

BV - 01
2019-20

Dr G.R.DAMODARAN COLLEGE OF SCIENCE(AUTONOMOUS),COIMBATORE - 14
DEPARTMENT OF COMPUTER SCIENCE
Scheme of Examination (under CBCS) - M. Sc(Information Technology)
For the candidates admitted from the Academic Year 2019- 2020

SEM	Course	Course Title	Credits	MARKS			Hrs/ week	Exam Duration (Hrs)
				CA	TEE	Total		
I	Core	Distributed Operating System	4	25	75	100	5	3
	Core	Advanced DBMS	4	25	75	100	5	3
	Core	Enterprise Computing Using Java	4	25	75	100	5	3
	Core	Object Oriented Analysis and Design	4	25	75	100	5	3
	Core	Advanced DBMS Lab	2	40	60	100	5	3
	Core	Enterprise Java and UML Lab	2	40	60	100	5	3
II	Core	Software Project Management and Quality Assurance	4	25	75	100	4	3
	Core	Big Data Analytics	4	25	75	100	4	3
	Core	Mobile Application Development	4	25	75	100	4	3
	Non - Major	Aptitude *	3	25	75	100	4	3
	Elective	Elective - I	4	25	75	100	4	3
	Core	Software Project Management and Quality Assurance Lab	2	40	60	100	5	3
III	Core	Mobile Application Development Lab	2	40	60	100	5	3
	Core	Internet of Things	4	25	75	100	4	3
	Core	Web Programming	4	25	75	100	4	3
	Core	Cyber Security Intelligence	4	25	75	100	4	3
	Core	Project I	6	25	75	100	6	
	Non - Major	Soft Skills *	3	25	75	100	3	3
	Elective	Elective - II	4	25	75	100	4	3
Core	Web Programming Lab	2	40	60	100	5	3	
IV	Core	Project II	20	25	75	100		
Total			90	600	1500	2100	90	

* a part of the course is Self Study & Both CAM and TEE Marks will be evaluated Internally

Project I and Project II

Marks split up:	Marks
I Project Review	10
II Project Review	15
Project Documentation	25
Viva Voce	50

Total **100 Marks**

G. Radhakrishnan

BV -02

2019-20

Elective I

- 1 Ethical Hacking and Network Defense
- 2 Information Security
- 3 Cloud Computing
- 4 Digital Image Processing

Elective II

- 1 Business Intelligence
- 2 Neural Network Algorithms and Applications
- 3 Embedded Systems and Robotics
- 4 Navigation and Control Systems

G. Radhika

BV - 03
2019-20

Subject Code:

Dr. G R DAMODARAN COLLEGE OF SCIENCE (Autonomous), COIMBATORE

M. Sc (Information Technology)

Effective from the academic year: 2019-2020

FIRST SEMESTER

CORE : DISTRIBUTED OPERATING SYSTEM

Objective of the subject: The objective of the course is to gain more knowledge about advanced operating system principles, explore new ideas and research possibilities in future operating systems design. Topics include Characteristics and design issues of Distributed Systems (DS), DS architecture, network, operating system, applications, design and implementation of DS, performance, security, reliability issue and some case studies.

UNIT I: (8 Hrs)

Distributed Operating Systems - Distributed computing system models-Issues in designing a distributed OS. Message passing - Synchronization - Buffering - failure handling.

UNIT II: (8 Hrs)

Remote Procedure calls - The RPC model - Transparency of RPC - Implementing RPC - Stub generation and RPC messages - Marshalling arguments & results - Server management and parameter passing semantics- Communication protocols for RPC - Client Server binding - Lightweight RPC.

UNIT III: (8 Hrs)

Distributed shared memory - General architecture - Design and Implementation issues- Granularity - Structure of shared memory space - Consistency models - Replacement strategy- Thrashing.

UNIT IV: (10 Hrs)

Synchronization - Mutual exclusion – Deadlock - Election algorithms. Process management- Process migration. Distributed file systems – Features - File models - File sharing semantics - File caching schemes - File replication – Fault tolerance.

UNIT V: (6 Hrs)

Case Studies: Amoeba - Design goals & main features – System Architecture-Objects and their management – Process management - File Management - Interprocess communication.

Reference Books :

1. Distributed Operating Systems Concepts and Design, Pradeep K Sinha, Prentice Hall of India Pvt. Ltd, 2012. (Unit I – Unit V)
2. Operating Systems, D M Dhamdhare, Tata McGraw-Hill Publishing Company Limited, 2012.

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Subject Code:

Dr. G R DAMODARAN COLLEGE OF SCIENCE (Autonomous), COIMBATORE

M. Sc (Information Technology)

Effective from the academic year: 2019-2020

FIRST SEMESTER

CORE: Advanced DBMS

Objective of the subject: The objective of this course is to give students a basic understanding of the concepts, techniques and applications of open source database management technology. Students will have hands-on experience to use and develop open source database applications.

UNIT I

(8 Hrs)

Database system architectures: Centralized systems – Client/Server systems – Parallel and Distributed systems. **Advanced Querying:** Decision-support systems – Data mining – Data warehousing – Directories and categories.

UNIT II

(8 Hrs)

Storage and File Structure: File Organization – Organization of Records in Files - Data Dictionary storage – Database Buffer. **PL/SQL:** Triggers- Procedures- Functions-Packages- Cursors-Exception handling.

UNIT III

(9 Hrs)

Transactions: Concept – A simple Transaction Model – Storage structure – Transaction Atomicity and Durability – Transaction Isolation – Serializability - Transaction Isolation and Atomicity. **Distributed Databases:** Homogeneous and Heterogeneous Databases – Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency control in Distributed database – Availability – Distributed Query Processing – Cloud-based Databases.

UNIT IV

(7 Hrs)

Introduction to **MongoDB:** Using Java Script Object Notation – **Creating or Generating a Unique Key:** Database, Collection, Document, Support for dynamic queries, Storing binary data, Replication, Sharding, Updating information In-place – **Terms used in RDBMS and MongoDB:** Create and Drop database – Data types.

