B. E. SYLLABUS

COMPUTER SCIENCE & ENGINEERING

VII & VIII SEMESTER

With
Scheme of Teaching
& Examination
# DEPARTMENT:
## COMPUTER SCIENCE & ENGINEERING

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Degree</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. Niranjan.N. Chiplunkar</td>
<td>Ph.D.</td>
<td>Professor/Principal</td>
</tr>
<tr>
<td>2</td>
<td>Dr. K C Shet</td>
<td>Ph.D.</td>
<td>Professor</td>
</tr>
<tr>
<td>3</td>
<td>Dr. Sarojadevi H</td>
<td>Ph.D.</td>
<td>Prof. and HOD</td>
</tr>
<tr>
<td>4</td>
<td>Mrs. Sharada U Shenoy</td>
<td>M.Tech(PhD)</td>
<td>Asst. Prof Gd III</td>
</tr>
<tr>
<td>5</td>
<td>Mr. Venugopala P.S.</td>
<td>M.Tech(PhD)</td>
<td>Asst. Prof Gd III</td>
</tr>
<tr>
<td>6</td>
<td>Mr. Roshan Fernandes</td>
<td>M.Tech(PhD)</td>
<td>Asst. Prof Gd III</td>
</tr>
<tr>
<td>7</td>
<td>Mrs. Neelima B</td>
<td>M.Tech(PhD)</td>
<td>Asst. Prof Gd III</td>
</tr>
<tr>
<td>8</td>
<td>Ms. Shalini P.R</td>
<td>M.Tech</td>
<td>Asst. Prof Gd III</td>
</tr>
<tr>
<td>9</td>
<td>Mr. Radhakrishna Dodmane</td>
<td>M.Tech</td>
<td>Asst. Prof Gd III</td>
</tr>
<tr>
<td>10</td>
<td>Mr. Raju K</td>
<td>M.Tech(PhD)</td>
<td>Asst. Prof Gd III</td>
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<tr>
<td>11</td>
<td>Mr. Pradeep Kanchan</td>
<td>M.Tech</td>
<td>Asst. Prof Gd III</td>
</tr>
<tr>
<td>12</td>
<td>Mr. Sudeepa K B</td>
<td>M.Tech(PhD)</td>
<td>Asst. Prof Gd III</td>
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<tr>
<td>13</td>
<td>Mr. Ravi B</td>
<td>M.Tech(PhD)</td>
<td>Asst. Prof Gd II</td>
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<tr>
<td>14</td>
<td>Mr. Vijaya Murari T</td>
<td>M.Tech</td>
<td>Asst. Prof Gd II</td>
</tr>
<tr>
<td>15</td>
<td>Mr. Chandra Naik</td>
<td>M.Tech</td>
<td>Asst. Prof Gd II</td>
</tr>
<tr>
<td>16</td>
<td>Mr. Manjunath Kamath</td>
<td>M.Tech</td>
<td>Asst. Prof Gd II</td>
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<tr>
<td>17</td>
<td>Mrs. Pallavi K N</td>
<td>M.Tech</td>
<td>Asst. Prof Gd II</td>
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<tr>
<td>18</td>
<td>Mrs. Reija S.R</td>
<td>M.Tech(PhD)</td>
<td>Asst. Prof Gd II</td>
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<tr>
<td>19</td>
<td>Mr. Hemanth Kumar G</td>
<td>M.Tech</td>
<td>Asst. Prof Gd II</td>
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<tr>
<td>20</td>
<td>Mr. Pradeep Nazareth</td>
<td>M.Tech</td>
<td>Asst. Prof Gd II</td>
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<tr>
<td>21</td>
<td>Mr. Ranjan Kumar H S</td>
<td>M.Tech</td>
<td>Asst. Prof Gd II</td>
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<tr>
<td>22</td>
<td>Mrs. Anisha P Rodrigues</td>
<td>M.Tech</td>
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<tr>
<td>23</td>
<td>Mr. Ramesha Shettigar</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
</tr>
<tr>
<td>24</td>
<td>Ms. Grantha K N</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
</tr>
<tr>
<td>25</td>
<td>Ms. Savitha Shetty</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
</tr>
<tr>
<td>26</td>
<td>Ms. Sharmila Shanthi Sequeira</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
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<tr>
<td>27</td>
<td>Mr. Sannidhan M.S</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
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<tr>
<td>28</td>
<td>Mr. Naveen Chandaverkar</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
</tr>
<tr>
<td>29</td>
<td>Mr. Pawan Hegde</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
</tr>
<tr>
<td>30</td>
<td>Mrs. Keerthana B. Chigateri</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
</tr>
<tr>
<td>31</td>
<td>Mrs. Asmita Poojari</td>
<td>M.Tech</td>
<td>Asst. Prof Gd-I</td>
</tr>
<tr>
<td>32</td>
<td>Mr. Raghunandan K R</td>
<td>M.Tech</td>
<td>Asst Prof Gd-I</td>
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<tr>
<td>33</td>
<td>Mrs. Minu P. Abraham</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
</tr>
<tr>
<td>34</td>
<td>Mrs. Shabari Shethdi. B</td>
<td>M.Tech</td>
<td>Asst Prof Gd-I</td>
</tr>
<tr>
<td>35</td>
<td>Mr. H R Manjunath Prasad</td>
<td>M.Tech(PhD)</td>
<td>Asst. Prof Gd I</td>
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</tbody>
</table>
Department of Computer Science & Engineering

