B. E. SYLLABUS

INFORMATION SCIENCE & ENGINEERING

VII & VIII SEMESTER

With
Scheme of Teaching & Examination
## DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING
### SCHEME OF TEACHING
#### VII Semester (25 credits)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Subject Code</th>
<th>Name of the Subject</th>
<th>Contact Hrs / Week</th>
<th>C.I.E.</th>
<th>S.E.E</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12HU701</td>
<td>Engineering Management (Institution level core)</td>
<td>3+0+0</td>
<td>50</td>
<td>50</td>
<td>3</td>
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<tr>
<td>2</td>
<td>12IS702</td>
<td>Software Testing</td>
<td>3+0+0</td>
<td>50</td>
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<tr>
<td>3</td>
<td>12IS703</td>
<td>Compiler Design</td>
<td>4+0+2</td>
<td>50</td>
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<tr>
<td>4</td>
<td>12IS704</td>
<td>Business Intelligence and its Applications</td>
<td>3+0+2</td>
<td>50</td>
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<tr>
<td>5</td>
<td>12IS71X</td>
<td>Elective - IV</td>
<td>3+0+0</td>
<td>50</td>
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<tr>
<td>6</td>
<td>12IS72X</td>
<td>Elective - V</td>
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<tr>
<td>7</td>
<td>12IS705</td>
<td>Project Phase - I</td>
<td>0+0+3</td>
<td>50</td>
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<tr>
<td>8</td>
<td>12IS706</td>
<td>Seminar + Technical Paper Writing</td>
<td>0+2+0</td>
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<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>28</strong></td>
<td><strong>400</strong></td>
<td><strong>300</strong></td>
<td></td>
<td><strong>25</strong></td>
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</table>

**Elective - IV**
1. 12IS711 – Cloud and Grid Computing
2. 12IS712 – Adhoc Networks
3. 12IS713 – Microcontroller & its Applications

**Elective - V**
1. 12IS721 – Mobile Application Development
2. 12IS722 – Advanced Computer Architecture
3. 12IS723 – Multicast Communication

**Note:** In the Subjects with combined theory and lab, students must score minimum passing marks in each of the component.

**This will be carried out by the student in a team, which will help them further to take up a mini project in the 8th semester. The topic of the mini project may be in line with the main project that the student will take up in the 8th semester. Students need to submit a report at the end of the semester.**
## DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING
### SCHEME OF TEACHING

VIII Semester (24 credits)  
24 Hours/week

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Sub Code</th>
<th>Name of the Subject</th>
<th>Contact Hours / Week</th>
<th>C.I.E.</th>
<th>S.E.E</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Theory/Tut/Practical</td>
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<tr>
<td>1</td>
<td>IS801</td>
<td>Information Security</td>
<td>3+0+0</td>
<td>50</td>
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<tr>
<td>2</td>
<td>IS81X</td>
<td>Elective-VI</td>
<td>3+0+0</td>
<td>50</td>
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<tr>
<td>3</td>
<td>IS82X</td>
<td>Elective-VII</td>
<td>3+0+0</td>
<td>50</td>
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<tr>
<td>4</td>
<td>IS8XY</td>
<td>Open Elective</td>
<td>3+0+0</td>
<td>50</td>
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<tr>
<td>5</td>
<td>IS802</td>
<td>Project Work</td>
<td>0+0+12</td>
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<td><strong>TOTAL</strong></td>
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<td><strong>24</strong></td>
<td><strong>250</strong></td>
<td><strong>250</strong></td>
<td><strong>24</strong></td>
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</table>

**Elective - VI**
1. IS811 - Building Enterprise Applications
2. IS812 - Embedded & Real Time Systems
3. IS813 - Game Theory

**Elective - VII**
1. IS821 - Management Information Systems
2. IS822 - Decision Support Systems
3. IS823 - Supply Chain Management & Enterprise Resource Planning
4. IS824 - Big Data and Analytics
Open Electives: 12IS8X26 - Data Structures and 12IS8X27 - Operating Systems

ENGINEERING MANAGEMENT
(Institution Level Core Paper)

Subject Code: 12HU701/801
CIE Marks: 50
Hours/Week: 03
Exam Hours: 03
Total Hours: 39
Exam Marks: 50

UNIT I
06 Hrs
Management: Meaning – Functions of Management
Objectives – Meaning, Characteristics/Qualities of Sound Objective.
Forecasting – Meaning, Methods of Forecasting (Qualitative methods and Quantitative methods – simple moving average method, weighted moving average method, exponential smoothing method, simple regression model)

UNIT II
7 Hrs
Organizing: Meaning, Legal Forms of Organization – Sole Proprietorship, Partnership, Corporation/Company, Co-operatives – Meaning and Features only)
Delegation of Authority and Span of Control – Meaning, Factors Determining the Span of Control.
Performance Appraisal – aims and formal schemes/methods of performance appraisal, 360 degree performance appraisal.

UNIT III
06 Hrs
Motivation – Meaning, Theories of motivation (the Carrot and the Stick, Maslow’s Need Hierarchy theory, Herzberg’s Motivation-Hygiene theory, McClelland’s Trio of Needs, Self-Motivation, General Motivational Techniques).
Leadership – Meaning, Ingredients/Traits of leadership, styles of leadership.

UNIT IV
12 Hrs
Project Evaluation Techniques: Interest Rate Calculations, Simple Interest, Compound Interest, Effective Rate of Interest, Payback Time, Present Worth, Future Worth, Annual Worth Calculations.

UNIT V
08 Hrs
Project Planning Tools – Gantt (Bar) Charts, Network Analysis – PERT and CPM - Crashing the Project completion duration using network analysis.
Depreciation – Types and Causes, Computing Depreciation (using straight line method only) – Estimation of Sunk Cost.
TEXT BOOKS:

REFERENCE BOOKS:

SOFTWARE TESTING

Subject Code : 12IS702
Hrs/Week : 3
Credits: 03
Total Hours : 39

UNIT-I
Basics of Software Testing – 1: Human Errors and Testing; Software Quality; Requirements, Behavior and Correctness; Correctness versus Reliability; Testing and Debugging; Test Metrics.

UNIT-II
Basics of software testing – 2: Software and Hardware Testing; Testing and Verification; Defect Management; Execution History; Test generation Strategies, Static Testing. Model-Based Testing and Model Checking; Control-Flow Graph; Types of Testing; The Saturation Effect

UNIT-III
Test generation from requirements – 1: Introduction; The Test-Selection Problem; Equivalence Partitioning; Boundary Value Analysis; Category-Partition Method.