UNIT V

(8 Hrs)

MongoDB Query Language: Insert method, Save method, Update method, Remove method, Find method, Dealing with NULL Values, Count, Limit, Sort and Skip, Arrays, Aggregate function, MapReduce Function.

Reference Books :

1. "Database System Concepts", Abraham Silberchatz, Henry F.Korth, S.Sudharshan, McGraw Hill, 6th Edition, 2011.
2. "ORACLE 9i-The Complete Reference", Kevin Loney, George Koch, Tata McGraw Hill, 2008
3. "Big Data and Analytics", Seema Acharya, Subhashini Chellappan, Wiley India Pvt. Ltd., First Edition, 2015.

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M. Sc (Information Technology)

Effective from the academic year: 2019-2020

FIRST SEMESTER

CORE : ENTERPRISE COMPUTING USING JAVA

Objective of the subject: This course covers the advanced features of Java starting with the database connectivity using drivers, servlet programming and distributed computing strategies of Java using RMI. The basic concepts of J2EE, Web Services are also discussed.

UNIT I: (8 Hrs)

Database Programming with JDBC: Database Drivers - The java.sql Package – The javax.sql Package: JDBC Data Sources – Connection Pooling – Distributed Transactions – RowSet Objects.

UNIT II: (8 Hrs)

Servlet Programming: Servlet Implementation – Servlet Configuration – Servlet Exceptions - The Servlet Lifecycle – Requests and Responses – Servlet Programming.

UNIT III: (8 Hrs)

JSP Basics and Architecture: Introducing JSP – The Nuts and Bolts – JSP Technical Support – JSP Design Strategies.

UNIT IV: (8 Hrs)

J2EE and Web Services: Web Services – Web Service Technologies – J2EE Technologies for Web Services – Developing Web Services – Making Services Smarter – Vendor Support for Web Services.

UNIT V: (8 Hrs)

Distributed Computing using RMI – The RMI Architecture – Locating Remote Objects – Developing Applications with RMI. EJB Architecture and Design – The EJB Container and its Services – Working with EJBs – EJB Components on the Web- Client-Tier Access to EJBs – Design of the EJB Tier.

Reference Books :

1. Professional Java Server Programming, Subrahmanyam Allamaraju, Cedric Bues, Apress, SPD, 2005. (Unit I – Unit IV)
2. Java Server Programming, J2EE1.4 Edition, Black Book, Dreamtech Press, 2008 Reprint
3. Java Server Programming, J2EE1.7 Edition, Black Book, Dreamtech Press, 2014.

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M. Sc (Information Technology)

Effective from the academic year: 2019-2020

FIRST SEMESTER

CORE : OBJECT ORIENTED ANALYSIS AND DESIGN

Objective of the subject: This subject gives guidance on the construction of object oriented systems. It helps in understanding the fundamental concepts and notations of object oriented analysis and design.

UNIT I:

(8 Hrs)

Object Oriented Systems Development: Two orthogonal views of software – object oriented systems development methodology – object orientation – overview of unified approach - object oriented philosophy – objects – objects are grouped in classes – attributes: object state and properties – object behavior hierarchy – objects respond to messages – object oriented concepts in relation with the case study – case study.

UNIT II :

(8 Hrs)

Object oriented systems development lifecycle: The software development process- building high quality software - Object oriented systems development: A use-case driven approach – reusability.

Object oriented methodologies: Towards the unification of the methodologies – survey of some Object oriented methodologies – Rumbaugh model – Booch methodology – Jacobson methodology -patterns – Framework – The unified Approach.

UNIT III:

(8 Hrs)

Unified modeling Language: Static and Dynamic models – UML Introduction – UML Diagrams – UML class diagram – Use case-diagram – UML Dynamic modeling – Model management – UML Extensibility – UML metamodel. Object oriented analysis, process and identifying use cases: Analysis as a difficult activity – business object analysis – use-case driven object oriented analysis- business process modeling – use case model- developing effective documentation – case study.

UNIT IV:

(8 Hrs)

Object Oriented Analysis classification: Classification Theory – Approaches for identifying classes – noun phrase approach – common class patterns approach – use case driven approach – classes, responsibilities and collaborators – naming classes. Identifying object relationships, attributes and methods: Associations – Super-sub relationships – a part of relationship aggregation – case study – class responsibility – defining attributes – object responsibility – defining methods.

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Subject Code:

UNIT V:

(8 Hrs)

Object oriented design process and design axioms: object oriented design process – object oriented design axioms – corollaries.

Designing classes: Object oriented design philosophy – UML object constraint language – designing classes – class visibility- refining attributes – designing methods and protocols – designing attributes and methods for case study – Packaging and managing classes.

Reference Books:

1. Object Oriented Systems Development, Ali Bahrami, Tata McGraw- Hill, Twelfth Reprint 2012
2. UML Distilled, Martin Fowler, Pearson, III Edition, Twelfth Impression 2012



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M. Sc (Information Technology)

Effective from the academic year: 2019-2020

FIRST SEMESTER

CORE: ADVANCED DBMS LAB

Objective of the subject: This paper gives a hands-on experience on implementing PL/SQL concepts like Procedures, Functions etc.

Write the program for the following PL/SQL concepts

1. Referential Integrity in SQL.
2. Assertions.
3. Triggers.
4. Implicit and Explicit Cursors.
5. Exception Handling.
6. Procedures.
7. Functions.
8. Database creation, conforming existing DB, Listing all DBs and dropping a DB using MongoDB.
9. Use Count, Limit, Sort and Skip in MongoDB.

Note:

Develop a project / case study using the above applicable concepts.



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FIRST SEMESTER

CORE: ENTERPRISE JAVA AND UML LAB

Objective of the subject: This paper gives a hands-on experience on creating applet application, servlet page, and JSP page. It provides practice on creating server stub, client stub in RMI. It also gives an idea on developing the modeling diagrams like class diagram, object diagram, use case diagram, state transition diagram.

