100
Minimum number of class tests to be conducted: 02.
ELECTIVE -I

Unit - I : Introduction to Cloud Computing
What is the Cloud? The Emergence of Cloud Computing, Cloud-Based Service Offerings, Benefits of using a Cloud Model, What Are the Key Characteristics of Cloud Computing?, The Evolution of Cloud Computing – Hardware & Internet Software Evolution.

Unit - II: Services for Cloud Computing
Communication-as-a-Service (CAAS), Infrastructure-as-a-Service (IAAS), Monitoring-as-a-Service (MAAS), Platform-as-a-Service (PAAS), Software-as-a-Service (SAAS).

Unit - III: Data Center Base
The Evolution from the MSP Model to Cloud Computing and Software-as-a-Service, The Cloud Data Center, Basic Approach to a Data Center-Based SOA, Where Open Source Software is Used?, Service-Oriented Architectures as a Step Toward Cloud Computing.

Unit - IV: Cloud Security
Cloud Security Challenges, Software-as-a-Service, Security Management People, Security Governance, Security Portfolio Management, Security Architecture Design, Virtual Machine Security, Identity Access Management (IAM), Data Security.

Unit – V: Smartphone's
 What is a Smartphone?, Mobile Operating Systems for Smartphone's (iPhone, Windows Mobile), Google(Android) Blackberry, Ubuntu Mobile Internet, Mobile Platform Virtualization (KVM, VMWare).

Text Books :
>   1. Toby Velte, Anthony Vote and Robert Elsenpeter, "Cloud Computing: A Practical Approach", McGraw Hill, 2002.

Reference Books :
>   1. George Reese, "Cloud Application Architectures: Building Applications and Infrastructures in the Cloud", O'Reilly Media, 2003.
>   2. Tim Matherm, Subra Kumaraswamy and Shahed Latif, "Cloud Security and Privacy: An Enterprise Perspective on *Ris*ks and Compliance", O'Reilly Media, 2005.

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Semester: I   **Branch: Information Technology.**
Subject: Digital Image Processing Laboratory   **Code: 533121 (33)**
Total Lab Periods: 40   **Total Marks in End Semester Exam: 75**
Minimum number of class tests to be conducted: 02.

DIGITAL IMAGE PROCESSING LABORATORY
List of Experiment

1. Write a program to perform Point-to-point transformation.
2. Write a program to perform morphological operations.
3. Write a program to perform histogram equalization.
4. Write a program to perform Geometric transformations of given image.
5. Write a program to perform Two-dimensional Fourier transfor.
6. Write a program to perform Linear filtering using convolution.
7. Write a program to perform Highly selective filters.
8. Write a program to perform Ideal filters in the frequency domain.
9. Write a program to perform Non Linear filtering using convolutional masks.
10. Write a program to perform Entropy as a compression measure in given image
11. Write a program to perform Edge detection method of given image.
12. Write a program to perform segmentation method of given image.
13. Write a program to perform feature extraction in given image.
14. Write a program to perform image enhancement of given image
15. Write a program to develop GUI.

List of Tools Required:
1. Matlab

Text books:
Programming with Matlab, Rafael C. Gonzalez & Richard E. Woods,

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Semester: I   **Branch: Information Technology.**
Subject: SOFTWARE TESTING LABORATORY   **Code: 533122 (33)**
Total Lab Periods: 40   **Total Marks in End Semester Exam: 75**

SOFTWARE TESTING LABORATORY
List of Experiments

1. To perform Record and playback process
2. Creating resilient scripts with assure technology and Performing user actions with a script(including verification points)
3. Creating and using Test object map
4. To perform object recognition and analyze recognition Score also perform pattern based recognition
5. To perform rational software development platform (perspectives, script debugging and editing)
6. To examine extending scripts with script support features and analyze layout and structure of a script
7. To perform Logs and logging options and analyze data pools and external data sources
8. To understand and use the Dashboard with various roles in RQM.
9. Write review and approve an attest plan with RQM.
10. Analysis and perform capture risk attributes, prioritize risk and optimize testing based on risk.
11. To Show requirement traceability and coverage to the test plan in RQM.
12. To analyze Manager Use defect capabilities and to include duplicate defect detection.
13. To analyze the Use of IBM RFT and RQM.
14. To understand workflow control and use work items in RQM.
15. Create and execute a test suite and explain how to run planning and execution status reports.

List of Tools Required:
1. Rational Functional Tester
2. Rational Quality Manager

Text books:
1. IBM, "Essentials of Test Management with IBM Rational Quality Manager v2.0" by IBM Corporation: Student Manual, October 2009.
2. IBM, Essentials of IBM Rational Functional Tester, Java Scripting by IBM Corporation: Student Manual, January 2009.

Reference books:
1. Prasad, K.V.K.K. "Software Testing Tools" by Wiley Dreamtech India Publication, 2005
2. Perry, William E. "Effective Methods for Software Testing" by Wiley India Publication