UNIT-IV
Structural testing: Overview; Statement testing; Branch testing; Condition testing, Path testing; Procedure call testing; Comparing structural testing criteria; The infeasibility problem.
Dependence and data flow models: Definition-Use pairs; Data flow analysis; Classic analyses; From execution to conservative flow analysis; Data flow analysis with arrays and pointers; Inter-procedural analysis;
UNIT-V

**Data flow testing:** Overview of data flow testing; Definition- Use associations; Data flow testing criteria; Data flow coverage with complex structures; The infeasibility problem.

**Test case selection and adequacy, test execution:** Overview; Test specification and cases; Adequacy criteria; Comparing criteria; Overview of test execution; From test case specification to test cases; Scaffolding; Generic versus specific scaffolding; Test oracles; Self-checks as oracles; Capture and replay.

6 Hrs

**Course outcomes**

Student has the opportunity to study the following

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Course outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>To learn about correctness vs. reliability</td>
</tr>
<tr>
<td>2.</td>
<td>To study about defect management and test generation strategies</td>
</tr>
<tr>
<td>3.</td>
<td>To understand about model based testing methodology</td>
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<tr>
<td>4.</td>
<td>To know about equivalence partitioning, boundary value analysis, category-partitioning method</td>
</tr>
<tr>
<td>5.</td>
<td>Study about comparing structural testing criteria</td>
</tr>
<tr>
<td>6.</td>
<td>To know about definition-use pairs</td>
</tr>
<tr>
<td>7.</td>
<td>To learn about execution to conservative flow analysis</td>
</tr>
<tr>
<td>8.</td>
<td>To study about inter-procedural analysis</td>
</tr>
<tr>
<td>9.</td>
<td>To learn about data flow coverage with complex structures</td>
</tr>
<tr>
<td>10.</td>
<td>To know about adequacy and comparing criteria</td>
</tr>
<tr>
<td>11.</td>
<td>To learn from test case specification to test cases</td>
</tr>
</tbody>
</table>

**TEXT BOOKS:**


**REFERENCE BOOKS :**


**COMPILER DESIGN**

Sub code: 12IS703  
No. of Hours/Week: 04  
Total Hours: 52  
L-T-P : 4-0-2  
CIE: 50  
SEE: 50

**Unit I**

1. **Introduction to Compiling:**


2. **Lexical Analysis:**

The Role of Lexical Analyzer, Input Buffering, Specifications of Tokens, Recognition of Tokens, A Language for Specifying Lexical Analyzer.
3. Design of Lexical Analyzer Generator.-\textbf{LEX programming} \hspace{1cm} 10 Hrs

\textbf{UNIT II}

4. Syntax Analysis: 
The Role of the Parser, Context-free Grammars, Writing a Grammar, Top-down Parsing, Bottom-up Parsing, Operator-Precedence Parsing. \hspace{1cm} 10 Hrs

\textbf{UNIT III}

5. Syntax Analysis: 
LR Parsers –Simple LR (SLR), Canonical LR (CLR), Look Ahead LR (LALR) Parsers, Parser Generators-YACC programming \hspace{1cm} 10 Hrs

\textbf{UNIT IV}

7. Syntax-Directed Translation : 
Syntax-Directed definitions, Constructions of Syntax Trees, Bottom-up Evaluation of \(S\)-attributed definitions, \(L\)-attributed definitions \hspace{1cm} 06 Hrs

8. Intermediate Code Generation: 
Intermediate Languages, Declarations, Assignments, Boolean Expressions, Case statements. \hspace{1cm} 06 Hrs

\textbf{UNIT V}

9. Code Generation: 
Issues in the design of Code Generator, The Target Machine, Run-time Storage Management, Basic blocks and Flow graphs, Next-use information, A Simple Code Generator, Register Allocation and Assignment, The DAG representation of Basic Blocks. \hspace{1cm} 07 Hrs

10. Code Optimization: 
Introduction, The Principle of Optimization, Optimization of Basic Blocks, Loops in flow graphs. \hspace{1cm} 03 Hrs

\textbf{Course outcomes} 
\textbf{Student has the opportunity to study the following}

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Course outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The study about design and implementation of Assemblers</td>
</tr>
<tr>
<td>2.</td>
<td>To learn three processes: loading, reallocation and linking</td>
</tr>
<tr>
<td>3.</td>
<td>To give a high level overview of the structure of a typical compiler</td>
</tr>
<tr>
<td>4.</td>
<td>The study of lexical-analyzer generators</td>
</tr>
<tr>
<td>5.</td>
<td>The study of LEX programming</td>
</tr>
<tr>
<td>6.</td>
<td>To explain role of parser, top down parser, shift reduce parser and operator precedence parser</td>
</tr>
<tr>
<td>7.</td>
<td>To discuss parsing methods such as SLR, CLR, and LALR that are typically used in compilers</td>
</tr>
<tr>
<td>8.</td>
<td>The Study of YACC programming</td>
</tr>
<tr>
<td>9.</td>
<td>To develop the translation of languages guided by context-free grammars</td>
</tr>
</tbody>
</table>
To understand different methods of an intermediate representation
To learn different issues in the design of a code generator
To know about different code optimization techniques

Text Books:

Reference Books:

LABORATORY COMPONENTS

<table>
<thead>
<tr>
<th>Hrs/Week</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Hours</td>
<td>26(13 weeks)</td>
</tr>
</tbody>
</table>

Credit :01

PART A

LEX PROGRAMS:
1. Program to count the number of vowels and consonants in a given string.
2. Program to count the number of characters, words, spaces and lines in a given input file.
3. Program to count no of:
   a) +ve and –ve integers
   b) +ve and –ve fractions
4. Program to count the no of comment line in a given C program. Also eliminate them and copy that program into separate file.
5. Program to count the no of ‘scanf’ and ‘printf’ statements in a C program. Replace them with ‘readf’ and ‘writef’ statements respectively.
6. Program to recognize a valid arithmetic expression and identify the identifiers and operators present. Print them separately.
7. Program to recognize whether a given sentence is simple or compound.
8. Program to recognize and count the number of identifiers in a given input file.

YACC PROGRAMS:
1. Program to test the validity of a simple expression involving operators +, -, *, and /.
2. Program to check the syntax of a simple expression involving operators +, -, *, and /.
3. Program to recognize a valid variable, which starts with a letter, followed by any number of letters or digits
4. Program to evaluate an arithmetic expression involving operating +, -, *, and /.
5. Program to recognize strings ‘aaab’, ‘abbb’, ‘ab’ and ‘a’ using grammar (a^n b^n, n>=0).
6. Program to recognize the grammar (a^n b^n, n>=10).

PART B: (Mini Project)
1. Implement a simple Lexical Analyzer.
2. Implement a simple Syntax Analyzer.
3. Implement a Simple Code generation
4. Implement a Parsing Generator:
   a) Predictive Parser
   b) LR Parser
   c) SLR Parser
d) CLR Parser
e) LALR Parser

Course outcomes
Student has the opportunity to study the following

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Course outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The study about regular expressions and implementation of simple LEX programs</td>
</tr>
<tr>
<td>2.</td>
<td>The study about grammars and implementation of simple YACC programs</td>
</tr>
<tr>
<td>3.</td>
<td>The study about code generation, intermediate code generation, tokenizing</td>
</tr>
<tr>
<td>4.</td>
<td>The study about design and implementation of Assemblers for SIC or SIC/XE or 8086</td>
</tr>
<tr>
<td>5.</td>
<td>The study about design and implementation of mini C compiler.</td>
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BUSINESS INTELLIGENCE AND ITS APPLICATIONS

Sub code: 12IS704 L-T-P : 3-0-2
No. of Hours/Week: 03 CIE: 50
Total Hours: 39 SEE: 50

Unit 1
Business View of Information Technology Applications
Business Enterprise Organization, Its Functions, and Core Business Processes; Baldrige Business Excellence Framework; Key Purpose of Using IT in Business; The Connected World: Characteristics of Internet-ready IT Applications; Enterprise Applications (ERP/CRM, etc.) and Bespoke IT Applications; Information Users and Their Requirements; Case Study Briefs: GoodLife HealthCare Group, GoodFood Restaurants Inc., TenToTen Retail Stores

Types of Digital Data
Introduction; Getting into “GoodLife” Database; Getting to Know Structured Data; Getting to Know Unstructured Data; Getting to Know Semi-Structured Data; Difference Between Semi-Structured and Structured Data

07 Hours

Unit 2
Introduction to OLTP and OLAP
OLTP (On-Line Transaction Processing); OLAP (On-Line Analytical Processing); Different OLAP Architectures; OLTP and OLAP; Data Models for OLTP and OLAP; Role of OLAP Tools in the BI Architecture; Should OLAP be Performed Directly on Operational Databases? A Peek into the OLAP Operations on Multidimensional Data; Leveraging ERP Data Using Analytics
Getting Started with Business Intelligence
Using Analytical Information for Decision Support; Information Sources Before Dawn of BI?
Business Intelligence (BI) Defined; Evolution of BI and Role of DSS, EIS, MIS, and Digital Dashboards; Need for BI at Virtually all Levels; BI for Past, Present, and Future; The BI Value Chain; Introduction to Business Analytics

08 Hours

Unit 3
BI Definitions and Concepts
BI Component Framework; Who is BI for? BI Users; Business Intelligence Applications; BI Roles and Responsibilities; Best Practices in BI/DW; The Complete BI Professional; Popular BI Tools

Basics of Data Integration
Need for Data Warehouse; Definition of Data Warehouse; What is a Data Mart? What is Then an ODS? Ralph Kimball’s Approach vs. W.H. Inmon’s Approach; Goals of a Data Warehouse; What Constitutes a Data Warehouse? Extract, Transform, Load; What is Data Integration? Data Integration Technologies; Data Quality; Data Profiling

08 Hours

Unit 4
Multidimensional Data Modeling
Introduction; Data Modeling Basics; Types of Data Model; Data Modeling Techniques; Fact Table; Dimension Table; Typical Dimensional Models; Dimensional Modeling Life Cycle

Measures, Metrics, KPIs, and Performance Management
Understanding Measures and Performance; Measurement System Terminology; Navigating a Business Enterprise, Role of Metrics, and Metrics Supply Chain; “Fact-based Decision Making” and KPIs; KPI Usage in Companies; Where Do Business Metrics and KPIs Come From? Connecting the Dots: Measures to Business Decisions and Beyond

08 Hours

Unit 5
Basics of Enterprise Reporting
Reporting Perspectives Common to All Levels of Enterprise; Report Standardization and Presentation Practices; Enterprise Reporting Characteristics in OLAP World; Balanced Scorecard; Dashboards; How Do You Create Dashboards? Scorecards vs. Dashboards; The Buzz Behind Analysis…

BI Road Ahead
Understanding BI and Mobility; BI and Cloud Computing; Business Intelligence for ERP Systems; Social CRM and BI

08 Hours

Course Outcomes:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course Outcome</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Understand the business view of information technology applications</td>
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<tr>
<td>2</td>
<td>Understand different types of data</td>
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<tr>
<td>3</td>
<td>Differentiate On-Line Transaction Processing and On-Line Analytical Processing</td>
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<tr>
<td>4</td>
<td>Define Business Intelligence concepts</td>
</tr>
<tr>
<td>5</td>
<td>Analyze the basics of data integration including data quality and data profiling</td>
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<tr>
<td>6</td>
<td>Implement different data integration approaches</td>
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<tr>
<td>7</td>
<td>Apply different methods of multi-dimensional modeling</td>
</tr>
<tr>
<td>8</td>
<td>Evaluate Key Performance Indicators</td>
</tr>
<tr>
<td>9</td>
<td>Create Enterprise Reports</td>
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</tbody>
</table>
Understand the future of Business Intelligence

BUSINESS INTELLIGENCE LABORATORY

Hrs/Week : 2  Credit:01
Total Hours : 26(13 weeks)

- Experiments using Business Intelligence Development Studio (BIDS), MySQL/SQL Server
- Case study
- Mini Projects for creating data warehouse and designing reports - Project: Data warehouse creation and designing reports; Introduction to SSRS Architecture, Enterprise reporting using SSRS; Use of Business Intelligence Development Studio (BIDS)

Text Books:
3. Infosys Reference Book on Business Intelligence

Reference Books:
4. Cindi Howson: Successful Business Intelligence: Secrets to making Killer BI Applications
7. Stephen Few: Information Dashboard Design
8. Kettle – Pentaho – Open source for ETL

Course outcomes
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<tbody>
<tr>
<td>1.</td>
<td>To implement various transformations to transfer data from source to data warehouse.</td>
</tr>
<tr>
<td>2.</td>
<td>To analyze the business scenario to design a data model.</td>
</tr>
<tr>
<td>3.</td>
<td>To implement a data cube for the business scenario.</td>
</tr>
<tr>
<td>4.</td>
<td>To implement report for a given business scenario.</td>
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CLOUD AND GRID COMPUTING

Subject Code: 12IS711  Credits: 03
Hours / Week: 3  Total Hours: 39

UNIT I

10 Hrs
**Introduction to grid computing**: Early Grid Activities, Current Grid Activities, An overview of grid business areas, Grid Applications, Grid Infrastructure, Organizations Developing grid standards & best practice guidelines, Organizations developing grid computing toolkits & framework, Organizations building & using grid based solutions to solve computing, Data & network requirements.

**UNIT II**

10 Hrs


**Architecture-1**: SOA, Web service Architecture, XML, re4lated technologies & their relevance to web services, XML messages & Enveloping, Service Message Description Mechanism.

**Architecture-2**: Web service interoperability & role of WS-I organization, OGSA Architecture & goals, CDC.

**UNIT III**

10 Hrs


**UNIT IV**

10 Hrs

**Cloud Computing Technology**: Hardware and Infrastructure-client, security, network and services, Accessing the Cloud (basics to APIs)-platform, web application, web API’s and web browser, Cloud Storage-overview and cloud storage providers, standards-Application, client, infrastructure and service.

**UNIT V**

10 Hrs

**Cloud Computing at Work**: Software as a Service, Software plus Services, Developing Applications-Google, Microsoft, cast iron cloud, bungee connect, Local Clouds and Thin Clients-virtualization in your organization, Migrating to the Cloud-which applications do you need, sending existing data and use the wave approach, Best Practices- finding right vendor, phased-in vs flash-cut approach and be creative in your approach.

### Course Outcomes

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<thead>
<tr>
<th>Sl.No.</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>To learn about grid activities, areas, applications and infrastructure</td>
</tr>
<tr>
<td>2.</td>
<td>To study different grid organizations</td>
</tr>
<tr>
<td>3.</td>
<td>To identify grid problem and study virtual organization</td>
</tr>
<tr>
<td>4.</td>
<td>To discuss the grid computing initiatives</td>
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<tr>
<td>5.</td>
<td>To understand the web service architecture</td>
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<tr>
<td>6.</td>
<td>To study the role of WS-I organizations</td>
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<tr>
<td>7.</td>
<td>To know the OGSA transport mechanism and infrastructure</td>
</tr>
<tr>
<td>8.</td>
<td>Study open grid service infrastructure</td>
</tr>
<tr>
<td>9.</td>
<td>To discuss common management model</td>
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<tr>
<td>10.</td>
<td>To know the basics of cloud</td>
</tr>
<tr>
<td>11.</td>
<td>To learn benefits and limitations of cloud computing</td>
</tr>
<tr>
<td>12.</td>
<td>To discuss real world applications of cloud computing</td>
</tr>
<tr>
<td>13.</td>
<td>To study the benefits to business by using cloud</td>
</tr>
<tr>
<td>14.</td>
<td>To learn the security aspects</td>
</tr>
<tr>
<td>15.</td>
<td>To understand web application platform and storage providers</td>
</tr>
<tr>
<td>16.</td>
<td>To analyze software and vendor consideration</td>
</tr>
<tr>
<td>17.</td>
<td>To discuss mobile device integration</td>
</tr>
<tr>
<td>18.</td>
<td>To identify various application areas</td>
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<tr>
<td>19.</td>
<td>To identify server solutions</td>
</tr>
<tr>
<td>20.</td>
<td>To understand the need of cloud for individual and migration</td>
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</table>

**TEXT BOOKS:**

**REFERENCE BOOK:**

**ADHOC NETWORKS**
Subject Code : 12IS712
Credits:03
Hrs/week : 3
Total Hours:39

**UNIT-I**
**INTRODUCTION:**
*Fundamentals of Wireless communications Technology*: Characteristics of Wireless channels, Modulation techniques, Multiple access Techniques and Error control
*Introduction to Wireless LANs and Pans*

**UNIT-II**
*MAC – 2*: Contention – based MAC protocols with scheduling mechanism, MAC protocols that use directional antennas, Other MAC protocols

**UNIT-III**
*ROUTING – 1*: Routing protocols for Ad hoc wireless Networks : Introduction, Issues in designing a routing protocol for Ad hoc wireless Networks, Classification of routing protocols, Table drive routing protocol, on-demand routing protocol.
*ROUTING – 2*: Hybrid routing protocol, Routing protocols with effective flooding mechanisms

**UNIT-IV**
TCP over Ad hoc wireless Networks, Other transport layer protocols for Ad hoc wireless Networks.

7 Hrs

UNIT-V


8 Hrs

TEXT BOOK:

REFERENCE BOOKS:

MICROCONTROLLER AND APPLICATIONS

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Credits</th>
<th>Hrs/Week</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>12IS713</td>
<td>03</td>
<td>3</td>
<td>39</td>
</tr>
</tbody>
</table>

UNIT-I


8 Hrs

UNIT-II

8 Hrs

UNIT-III
Jump and Call Instructions: The JUMP and CALL Program range, Jumps, Calls and Subroutines, Interrupts and Returns, More detail on Interrupts, Example Problems.

8 Hrs
TEXT BOOKS:

REFERENCE BOOKS:
1. Pedko; Programming and Customizing the 8051 Microcontroller – TMH
3. Ajay V. Deshmukh; Microcontrollers – Theory and Applications, TMH, 2005
4. Dr. RamaniKalpathi and Ganesh Raja; Microcontroller and its applications, Sanguine Technical publisher, Bangalore- 2005

MOBILE APPLICATION DEVELOPMENT LAB
Subject Code : 12IS721
Credits:03
Hrs/Week : 3
Total Hours: 39

Group of 2 students will develop a mini project on mobile application developments in the lab by demonstrating models.

UNIT-I
Getting started with Mobility
Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, setting up the mobile app development environment along with an emulator, a case study on Mobile app development

UNIT-II
Building blocks of mobile apps
App user interface designing – mobile UI resources (Layout, UI elements, Draw-able, Menu), Activity- states and life cycle, interaction amongst activities.
App functionality beyond user interface - Threads, Async task, Services – states and life cycle, Notifications, Broadcast receivers, Telephony and SMS APIs
Native data handling – on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via Internet/Intranet)  

UNIT-III

Sprucing up mobile apps

Graphics and animation – custom views, canvas, animation APIs, multimedia – audio/video playback and record, location awareness, and native hardware access (sensors such as accelerometer and gyroscope)

UNIT-IV

Testing mobile apps

Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps, JUnit for Android, Robotium, MonkeyTalk

UNIT-V

Taking apps to Market

Versioning, signing and packaging mobile apps, distributing apps on mobile market place

TEXT BOOK:

   http://www.amazon.com/exec/obidos/ASIN/1934356174/advancedjavapr00
Data Parallel Architecture: Introduction (Ref.1: 10)-Static and dynamic interconnection networks – omega l and baseline networks (Ref. 2: 2.4) SIMD systems – case study – MPP and CMS (Ref.1: 11.3, 11.4) Vector Processing – Case study – Cray family (Ref.1: 14.3 to 14.7) Introduction to Systolic architecture – example matrix multiplication (Ref. 1: 13.3)

UNIT-V
Multiprocessors and Multicomputers cache coherence and Synchronization mechanism (Ref. 2: 7.2) Three generation of multicomputers (Ref. 2: 7.3). Data Flow Architecture: Data Flow and HybridArchitecture – Data Flow Architecture (Ref. 2: 9.5)

Course outcomes
Student has the opportunity to study the following

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Course outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>To know about SIMD and VLSI models</td>
</tr>
<tr>
<td>2.</td>
<td>To learn about linear and non-linear pipelines</td>
</tr>
<tr>
<td>3.</td>
<td>To understand issue latencies for non-linear pipes</td>
</tr>
<tr>
<td>4.</td>
<td>Study about data control, resource dependencies, and register renaming</td>
</tr>
<tr>
<td>5.</td>
<td>To know about PowerPC 620, CISC processors with RISC core, PentiumPro</td>
</tr>
<tr>
<td>6.</td>
<td>To understand issues in branch control</td>
</tr>
<tr>
<td>7.</td>
<td>To know about various topologies</td>
</tr>
<tr>
<td>8.</td>
<td>To study about MPP and CMS</td>
</tr>
<tr>
<td>9.</td>
<td>To learn about Cray family</td>
</tr>
<tr>
<td>10.</td>
<td>To implement matrix multiplication</td>
</tr>
<tr>
<td>11.</td>
<td>To know about cache coherence and synchronization and three generations of multicomputers</td>
</tr>
<tr>
<td>12.</td>
<td>To design data flow and hybrid architecture</td>
</tr>
</tbody>
</table>

TEXT BOOKS

MULTICAST COMMUNICATIONS

Subject Code :12IS723
Hrs/Week : 3
Credits: 03
Total Hours: 39

UNIT – I
The basics of group communications: Types of communications; Multicast vs Unicast; Scalability; Applications of group communication; characteristics of groups; Special aspects of group communication

UNIT – II
Multicast Routing: Basic Routing algorithms; Group dynamics; scoping and multicast address allocation; Concepts of multicast routing; Multicast routing on the internet.
UNIT – III

Multicast in ATM networks: The switching technology ATM; ATM multicast.
Transport protocols: UDP; XTP.

UNIT – IV

Transport protocols: MTP; RMP; LBRM; SRM; RMTP

UNIT – IV

Mbone- The Multicast Backbone of the Internet: Mbone architecture; Mbone applications; Mbone Tools; Outlook; Multicast Routing and Mobile Systems

TEXT BOOK:

INFORMATION SECURITY

Course Code: 12IS801
Course Title: Information Security
Teaching Hours: 39

UNIT – I


Security technology-1: Introduction; Physical design; Firewalls; Protecting Remote Connections.

UNIT – II

Security technology – 2: Intrusion Detection Systems (IDS); Honey Pots, Honey Nets, and Padded cell systems; Scanning and Analysis Tools.


UNIT – III

Public Key Cryptography: Principles of Public Key Cryptosystems, the RSA algorithm, Key Management, Diffie Hellman Key Exchange.


UNIT – IV

Authentication applications: Kerberos, X.509 Directory Authentication Service.

Electronic mail security: Pretty Good Privacy (PGP); S/MIME.
UNIT – V

IP security: IP Security Overview; IP Security Architecture; Authentication Header (AH); Encapsulating Security Payload (ESP); Combining Security Associations; Key Management.

Web security: Web security requirements; Secure Socket layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Course outcomes

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Course outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Study the characteristics of Information Security</td>
</tr>
<tr>
<td>2.</td>
<td>Discuss physical design principles, discuss the threat models and understand simple systems of protection</td>
</tr>
<tr>
<td>3.</td>
<td>Understand the concept of network security mechanisms and conventional encryption techniques</td>
</tr>
<tr>
<td>4.</td>
<td>Discuss cipher modes, methods used and distinguish their characteristics and usage</td>
</tr>
<tr>
<td>5.</td>
<td>Understand the standard security methods used with email protocols</td>
</tr>
<tr>
<td>6.</td>
<td>Understand and distinguish IP security issues and architecture at various levels.</td>
</tr>
<tr>
<td>7.</td>
<td>Study various protocols used in today’s web security requirements. Identify different kinds of threats at the information exchange process. Discuss few preventive techniques.</td>
</tr>
</tbody>
</table>

TEXT BOOKS

REFERENCES

BUILDING ENTERPRISE APPLICATIONS

Subject Code: 12IS811 Credits: 03
Hrs/Week: Total Hours: 39

UNIT-I

Introduction to enterprise applications and their types, software engineering methodologies, life cycle of raising an enterprise application, introduction to skills required to build an enterprise application, key determinants of successful enterprise applications, and measuring the success of enterprise applications

8 Hrs

UNIT-II
Inception of enterprise applications, enterprise analysis, business modeling, requirements elicitation, use case modeling, prototyping, non functional requirements, requirements validation, planning and estimation

UNIT-III
Concept of architecture, views and viewpoints, enterprise architecture, logical architecture, technical architecture - design, different technical layers, best practices, data architecture and design – relational, XML, and other structured data representations, Infrastructure architecture and design elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of application architecture and design.

UNIT-IV
Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing, dynamic code analysis – code profiling and code coverage.

UNIT-V
Types and methods of testing an enterprise application, testing levels and approaches, testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application

Courseware & reference books:
The courseware including PowerPoint is available for the Elective. In addition, following reference book can also be used:

TEXT BOOKS:
1. Raising Enterprise Applications – Published by John Wiley, authored by AnubhavPradhan, Satheesha B. Nanjappa, Senthil K. Nallasamy, VeerakumarEsakimuthu
2. Building Java Enterprise Applications – Published by O'Reilly Media, authored by Brett McLaughlin

REFERENCE BOOKS:
1. Software Requirements: Styles & Techniques – published by Addison-Wesley Professional
5. Designing Enterprise Applications with the J2EE Platform (PDF available at http://java.sun.com/blueprints/guidelines/designing_enterprise_applications_2e/)
1. Software Testing, 2/e – published by Pearson
2. SOFTWARE TESTING Principles and Practices – published by Oxford University Press
EMBEDDED AND REAL TIME SYSTEM

Subject Code: 12IS812
Credits: 03
Hrs/Week: 03
Total Hours: 39

UNIT-I
Embedded system definition, characteristics, design metrics; Processor, IC and design technologies; ASIPs, Embedded system examples
8 Hrs

UNIT-II
Combinational and sequential building blocks, Timers, ADCs, Keypad controllers, LCD controllers, stepper motor and DC motor control
8 Hrs

UNIT-III
Custom Single Purpose processor design examples: GCD Generator, Network Bridge, 4 bit shift multiplier
8 Hrs

UNIT-IV
Introduction to RTOS, Defining RTOS, The Scheduler, Objects, services, key characteristics of RTOS, Tasks: - Defining Tasks, Task States & Scheduling, typical Task Operations, Typical Task Structure, synchronization, Communication & Concurrency.
8 Hrs

UNIT-V
Semaphores: Operations, Usage, Message Queues: Typical message QUE Operations, Usage, Other RTOS services.
7 Hrs

TEXT BOOKS:
1. Frank Vahid, Tony Givargis; Embedded System Design- a unified hardware/software introduction, John Wiley 2002

REFERENCE BOOKS:
3. Philip Laplante-“Real time systems design and analysis – an Engineer’s Handbook”, PHI publications
GAME THEORY

Subject Code : 12IS813  
Credits: 03
Hrs/Week : 3  
Total Hours: 39

UNIT-I
Introduction; Strategic Games
What is game theory? Four elements, Classification of games, The theory of rational choice; Interacting decision makers, Strategic games; Example: The prisoner’s dilemma; Nash equilibrium; Examples of Nash equilibrium; Best- response functions; Dominated actions; Equilibrium in a single population: symmetric games and symmetric equilibria, Interpretation of Nash Equilibrium

8 Hrs

UNIT-II
Mixed Strategy Equilibrium
Introduction; Strategic games in which players may randomize; Mixed strategy Nash equilibrium; Finding mixed strategy by graphical method; Finding mixed strategy by analysing subset of all actions; Dominated actions; Pure equilibria when randomization is allowed, examples; The formation of players beliefs; Eliminating dominated actions, Median Voter theorem

8 Hrs

UNIT-III
Extensive Games
Extensive games with perfect information; Strategies and outcomes; Nash equilibrium; Subgame perfect equilibrium; Finding subgame perfect equilibria of finite horizon games.

8 Hrs

UNIT-IV
Extensions: Allowing for simultaneous moves, examples, Discussion: subgame perfect equilibrium and backward induction.
Strictly Competitive Games and maximization: Maximization and Nash equilibrium; Strictly Competitive Games; Maximization and Nash equilibrium in strictly competitive games
Rationalizability: Iterated elimination of strictly dominated actions; Iterated elimination of weakly dominated actions; Dominance solvability.

8 Hrs

UNIT-V
Applications of Game Theory
Assumptions and issues in Game theory, Mechanism design problem and examples, game theory and cryptography, game theory and wireless adhoc networks, game theory and network security, Pareto optimal, Selfish routing, Correlated equilibrium

7 Hrs

Course outcomes
Student has the opportunity to study the following

<table>
<thead>
<tr>
<th>Sl.No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Understand about game theory and its application</td>
</tr>
<tr>
<td>2.</td>
<td>Define strategic games and Understand the significance of Nash Equilibrium concept</td>
</tr>
<tr>
<td>3.</td>
<td>To understand the importance of Dominated Actions</td>
</tr>
<tr>
<td>4.</td>
<td>Solve mixed strategy Nash Equilibrium problems using different techniques</td>
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<tr>
<td>5.</td>
<td>Formulate extensive games and find Nash Equilibrium</td>
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<tr>
<td>6.</td>
<td>Know to specify set of players and their preferences, the order of players moves the each players action</td>
</tr>
<tr>
<td>7.</td>
<td>A notion of Equilibrium helps to model a robust steady state</td>
</tr>
<tr>
<td>8.</td>
<td>Find set of Subgame perfect equilibria of Finite horizon games</td>
</tr>
<tr>
<td>9.</td>
<td>Understand the situations in which, after some events, the members of a group of decision-makers choose their actions “simultaneously”</td>
</tr>
<tr>
<td>10.</td>
<td>Assess the drawbacks when players make mistakes and know the importance of this method with subgame perfect equilibrium</td>
</tr>
<tr>
<td>11.</td>
<td>Understand how to choose the action for which this worst outcome is best</td>
</tr>
<tr>
<td>12.</td>
<td>Discuss the relationship between Maxminimization and Nash Equilibrium. Able to solve examples by plotting graph</td>
</tr>
<tr>
<td>13.</td>
<td>Define strictly competitive games with examples. Helps to maximize her own payoff in such game</td>
</tr>
<tr>
<td>14.</td>
<td>Study to know how the strictly competitive game that possesses a mixed strategy equilibrium, the payoffs are same</td>
</tr>
<tr>
<td>15.</td>
<td>Helps to explain what outcomes in a strategic game are consistent with each other’s rational behavior</td>
</tr>
<tr>
<td>16.</td>
<td>To understand importance of iterated elimination of such actions</td>
</tr>
<tr>
<td>17.</td>
<td>To understand the importance of iterated elimination of weakly dominated actions</td>
</tr>
<tr>
<td>18.</td>
<td>Study the benefits and challenges involved in applying game theory to wireless adhoc networks</td>
</tr>
<tr>
<td>19.</td>
<td>Study the relationship between cryptography and game theory</td>
</tr>
<tr>
<td>20.</td>
<td>Study about the problems applicable in networks</td>
</tr>
<tr>
<td>21.</td>
<td>Understand the need and importance of selfish routing with motivating examples</td>
</tr>
<tr>
<td>22.</td>
<td>A measure of efficiency for outcome of a game</td>
</tr>
<tr>
<td>23.</td>
<td>To know the advantages of correlated equilibria over Nash equilibrium</td>
</tr>
</tbody>
</table>

**TEXT BOOKS:**
2. An Introduction to Game Theory: Strategy, Joel Watson, W W Norton and Company

**REFERENCE BOOKS**

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**MANAGEMENT INFORMATION SYSTEMS**

<table>
<thead>
<tr>
<th>Subject Code : 12IS821</th>
<th>Credits : 03</th>
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<tbody>
<tr>
<td>Hrs/Week : 3</td>
<td>Total Hours: 39</td>
</tr>
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</table>

**UNIT-I**

*Foundations of information systems in business* Introduction to Information Systems in Business: Why study Information Systems?: What you need to know. A global Information society,
Success and Failure with IT, Why Businesses need Information Technology.


UNIT-II
Solving Business Problems with Information Systems: A Systems Approach to problem Solving:

Business applications - i
The Internet and Electronic Commerce: The Internet and Business:

UNIT-III

UNIT-IV

Business applications - ii

UNIT-V
Creating a virtual Company, Building the knowledge-creating company, Using the Internet Strategically.

8 Hrs

TEXTBOOK:

REFERENCE BOOKS:

DECISION SUPPORT SYSTEMS
Subject Code: 12IS822
Credits: 03
Hrs/Week: 3
Total Hours: 39

UNIT-I

8 Hrs

UNIT-II
Decision Making and Computerized Support (Contd...)

8 Hrs

UNIT-III
Decision Support Systems-I.

7 Hrs

UNIT-IV
Decision Support Systems – II
Introduction to DSS development, The Traditional System Development Life cycle, Alternate Development Methodologies, Prototyping: The DSS Development Methodology, DSS Technology

UNIT-V

Knowledge Based DSS:

TEXT BOOK:

REFERENCE BOOKS:

SUPPLY CHAIN MANAGEMENT AND ENTERPRISE RESOURCE PLANNING

Subject Code: 12IS823  
Credits: 03  
Hrs/Week: 03  
Total Hours: 39

UNIT-I

Understanding the Supply Chain: What is a supply chain?, The objective of a supply chain, Importance of supply chain decisions, Decision phases in a supply chain, process views of a supply chain, Examples of supply chains

Logistics and Competitive Strategy: competitive advantage, gaining competitive advantage through logistics, the mission of logistic management, the supply chain and competitive performance, the changing the logistic environment.
UNIT-II
Transportation in a supply chain: roles of transportation in a supply chain, modes of transportation and their performance characteristics, transportation infrastructure and policies, design option for a transportation network, trade-offs in transportation design, tailored transportation, role of IT in transportation, risk management in transportation, Indian transportation system-in need of innovations to propel economic growth, making transportation decisions in practice.

Coordination in a supply chain: Lack of supply chain coordination and bullwhip effect, the effect on performance of lack of coordination, obstacles to coordination in supply chain, managerial levels to achieve coordination, building strategic partnerships and trusts within, continuous replenishment and vendor managed inventories, collaborative planning, forecasting and replenishment (CPFR), collaborative planning, forecasting and replenishment-Indian experiences, the role of IT in coordination.

8 Hrs

UNIT-III
Total distribution cost analysis: total cost concept, principles of logistic costing, logistics and bottom line, logistics and shareholder value, customer profitability analysis, direct product profitability, cost drivers and activity based costing.

IT enabled supply chain: introduction, changing role of IT, IT solution options, Electronic Data Interchange (EDI).

8 Hrs

UNIT-IV
ERP overview: Benefits, business engineering, ERP and management concerns, Business Modeling for ERP, ERP implementation, customization, post implementation options.

8 Hrs

UNIT-V
ERP and competitive advantage: marketing of ERP, ERP domain: SAP, BAAN, SAP r/3, MGF/PRO, IFS/Avalon.

7 Hrs

TEXT BOOKS:
1. Martin Christopher, "Logistics and supply chain management"
2. Sunil Chopra, Peter Meindl, supply chain management strategy, planning, and operation, Pearson Education 2003

BIG DATA AND ANALYTICS

Subject Code: 12IS824 Credits: 03
Hrs/Week: 03 Total Hours: 39

Unit 1

Chapter 1: Types of Digital Data

What’s in Store?

- Classification of Digital Data
- Structured Data
  - Sources of Structured Data
Ease of Working with Structured Data

- Semi-Structured Data
  - Sources of Semi-Structured Data

- Unstructured Data
  - Issues with “Unstructured” Data
  - How to Deal with Unstructured Data

Chapter 2: Introduction to Big Data

What’s in Store?
- Characteristics of Data
- Evolution of Big Data
- Definition of Big Data
  - Volume
  - Velocity
  - Variety
- Challenges of Big Data
- What is Big Data?
- Other Characteristics of Data Which are Not Definitional Traits of Big Data
- Why Big Data?
- Are We Just an Information Consumer or Do We Also Produce Information?
- Traditional Business Intelligence (BI) versus Big Data
- A Typical Data Warehouse Environment
- A Typical Hadoop Environment
- What is Changing in the Realms of Big Data?
- What is New Today?
- Coexistence of Big Data and Data Warehouse

07 Hours

Unit 2

Chapter 3: Introduction to Big Data Analytics

What’s in Store?
- Where do we Begin?
- What is Big Data Analytics?
- What Big Data Analytics isn’t?
- Why this Sudden Hype Around Big Data Analytics?
- Classification of Analytics
- Greatest Challenges that Prevent Businesses from Capitalizing on Big Data
- Top Challenges Facing Big Data
- Why is Big Data Analytics Important?
- What Kind of Technologies are we Looking Toward to Help Meet the Challenges Posed by Big Data?
- Data Science
- Data Scientist … Your New Best Friend!!!
- Terminologies Used in Big Data Environment
  - In Memory Analytics
  - In Database Processing
  - Symmetric Multiprocessor System
  - Massively Parallel Processing
  - Difference between Parallel versus Distributed Systems
  - Shared Nothing Architecture
  - Consistency, Availability, Partition Tolerance (CAP): Theorem Explained
  - Basically Available Soft State Eventual Consistency (BASE)
- Few Top Analytics Tools
Chapter 4: The big data technology landscape
What’s in Store?
- NoSQL
  - Where is it used?
  - What is it?
  - Types of NoSQL Databases
  - Why NoSQL?
  - Advantages of NoSQL
  - What we miss with NoSQL?
- NoSQL Vendors
- SQL versus NoSQL
- NewSQL
- Comparison of SQL, NoSQL and NewSQL
- Hadoop
  - Features of Hadoop
  - Key Advantages of Hadoop
  - Versions of Hadoop
    - Hadoop 1.0
    - Hadoop 2.0
  - Overview of Hadoop Ecosystems
  - Hadoop Distributions
  - Hadoop versus SQL
  - Integrated Hadoop Systems Offered by Leading Market Vendors
  - Cloud based Hadoop solutions

Unit 3
Chapter 5: Introduction to Hadoop
What’s in Store?
1. Introducing Hadoop
   - Data: The Treasure Trove
2. Why Hadoop?
3. Why not RDBMS?
4. RDBMS versus Hadoop
5. Distributed Computing Challenges
   - Hardware Failure
   - How to Process this Gigantic Store of Data?
6. A Brief History of Hadoop
   - The Origin of the Name “Hadoop”
7. Hadoop Overview
   - Key Aspects of Hadoop
   - Hadoop Components
   - Hadoop Conceptual Layer
   - High Level Architecture of Hadoop
8. Business Value of Hadoop
   - ClickStream Data
9. Hadoop Distributors
10. Hadoop Distributed File System
    - HDFS Daemons
    - Anatomy of File Read
    - Anatomy of File Write
    - Replica Placement Strategy
    - Working with HDFS commands
11. Processing Data with Hadoop
   - MapReduce Daemons
   - How does MapReduce work?
   - MapReduce Example

12. Managing Resources and Application with Hadoop YARN
   - Limitations of Hadoop 1.0 Architecture
   - HDFS Limitation
   - Hadoop 2: HDFS
   - Hadoop 2 YARN: Taking Hadoop Beyond Batch

13. Hadoop Ecosystem
   - Pig
   - Hive
   - Sqoop
   - HBase

Chapter 6: Introduction to MongoDB
- What’s in Store?
- What is MongoDB?
- Why MongoDB?
  - Using JSON
  - Creating or Generating a Unique Key
  - Support for Dynamic Queries
  - Storing Binary Data
  - Replication
  - Sharding
  - Updating Information In-Place
- Terms used in RDBMS and MongoDB
- Data Types in MongoDB
- CRUD (Create, Read, Update and Delete)
  - Insert(), Update(), Save(), Remove(), find()
  - Arrays
  - MapReduce Functions
  - Aggregation
  - Java Scripting
  - Cursor
  - Index
  - MongoImport
  - MongoExport
  - Automatic generation of unique numbers for the “_id” field

Chapter 7: Introduction to Cassandra
- What’s in Store?
- Apache Cassandra – An Introduction
- Features of Cassandra
  - Peer-to-Peer Network
  - Gossip and Failure Detection
  - Partitioner
  - Replication Factor
  - Anti-Entropy and Read Repair
  - Writes in Cassandra
• Hinted Handoffs
• Tunable Consistency: Read Consistency and Write Consistency
• CQL Data Types
• CQLSH
• Keyspaces
• CRUD
   Insert
   Update
   Delete
   Select
• Collections
  • Set
  • List
  • Map
• Using a Counter
• Time To Live (TTL)
• Alter
   Alter Table to Change the Data Type of a Column
   Alter Table to Delete a Column
   Drop a Table
   Drop a Database
• Import and Export
  • Export to CSV
  • Import from CSV
  • Import from STDIN
  • Export to STDOUT
• System Tables
• Practice Examples

**Chapter 8: Introduction to Hive**
What’s in Store
• What is Hive?
   History of Hive and Recent Releases of Hive
   Hive Features
   Hive Integration and Work Flow
   Hive Data Units
• Hive Architecture
• Hive Data Types
   Primitive Data Types
   Collection Data Types
• Hive File Format
   Text File
   Sequential File
   RCFile (Record Columnar File)
• Hive Query Language
   DDL (Data Definition Language) Statements
   DML (Data Manipulation Language) Statements
   Starting Hive Shell
   Database
   Tables
   Partitions
   Buckets
   Views
Chapter 9: Introduction to Pig

- What’s in Store?
- What is Pig?
  - Key Features of Pig
- The Anatomy of Pig
- Pig on Hadoop
- Pig Philosophy
- Use Case for Pig: ETL Processing
- Pig Latin Overview
  - Pig Latin Statements
  - Pig Latin: Keywords
  - Pig Latin: Identifiers
  - Pig Latin: Comments
  - Pig Latin: Case Sensitivity
- Data Types in Pig
  - Simple Data Types
  - Complex Data Types
- Running Pig
  - Interactive Mode
  - Batch Mode
- Execution Modes of Pig
  - Local Mode
  - Map Reduce Mode
- HDFS Commands
- Relational Operators
- Eval Function
- Complex Data Type
  - Tuple
  - Map
- Piggy Bank
- UDF (User Defined Function)
- Parameter Substitution
- Diagnostic Operator
- Word Count Example
- When to use Pig?
- When NOT to use Pig?
- Pig at Yahoo
- Pig versus Hive
- Hive Vs Pig

Chapter 10: Jasper Report using Jasper Soft

- What’s in Store?
- Introduction to JasperReports, Jaspersoft Studio
- JasperReports
- Jaspersoft Studio
- Connecting to MongoDB NoSQL database
  - Syntax of Few MongoDB Query Language
  - Elements and Attributes
  - Creating Variables
  - Creating Report Parameters
- Connecting to Cassandra NoSQL Databases

**Course Outcomes:**

<table>
<thead>
<tr>
<th>Sl. No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Appreciate the big data landscape and familiarize with open source tools available for big data analytics</td>
</tr>
<tr>
<td>2</td>
<td>Understand Hadoop platform and MapReduce</td>
</tr>
<tr>
<td>3</td>
<td>Understand the need of NoSQL, NewSQL, MongoDB, Cassandra, Hive and Pig</td>
</tr>
<tr>
<td>4</td>
<td>Generate reports using open source reporting tools</td>
</tr>
</tbody>
</table>

**Text Books:**

**Reference Books:**
3. Chuck Lam: *Hadoop in action*.