Fourth Year -Semester VIII									
Scheme of Instructions					**Scheme of Examinations**				
Sr. No	Subjects	Lect/ Week	Pract/ Week	Tuto/ Week	Theory		T/W	Practical	Oral	Total
					Hours	Marks	Marks	Marks	Marks	Marks
1	Information Storage Management and Disaster Recovery	4	2	--	3	100	25	--	25	150
2	Gaming Architecture and programming	4	2	--	3	100	25	--	25	150
3	Software Project Management	4	2	--	3	100	25	--	25	150
4	Elective - II	4	2	--	3	100	25	--	25	150
5	Project - II		4	--	--	--	50	--	50	100
	TOTAL	**16**	**12**	**--**	**--**	**400**	**150**	**--**	**150**	**700**

Elective - II (Semester VIII)

1. Cloud Computing
2. IT for Health Care
3. Service Oriented Architecture
4. E-Government
5. ERP & CRM
6. Mobile & Ecommerce
7. Robotics and Machine Intelligence

INFORMATION STORAGE MANAGEMENT AND DISASTER RECOVERY				
CLASS B.E. (INFORMATION TECHNOLOGY) VIII			SEMESTER	
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		--	25
	TERM WORK		--	25
Prerequisite: Operating Systems for Computational Devices, Networking Technology for Digital Devices, and Database Systems				
Objective: Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, and CAS. Define backup, recovery, disaster recovery, business continuity, and replication. Examine emerging technologies including IP-SAN. Understand logical and physical components of a storage infrastructure. Identify components of managing and monitoring the data center. Define information security and identify different storage virtualization technologies.				

1. **Introduction to Information Storage Technology:** Review data creation and the amount of data being created and understand the value of data to a business, Challenges in Data Storage and Management, Data Storage Infrastructure.

2. **Storage Systems Environment:** Components of a Storage System Environment: Disk drive components, Disk Drive Performance, Logical Components.

3. **Data protection:** Concept of RAID and its Components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Comparison of Levels.

4. **Intelligent Storage Systems;** Components, Intelligent Storage Array, High-level architecture and working of an intelligent storage system.

5. **Introduction to Networked Storage:** Evolution of networked storage, Architecture, Overview of FC-SAN, NAS, and IP-SAN. Network-Attached Storage (NAS): Benefits of NAS, Components, Implementations, File Sharing, I/O operations, Performance and Availability.

6. **Content Addressed Storage (CAS):** features and Benefits of a CAS. CAS Architecture, Storage and Retrieval, Examples.

7. **Storage Virtualization**: Forms, Taxonomy, Configuration, Challenges, Types of Storage Virtualizations.

8. **Information Availability & Monitoring & Managing Datacenter:** Information Availability, Business continuity, Failure Analysis, Business impact Analysis, Differentiate between business continuity (BC) and disaster recovery (DR).
9. **Disaster Recovery:** Backup, Methods, And Technologies, Replication technologies: Local replicas, Technologies, Restore and Restart, Multiple Replicas. Remote Replication. DR in practice.
10. **Storage Security and Management**: Security Framework, Storage security domains, List and analyzes the common threats in each domain, Security Implementations.
11. **Managing The Storage Infrastructure:** Monitoring the Storage Infrastructure, Storage Management Activities, Challenges and solutions.

Text Book:
1. EMC Educational Services, "Information Storage and Management", Wiley India.

Reference Books:
1. Richard Barker and Paul Massiglia, "Storage Area Network Essentials: A Complete Guide to Understanding and Implementing SANs", Wiley India.
2. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill Osborne, 2003.
3. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
4. Meet Gupta, "Storage Area Network Fundamentals", Pearson Education Limited, 2002.

Term Work:
Term work shall consist of a combination of 10 assignments and programs covering the topics of the syllabus. One written test is also to be conducted.
Distribution of marks for term work shall be as follows:

19. Laboratory work (Experiments and Journal)   15 Marks
20. Test (at least one)   10 Marks
The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

 Suggested Program/Assignment list
1. The website of the textbook has sample assignments for every chapter. These can be used as a guideline
2. Programming assignments can be done on simulators available at the website – RAID, Virtualization etc.
3. Two Case Studies like IBM Tivoli, EMC technologies etc.

ORAL EXAMINATION
An oral examination is to be conducted based on the above syllabus**.**

GAME ARCHITECTURE & PROGRAMMING				
CLASS B.E. (INFORMATION TECHNOLOGY)			SEMESTER VIII	
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	
	ORAL		--	25
	TERM WORK		--	25
Prerequisite Proficiency in C/C++ programming				

Objective: An important characteristic of technical education is an emphasis on their challenging nature, the structured character of the concepts, the critical role of quantitative problem solving, and the importance of qualitative reasoning.

Much of the difficulty in mastering technical subjects lies in the importance of abstract variables and the constraints among them. Concepts of Modern game software architecture, Game worlds and game objects, Collision detection, Events and scripting, Introduction to animation and Implementing game play would help students acquire this knowledge. This course provides students with an introduction to the technologies and software engineering practices used in the video game industry today. Students will learn the basics of creating a PC game based DirectX, through lecture material, hands-on labs, and a final project in which the students will actually build a simple game from the ground up.

GAME ARCHITECTURE

1. **Core Design:** What Is a Game? Games Aren't Everything. Games Mean Gameplay. Creating the Game Spec. Example Game Spec.

2. **Initial Design:** The Beginning. Hardware Abstraction. The Problem Domain. Thinking in Tokens.

3. **Use of Technology:** The State of the Art. Blue-Sky Research. Reinventing the Wheel. Use of Object Technology.

4. **Building Bricks:** Reusability in Software.

5. **Initial Architecture Design:** The Birth of Architecture. The Tier System. Architecture Design.

6. **Development:** The Development Process. Code Quality. Coding Priorities. Debugging and Module Completion. The Seven Golden Gambits. The Three Lead Balloons.

GAME PROGRAMMING

1. **Technologies:** Display, Mixing 2D & 3D, DirectX, User Interface code, Resource caching, the main loop.

2. **Design Practices:** Smart & naked pointers, using memory correctly, Game scripting languages.

3. **Building your game:** Creating a project, source code repositories and version control, Building the game and scripts.

4. **User interface programming and input devices:** Getting the Device State, Working with the Mouse (and Joystick), Working with the Keyboard, User Interface Components, More Control Properties

5. **2D Drawing and DirectX:** 2D Drawing and DirectX, Basic 2D Drawing Concepts, Drawing Text, Working with Sprites, Graphics File Formats.

6. **Initialization and the Main Loop:** Initialization, Some C++ Initialization Pitfalls, Initializing your Game, the Main Loop, Stick the Landing: A Nice Clean Exit.

7. **Loading and Caching Game Resources:** Art and Sound Formats, Resource Files, Data Compression, IPac: A Resource File Builder, the Resource Cache, World Design and Cache Prediction.

8. **3D Graphics & 3D Engines:** 3D Graphics Pipeline, Setting Up a Project, Using a Scene Graph, 3D Middleware Review, Rolling Your Own 3D Engine.

Text Books:
1. "Game Architecture and Design", Andrew Rollings & Dave Morris
2. "Professional Game Programming" Mike McShaffry, Dreamtech Press**.**

Reference Book:
1. "Game Programming", Andy Harris, Wiley India.

Term Work:
Term work shall consist of at least 10 experiments covering all topics and one written test.
Distribution of marks for term work shall be as follows:

21. Laboratory work (Experiments and Journal)   15 Marks
22. Test (at least one)   10 Marks

The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

SOFTWARE PROJECT MANAGEMENT				
CLASS B.E. (INFORMATION TECHNOLOGY)			SEMESTER VIII	
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		--	25
	TERM WORK		--	25
Prerequisite: Software Engineering				
Objective: At the end of the course, the student should get familiarize with the characteristics of a project, project management principles, risk in environment and the management challenges for effective project management. The student will be able to understand and use the project management principles across all phases of a project. They will be able to demonstrate competency in the management of a project plan, especially in monitor and controlling a project schedule and budget, tracking project progress. They will understand how to work as team member and as individual without affecting the quality of project. The student should be able to coordinate the close out of a project contract. They will share best practices and tools related to project management				

1. **An overview of IT Project Management:** Introduction, the state of IT project management, context of project management, need of project management, project goals, project life cycle and IT development, extreme project management, PMBOK.

2. **Conceptualizing and Initializing the IT Project:** An information technology project methodology (ITPM), project feasibility, request for proposal (RFP), the business case, project selection and approval, project contracting, IT governance and the project office.

3. **The Human Side of Project Management:** Introduction, organization and project planning, the project team, the project environment.

4. **Developing the Project Charter and Project Plan:** Introduction, project management process, project integration management, the project charter, project planning framework, the contents of a project plan, the planning process, The Work Breakdown Structure (WBS), the linear responsibility chart, multidisciplinary teams.

5. **The Scope Management Plan:** Introduction, scope planning, project scope definition, project scope verification, scope change control.

6. **The Project's Schedule, Budget and Risk Management:** Introduction, developing the project schedule, project management software tools, methods of budgeting, developing the project budget, improving cost estimates, finalizing the project schedule and budget. IT project risk management planning process, identifying IT project risks, risk analysis and assessment, risk strategies, risk monitoring, and control, risk responses and evaluation.

7. **Allocating Resources to the Project:** Resource loading, resource leveling, allocating scarce resources to projects and several projects, Goldratt's critical chain.

8. **The Project Communication Plan:** Introduction, monitoring and controlling the project, the project communications plan, project metric, project control, designing the control system, the plan-monitor-control cycle, data collection and reporting, reporting performance and progress, information distribution.

9. **Managing Change, Resistance and Conflicts:** Introduction, the nature of change, the change management plan, dealing with resistance and conflicts.

10. **Managing Project Procurement and Outsourcing:** Introduction, project procurement management, outsourcing.

11. **Project Leadership and Ethics:** Introduction, project leadership, ethics in projects, multicultural projects.

12. **The Implementation Plan and Project Closure:** Introduction, project implementation, administrative closure, project evaluation, project audit.

Text Book:
"Information Technology Project Management", Jack T. Marchewka, 3rd edition, Wiley India, 2009.

Reference Books:
1. S. J. Mantel, J. R. Meredith and etl., "Project Management"1st edition, Wiley India, 2009.
2. John M. Nicholas, "Project Management for Business and Technology", 2nd edition, Pearson Education.
3. Joel Henry, "Software Project Management, A real-world guide to success", Pearson Education, 2008.
4. Gido and Clements, "Successful Project Management", 2nd edition, Thomson Learning
5. Hughes and Cornell, "Software Project Management", 3rd edition, Tata McGraw Hill
6. Joseph Phillips, "IT Project Management", end edition, Tata McGraw Hill
7. Robert K. Wyzocki and Rudd McGary, "Effective Project Management", 3rd edition, Wiley
8. Brown, K.A. Project Management, McGraw Hill, 2002.
9. E-Book – Project Management Body of Knowledge.
10. Dinsmore, P. C. (Ed.). (1993) The AMA Handbook of Project Management. AMACOM

Term Work:

Term work shall consist of at least 10 experiments covering all topics and one written test.

Distribution of marks for term work shall be as follows:

23. Laboratory work (Experiments and Journal)   15 Marks
24. Test (at least one)   10 Marks

The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiment List

In practical, a group of maximum three students should be formed. Each group is supposed to complete all lab experiments on the case study given by the subject teacher. In lab experiments students can used the tools like MsWord to prepare document whereas MsProject to preparing WBS, N/w diagram, PERT, CPM, Variance analysis etc.

1. Project and System's Management
2. Feasibility study document
3. Project Proposal
4. Project Planning
5. Activity Planning
6. Analyzing the project network diagram
7. Cost estimation and budgeting
8. Risk management
9. Performance analysis of project
10. Project evaluation and closure

Elective II - CLOUD COMPUTING				
CLASS B.E. (INFORMATION TECHNOLOGY)			SEMESTER VIII	
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		--	25
	TERM WORK		--	25
Prerequisite: Distributed Systems				
Objective: Students will have a comprehensive knowledge of cloud computing techniques, best practices in cloud computing. They will be able to understand the current challenges in cloud computing. They will be able to understand how to design and implement cloud-based applications.				

1. **Understanding Cloud Computing:** Introduction to cloud computing, are you ready for cloud computing?, surveying the Role of Cloud Computing, developing the cloud services.

2. **Understanding Windows Azure Platform Architecture:** The Windows Azure Developer Portal, Creating and running Projects in the Azure Development Platform, Using Azure Application Templates for Visual Studio 2008, Taking advantage of Auxiliary Cloud Services, Deploying Application and Services to the Azure Cloud.

3. **Analyzing the Windows Azure Operating System:** The Lifecycle, Securing and Isolating Services and Data, Assuring Fabric Controller Availability, Virtualizing Windows Server for Azure.

4. **Scaling Azure Table and Blob Storage:** Creating Storage Accounts, Using or Wrapping the Azure Storage Services' REST APIs, Understanding Azure Table Storage, Storing and retrieving Blobs.

5. **Minimizing Risk When Moving to the Azure Cloud Service:** Bypassing the Barrier to Cloud Computing, Implementing the Secure Sockets Layers Transmission, Encryption for Web Roles, Encrypting Personal Information in Azure Storage Services, Auditing Conformance to Regulatory and Industry Standards.

6. **Authenticating and Authorizing Service User:** Taking Advantage of ASP.NET Membership Services, Adapting ASP.NET Authentication and Role Management to Windows Azure Web Role, Analyzing the AspProviders Library's Classes, Moving the AspProvidersDemo's Data Source to the Cloud, Integrating Membership Services with an Azure Service, Authenticating users with Windows Live ID.

7. **Optimizing the Scalability and Performance of Azure Tables:** Assigning Primary Key Values to Entities, Handling Associated Entities, Taking Advantage of Entity Group Transactions, Uploading the table data, Displaying the Data from Heterogeneous Tables in Grids.

8. **Massaging with Azure Queues:** Creating and Processing Azure Queues and Messages, Enhancing the Thumbnails.sin Sample Solution.

9. **Authenticating Users with .NET Access Control Services:** Creating the .NET Services Solution, Installing the .NET Services SDK and other Tools, Crating the CardSpace Credentials at Federatedidentity.net, Using a Managed CardSpace Credential with ACS.

10. **Interconnecting the Services with the .NET Service Bus:** Creating .NET Service Solution and Installing Prerequisites, Relaying Message with SB, Analyzing the .NET Services SDK's EchoSample Solution, Using the Configuration File to Specify WSHttpRelayBinding.

11. **Exploring .NET Service Bus Queues and Routers:** Persisting Messages in Service Bus Queues, Delivering Message with Service Bus Routers.

Text Book:
"Cloud Computing with the Windows Azure Platform", Roger Jennings, Wiley.

Reference Books:
11. "Cloud Computing", Michael Miller, Pearson Education.
12. "AJAX Construction Kit: Building Plug-and-Play Ajax Applications," Michael Morrison.
13. "AJAX Security", Billy Hoffman and Bryan Sullivan.
14. "Parallel Programming", Barry Wilkinson and Michael Allen

Term Work:
Term work shall consist of at least 10 experiments covering all topics and one written test.
Distribution of marks for term work shall be as follows:

25. Laboratory work (Experiments and Journal)   15 Marks
26. Test (at least one)   10 Marks
The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiment List
1. Collaboration on calendars, schedules, and task management
2. Collaboration on event management
3. Collaboration on contact management

4. Collaboration on project management
5. Collaboration on word processing
6. Collaboration on spreadsheets
7. Collaboration on databases
8. Collaboration on presentation
9. Collaboration on file sharing and any other on line content
10. Collaboration via web communication tools

Elective - II: IT FOR HEALTH CARE			
CLASS B.E. (INFORMATION TECHNOLOGY)			SEMESTER VIII
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	**MARKS**
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		--	25
	TERM WORK		--	25

Prerequisite: Basic knowledge of IT and MIS

Objective: The aim of this course is to make students aware of the use of information and communication technology in health care. Health IT can support patient care related activities using Health IT applications, such as desktop computer applications, cellular phones, personal digital assistants (PDAs), touch screen kiosks, and others. Examples of health IT applications are, electronic health records (EHR) electronic medical records (EMR), personal health records (PHR), telemedicine, clinical alerts and reminders, computerized provider order entry, computerized clinical decision support systems, consumer health informatics applications, and electronic exchange of health information. Widespread adoption of health information technology (health IT) can foster improvements in quality, safety, efficiency and access – key goals in today's national dialog on health reform.

1. **Planning and Developing an IT Strategy:** Introduction - Mission of IT in Health Care: Creating a System - Managing the IT Strategic Planning -Process - Strategies in Consulting for the 21st Century - Baylor Health Care - Clarian Health care.

2. **Preparing For Organizational Change:** Informatics in Health Care: Managing Organizational Change - The Role of Ethics in IT Decisions - Cases in Redesign - Memorial Hermann Healthcare System: Redesign and Implementation of a Multifacility - Clinical Information System - UPMC Health System.

3. **Transformation:** IT- Transition Fundamentals in Care Transformation -The Role of the CIO - Northwestern Memorial Hospital, Chicago: Patients First from the Ground Up - The Jewish Home and Hospital Lifecare System - NYC.

4. **Patient-Centered Technologies:** Patient Outcomes of Health Care - Six Sigma Excellence - Electronic Health Record - Interviewing Patients with a Computer - Nursing Administration: A Growing Role in Systems Development - Computer-Enhanced Radiology - Information Technology and the New Culture of Patient Safety - A Component Based Clinical Information and Electronic Health Record.

5. **Outlook On Future Technologies:** Technologies in Progress - Evidence-Based Medicine - Aligning Process and Technology - Clinical Decision Support Systems -

Quality Information and Care - Role for Health Information Systems - Clinical Practice - Connecting the Community for Better Health.

Text Book:
1. Ball, Marion; Weaver, Charlotte A.; Kiel, Joan M. (Eds.), "Healthcare Information Management Systems Cases, Strategies, and Solutions Series: Health Informatics", 3rd ed., Springer Berlin Heidelberg New York, 2004.

Reference:
1. Karen A. Wager, Frances Wickham Lee, John P. Glaser, "Managing Health Care Information Systems: A Practical Approach for Health Care Executives", Jossey-Bass, 2005.

Term Work:
Term work shall consist of at least 10 experiments covering all topics and one written test.
Distribution of marks for term work shall be as follows:

27. Laboratory work (Experiments and Journal)   15 Marks
28. Test (at least one)   10 Marks
The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiment List
Case study can be given to a group of maximum three students. Students can conduct the literature survey on it and design and develop the small system which will be useful to health care department.

Elective- II: Service-Oriented Architecture				
CLASS B.E. (INFORMATION TECHNOLOGY)			SEMESTER VIII	
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	**MARKS**
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		--	25
	TERM WORK		--	25
Prerequisite: Middleware Technology and Enterprise Application Integration				
Objective: SOA has quickly become the industry standard for building next-generation software. This course begins with a look at the architectural principles needed to create successful applications and then goes on to examine the process for designing services and SOA implementations.				

1. **Introduction:** The Promise of SOA, The Challenges of SOA, Reuse, Efficiency in Development, Integration of Applications and Data, Agility, Flexibility, and Alignment, Meeting the Challenge, Reference Architecture, Common Semantics, Governance, Business Process Modeling, Design-Time Service Discovery, Model-Based Development, Best Practices in SOA Analysis and Design.

2. **Getting Started:** Overview of SOA Implementation Methodology, SOA Reference Architecture, Business Architecture, Business Processes, Information Design, Service Identification, Service Specification, Services Realization, Service Life Cycle, The Service Design Process.

3. **Starting with the Business:** Business Architecture, Understanding the Business Motivation Model, Business Process Management and Modeling, How to Create Business Process Models, Use Cases, Conditional Business Process Models, Organizing Services, Domains, Types of Domains, The Service Inventory.

4. **Service Context and Common Semantics:** The Importance of Semantics in SOA, Core Information Modeling, Defining Types, Beyond the Basics, Structuring, Information Models, Documents, Documents and XML, XML Schema, XML Patterns, Best Practices for the SOA Architect.

5. **Designing Service Interfaces:** Services, Design Guidelines, Interface Design Illustrated, Solution Model.

6. **Designing Service Implementations:** Basic Service Architecture, Implementing the Interface Layer, Implementing the Business Layer, Implementing the Resource Layer, Implementation Design Illustrated.

7. **Composing Services:** Understanding Service Composition, Architectural Models in Service Composition, Service Composition Implementation, Service Composition and Business Rules, Service Composition and Transactions, Incorporating Human Activities into Service Composition, Orchestration with BPEL.

8. **Using Services to Build Enterprise Solutions:** Enterprise Solutions versus Applications, Service-Based Enterprise Solutions, Layered SOA Architecture and Multitiered Application Architecture, Locating Services, Versioning: Dealing with Service Changes, Architecting Security for Service-Based Solutions, Exception Handling and Logging in Enterprise Solutions, Monitoring and Managing Enterprise Solutions, Enterprise Service Bus.

9. **Designing and Using Integration in SOA Solutions:** Challenges of Integration in SOA, Integration in SOA Defined, Special Considerations for Implementing of Integration.

10. **SOA Security:** SOA Security Goals and Fundamentals, Web Service Security Standards and Specifications, SOA Security Blueprints.

11. **SOA Governance:** SOA Management and Governance Defined, The Case for SOA Governance, SOA Governance and the Service Life Cycle, Design-Time Governance, Practical SOA Governance, Developing and Registering Run-Time Policies, Run-Time Policy Enforcement and Adaptation.

Text Book
1. "Applied SOA", Michael Rosen etal., Wiley India.

Reference:
1. "Service- Oriented Architecture for Enterprise Applications", Shankar Kambhampaty, Wiley
2. "SOA Principles of Service Design" by Thomas Erl, Prentice Hall
3. Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, Rawn Shah, **"**Service-Oriented Architecture Compass: Business Value, Planning, and Enterprise Roadmap**"**, IBM Press Publication, 2005.
4. Sandy Carter, "The New Language of Business: SOA & Web 2.0**",** IBM Press, 2007.
5. Sanjiva Weerawarana, Francisco Curbera, Frank Leymann, Tony Storey, Donald F.Ferguson, "Web Services Platform Architecture: SOAP, WSDL, WS-Policy, WS-Addressing, WS-BPEL, WS-Reliable Messaging, and More**",** Prentice Hall Publication, 2005.
6. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services**",** Addison Wesley Publication, 2004.
7. Dave Chappell, "Enterprise Service Bus**",** O'Reilly Publications, 2004.
8. Thomas Erl, **"**Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services**",** Prentice Hall Publication, 2004.

Term Work:
Term work shall consist of at least 10 experiments covering all topics and one written test.

Distribution of marks for term work shall be as follows:

29. Laboratory work (Experiments and Journal)   15 Marks
30. Test (at least one)   10 Marks
The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Elective II - E-GOVERNMENT				
CLASS B.E. (INFORMATION TECHNOLOGY)				SEMESTER VIII
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		--	25
	TERM WORK		--	25

Prerequisite: Web Technology and Information Technology for Management of Enterprise

Objective: This course explains Basic concepts of e-Government, the range of information, services, and activities that comprise e-government. Good practice approaches, tools and techniques widely used for Managing e-Government, such as models e-Government, theories of evolution of e-Government, e-Government assessment models, BPRs and change management, Program management, etc. The role of ICT as an enabler for structural and process changes in government and public services organizations. The technical implementation, management, and security of e-government. The critical analysis and assessment of e-Government projects.

1. **Introduction to e-Government:** Definitions, Domains, Taxonomy, Current status – Indian and global, Conceptual Foundations, Citizen Centric e-Government, e-Government Services, Definitions, differentiation of G2C, G2B, G2G, G2E services – a broad outline.

2. **Managing e-Government – strategy and implementation:** Management Models - centralized, decentralized, hybrid, Implementation models - Back end automation, Front end only services, holistic, Business models - Self financed, PPP, JV, differed Payment, Facilities Management outsourcing, Management of Intellectual Property.

3. **Theories of Evolution in e-Government:** Four stages of e-Government evolution, various models and discussion on these four stages, e-Government maturity model.

4. **Managing e-Government:** Transformational Government for value Creation, Theory and practice of BPRs, Change management, Capacity Building, roles of political leadership, Media, and citizens, Technology - components and overview, procurement strategy and challenges, Challenges and strategies for Business Continuity, Data - Building Data Quality and Data culture, Challenges and strategies for data Preparedness and Data sustenance, Additional challenges in implementation of COTS Packages and ERP Packages. Security Policy, ISMS, Challenges of protecting citizen privacy, RTI and related challenges and strategies

5. **E-Government Project Life Cycle and Program management:** Differences between general and e-Government Project Life cycle, Concepts behind and importance of each PLC stage, Overview of theory and practice of Program Management.

6. **Challenges in Implementation of e-Government Project:** Universally identified challenges, Challenges facing e-Government practitioners in India.

7. **E-Government – Performance Management:** Indian and Global assessment frameworks and variety of e-readiness indexes, and their usefulness, Outcome and Benefits management.

8. **E-Government – Case studies:** Global and Indian Case studies of Successful and Unsuccessful Projects.

Reference Books:
1. "Implementing and managing E-Government", Richard Heeks, Vistaar Publications, India.
2. "Information Technology and E-Governance", N. Gopalsamy, New Age International Publications.
3. "Digital government: Technology and Public Sector performance", West, Darell M., Princeton University Press.
4. "Public Information Technology and e-Governance: Managing the Virtual State", Garson G. David, Jones and Bartlett".
5. "E-Government: From vision to Implementation", Subhash Bhatnagar, Sage Publications India Pvt. Ltd.
6. "IT Experience in India: Bridging the Digital Divide", Kenneth Kenniston, Deepak Kumar, Sage Publications India Pvt. Ltd.
7. "E-Governance Case Studies", Ashok Agarwal, University Press India.
8. "Compendium of E-Governance Initiatives in India", Piyush Gupta, R. K. Bagga, University Press India.
9. "E-Government - The Science of the Possible", J Satyanarayana, Prentice Hall.
10. "Bridging the digital Divide: Gyandoot – The Model for Community Networks", Rajesh Rajora.
11. "Digital Divide or Digital Jumo: Beyond the IT Revolution", Mitshiro Kagami and Masatsugu Tsuji (ed.)
12. "E-Governance – Concepts and Case Studies", C. S. R. Prabhu.

Term Work:
Term work shall consist of project report preparation.
Distribution of marks for term work shall be as follows:

31. Laboratory work (Experiments and Journal)   15 Marks
32. Test (at least one)   10 Marks
The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiment List
• The project work shall be a group activity.

- Each group of students shall be expected to pick up either a successful E-Government project of national importance, or a state of India as a whole; as the topic for the project.
- The students shall gather information related to the selected topic from various sources.
- Students shall be expected to apply the theories learned during the course to the project and arrive at their own conclusions about the project along with justifications.
- At the end of semester each group has to submit the Project Report and A power point presentation of the project report.

Elective II - ERP & CRM				
CLASS B.E. (INFORMATION TECHNOLOGY)			SEMESTER VIII	
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		--	25
	TERM WORK		--	25
Prerequisite: Information Technology for Management of Enterprise				
Objective: The aim this course is to give an insight into the principles of enterprise planning systems, its utility and implementation issues. The course introduces ERP and beyond ERP applications. Also it gives idea of CRM, CRM strategy, CRM Systems and its Implementation, CRM In Different Markets, e-CRM, Current Trends In CRM & Future Of CRM.				

Part – I: ERP

1. **A Foundation for understating Enterprise Resource Planning (ERP) Systems:** What is ERP?, what does it do?, the evolution of ERP, the applicability of ERP, ERP as a foundation, the ABCs of ERP implementation, class ABCD, implementers and reimplementers, the implementers' dilemma.

2. **ERP Implementation (Company-Wide) and Challenges:** Catch-22, an aggressive implementation schedule, the three knobs, the proven path. Schedule by function, not software modules, cut the cloth to fit the pattern, time waster.

3. **ERP Softwares:** Introduction, category 1, category 2, category 3, enterprise software, software selection, configuration and enhancement, installation, on-going support, bolt-on support, selecting bolt-on support, managing request for changes.

4. **Getting Ready and Project Launch**: Audit/Assessment 1, first-cut education, vision statement, cost/benefit analysis, go/no go decision, the implementers' checklist. Project organization, performance goals.

5. **Initial Education:** Objective of education for ERP, criteria for a program to accomplish behavior change, the change process.

6. **Sales and Operations Planning:** Where does it fit?, why is top management necessary?, the monthly S&OP process, the S&OP implementation steps, S&OP across the board.

7. **Process Definition and Data Integrity:** Defining demand management, planning and scheduling process, creating the project schedule, maintaining the project schedule, managing the schedule, policies, defining and implementing finance and accounting processes, timing. Inventory balances, scheduled receipts, allocations, bills of material, routings, customer orders, forgiving data, item data, worker center data, forecasts.

8. **ERP (phase I, II and III):** Three ways to implement systems, three kinds of pilots, cutover, the need for feedback during cutover, the potential inventory blip, don't starve the sources, the inadvertent big bang cutover, performance measurements, audit/assessment II. Supply chain integration, collaborative forecasting, audit/assessment III. Overview of Quick-Slice ERP, where quick slice applies, how can it be done so quickly?, quick-slice implementation details. Operating ERP, The Strategic Future See it, time and knowledge, zero inventory, internet, choices, selling ERP in strategy.

9. **Securing & Auditing ERP Systems:** Concepts, strategies, and various tools to promote security of an ERP System. They will configure, monitor, and trace various aspects of ERP vulnerability, evaluating security of database tables, identifying separation of duty concerns and isolating critical authorizations that pose risks to system security

Part – II: CRM

1. **Basics of CRM:** Introduction, Definition, CRM as a business strategy, Elements of CRM, CRM Processes and systems, Entrance, applications and success of CRM, Description of customer-supplier relationships, The dynamic in relationships, Communities.

2. **CRM as an Integral Business Strategy:** The nature of the CRM strategy, the context of the CRM strategy, the results of a successful CRM strategy. The relationship-oriented organization: Mission, Culture, Structure, People, Communication and information, Systems, Where do we stand.

3. **Customer Knowledge:** The value of customer knowledge, The utilisation of data as an asset, From data to customer, knowledge, Privacy, Personal Data Protection Act, Information policy.

4. **Communications and Multi-channels:** Multi-channels defined, the channels, Customers and the use of the channels, Influence of the channels on pricing and the formation of relationships, Recommendations on multichannel communication. The Individualized Customer Proposition: Customisation, Individualisation of the product offering, Individualised pricing policy.

5. **The Relationship Policy & Relationship Data Management:** Improvement of the size and quality of the customer database, Relationship policy per segment, Relationship policy by relationship phase, Translating the relationship policy into contact moments, Loyalty programmes. Customer identification, Expanding the size

of the customer database, Customer profiling, Data analyses and data mining, Experiences with data analysis, The analysis process, Data mining.

6. **Segmentation and Selection:** Segmentation and selections, Segmentation study as input for the formulation of the marketing strategy, Segmentation research used in compiling the list.

7. **Retention, cross-sell Analyses and the Effects of Marketing Activities:** Retention and cross-sell analyses, Retention, Cross-selling. The effects of marketing activities, evaluating the effect of marketing activities on the customer value, Experiments, The learning organization. Reporting results, Lifetime value, Alternatives for lifetime value, Balanced score card.

8. **Call Centre Management:** Call centre management, Call centres described, Call centres and human resources, determining the service level, Capacity planning, managing satisfaction using telephone contact, managing the quality of contacts through other channels, Key performance indicators.

9. **Internet and the Website & Direct Mail:** Internet and the website, Traffic building, Starting points for providing quality during the visit, Creating quality during the visit, From visit to transaction, From transaction to delivery, From delivery to retention, Measuring the results, direct mail, the position of direct mail, The process of developing, producing, sending and following-up direct mailings, Effective direct mail messages.

10. **CRM Systems and its Implementation:** CRM systems, Overview of CRM systems, The call centre, The Internet and the website, Data warehouse and datamart, Campaign management systems, Content management system, Suppliers of CRM systems, Causes for disappointing results, An initial exploration with CRM and how companies handle this, The CRM road map, CRM project management, International or cross-division projects.

11. **CRM In Different Markets And e-CRM:** CRM In Different Markets, CRM In B2C Markets, CRM Systems In B2B Marketing, Value Added Partnerships (VAPs), Market Intelligent Enterprise, What Is e-CRM, e-CRM Vs CRM, The Six "E's" Of e-CRM, Key e-CRM Features, Evolving To e-CRM, e-CRM Assessment, e-CRM Strategy Alignment, e-CRM Architecture, Basic Components And Architecture Of e-CRM Solution,

12. **Current Trends In CRM & Future Of CRM:** Current Trends In CRM, Future Of CRM, Factors which influence the future of CRM, The continuation of the journey, Is CRM A Science Or An Art?, 20th And 21st Century Business Models.

Text Books:
1. T. F. Wallace and M. H. Kremzar, "ERP: Making It Happen", Wiley.
2. Ed Peelen, "Customer Relationship Management", Pearson Education.

Reference Books:

1. Mary Sumner, "Enterprise Resource Planning", Pearson Education.
2. Brady, Monk, Wagner, "Concepts in Enterprise Resource Planning".
3. Alexis Leon, "ERP Demystified", TMH.
4. S. Parthasarathy, "ERP – A managerial and Technical Perspective", New Age International Publications.
5. Jagdish N. Sheth, Atul Parvatiyar and G. Shainesh, "Customer Relationship Management", TMH.
6. R. K. Sugandhi, "Customer Relationship Management", New Age International Publications.
7. E-Business & ERP: Transforming the Enterprise Norris, Grant, Hurley, James R., Hartley, K.M., Dunleavy, John R. and Balls, John, D. Hardcover, Wiley.

Term Work:

All students are expected to develop an ERP source code for a virtual enterprise having at least four modules (departments) preferably in JAVA technology (swing JDBC, Servelets / JSP) and or a CRM source code for a virtual enterprise using visual Basic and SQL server

33. Laboratory work (Experiments and Journal)   15 Marks
34. On line test of developed source code   10 Marks

Elective – II: MOBILE AND E-COMMERCE				
CLASS B.E. (INFORMATION TECHNOLOGY) SEMESTER VIII				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		--	25
	TERM WORK		--	25
Prerequisite: Wireless Networks				
Objective: The main objective of this course is to introduce participants to the new technologies, applications, services and business models of M-Commerce. In addition, we also look at mobile policy implications along with wireless spectrum auctions.				

1. **Introduction to e-business and e-commerce:** Introduction, What is the difference between e-commerce and e-business?, How significant are e-commerce and e-business?, Business adoption of digital technologies for e-commerce and e-business, Introducing the B2B and B2C companies, Management responses to e-commerce and e-business.

2. **E-commerce fundamentals:** Introduction, The e-commerce environment, The e-commerce marketplace, Focus on portals, Location of trading in the marketplace, Commercial arrangement for transactions, Focus on auctions, Business models for e-commerce, Revenue models, Focus on internet start-up companies-the dot-coms.

3. **E-business infrastructure:** Introduction, What is the internet?, How does it work? Internet standards, Focus on who controls the internet, Managing e-business infrastructure, Focus on web service and service and service-oriented, Focus on new access devices,

4. **E-environment:** Introduction, Social factors, Taxation, Economics and competitive factors, Focus on e-commerce and globalization, Political factors, Internet governance, E- governance, Technological innovation and technology assessment,.

5. **E-business strategy:** Introduction, E-business strategy, Strategic analysis, Strategic objectives, Strategy definition, Strategy implementation, Focus on information systems strategy and e-business strategy.

6. **Supply chain management:** Introduction, What is supply chain management?, Focus on the value chain, Option for restructuring the supply chain, Using e-business to restructure the supply chain, Supply chain management implementation.

7. **E-procurement:** Introduction, What is e-procurement?, Drivers of e-procurement, Focus on estimating e-procurement cost savings, Risks and impacts of e-procurement, Implementing e-procurement, Focus on electronics B2B marketplaces, The future of e-procurement?.

8. **E-marketing:** Introduction, What is e-marketing?, E-marketing planning, Situation analysis, Objective setting, Strategy, Focus on characteristics of new-media marketing communications, Tactics, Focus on online branding, Actions, Control.

9. **Customer relationship management:** Introduction, What is e-CRM?, conversion marketing, the online buying process, customer acquisition management , focus on marketing communications for customer acquisition ,customer retention management focus on excelling in e- commerce service quality, customer extension

10. **Change management:** Introduction, The challenges of e-business transformation, different types of change in business, Planning change, Human resource requirements, Revising organizational structures, approaches to managing change, focus on knowledge management, risk management.

11. **Analysis and design**: Introduction, process modeling, Data modeling, Design for e-business, Focus on user –centred site design, Focus on security design for e-business.

12. **Implementation and maintenance**: Introduction, Alternatives for acquiring e-business systems, Development of web-based content and services, focus on developing dynamic web content , testing, Changeover , Content management and maintenance, Focus on measuring and improving performance of e- business systems.

13. **M-Commerce:** Introduction to m-commerce: Emerging applications, different players in m-commerce, m-commerce life cycle Mobile financial services, mobile entertainment services, and proactive service management.

14. **Management of mobile commerce services:** Content development and distribution to hand-held devices, content caching, pricing of mobile commerce services The emerging issues in mobile commerce: The role of emerging wireless LANs and 3G/4G wireless networks, personalized content management, implementation challenges in m-commerce, futuristic m-commerce services.

Text Book:
Dave Chaffey, "E-Business and E-Commerce Management", Third Edition, 2009, Pearson Education.

Reference Books:
1. Henry Chan, Raymod Lee and etl., "E-Commerce Fundamental and Applications", Wiley.
2. Brian Mennecke and Troy Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group, 2003.
3. Nansi Shi, "Mobile Commerce Applications", IGI Global, 2004.
4. Gary P. Schneider, "Electronic Commerce", Seventh Edition, CENGAGE Learning India Pvt. Ltd., New Delhi.
5. K. K. Bajaj, D. Nag "E-Commerce", 2nd Edition, McGraw Hill Education, New Delhi
6. P. T. Joseph, "E-Commerce an Indian Perspective", PHI Publication, New Delhi.
7. Bhaskar Bharat, "Electronic Commerce-Technology and Application", McGraw Hill Education, New Delhi
8. Mary Sumner, "Enterprise Resource Planning", 2005, PHI Learning India Pvt. Ltd. / Pearson Education, Inc. New Delhi.
9. Chan, "E-Commerce fundamentals and Applications", Wiley India, New Delhi.
10. Pete Loshin, "Electronic Commerce", 4th Edition, Firewall media, An imprint of laxmi publications Pvt. Ltd., New Delhi, 2004.
11. Jeffrey F. Rayport and Bernard J. Jaworski, "Introduction to E-Commerce", 2nd Edition, Tata Mc-Graw Hill Pvt., Ltd., 2003.
12. Greenstein, "Electronic Commerce", Tata Mc-Graw Hill Pvt., Ltd., 2000.
13. Ravi Kalakota and Andrew B. Whinston, "Frontiers of Electronic Commerce", Addison Wisely 1996.
14. Pete Loshin, Paul A. Murphy, "Electronic Commerce", 2nd Edition, Jaico Publishers, 1996.
15. David Whiteley, "e-Commerce: Strategy, Technologies and Applications", McGraw Hill, 2000.
16. Norman Sadeh, "M-Commerce: Technologies, Services, and Business Models", Wiley, 2002.

Term Work:
Term work shall consist of at least 10 experiments covering all topics and one written test.
Distribution of marks for term work shall be as follows:

35. Laboratory work (Experiments and Journal)   15 Marks
36. Test (at least one)   10 Marks
The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiment list
Case study can be given to a group of maximum three students. Students can conduct the literature survey on it and design and develop the small system which will be useful to health care department.

Elective – II: ROBOTICS AND MACHINE INTELLIGENCE		
CLASS: B.E. (INFORMATION TECHNOLOGY)	**SEMESTER – VIII (Elective)**	
HOURS PER WEEK	**LECTURES**	**04**
	TUTORIALS	**--**
	PRACTICALS	**02**
	Hours	**Marks**
EVALUATION SYSTEM	**THEORY**	03	100
	PRACTICAL		
	ORAL	-	25
	TERM WORK	-	25

1. **Robotic Manipulation**

   Automation and Robots, Classification, Application, Specification Notations

2. **Direct and Inverse Kinematics**

   Co-ordinate frames, Rotations, Link Co-ordination Arm Equation, (Two axis , Three axis, Four-axis robot SCARA, Five-axis only Rhino XR-3 Robot).General properties of solutions Tool configuration Two axis, Three axis planar articulated, Four axis SCARA , Five axis robots only Rhino XR-3 Robot.

3. **Workspace Analysis and Trajectory Planning**

   Introduction to Workspace Analysis and Trajectory Planning, Work Envelop and examples, Pick and place operations, Continuous path motion, Interpolated motion, Straight-line motion.

4. **Machine Intelligence**

   Object Detection using Adaboost, Object Recognition using Moments, Template Matching using correlation principle & Principal Component Analysis (PCA), Object Tracking using Discrete Wavelet Transform, Segmentation, Region Labeling, Shrink and Swell operators, Perspective Transformation, Stereo Vision, Depth Measurement with Vision Systems, Real Time Video Processing.

5. **Embedded Systems and Real-time Operating System**

   Introduction to Embedded systems, Embedded Micro Controller cores (ARM, RISC, CISC, SOC), Embedded Memories, Architecture of Embedded Systems, Real-Time Operating Systems, Required RTOS services/capabilities (in contrast with traditional OS)..RT Linux, Programming languages for Embedded Systems

6. **Robotics Convergence Technology**

   Telematric camera Robotic System, Non-Imaging Sensors, Artificial intelligence for robotics, Knowledge representation, planning, and task scheduling. Sound

and touch sensing, People sensing, Autonomous mobile robot,humanoid robots and simulated humans,human-robot interaction.

7. Applications of Robotics

Robot Application in Manufacturing: Material Transfer - Material handling, loading and unloading Processing - spot and continuous arc welding & spray painting – Assembly Inspection, Selected Embedded System-based Applications: Database Applications (smart cards), Process-Control (Fuzzy logic), Robot application in Medical, Industrial Automation, Security

Text Books :

1. Robert Shilling, Fundamentals of Robotics-Analysis and control, Prentice Hall of India
2. Fu, Gonzales and Lee, Robotics, McGraw Hill
3. J.J, Craig, Introduction to Robotics, Pearson Education
4. Curtis D. Johnson, Process Control Instrumentation Technology, PHI Publication, Eighth Edition
5. An Embedded Software Primer – David E. Simon – Pearson Education
6. Embedded Microcomputer Systems -Jonathan W. Valvano - Thomson
7. Embedded Realtime Systems Programming- Sriram V Iyer, Pankaj Gupta - Tata McGraw Hill

Reference Books :

4. Staughard, Robotics and AI, Prentice Hall of India
5. Grover, Wiess, Nagel, Oderey, "Industrial Robotics", McGraw Hill
6. Niku, Introduction to Robotics, Pearson Education
7. Klafter, Chmielewski, Negin, Robot Engineering, Prentice Hall of India
8. Mittal, Nagrath, Robotics and Control, Tata McGraw Hill publications
9. George L Balten Jr., Programmable Controllers , Tata McGraw Hill publications
10. Embedded Linux – Hollabaugh, Pearson Education
11. Robotics / Fu K S/ McGraw Hill.
12. Robotic Engineering / Richard D. Klafter, Prentice Ha
13. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science.

Term Work:

Term work should consist of at least 8 Practicals and Assignments on every topic of the syllabus A term work test shall be conducted with a weightage of 10 marks

Marks :

Distribution of marks for term work shall be as follows:

3. Laboratory work(Experiment and Journal)   15 Marks
4. Test (at least one)   10 Marks

The final certification and acceptance of Term Work ensures the satisfactory performance of laboratory work and minimum passing in term work

List of Experiments :

Topic-1 : Robotics Manipulation [Any Two]

1. Develop an arm matrix for Rhnio XR-3 robot.
2. Inverse Kinematics for Adept-1 SCARA Robot.
3. Work space analysis for Two-axis planer articulated Robot arm.
4. Trajectory planning (Cubic Spline Method).

Topic-2 : Machine Vision [Any Two]

1. Object Tracking using Discrete Wavelet Transform,
2. Template Matching: - To find the best match using Performance Index and Normalized Cross Correlation.
3. Area Descriptors: - To find the different moments, centroid, and principal angle of a given image.
4. Real Time Video Processing.

Topic -3 Embedded Systems [Any Two]

1. DC Motor Control
2. Relay and Buzzer Control for alarm events
3. Unipolar and Bipolar Stepper Motor Control
4. Blue tooth/Zig-bee interface

Topic-4 Real Time Operating System (RTOS) Case Study [Any Two]

1. Case Study (Lab Practicals) : RTLinux porting to x86 Architecture
2. Case Study (Lab Practicals) : uCLinux porting to ARM Architecture
3. Case Study (Lab Practicals) : MSPGCC porting to MSP RISC Architecture

PROJECT – II				
CLASS B.E. (INFORMATION TECHNOLOGY)				SEMESTER VIII
HOURS PER WEEK	LECTURES	:	--	
	TUTORIALS	:	--	
	PRACTICALS	:	04	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		--	--
	PRACTICAL		--	--
	ORAL		--	50
	TERM WORK		--	50

Objective: The primary objective is to meet the milestones formed in the overall project plan decided in Project - I. The idea presented in Project – I should be implemented in Project – B with results, conclusion and future work. The project work shall also result in the documentation of the work done to carryout the project

Guidelines:

2. **Project Report Format:**
   At the end of semester a student need to prepare a project report which preferably contain following details:-
   Abstract, Project overview, Introduction and Motivation, Problem Statement, Requirement Analysis, Project design, Implementation Details, Technologies used Test cases, Project time line, Task Distribution, conclusion & future work, references, and Appendix consisting of user Manuals. Every student must prepare project report on a CD containing: project documentation, Implementation code, required utilities, Software's and user Manuals need to be attached. For certification purpose few pages shall be bound together embodying the title of project, table of contents and certification pages

3. **Term Work: Maximum Mark 50**
   Student has to submit weekly progress report to the internal guide and where as internal guide has to keep track on the progress of the project and also has to maintain attendance report. This progress report and final documentation of the project can be used for awarding term work marks.