Vision: To become a hub of academic activities of the Computer Science & Engineering and a center of excellence in the field of computer science education.

Mission: To transform the students into Computer Science graduates who would be ready to take up any challenge in the field of computer science as well informed, attuned, adapted and responsible, by imparting the state of the art concepts and technologies

Program: B.E. Computer Science & Engineering

PEO’s (Program Educational Objectives)

1. Graduates must gain the ability to identify, formulate & solve challenging Computer science and Engg. problems both theoretically and practically.
2. Graduates must develop professional and communication skills that prepare them for immediate employment or for adapting to emerging trends by engaging in life-long learning in Computer science and related disciplines.
3. Graduates be provided with an educational foundation that prepares them for leadership roles along diverse career paths and work in a team.
4. Graduates must develop an understanding of the social and human context in which their engineering contribution will be utilized.

Program Outcomes (PO’s):

a. An ability to apply knowledge of mathematics, science and engineering
b. An ability to design and conduct experiments, as well as to analyze and interpret data

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<thead>
<tr>
<th></th>
<th>Name</th>
<th>Qualification</th>
<th>Position</th>
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<tbody>
<tr>
<td>36</td>
<td>Mr. Krishna Prasad N Rao</td>
<td>M.Tech</td>
<td>Asst. Prof Gd I</td>
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<tr>
<td>37</td>
<td>Mr. SampathKini</td>
<td>BE (MTech)</td>
<td>Asst Prof</td>
</tr>
<tr>
<td>38</td>
<td>Mrs. Divya Jennifer D'Souza</td>
<td>BE (MTech)</td>
<td>Asst Prof</td>
</tr>
</tbody>
</table>
c. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
d. An ability to function on multidisciplinary teams
e. An ability to identify, formulate and solve engineering problems
f. An understanding of professional and ethical responsibility
g. An ability to communicate effectively
h. The broad education necessary to understand the impact of engineering solutions in global, economic environmental and societal context
i. A recognition of the need for and an ability to engage in lifelong learning
j. An ability to apply engineering and project management principles.
k. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
l. An ability to understand and apply the concepts of programming and computer design & technology

<table>
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<tr>
<th>PO’s</th>
<th>Graduate Attributes</th>
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<tr>
<td>a</td>
<td>Engineering Knowledge</td>
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<tr>
<td>b</td>
<td>Conduct investigations of complex problems</td>
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<tr>
<td>c</td>
<td>Engineer and society</td>
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<td>d</td>
<td>Individual and team work</td>
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<td>i</td>
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<td>j</td>
<td>Project Management and finance</td>
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<td>k</td>
<td>Modern tool usage</td>
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### DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
### SCHEME OF TEACHING

**VII Semester (26 credits)**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Subject Code</th>
<th>Name of the Subject</th>
<th>Hours/week</th>
<th>C.I.A.</th>
<th>S.E.E</th>
<th>Credits</th>
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<td>Lect/Tut/Prac</td>
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<tr>
<td>1</td>
<td>CS701</td>
<td>Object Oriented Modeling and Design</td>
<td>4+0+0</td>
<td>50</td>
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<tr>
<td>2</td>
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<td>Advanced Computer Architecture</td>
<td>4+0+0</td>
<td>50</td>
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<td>3</td>
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<td>Software Architecture</td>
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<tr>
<td>4</td>
<td>CS704</td>
<td>Business Intelligence &amp; its applications</td>
<td>3+0+2</td>
<td>50+50</td>
<td>50+50</td>
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<td>5</td>
<td>CS71Y</td>
<td>Elective –IV</td>
<td>3+0+0</td>
<td>50</td>
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<td>6</td>
<td>CS72Y</td>
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<td>3+0+0</td>
<td>50</td>
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<td>7</td>
<td>CS705</td>
<td>Project Phase-I**</td>
<td>0+0+6</td>
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<td>8</td>
<td>CS706</td>
<td>Seminar + Technical Paper Writing</td>
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**Elective – IV** | **Elective – V**
--- | ---
CS711. Advanced Computer Networks | CS721. Artificial Intelligence and Machine learning
CS713. Image Processing | CS723. Advanced Java Programming
CS714. Web 2.0 and rich internet applications | CS724. Service Oriented architecture
CS715. Programming interactivity | CS725. Bioinformatics
| CS726. Heterogeneous Parallel Computing
| CS727. Mobile Application Development Lab

**This** will be carried out by the students in a team, which will help them further to take up a Main project in the 8th semester. The topic of the mini project may be in line with the main project that the students will take up in the 8th semester. Students need to submit a report at the end of the semester. *C# programming language is required to be introduced here.*
## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### SCHEME OF TEACHING

#### VIII Semester (24 credits)

<table>
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<tr>
<th>Sl. No.</th>
<th>Code</th>
<th>Subject</th>
<th>Hours/week</th>
<th>C.I.A.</th>
<th>S.E.E</th>
<th>Credits</th>
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<tr>
<td>1</td>
<td>HU801</td>
<td>Engineering Management</td>
<td>3+0+0</td>
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<td>Elective-VI</td>
<td>3+0+0</td>
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<td>3</td>
<td>CS82Y</td>
<td>Elective-VII</td>
<td>3+0+0</td>
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<td>4</td>
<td>CS8XY</td>
<td>Open Elective</td>
<td>3+0+0</td>
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<td>5</td>
<td>CS802</td>
<td>Project</td>
<td>0+0+12</td>
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24 hours/week
Open Electives - offered by CSE Dept for non-IT streams.

- CS8X14: Object Oriented Programming with C++
- CS8X15: Essentials of Information Technology (Industry elective for non-IT students)

**Note:** Where ever there is a combined theory and lab, students must score minimum passing marks in each of the component
OBJECT ORIENTED MODELING
AND DESIGN

Subject Code : CS701
Credits : 04
Hrs/Week : 4
Total Hours : 52

UNIT - I
INTRODUCTION, MODELING CONCEPTS, CLASS MODELING:
What is Object Orientation? What is OO development? OO themes; Evidence for usefulness of OO development; OO modeling history. Modeling as Design Technique: Modeling; abstraction; The three models. Class Modeling: Object and class concepts; Link and associations concepts; Generalization and inheritance; A sample class model; Navigation of class models; Practical tips.
ADVANCED CLASS MODELING, STATE MODELING:
Advanced object and class concepts; Association ends; N-ary associations; 10 Hrs

UNIT - II
ADVANCED CLASS MODELING, STATE MODELING:
Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification; Constraints; Derived data; Packages; Practical tips. State Modeling: Events, States, Transitions and Conditions; State diagrams; State diagram behavior; Practical tips.
ADVANCED STATE MODELING, INTERACTION MODELING:
Advanced State Modeling: Nested state diagrams; Nested states; Signal generalization; Concurrency; A sample state model; Relation of class and state models; Practical tips. Interaction Modeling: Use case models; Sequence models; Activity models. Use case relationships; Procedural sequence models; Special constructs for activity models; 11 Hrs

UNIT - III
PROCESS OVERVIEW, SYSTEM CONCEPTION, DOMAIN ANALYSIS:
Process Overview: Development stages; Development life cycle. System Conception: Devising a system concept; Elaborating a concept; Preparing a problem statement. Domain Analysis: Overview of analysis; Domain class model; Domain state model; Domain interaction model; Iterating the analysis.
APPLICATION ANALYSIS:
Application Analysis: Application interaction model; Application class model; Application state model; Adding operations; 11 Hrs
UNIT – IV

System Design: Overview of system design; Estimating performance; Making a reuse plan; Breaking a system into sub-systems; Identifying concurrency; Allocation of sub-systems; Management of data storage; Handling global resources; Choosing a software control strategy; Handling boundary conditions; Setting the trade-off priorities; Common architectural styles; Architecture of the ATM system as the example.  

10 Hrs

UNIT - V

CLASS DESIGN, IMPLEMENTATION MODELING, LEGACY SYSTEMS: Class Design: Overview of class design; Bridging the gap; Realizing use cases; Designing algorithms; Recursing downwards, Refactoring; Design optimization; Reification of behavior; Adjustment of inheritance; Organizing a class design; ATM example. Implementation Modeling: Overview of implementation; Fine-tuning classes; Fine-tuning generalizations; Realizing associations; Testing. Legacy Systems: Reverse engineering; Building the class models; Building the interaction model; Building the state model; Reverse engineering tips; Wrapping; Maintenance.  

10 Hrs

TEXTBOOKS:

REFERENCE BOOKS:
ADVANCED COMPUTER ARCHITECTURE

Subject code : CS702  
Credits : 04  
Hrs/week : 4  
Total Hours : 52

UNIT - I
Fundamentals of Computer Design: Introduction, Classes of Computers, measuring, reporting and summarizing performance, quantitative principles of computer design (Text 1, chap: 1).
Parallel Computer Models: Shared memory multiprocessors, Distributed-Memory multicomputers (Text 3: chap 1.2). Introduction to Parallel processing: Concepts of concurrent and parallel execution, types and levels of parallelism. (Text 2: chap 3) 10 Hrs

UNIT - II
Pipelining: introduction, the major hurdle of pipelining- pipeline hazards, How is pipelining implemented. (Text 1, Appendix A). Linear pipeline processors and Non-linear pipeline processors (Text 3, Chap 6). 10 Hrs

UNIT - III
Instruction level parallelism: Concepts and Challenges, Basic compiler techniques for exposing ILP, Reducing branch cost with prediction, overcoming data hazards with dynamic scheduling, hardware based speculation, exploiting ILP using multiple issues and static scheduling, exploiting ILP using Dynamic scheduling, multiple issue and speculation, advanced techniques for instruction delivery and speculation. (Text 1, chap 2) 10 Hrs

UNIT - IV
Multiprocessors and Multicomputers: cache coherence and Synchronization mechanism (Text. 3: chap 7.2) Three generation of multicomputers (Text. 3: chap 7.3) Data Flow Architecture: Data Flow and Hybrid Architecture – Data Flow Architecture (Text. 3: chap 9.5). Data Parallel Architecture: Introduction (Text. 2: chap 10), Static and dynamic interconnection networks – omega l and baseline networks (Text. 3: chap 2.4) 12 Hrs

UNIT - V
HARDWARE AND SOFTWARE FOR VLIW AND EPIC (Text 1, Appendix G) 10 Hrs
TEXT BOOKS:

SOFTWARE ARCHITECTURE
Subject Code : CS703 Credits : 04
Hrs/ Week : 4 Total Hours : 52

UNIT – I
INTRODUCTION: The Architecture Business Cycle: Where do architectures come from? Software processes and the architecture business cycle; What makes a “good” architecture? What software architecture is and what it is not; Other points of view; Architectural patterns, reference models and reference architectures; Importance of software architecture; Architectural structures and views.

ARCHITECTURAL STYLES AND CASE STUDIES:
Architectural styles; Pipes and filters; Data abstraction and object-oriented organization; Event-based, implicit invocation; Layered systems; Repositories; Interpreters; Process control; Other familiar architectures; Heterogeneous architectures. Case Studies: Keyword in Context; Instrumentation software; Mobile robotics. 10 Hrs

UNIT – II
QUALITY: Functionality and architecture; Architecture and quality attributes; System quality attributes; Quality attribute scenarios in practice; Other system quality attributes; Business qualities; Architecture qualities. Achieving Quality: Introducing tactics; Availability tactics; Modifiability tactics; Performance tactics; Security tactics; Testability tactics; Usability tactics. 10 Hrs
UNIT – III

11 Hrs

UNIT – IV
SOME DESIGN PATTERNS: Structural decomposition: Whole – Part; Organization of work: Master – Slave; Access Control: Proxy.

11 Hrs

UNIT – V
DESIGNING AND DOCUMENTING SOFTWARE ARCHITECTURE: Architecture in the life cycle; designing the architecture; Forming the team structure; Creating a skeletal system. Uses of architectural documentation; Views; choosing the relevant views; Documenting a view; Documentation across views. 

10 Hrs

TEXT BOOKS:


REFERENCE BOOK:
1. Design Patterns- Elements of Reusable Object-Oriented Software – E. Gamma, R. Helm, R. Johnson, J. Vlissides:, Addison- Wesley, 1995. Web site for Patterns: http://www.hillside.net/patterns/
BUSINESS INTELLIGENCE AND ITS APPLICATION

Subject Code : CS704  
Credits : 04
Hrs/week : 3  
Total Hours : 52

UNIT - I
Introduction to Business Intelligence
Types of digital data; Introduction to OLTP, OLAP and Data Mining; BI Definitions & Concepts; Business Applications of BI; BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities 7 Hrs

UNIT - II
Basics of Data Integration (Extraction Transformation Loading); Concepts of data integration; Need and advantages of using data integration; Introduction to common data integration approaches; Introduction to data quality, data profiling concepts and applications, Introduction to SSIS Architecture, Introduction to ETL using SSIS; 8 Hrs

UNIT - III
Data Warehouse and OLAP Technology – Definition, A Multidimensional Data Model, Concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema; Data Warehouse Architecture. Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling; Introduction to business metrics and KPIs; Introduction to enterprise reporting; Concepts of dashboards, balanced scorecards; Applications of Data mining and Case studies of BI 8 Hrs

UNIT - IV
Data Mining—On What Kind of Data? Data Mining Functionalities—What Kinds of Patterns Can Be Mined? Mining Association rules: Basic concepts, frequent item set mining methods. Definitions of classification, prediction and clustering; 8 Hrs

UNIT - V
Classification and Prediction - Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Prediction, Cluster Analysis - Types of Data in Cluster Analysis, Hierarchical Methods. 8 Hrs
TEXT BOOKS:

REFERENCE BOOKS:
- “Business Intelligence for the Enterprise” by Mike Biere
- “Business Intelligence Roadmap” by Larissa Terpeluk Moss, Shaku Atre
- “Successful Business Intelligence: Secrets to making Killer BI Applications” by Cindi Howson
- “Delivering Business Intelligence with Microsoft SQL server 2008” by Brain, Larson
- “Foundations of SQL Server 2005 Business Intelligence” by Lynn Langit
- “Information Dashboard Design” by Stephen Few

ADVANCED COMPUTER NETWORKS
Subject Code: CS711 Credits: 03
Hrs/Week: 3 Total Hours: 39

UNIT - I
Application Layer

UNIT - II
Wireless and Mobile Networks
Data Link Layer: Introduction and Services, Error-Detection and Correction Techniques, LAN Addresses and ARP, Ethernet, Hubs, Bridges, and Switches, Wireless Links, PPP: The Point-to-Point

8 Hrs

UNIT - III

Multimedia Networking
Multimedia Networking Applications, Streaming Stored Audio and Video, Making the Best of the Best-Effort Service: An Internet Phone Example, Protocols for Real-Time Interactive Applications, Beyond Best-Effort, Scheduling and Policing Mechanisms, Integrated Services, RSVP, Differentiated Services  

8 Hrs

UNIT - IV

Security in Computer Networks

8 Hrs

UNIT - V

Network Management
Infrastructure of Network Management: The internet standard management Framework: SMI, MIB, SNMP protocol operations and transport mappings, security and administration., ASN.1 syntax.  

7 Hrs

TEXT BOOK:
James F. Kurose and Keith W. Ross, Computer Networking- A Top-Down Approach Featuring the Internet, 3rd Edition, Pearson Education (Chapters 1, 2, 6,7,8)

REFERENCE BOOK:
Andrew S. Tanenbaum, Computer Networks, Fourth edition, PHI / Pearson Publication, 2002
NETWORK MANAGEMENT

Subject Code : CS712  Credits : 03
Hrs/week : 3  Total Hours : 39

UNIT - I
Data Communications and Network Management Overview
Analogy of telephone network, Data and telecommunication network, Distributed computing environment, Internet, Protocols and standards, IT management, Network and system management, Current status and future of network management  8 Hrs

UNIT - II
Basic Foundations: Standards, Models, and Language
Network Management Standards, Network Management Model, Organizational Model, Information Model, Communication Model, Abstract Syntax Notation One, TLV Encoding, Functional Model.  8 Hrs

UNIT - III
SNMPv1 Network management: Organization and Information Models

UNIT - IV
SNMPv1 Network management: Communication and Functional Models
Communication and Functional Models, Administrative Model, SNMP Community, Administration Model, Generalized Administration Model, Get and Set PDU, Trap PDU, SNMP Operations, MIB for Get-Next-Request, MIB Lexicographic Order, Get-Next-Request Operation, Sniffer Data, SNMP MIB  4 Hrs

SNMP Management: RMON
What is Remote Monitoring? RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring, Case Study, Case Study Results  4 Hrs

UNIT - V
Broadband Network management
ATM Technology, ATM Network management, HFC Management, DSL Technology and ADSL Management, Network management applications  8 Hrs
TEXT BOOK:

**IMAGE PROCESSING**

Subject Code : CS713  
Credits : 03  
Hrs/week : 3  
Total Hours : 39

**UNIT - I**

7 Hrs

**UNIT - II**
Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Image Enhancement in the Frequency Domain- Background, Introduction to the Fourier Transform and the Frequency Domain, Smoothing Frequency-Domain Filters,  

8 Hrs

**UNIT - III**
Sharpening Frequency Domain Filters, Homomorphic Filtering, Image Segmentation- Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Segmentation by Morphological Watersheds, the Use of Motion in Segmentation  

8 Hrs

**UNIT - IV**
Image Compression - Fundamentals Image Compression, Models Elements of Information, Theory Error-Free Compression, Lossy Compression, Image Compression Standards Morphological Image Processing - Preliminaries, Dilation and Erosion, Opening and Closing, the Hit-or-Miss Transformation Some Basic, Morphological Algorithms  

8 Hrs
UNIT - V

TEXT BOOKS:

REFERENCE BOOKS:

WEB 2.0 AND RICH INTERNET APPLICATIONS

Subject Code : CS714  Credits : 03
Hrs / Week : 3  Total Hours : 39

UNIT – I
INTRODUCTION: What is Web 2.0?, Folksonomies and Web 2.0, Software as a Service (SaaS), Data and Web 2.0, Convergence, Iterative development, Rich User experience, Multiple Delivery Channels, Social Networking.
What is JSON?, Array literals, Object literals, Mixing literals, JSON Syntax, JSON Encoding and Decoding, JSON versus XML. 3 Hrs

BUILDING RICH INTERNET APPLICATIONS WITH AJAX:
Limitations of Classic Web application model, AJAX principles, