



**Invertis Institute of Engineering
&Technology INVERTIS UNIVERSITY**

Invertis Village
Bareilly-Lucknow NH-24, Bareilly

Effective from the batches admitted in 2014-15
onwards

Scheme of Instruction & Syllabi
of
Diploma in Computer Science and Engineering
(Three Year Diploma Course)
II and III Year
(Effective Session 2014-15)

STUDY AND EVALUATION SCHEME
Diploma in Computer Science and Engineering
(Effective from session 2014-2015)
YEAR III, SEMESTER V

S. No.	Course Code	SUBJECT	PERIODS			EVALUATION SCHEME					TOTAL	Credit
						SESSIONAL EXAM.				E-SEM.		
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	DCS501	DBMS	3	1	0	20	10	10	40	60	100	4
2	DCS502	JAVA	3	1	0	20	10	10	40	60	100	4
3	DCS503	Management Information System	3	1	0	20	10	10	40	60	100	4
4	DCS504	Computer Hardware and Maintenance	3	1	0	20	10	10	40	60	100	4
5	DCS505	Computer Graphics	3	1	0	20	10	10	40	60	100	4
PRACTICAL/TRAINING/PROJECT												
6	DCS551	DBMS Lab	0	0	4	-	-	-	50	50	100	2
7	DCS552	JAVA Lab	0	0	4	-	-	-	50	50	100	2
8	DCS554	Repaired and Maintenance Lab	0	0	4	-	-	-	50	50	100	2
9	DCS555	Computer Graphics Lab	0	0	4	-	-	-	50	50	100	2
10	GP501	Discipline & General Proficiency	-	-	-	-	-	-	100	-	100	1
		TOTAL	15	5	16	100	50	50	500	500	1000	29

L-Lecture, T- Tutorial , P- Practical , CT – Cumulative Test ,TA –Teacher Assessment , AT – Attendance , E-Sem – End Semester Marks

STUDY AND EVALUATION SCHEME
Diploma in Computer Science and Engineering
(Effective from session 2014-15)
YEAR III, SEMESTER VI

S. No.	Course Code	SUBJECT	PERIODS			EVALUATION SCHEME					TOTAL	Credit
						SESSIONAL EXAM.				E-SEM.		
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	DCS601	Web Technology	3	1	0	20	10	10	40	60	100	4
2	DCS602	Software Engineering	3	1	0	20	10	10	40	60	100	4
3	DCS603	Computer Networks	3	1	0	20	10	10	40	60	100	4
4	DAS604	Environment and Ecology	2	0	0	10	05	05	20	30	50	2
5	DCS604	Introduction to Cloud Computing	3	1	0	20	10	10	40	60	100	4
PRACTICAL/TRAINING/PROJECT												
6	DCS651	Web Technology Lab	0	0	4	-	-	-	50	50	100	2
7	DCS652	Project Lab	0	0	6	-	-	-	100	150	250	6
8	DCS653	Industrial Training and Seminar	0	0	2	-	-	-	100	-	100	2
9	GP601	Discipline & General Proficiency	-	-	-	-	-	-	100	-	100	1
		TOTAL	11	03	12	70	35	35	490	410	1000	29

L-Lecture, T- Tutorial , P- Practical , CT – Cumulative Test ,TA –Teacher Assessment , AT – Attendance , E-Sem – End Semester Marks

DCS501	DBMS	L T P	4 Credits
		3 1 0	

Pre-requisites: None

Course Objectives:

The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

DETAILED SYLLABUS

Unit-1

Basic Concepts of DBMS

Introduction to Database Management System, Data Base Vs file oriented approach, Basic DBMS terminology.

Unit-2

DBMC Architecture

Data independence, General Architecture of a Data Base Management Software, Components of DBMS, Advantages and Disadvantages of DBMS.

Unit-3

Data Modeling

Introduction to Data Models, Entities, Attributes, Introduction to entity sets, relationships sets and Attributes.

Unit-4

Entities and Relationships

KEYS in entity & relationship sets: (a) super key, (b) candidate key, (c) primary key, (d) unique key, E-R Diagrams, Database Security & Integrity.

Unit-5

Structured Query Language

Elementary ideas of Structured Query Language – SQL Commands –SQL Data Types, Basic Queries in SQL- Data Definition Language (DDL), Creating Tables, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) From a Table, Dropping Columns.

Reference Books:

1. Database Management Systems by Henry F. Korth .
2. Fundamentals of Database Systems by Shamkant B. *Navathe*.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Describe the fundamental elements of relational database management systems.
CO2	Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL .
CO3	Design ER-models to represent simple database application scenarios
CO4	Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
CO5	Improve the database design by normalization.

DCS502	JAVA	L T P	4 Credits
		3 1 0	

Pre-requisites: None

Course Objectives:

Objective of this course is to provide the ability to design console based, GUI based and web based applications. Students will also be able to understand integrated development environment to create, debug and run multi-tier and enterprise-level applications.

DETAILED SYLLABUS

Unit-1

The Java Language: History and evolution of Java, Java's Lineage. Object Orientation concepts; Class, Object and its significance. Environment variable. Data Types, Variables and Array: Strongly typed Language, Primitive type, Non Primitive type, Scope & lifetime of the variables, Type Conversion and casting, Automatic Type promotions, Control Statements: Selection Statement, Iteration Statement.

Introducing classes: Class Fundamentals, Creating and Operating Objects, Constructor & initialization code block, Access Control, Modifiers, methods, Abstract Class & Interfaces, Defining Methods, Argument Passing Mechanism, Method Overloading.

Unit-2

Inheritance: Use and Benefits of Inheritance in OOP, Types of Inheritance in Java, Inheriting Data Members and Methods. Overloading concept & Overriding Super Class Methods.

Package: Organizing Classes and Interfaces in Packages. Package as Access Protection Defining Package CLASSPATH Setting for Packages.

Unit-3

Exception Handling: The Idea behind Exception, Exceptions & Errors Types of Exception, Control Flow In Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Un-Checked Exceptions,

Unit-4

Thread : Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads.

The Java Library:

Array & String: Defining an Array, Initializing & Accessing Array, Multi-Dimensional Array, and Operation on String, Mutable & Immutable String.

Unit-5

Database Programming using JDBC: Introduction to JDBC, JDBC Drivers & Architecture.

Text Book:

1. Herbert Schildt, "The Complete Reference: Java" Seventh Edition, TMH.

References:

1. Herbert Schildt "Java Programming Cook Book" McGraw Hill.
2. Core Java™ 2 Volume I - Fundamentals, Seventh Edition Prentice Hall PTR
3. Core Java™ 2 Volume II - Fundamentals, Seventh Edition Prentice Hall PTR

Course Outcomes: After the completion of the course the student will be able to:

CO1	Read and understand Java-based software code of medium-to-high complexity.
CO2	Use standard and third party Java's API's when writing applications.
CO3	Understand the basic principles of creating Java applications with graphical user interface (GUI).
CO4	Create rich user-interface applications using modern API's such as JAVAFX.
CO5	Understand the fundamental concepts of computer science: structure of the computational process, algorithms and complexity of computation.

DCS503	Management Information System	L T P	4 Credits
		3 1 0	

Pre-requisites: None

Course Objectives:

The objective of the course is to describe the role of information technology and decision support systems in business and record the current issues with those of the firm to solve business problems. To introduce the fundamental principles of computer-based information systems analysis and design and develop an understanding of the principles and techniques used.

DETAILED SYLLABUS

Unit-1

Introduction to Information system, Types of Information system, System Vs MIS, What is MIS, Importance and Need of MIS, Network and Internet, Types of information system TPS,DSS,MIS.Assumptions & limitations of each system.

Unit-2

Structure of MIS, MIS vs Data Processing, Knowledge requirement of MIS, Information flow in MIS, MIS and Information Resource Management, Service Management, Availability Management.

Unit-3

Information system in Business, Problem with MIS, Causes and solution, Problem Management, The Planning Process, Controlling process in an organization, Database Backup & Storage, Archive & Retrieve, Disaster Recovery, Database & Application Protection.

Unit-4

Internet , Intranet, Extranet, Computer and internet Security, Access Management. Intrusion Detection, Security Information Management, Identity management, Release management.

Unit-5

Inputs and outputs, Processors, Controls, Feedback, Environment, Boundaries and Interface, Examples of System, System Development Life Cycle, Problems Identification, Types of Feasibility - Operational, Technical, Economical, System Analysis, System Design, Testing, Implementation.

Text Books:-

1. Goel Ritendra, *Computer Application in Management*, New Age International Publishers, New Delhi.
2. Chowdhury G.G., *Text Retrieval Systems in information Management*, New Age International Publishers, New Delhi.
3. S.Shahjahan., *Management Information System*, New Age International Publishers, New Delhi.
4. O Brian, "Introduction to Information System", MCGRAW HILL

Course Outcomes: After the completion of the course the student will be able to:

CO1	Relate the basic concepts and technologies used in the field of management information systems.
CO2	Compare the processes of developing and implementing information systems.
CO3	Outline the role of the ethical, social, and security issues of information systems
CO4	Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
CO5	Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization

DCS504	COMPUTER HARDWARE & MAINTENANCE	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

The objective of this course is to provide the students much needed knowledge of computer hardware and networking, enabling them to identify and rectify the onboard computer hardware, software and network related problems in Engine Room Integrated Automation systems and Navigational equipment on Bridge. With the help of this course the participant will be able to understand the hardware specifications that are required to run operating system and various shipboard application programs.

DETAILED SYLLABUS

Unit-1

Component and peripheral devices, Connected with computer. Mother Board : BUS, Motherboard components, Battery, Connections on the Mother Board, Keeping CPU cool, Mother board trouble shooting.

Unit-2

Key Board: Switches, Keyboard organization, Key board type trouble shooting. Mouse: Mouse type, Connecting Mouse, Trouble shooting Mouse.HDD : Magnetic recording, Data Encoding Method, HDD feature, Head barking, HDD trouble shooting.

Unit-3

Printers : Image formation method, Printing mechanism, DMP, Ink Jet, Laser Printer. How printer works and Troubleshooting.

Unit-4

Network : Setting up N/W, Trouble Shooting N/W, Make your own computer.

Unit-5

Software Installation, Windows and other S/w, Boot Process, How to use Pen drive and other devices. Power Supply: Operating characteristics, Types and maintenance.

Reference Books:

1. **Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance**” by James K L
2. Microprocessors, **Pc Hardware** and Interfacing” by Mathivanan.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Understand basic concept & structure of Computer Hardware & Networking Components.
CO2	Identify the existing configuration of the computers & peripherals.
CO3	Upgrading the same as & when required.
CO4	Apply their knowledge about computer peripherals to identify/rectify problems on board
CO5	Integrate the PC's into Local Area Network & re-install OS & various shipboard applications.

DCS505	COMPUTER GRAPHICS	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

The main objective of this module is to introduce to the students the concepts of computer graphics. It starts with an overview of interactive computer graphics, two dimensional system and mapping, then it presents the most important drawing algorithm, two-dimensional transformation; Clipping, filling and an introduction to 3-D graphics.

DETAILED SYLLABUS

Unit-1

Introduction and Line Generation: Graphic Displays- Random scan displays, Raster scan displays, Frame buffer and video controller, Points and lines, Line drawing algorithms, Circle generating algorithms, Mid-point circle generating algorithm.

Unit-2

Transformations: Basic transformation, Matrix representations and homogenous coordinates,

Composite transformations, Reflections and shearing.

Windowing and Clipping: Viewing pipeline, Viewing transformations, 2-D Clipping algorithms-Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Polygon clipping –Sutherland Hodgeman polygon clipping.

Unit-3

Three Dimensional: 3-D geometric primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

Unit-4

Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects, introductory concepts of Spline, B-spline and Bezier curves and surfaces.

Unit-5

Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method, A-buffer

method, Scan line method, basic illumination models – Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.

Text Books:

1. Donald Hearn and M Pauline Baker, “Computer Graphics C Version”, Pearson Education
2. Amrendra N Sinha and Arun D Udai,” Computer Graphics”, TMH

References:

3. Donald Hearn and M Pauline Baker, “Computer Graphics with OpenGL”, Pearson Education
4. Steven Harrington, “Computer Graphics: A Programming Approach”, MH
5. Rogers, “Procedural Elements of Computer Graphics”, McGraw Hill

Course Outcomes: After the completion of the course the student will be able to:

CO1	Explain the core concepts of computer graphics, including viewing, projection, perspective, modelling and transformation in two and three dimensions.
CO2	Apply the concepts of colour models, lighting and shading models, textures, ray tracing, hidden surface elimination, anti-aliasing, and rendering.
CO3	Interpret the mathematical foundation of the concepts of computer graphics.
CO4	Describe the fundamentals of animation, parametric curves and surfaces, and spotlighting.
CO5	Identify a typical graphics pipeline and apply graphics programming techniques to design and create computer graphics.

STUDY AND EVALUATION SCHEME
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YEAR III, SEMESTER VI

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						SESSIONAL EXAM.				E-SEM.		
			L	T	P	CT	TA	AT	TOTAL			
THEORY												
1	DCS601	Web Technology	3	1	0	20	10	10	40	60	100	4
2	DCS602	Software Engineering	3	1	0	20	10	10	40	60	100	4
3	DCS603	Computer Networks	3	1	0	20	10	10	40	60	100	4
4	DAS604	Environment and Ecology	2	0	0	10	05	05	20	30	50	2
5	DCS604	Introduction to Cloud Computing	3	1	0	20	10	10	40	60	100	4
PRACTICAL/TRAINING/PROJECT												
6	DCS651	Web Technology Lab	0	0	4	-	-	-	50	50	100	2
7	DCS652	Project Lab	0	0	6	-	-	-	100	150	250	6
8	DCS653	Industrial Training and Seminar	0	0	2	-	-	-	100	-	100	2
9	GP601	Discipline & General Proficiency	-	-	-	-	-	-	100	-	100	1
		TOTAL	11	03	12	70	35	35	490	410	1000	29

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DCS 601Web Technology

Pre-requisites: None

Course Objectives:

CO1	Student will come to aware of cyber law.
CO2	student will be familiar with client server architecture
CO3	able to develop a web application using java technologies
CO4	Students will gain the skills and project-based experience needed for entry into web application and development careers

Detailed Syllabus

Unit-1

Introduction to Web Based System Development:

History of web, Growth of the Web, Protocols, governing the web, Introduction to Cyber Laws in India,

Unit-2

HTML: HTML Formatting Tags, Links, List, Tables, Frames, Forms, Comments in HTML.

Unit-3

Web Scripting: DHTML, JavaScript Introduction, documents, and documents, forms, Statements, Functions, Object in JavaScript, Events and Event Handling Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.

Unit-4

XML: Introduction, Displaying an XML document, Data Interchange with an XML document, document type definitions.

Unit-5

Designing web pages of your polytechnic etc.

Text Books

1. Beginning Visual C# 2008, John Wiley, Wrox, May 2008.
2. Microsoft .Net for Programmers, Fergal Grimes, SPI, 2002

References:

1. Programming with C#, E. Balagurusamy, TMH, 1st Edition.
2. Collaborative Web Development, Burdman, Addison Wesley, 1st Edition, 1999.
3. Developing E-Commerce Sites, Sharma, Sharma, Addison Wesley, 1st Edition.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Students are able to examine the security issues as well as judge the website policies according to cyber law.
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CO2	To design and create the website using HTML and java scripts.
CO3	Students are able to create and design the server-side java applications validation using java script.
CO4	Student can create xml files for client and server based program.

DCS-602 Software Engineering

Pre-requisites: None

L T P C
3 1 0 4

Course Objectives:

CO1	It will give us information about various SDLC's , Software Characteristics and the need of Software engineering.
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CO2	By this Students will understand various technicalities of documentation and its importance
CO3	Student will understand various designing techniques along with software measurement and matrices.
CO4	Students will understand the coding, testing and software maintenance along with various testing mechanisms.

Detailed Syllabus

Unit-1

Introduction to Software Engineering: Software Components, Software Characteristics, Software Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model.

Unit-2

Software Requirement Specifications (SRS)

Requirement Engineering Process: Elicitation, Analysis, Documentation, Review. Feasibility Study, Data Flow Diagrams, SRS Document.

Unit-3

Software Design: Basic Concept of Software Design, Modularization, Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, LOC and Function Point (FP) Based Measures.

Unit-4

Software Testing: Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up Testing. Introduction to Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Alpha and Beta Testing.

Unit-5

Software Maintenance: Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance. Software Configuration Management Activities, Change Control Process. Introduction to Software Risk Analysis and Management.

Text book

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.

References:

1. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
2. Pankaj Jalote, Software Engineering, Willey

Course Outcomes: After the completion of the course the student will be able to:

CO1	To develop, maintain and evaluate large-scale software systems
CO2	Apply various testing techniques to test the software.
CO3	To meet ethical standards and legal responsibilities

CO4	To work as an effective member or leader of software engineering teams
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DCS603 COMPUTER NETWORKS

Pre-requisites: None

L T P C
3 1 0 4

Course Objectives:

CO1	Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
CO2	Acquire knowledge of OSI model
CO3	Study various terminology of networking.

CO4	Study various cryptography techniques for data security.
CO5	To study various data transfer and compression techniques.

Detailed Syllabus

Unit-1

Introduction Concepts: Goals and Applications of Networks, Advantages of computer network. Network Topologies, Types of Transmission Media, Switching methods.

Unit-2

Introduction to OSI reference model, Types of Error, Detection and Correction, Sliding Window protocols.

Unit-3

Connecting devices: Repeater, hub, bridge. Routing, IP address, IPv6. Introduction to Congestion control

Unit-4

Introduction to Data compression techniques, Cryptography.

Unit-5

File Transfer, Access and Management, Electronic mail, HTTP, WWW, Introduction to Firewalls.

Text Books:-

1. Forouzen, "Data Communication and Networking", TMH
2. A.S. Tanenbaum, Computer Networks, Pearson Education

Reference Book:-

3. W. Stallings, Data and Computer Communication, Macmillan Press
4. AnuranjanMisra, "Computer Networks", Acme Learning
5. G. Shanmugarathinam, "Essential of TCP/IP", Firewall Media

Course Outcomes: After the completion of the course the student will be able to:

CO1	Describe the functions of each layer in OSI and TCP/IP model.
CO2	Apply cryptography techniques to protect data.
CO3	Able to compress the data for data transfer.
CO4	Classify the routing protocols and analyze how to assign the IP addresses for the given network.
CO5	Well known about the networking.

DAS604 ENVIRONMENT AND ECOLOGY

L T P C
3 1 0 4

Pre-requisites: None

Course Objectives:

CO1	
CO2	
CO3	
CO4	
CO5	
CO6	

Detailed Syllabus

Unit-1

Introduction to Environmental Science - Definition and scope and need for public awareness
Ecosystems ,Concept, structure and functions, restoration of damaged ecosystems
Biodiversity – Definition, description at national and global level, threats and conservation

Unit-2

Natural Resources - Renewable and non-renewable and their equitable use for sustainability,
Material cycles – carbon, nitrogen and sulphur cycle. Conventional and Non-conventional
Energy Sources – fossil fuel-based, hydroelectric, wind, -nuclear and solar energy, biomass,
biodiesel, hydrogen as an alternative fuel.

Unit-3

Transportation and industrial growth Social Issues Related to Environment–Sustainable
development, reset lement and rehabilitation Environmental ethics.

Unit-4

Environmental Changes and Human Health Environmental Pollution–Definition, causes and
effects, control measures for water, air, soil, noise, thermal pollution,

Textbook:

Environmental Studies, J Krishna wamy , R J Ranjit Daniels, Wiley India.

Reference Books:

- 1.Environmental Science, Bernard J. Nebel, Richard T. Right, 9780132854467, Prentice Hall Professional 1993.
- 2.Environment and Ecology, R K Khandal, 978-81-265-4277-2, Wiley India.
- 3.Environmental Science, 8th Ed ISV, Botkin and Keller, 9788126534142,Wiley India.
- 4.Environmental Studies, R Rajagopalan, 978-0195673937, Oxford University Press
- 5.Textbook of Environmental Science and Technology, M.Anjireddy, BS Publications

Course Outcomes: After the completion of the course the student will be able to:

CO1	
CO2	
CO3	
CO4	
CO5	

DCS604 Introduction to Cloud Computing

L T P C
3 1 0 4

Pre-requisites: None

Course Objectives:

CO1	Study the basic terminology of cloud computing.
CO2	Study the various models of cloud computing.
CO3	Study various devices used in cloud computing for data transfer.
CO4	Study the various security policies.

Detailed Syllabus

Unit-1

Define cloud computing, Components of a computing cloud, Differentiating types of cloud: Public, Private, Hybrid,

Unit-2

Cloud Computing Models: Software as a service: SaaS, Platform as a service: PasS, Hardware as a service: HasS, Infrastructure as a service: IaaS.

Unit-3

Connecting devices: Repeater, hub, bridge. Routing, gateways, Network Types, IP Classes and subnets, CIDR

Unit-4

Introduction to Cloud security, User Authentication, Firewall and Cloud database

Unit-5

Amazon, Google, IBM Cloud, Microsoft and others adopting the cloud, Simple Storage Service-S3, Overview of buckets and Object, Amazon elastic block storage EBS.

Text Books:

1. Cloud Computing: Principles and Paradigms, Editors: Raj Kumar Buyya, James Bromberg, Andrej M Goscinski, Wiley, 2011.
2. Visible Ops private Cloud: From Virtualization to private Cloud in 4 Practical's steps, Andi Mann, Kurt Milne, Jeanne Mcrain IT Process Institute, In: first edition (April 8, 2011)

Reference Book:

- Cloud Computing Explained: Implementation Handbook for Enterprises, John Rotan, Recursive Press (November 2, 2009)

Course Outcomes: After the completion of the course the student will be able to:

CO1	Ability to use current techniques, skills, and tools necessary for computing practice
CO2	Technical design the technical ability to design a prescribed engineering sub-system
CO3	Design assessment the ability to develop and assess alternative system designs based on technical and non-technical criteria
CO4	Critically analyze case studies to derive the best practice model to apply when developing and deploying cloud based applications.