Java Exercises

1. Java programs using Packages, Applets.
2. Program demonstrating JDBC.
3. Web page creation using Servlet.
4. Web page creation using JSP.
5. Program demonstrating RMI server stub & client stub.
6. Creating a java interface using JSP.
7. Creating a stateless session bean using EJB.

Modeling Exercises

Draw the following diagrams for any computerized / automated systems.

1. Class Diagram.
2. Object diagram.
3. Use Case diagram.
4. State Transition diagram.
5. Activity Diagram.
6. Interaction diagram.
7. Physical diagram.
8. Package diagram.
9. Component diagram.

Note: Develop a project / case study using the above applicable concepts.

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SECOND SEMESTER

CORE : SOFTWARE PROJECT MANAGEMENT AND QUALITY ASSURANCE

Objective of the subject: This paper highlights on the methods of project planning like Step Wise planning, PRINCE2 method of project planning. It gives an idea on project's activities, management, project analysis, technical planning, risk management, managing people, organizing teams and software quality in project planning.

UNIT I:

(8 Hrs)

Introduction – Project – Software Projects versus other types of projects – Activities - Some ways of categorizing software projects – Management – Problems with software projects – Setting Objectives - Requirement Specification – Stepwise Project Planning. Project Evaluation: Strategic Management – Technical assessment – Cost – Benefit Analysis – Cash Flow Forecasting – Cost – Benefit Evaluation Techniques – Risk Evaluation.

UNIT II:

(9 Hrs)

Project analysis and technical planning: Choosing technologies – Technical plan contents list – choice of process models, structure vs. speed of delivery – the waterfall model – the V-process model – spiral model - software prototyping. Software estimation: Introduction – problems with over – and under – estimates – basis for software estimation - Effort estimation techniques. Activity Planning: objectives – project schedules – Project and activities – Network planning models.

UNIT III:

(8 Hrs)

Risk management: Risk – Managing Risk – Evaluating Risk. Resource allocation: Nature of Resources – Resource Requirement – Scheduling Resources – Creating Critical Path - Counting the Cost. Monitoring and control: creating framework – Collecting Data – Visualizing Progress – Cost Monitoring – Prioritizing Monitoring – change control.

UNIT IV:

(8 Hrs)

Managing people and organizing teams : Understanding behavior – Organizational behavior : a background – Selecting the right person for the job – Instruction in the best methods – Motivation – The Oldham-Hackman job characteristics model – Working in groups – Becoming a team – Decision making – Leadership – organizational structure – dispersed and virtual team.

UNIT V:

(7 Hrs)

Software Quality: Software quality in project planning – defining software quality – Practical software quality measures – Product versus process quality management – External standards – Techniques to help enhance software quality – Quality plans. Small Projects: Some problems with student projects – Content of a project plan.

Reference Books

1. Software Project Management, Bob Hughes and Mike Cotterell, Tata McGraw-Hill, 2012, 5th Edition.

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SECOND SEMESTER

CORE - BIG DATA ANALYTICS

Objective of the subject: This paper focuses on big data handling concepts, R Programming, Map Reduce and Hadoop based analytics.

UNIT I:

(9 Hrs)

Data warehousing: Need of Data warehousing – Data mining: Knowledge Discovery in Databases - Importance of Big Data: A Flood of Mythic “Start-Up” Proportions- A convergence of Key Trends- A Wider Variety of Data – The Expanding Universe of Unstructured Data. Industry Examples of Data: Digital Marketing and the Non - line World – Database Marketers, Pioneers of Big Data – Big Data and the New School of Marketing.

UNIT II:

(7 Hrs)

Installing R - Installing RStudio - Understanding the features of R language - Using R packages - Performing data operations - Increasing community support - Performing data modeling in R

UNIT III:

(8 Hrs)

Installing Hadoop - Understanding different Hadoop modes - Understanding Hadoop installation steps - Installing Hadoop on Linux, Ubuntu flavor (single node cluster) - Installing Hadoop on Linux, Ubuntu flavor (multinode cluster) - Installing Cloudera Hadoop on Ubuntu

UNIT IV:

(8 Hrs)

Understanding Hadoop features - Understanding HDFS - Understanding the characteristics of HDFS - Understanding MapReduce - Learning the HDFS and MapReduce architecture. Understanding the HDFS architecture - Understanding HDFS components - Understanding the MapReduce architecture - Understanding MapReduce components - Understanding the HDFS and MapReduce architecture by plot - Understanding Hadoop subprojects

UNIT V:

(8 Hrs)

Writing Hadoop and Map Reduce Programs – Understanding the basics of MapReduce – Introducing Hadoop MapReduce - Listing Hadoop MapReduce entities- Understanding the Hadoop MapReduce Scenario – Understanding the Limitations of MapReduce - Understanding the Hadoop MapReduce fundamentals - Understanding MapReduce objects - Deciding the number of Maps in MapReduce - Deciding the number of Reducers in MapReduce - Understanding MapReduce dataflow - Taking a closer look at Hadoop MapReduce terminologies - Example

Reference Books:

1. Michael Minelli, Michele Chambers, Ambiga Dhiraj “ BIG DATA BIG ANALYTICS “ , Wiley Publications, Indian Reprint 2014
2. Vignesh Prajapathi, Big Data Analytics with R and Hadoop, PACKT Publishing, 2013.

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SECOND SEMESTER

CORE : MOBILE APPLICATION DEVELOPMENT

Objective of the subject: To learn mobile application concepts and executing the applications through Android studio and to publish the android applications.

UNIT I: (10 Hrs)

All about Android: Versions – Java-XML-Linux-The android system architecture. Creating first app-Starting the Android Studio IDE-Launching and running first application. Examining a Basic Android app- A project's files

UNIT II: (10 Hrs)

Improving the application: Improving the layout - Localizing application-Responding to check box events – Displaying Images-Sending in the order. Android Activities: All about Activities – Intents – Using a Context- The Activity lifecycle-lifecycle methods.

UNIT III: (10Hrs)

Android layouts: Linear layout – Relative layout-Table layout-Grid layout-Frame layout-Using a scroll view. Menus: Options Menu-Context menu-Popup menu –Simple notification.

UNIT IV: (10 Hrs)

Designing user interface with views: Using basic views-Using list views to display long lists– Displaying pictures and menus with views- Data Persistence: Saving and loading user preferences-Persisting data to files-Creating and Using Databases.

UNIT V: (10 Hrs)

Content providers: Sharing data in android - Using a content provider. Messaging: SMS Messaging – Sending Email. Location based services: Obtaining the maps API key – Displaying the map – Getting location data. Publishing android applications: Preparing for publishing – Deploying APK files.

TEXT BOOKS

1. Barry Burd, Android Application Development for Dummies, Wiley IndiaPvt Ltd, 2nd edition.
2. Wei – Meng Lee, Beginning Android 4 Application Development, John Wiley.

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SECOND SEMESTER

NON MAJOR: APTITUDE

Objective of the subject: This subject highlights on improving the aptitude ability of the student and to understand technical and logical work outs like ratio and proportion, C Programming, OOPS concepts, Sequence and Series and Probability.

UNIT I:

(8 Hrs)

Ratio and proportion – Indices – Logarithms. Sequence and Series – Arithmetic and geometric progressions. Algebra – Average.

UNIT II:

(8 Hrs)

Problems on Ages – Clocks & Calendars – Mixtures & Alligations – Time & Work – Time & Distance – Profit & Loss.

Coding and Decoding - Blood Relations- Cubes and Dice - Analogy- Ranking- Arithmetical reasoning.

UNIT III:

(8 Hrs)

Statistical description of data – Textual, Tabular & Diagrammatic representation of data – Data Sufficiency – Probability and Expected Value by Mathematical Expectation.

UNIT IV:

(8 Hrs)

C Programming – Fundamental concepts – Data types – Functions - Structure and Union – Pointers – Exception handling – problem solving in C.

UNIT V:

(8 Hrs)

Object Oriented C++ - Classes – Objects – Object oriented Paradigms: Data Abstraction – Encapsulation – Inheritance – Polymorphism – Abstract Classes – Virtual classes.

Reference Books :

1. Quantitative Aptitude, R.S. Aggarwal, S. Chand & Company Ltd, 2007.
2. Quick Arithmetic, Ashish Aggrwal S. Chand & Company Ltd, 2007.
3. Quantitative Aptitude for Competitive Examinations, R.S. Aggarwal, S.Chand & Company Ltd, 2017.
4. C Programming with Problem solving, Jones, Jacqueline, Dreamtech Publishers, 2006.
5. Let us C++, Kanetkar, Yashavant P, BPB Publications, 2005.

Note: C & C++ should be explained with code snippets.

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SECOND SEMESTER

ELECTIVE I: ETHICAL HACKING AND NETWORK DEFENSE

Objective of the subject: This paper gives an idea to learn how to protect networks by using an attacker's knowledge to compromise network security, by understanding what tools or methodologies a hacker uses to break in to a network, security testers can protect a system from these attacks

UNIT I:

(8 Hrs)

Ethical Hacking Overview: Introduction to Ethical Hacking-What You Can Do Legally & Cannot Do Legally-Over View of TCP / IP -IP Addressing-Overview of Numbering Systems-Network and Computer Attacks: Malicious Software-Protecting Against Malware Attacks-Intruder Attacks on Networks and Computers-Addressing Physical Security

UNIT II:

(8 Hrs)

Foot Printing And Social Engineering: Using Web Tools For Foot Printing-Conductive Competitive Intelligence-Using Domain Name Service (DNS) Zone Transfers-Introduction To Social Engineering-Port Scanning: Introduction to Port Scanning-Types of Port Scans-Using Port Scanning Tools-Conducting Ping Sweeps-Understanding Shell Scripting.

UNIT III:

(9 Hrs)

Programming for Security Professionals: Understanding Practical Extraction and Report Language (Perl)-Understanding Object Oriented Programming Concepts-Vulnerabilities in Microsoft Services-Linux OS Vulnerabilities-Remote Attacks on Linux Systems-Counter Measures Against Linux Remote Attacks

UNIT IV:

(8 Hrs)

Hacking Web Servers: Understanding Web Applications: Understanding Web Application Vulnerabilities-Tools of Web Attackers And Security Testers-Hacking Wireless Network: Understanding Wireless Technology-Understanding Wireless Network Standards-Understanding Authentication-Understanding Wardriving-Understanding Wireless Hacking.

UNIT V:

(7 Hrs)

Cryptography: Understanding Cryptography Basics-Understanding Symmetric and Asymmetric Algorithms-Understanding Public Key Infrastructure-Understanding Cryptography Attacks-Understanding Network Security Devices-Understanding Intrusion Detection Systems (IDSs)-Understanding Honeypots

Reference Book

1. Ethical Hacking and Network Defense, Michael T.Simpson, Cengage Learning India Private Limited, 2009.
2. Ethical Hacking and Penetration Step by Step with Kali Linux, Rassoul Ghaznavi-zadeh, Primedia E-launch LLC, 2014.

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SECOND SEMESTER

ELECTIVE I: INFORMATION SECURITY

Objective of the Subject: This paper covers the concepts related to Security in Computing.

UNIT I:

(8 Hrs)

Introduction to computer security: Basic concepts threat models common security goals. Cryptography and cryptographic protocols, including encryption, authentication, message authentication codes, hash functions, one-way functions, public-key cryptography, secure channels, zero knowledge in practice, cryptographic protocols and their integration into distributed systems and other applications.

UNIT II:

(8 Hrs)

Operating system security: Memory protection, access control, authorization, authenticating users, enforcement of security, security evaluation, trusted devices, digital rights management.

UNIT III:

(8 Hrs)

Network Security: Firewalls, intrusion detection systems, viruses and worms, web security. Case studies: DNS, IPsec.

UNIT IV:

(8 Hrs)

Software Security: Secure software engineering, defensive programming, buffer overruns and other implementation flaws.

UNIT V:

(8 Hrs)

Language-based security: Analysis of code for security errors, safe languages, and sand boxing techniques. Case Studies: Privacy, mobile code, digital rights management and copy protection, trusted devices, denial of service and availability, network based attacks, security and the law, electronic voting.

Reference Books

1. Charles P Pfleeger and Shari Lawrence Pfleeger "Security in computing", Fourth Edition, Prentice Hall, 2007.
2. Ross J. Anderson and Ross Anderson, "Security Engineering: A Guide to Building Dependable Distributed Systems", Willey, 2001.
3. Debby Russell and G.T.Gangemi, "Computer Security Basics", 2nd edition, O'Reilly Media, 2006.
4. Thomas R. Peltier and John Blackley, "Information Security Fundamentals" 2nd Edition, Prentice Hall, 1996.
5. William Stallings, "Cryptography and Network Security Principles and Practice", 6th edition, Pearson Education, 2014.

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SECOND SEMESTER

ELECTIVE I: CLOUD COMPUTING

Objective of the Subject: This subject gives overview, features and capabilities of Cloud Computing, Cloud Architecture, Cloud Security concerns, Cloud supporting software environments.

UNIT I:

Cloud Platform Architecture: Cloud Computing and Service models: Public, Private and Hybrid clouds – Cloud Ecosystem and Enabling Technologies – Infrastructure-as-a-Service – Platform-as-a-Service – Software-as-a-Service.

UNIT II:

Data-Center Design and Interconnection Networks: Warehouse-Scale Data-Center Design – Data-Center Interconnection Networks – Modular Data Center in Shipping containers – Interconnection of modular data centers – Data-Center management issues.

Architectural design of compute and storage clouds: A Generic Cloud Architecture Design – Layered Cloud Architectural Development – Virtualization Support and Disaster Recovery – Architectural Design Challenges.

UNIT III:

Public Cloud Platforms: Public Cloud and Service Offerings – Google App Engine (GAE) – Amazon Web Services (AWS) – Microsoft Windows Azure.

Inter-Cloud Resource Management: Extended Cloud Computing Services – Resource Provisioning and Platform Deployment – Virtual Machine Creation and Management – Global Exchange of Cloud Resources.

UNIT IV:

Cloud Security and Trust Management: Cloud Security Defense Strategies – Distributed Intrusion/Anomaly Detection – Data and Software Protection Techniques – Reputation-Guided Protection of Data Centers.

Cloud Programming and Software Environments: Features of Cloud: Cloud Capabilities and Platform Features.

UNIT V:

Programming the Google App Engine – Google File System – BigTable, Google's NOSQL System. Programming on Amazon EC2 – Amazon Simple Storage Service – Amazon Elastic Bck Store and SimpleDB. MicroSoft Azure Programming Support: SQLAzure – Azure Tables.

Text Books:

1. "Distributed and Cloud Computing", Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra, Morgan Kaufmann Publishers (Imprint of Elsevier), 2014.

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M. Sc (Information Technology)**

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SECOND SEMESTER

ELECTIVE I: DIGITAL IMAGE PROCESSING

Objective of the subject: This paper covers the basics of Digital Image Processing and the fundamental steps like Image Acquisition, Enhancement, Restoration, dealing with color models and Image compression.

UNIT I (6 Hrs)

Introduction: Digital Image Processing – Origin – Examples – Fundamental steps in digital image processing – Components.

UNIT II (8 Hrs)

Image Acquisition: Elements of visual perception – Image sensing and acquisition – Image sampling and quantization – Basic relationship between pixels – Linear and Nonlinear operations.

UNIT III (8 Hrs)

Image Enhancement in spatial domain: Gray level transformations – Histogram processing – Enhancement using arithmetic/logic operations
Image Enhancement in frequency domain: Fourier transform – Homomorphic filtering

UNIT IV (9 Hrs)

Image Restoration: Model of Image Restoration process – Noise Models.
Color Image Processing: Color Fundamentals – Color Models – Pseudo color image processing – Color transformations

UNIT V (9 Hrs)

Wavelets: Wavelet transforms in one dimension – The fast wavelet transform – Wavelet transforms in two dimensions.
Image Compression: Fundamentals – Image Compression models – Image compression standards.

Reference Books

1. Digital Image Processing, Rafael C Gonzalez and Richard E Woods, Addition - Wesley Publishing Company, Third Edition, 2008.

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Effective from the academic year: 2019-2020

SECOND SEMESTER

CORE: SOFTWARE PROJECT MANAGEMENT AND QUALITY ASSURANCE LAB

Objective of the subject: This lab paper covers the class diagram, object diagram, use case diagram, activity diagram, component diagram and case transition diagram applied on developing models of a system.

Using any of the following Applications,

Accounting for a shop.
Payroll Management.
Result Management of a Student.
Hospital Administration.
Banking.

1. For any given system, identify the requirements and prepare a Software Requirement Specification. The functional and non-functional requirements can be classified.
2. For any given system, analyze and prepare a detailed schema design. The schema may portrait the limitations, constraints and relationships of the system.
3. For any given system, generating the Step wise project planning with the activities enlisted, duration for each activity.
4. For any given system, generate a networking planning model for depicting the activities as blocks over time using Gantt chart.
5. For any given system, generate a networking planning model for depicting the activities as blocks over time using PERT.
6. For any given system, generate the timeline chart for depicting the progress of the project using timeline chart.
7. Analyze any given system, for its financial requirements and prepare an effective budget/cost-estimate using PERT chart to show the critical path.
8. Prepare a Standard Quality Plan.

Note:

Develop a project / case study using the above applicable concepts.

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Subject Code:

Dr. G R DAMODARAN COLLEGE OF SCIENCE (Autonomous), COIMBATORE
M. Sc (Information Technology)

Effective from the academic year: 2019-2020

SECOND SEMESTER

CORE: MOBILE APPLICATION DEVELOPMENT LAB

Objective: This practical course will train the students to work in Android Smart Phone environment.

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop a native application that uses GPS location information.
7. Implement an application that writes data to the SD card.

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M. Sc (Information Technology)

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THIRD SEMESTER

CORE: INTERNET OF THINGS

Objective of the subject: This subject highlights on physical design, logic design, enabling technologies of Internet of Things, IoT system management and design methodology, Introduction to Python Programming, IoT physical devices and cloud offerings.

UNIT I: (8 Hrs)

Introduction to internet of things: Introduction-Physical design of IoT-Logical design of IoT- IoT Enabling Technologies-IoT Levels and Deployment templates.
IoT Design Methodology- case study on IoT system for weather monitoring- Motivation for using python.

UNIT II: (8 Hrs)

IoT system Management with NETCONF-YANG: Need for IOT System Management-Simple Network Management Protocol-Network Operator Requirements-NETCONF-YANG-IoT system Management with NETCONF – YANG.

UNIT III: (8 Hrs)

IoT Systems-Logical Design using Python: Introduction-Installing Python-Python data types and Data structures- Control Flow-Functions-Modules-Packages-File handling-Date and Time-Classes-Python Package of Interest for IoT.

UNIT IV: (8 Hrs)

IOT Physical devices and end points: Basic building blocks of an IOT device-Exemplary device Raspberry Pi-About the board-Linux on Raspberry Pi-Raspberry Pi interfaces-Programming Raspberry Pi with Python-Other IoT devices.

UNIT V: (8 Hrs)

Case Studies: Home Automation: Smart lighting-Cities : Smart Parking-Environment: Air pollution monitoring-Agriculture: smart irrigation-Productivity application: IoT Printer.

Reference Books:

1. **Internet Of Things-A hands on approach**, Arshdeep Bahga ,Vijay Madiseti-2014.

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THIRD SEMESTER

CORE : WEB PROGRAMMING

Objective of the subject: To understand .NET frame work concepts, web application development in .NET, creating dynamic web pages using various controls.

UNIT I: (8 Hrs)

The .NET Framework: Web Development – The .NET Framework - .NET Languages – The Common Language Runtime - .NET Class Library. Developing ASP.NET Applications: Creating Websites – Designing a web page –The anatomy of a web form – Writing Code – Debugging.

UNIT II: (8 Hrs)

Web Forms: The anatomy of an ASP.NET Application – Server Controls – HTML Control Classes – The Page Class – Application Events – ASP.NET Configuration. Web Controls: Stepping Up to Web Controls – Web Control Classes – List Controls – Table Controls – Web Control Events and AutoPostBack – A Simple Webpage.

UNIT III: (9 Hrs)

Building Better Web Forms: Validation: Understanding Validation - The Validation Controls. Rich Controls: The Calendar – The AdRotator – Pages with Multiple Views. Working with Data: ADO.NET Fundamentals: Configuring Database-SQL Basics-Data Provider Model: Direct Access – Disconnected Access.

UNIT IV: (8 Hrs)

Understanding Data Binding: Data binding - Data source binding: Binding data to page properties-Binding data to control properties-Binding data to an array list-Binding methods-Binding to a data view. Working with data grids: Using a data grid example-Using the columns property-Paging data grid-Sorting data grid.

UNIT V: (7 Hrs)

Using Templates: Templates: Repeater control-Data list control -Data grid control. Creating Templates: Combining templates with the repeater control -Combining templates with data list control - Combining templates with the Data grid control.

Reference Books:

1. Beginning ASP.NET 4 in VB 2010, Matthew MacDonald, Apress, Berkeley, CA, USA, 2011.(Unit I, II, III)
2. ASP.NET Bible, Mridula Parihar, Wiley Publishing Inc.USA-2006.(Unit IV, V)

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THIRD SEMESTER
CORE: CYBER SECURITY INTELLIGENCE

Objective of the subject: This paper broadly discusses on Cyber Threats and Cyber Security Intelligence required in handling these threats effectively. It also covers Cyber Security Ethics and Laws and Cyber Defense Mechanisms.

UNIT I:

(8 Hrs)

Cyber Threats & Cyber Threat Intelligence- Cyber Threats - Background - Sources and Types of Cyber Threats- Potential Risk factors of Cyber Threats- Implications of Cyber Threats - An Overview of Threat Intelligence-Key Characteristics-Need for Threat Intelligence-Impact of Threat Intelligence -Applicability-Threat Detection Rules- Risk Reduction through Threat Intelligence - Understanding and Implementing Threat Intelligence.

UNIT II:

(7 Hrs)

Cyber Security Architecture- Identity and Access Management-Security Information and Event Management-Planning, Design and Implementation of Security Architecture-Global Architectural Approach-Multifaceted Cyber Security-Cyber Security Monitoring and Management.

UNIT III:

(8 Hrs)

Cyber Security Ethics and Cyber Laws-Evolution of Cyber Ethics- Promoting Ethical Behavior- Importance of the Cyber Law-Morality and Law in Cyber Space- Cyber Crime Trends-Cyber Security Standards and Frameworks-BSI Standards on IT and Cyber Security-Coordination of the Framework Implementation.

UNIT IV:

(8 Hrs)

Handling Cyber threats through Security Intelligence- Planning, Design and Implementation Issues of Security Architecture - Global Architectural Approach- Multifaceted Cyber Security- Cyber Security Monitoring and Management- Cyber Threat Life cycle- Necessity and the Importance of Security Intelligence -Challenges of Cyber Threat Intelligence - Controlling Privileged Access and Mitigating Insider Threats- Fighting Cyber Attacks through Security Intelligence- Cyber Attacks: Prevention and Proactive measures

UNIT V:

(9 Hrs)

Cyber Defense Mechanisms- Cyber Self Defense- Cyber Attack Techniques and Defense Mechanisms- Cyber Defense Planning Model- Cyber Supply Chain Security- Cyber Supply



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Subject Code:

Chain Security Principles- Key Cyber Supply Chain Risks- DDOS Attacks and Cyber Defense: **Flooding or Volumetric Attacks-Amplification Attacks-Resource Depletion Attacks-Diversion or Ransom Attacks**-Defending against DDoS Attacks- Securing Industrial Control Systems - Implementation of Application White Listing - Ensuring a Proper Configuration /Patch Management -Reduction in the Attacks on the Surface Area

Reference Books:

1. Combating Cyber Threats through Cyber Security Intelligence, Dr.S.Sujatha, Dr.N.Sudha Bhuvaneshwari, Kalaikathir Publications, 2017.
2. Cyber Security Essentials, James Graham, Richard Howard, and Ryan Olson, Auerbach Publications, CRC Press, 2011.

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M. Sc (Information Technology)

Effective from the academic year: 2019-2020

THIRD SEMESTER

NON MAJOR: SOFT SKILLS

Objective of the subject: This course content guides and helps students to improve skills such as Communication, Body Language, Presentation, and Written Communication Skills.

UNIT I: (8 Hrs)
Soft skills with special focus on ITES: Soft skills - Communication skill as soft skill – Ability to express and explain – Clear and Lucid method of expression - Logical Reasoning.

UNIT II: (8 Hrs)
Body language - Motivation - Lead – Appeal – Benefits - Goal setting.
Telephone etiquette - Holding and answering – Voice modulation – Greetings – Salutation.

UNIT III: (8 Hrs)
Presentation Skills - Planning – Preparation and delivery – Eye contact – Feed back - Interview skills. Dress code – Manners.

UNIT IV : (8 Hrs)
Written Communication Skills: Verbal Reasoning - Writing a resume - Without error – visual presentation - Time and stress Management. Prioritize work – schedule timings – listening to music and yoga for reducing the stress

UNIT V: (8 Hrs)
Professional Ethics: Respect views, sentiments – Leadership Skill - Trust, share and stay together – accept responsibility – take up challenges.
Search Engines, grammar checking using tools, Article rewriting, Plagiarism checker.

Reference Books:

1. Interviewing in Action Relationships, Process & Change, Bianca Cody Murphy, Carolyn Dillon, Brooks/Cole, 2003.
2. Test of Reasoning, Edgar Thorpe, Tata McGraw Hill, 2007, 4th edition.
3. Developing Communication Skills, Krishna Mohan, Meera Banerji, Macmillan India Ltd, 2004.

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THIRD SEMESTER

ELECTIVE II : BUSINESS INTELLIGENCE

Objective of the subject: To gain better understanding about the changing business scenario and to apply information technology concepts for better decision making.

Unit I

(8Hrs)

Introduction to Business Intelligence - Changing Business Environments and Computerized Decision Support - A Framework for Business Intelligence - Intelligence Creation and Use and BI Governance - Transaction Processing Versus Analytic Processing -Successful BI Implementation - Major Tools and Techniques of Business Intelligence

Unit II

(8Hrs)

Data Warehousing - Data Warehousing Process Overview - Data Warehousing Architectures - Data Integration and the Extraction, Transformation, and Load (ETL) Process - Data Integration ,Extraction , Transformation , and Load (ETL) - Data Warehouse Development - Data Warehousing implementation Issues - Real-Time data Warehousing - Data Warehouse Administration , security Issues, and Future Trends – Data Mining Methods

Unit III

(8Hrs)

Business Performance Management - Business Performance Management (BPM) - Strategize: planning and the strategy gap - Plan - Operational Planning ,Financial Planning and Budgeting - Monitor - Diagnostic Control System ,Pitfalls of variance analysis - Act and adjust- Performance Measurement - BPM Methodologies - BPM Technologies and Applications - Performance Dashboards and Scorecards

Unit IV

(8Hrs)

Text and Web Mining - Text Mining Concepts and Definitions -Natural Language Processing - Text Mining Applications - Text Mining Process - Text Mining Tools - Web Mining Overview - Web content Mining and web structure Mining - Web usage Mining

UNIT V

(8Hrs)

Business Intelligence Implementation : Integration and Emerging Trends - Implementing BI: An overview - BI and Integration Implementation - Connecting BI Systems to Data base and other Enterprise System- On-Demand BI -Issues of Legality , Privacy, and Ethics - Emerging Topics In BI: An Overview -The future of business Intelligence - The Web 2.0 Revolution - Online Social Networking: Basics and Examples - Virtual Worlds - Social Networks and BI: Collaborative Decision Making - RFID and New BI Applications Opportunities - Reality Mining

REFERENCE BOOK:

1. Business Intelligence: A Managerial Approach, Efraim Turban, Ramesh Sharda, Dursun Delen, David Kind, Pearson II Edition, 2012

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M. Sc (Information Technology)

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THIRD SEMESTER

ELECTIVE II - NEURAL NETWORK ALGORITHMS AND APPLICATIONS

Objective of the subject: This paper covers the fundamentals of Neural Networks, Fuzzy logic, Genetic algorithms and some of its applications.

UNIT I: (8 Hrs)

Introduction to Artificial intelligence Systems - Fundamentals of Neural Networks - Basic concepts of Neural networks - Human Brain - Model of an Artificial Neuron - Neural Network Architectures - Characteristics of Neural Networks - Learning Methods - Taxonomy of Neural Network Architectures - Early Neural Network Architectures

UNIT II: (8 Hrs)

Back Propagation Networks - Architecture of a back Propagation Network - Single Layer Artificial Neural Network - Back propagation Learning – Applications - Effect of Tuning Parameters of the BPN - Selection of various parameters in BPN - Variations of Standard Propagation Algorithm.

UNIT III: (8 Hrs)

Associative Memory – Autocorrelators – HeteroCorrelators - Exponential BAM –Applications - The Hopfield Memory - Adaptive Resonance Theory – Introduction - ART1 Algorithm- ART2 Algorithm - Applications.

UNIT IV: (8 Hrs)

Fuzzy Logic - Fuzzy Set Theory - Fuzzy versus Crisp - Crisp Sets - Fuzzy Sets - Crisp Relations - Fuzzy Relations - Fuzzy Systems - Crisp Logic - Predicate Logic - Fuzzy Logic - Fuzzy Rule Based System - Defuzzification Methods – Applications

UNIT V: (8 Hrs)

Genetic Algorithms - Fundamentals of Genetic Algorithms - Genetic Algorithm History - Basic Concepts - Creation of Offsprings - Working Principle – Encoding - Fitness Function – Reproduction - Genetic Modeling - Inheritance operators – Crossover - Inversion and Deletion - Mutation operator– Applications

Reference Books:

1. Neural Networks, Fuzzy logic, and Genetic Algorithms, Synthesis and Applications
S. Rajasekaran and G.A. Vijayalaksmi Pai, PHI, Sixteenth Printing, 2012
2. Neural Networks, Milan Hajek, University of KwaZulu-Natal, 2005
3. Neural Networks for Pattern Recognition , Christopher M. Bishop, Oxford press, 1996.

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THIRD SEMESTER

ELECTIVE II - EMBEDDED SYSTEMS AND ROBOTICS

Objective of the Course: The objective of this course is to introduce embedded system design environment. The course covers microcontrollers, third programming & interfacing techniques

UNIT I: (8 Hrs)

Microprocessors, Microcontrollers - Basic differences between Microprocessors and Microcontroller - Intel 8051 Micro controller - Introduction to Intel 8051 Microcontroller, Architecture, Registers, Internal and External Memory. Instruction Set. On Chip Counters / Timers, Serial I/O, Interrupts and their use.

UNIT II: (8 Hrs)

Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits – Embedded Programming – an Overview.

UNIT III: (8 Hrs)

Advanced Microcontroller Chips: Atmel and PIC Microcontrollers - Introduction to Atmel and PIC C6X microcontrollers, architecture, registers, Internal and External Memory, Instruction Set, On Chip Counters / Timers, Serial I/O, Interrupts and their use.

UNIT IV: (8 Hrs)

Fundamentals of Sensors – Types - functional characteristics of sensors – IR Sensors – Temperature Sensors – Light Sensors - Actuators – Sensors and actuators for Biosciences – Tactile Sensors – Strain gauges - UAV flight control system, Applications of Embedded systems in Air surveillance

UNIT V: (8 Hrs)

Introduction to Robots – Types of Robots – Operating Principles and functions – Black Line follower robot – Edge detector robot – Obstacle sensing – Automation of Traffic signals. Applications: Robotics applications in Agriculture, Biotechnology, Information and Communication Technology, Navigation.

Reference Books:

1. M.A. Mazadi & J.G. Mazidi, "The 8051 Micro Controller & Embedded Systems", Pearson Education. Asia -2000.
2. John B. Peatman, "Designing with PIC Micro Controllers", Pearson Education.
3. V.K.Mehta, "Basic Electronics", S Chand & Co,

Web Reference: Arduino Tutorial: <http://www.ladyada.net/learn/arduino/>



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THIRD SEMESTER

ELECTIVE II : NAVIGATION AND CONTROL SYSTEMS

Objective of the Subject: This course is designed to discuss the computing technologies used for Air and Sea Navigation. Computer Vision and other fundamentals required Navigations are discussed. The Advanced and real time applications of the domains are covered.

UNIT I:

(8 Hrs)

Introduction to Flying: History of flight - Pilot and Aeronautical Information – Aircraft Vehicles and Ultra-light Vehicles – Pilot Certifications. Aircraft Construction – Major Components. Principles of Flight: Structure of the Atmosphere.

UNIT II:

(8 Hrs)

Flight Control Systems: Primary Flight Controls – Secondary Flight Controls. Weight and Balance: Balance, Stability and Center of Gravity. Weather Theory: Atmosphere - Wind and Currents. Airport Operations: Airport Categories - Airport Lighting – Wind Direction Indicators – Radio Communications.

UNIT III:

(8 Hrs)

Navigation: Aeronautical Charts. Satellite Navigation Systems: GNSS Signals and Systems – GNSS Navigation and Applications – GPS Positioning – Emerging Trends in Hybrid Vehicle Localization Systems. Radar : The Nature of RADAR – Tracking RADAR: Tracking with RADAR.

UNIT IV:

(8 Hrs)

Sea Navigation: Navigation with Wind – Navigation with current – The Effects of Ocean Currents – Shallow water effects on Ships. Stopping Distance: Stopping Distance of Ships – Few practical examples.

UNIT V:

(8 Hrs)

Use of Thrusters – Tug Assistance – Selecting the number of Tugs – Berthing without Tugs – Berthing with Anchors – Emergency Anchoring – Safe Maneuvering.

TEXT BOOKS

1. Pilots Handbook of Aeronautical Knowledge, Federal Aviation Administration, John S.Duncan, Flight Standards Service, 2016. (Unit I – II)
2. Global Navigation Satellite Systems, Shuanggen Jin, InTech Publications, 2012. (Unit III)
3. Introduction to RADAR Systems, Merrill I.Skolnik, McGraw Hill Book Company, Third Edition, 30th Reprint 2012. (Unit III)
4. A Guide to Ship Navigation Techniques, Karan Chopra, Marine Insight Publications, 2012.(Unit IV-V)

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THIRD SEMESTER

CORE: WEB PROGRAMMING LAB

Objective of the subject: The lab sessions includes creation of web pages using ASP.NET, manipulation with web controls and multiple format display using ADO.NET.

1. Creating Web pages.
2. Web controls with ASP.NET.
3. Validation controls.
4. Ad rotator web control.
5. Calendar web control.
6. GridView control ADO.NET
7. Manipulation of Data with Data Grid (MS-Access)
8. Manipulation of Data with Data Grid(SQL Server)
9. Combining Templates with Repeater Control.
10. Combining Templates with Data list Control.

Note:

Develop a project / case study using the above applicable concepts.

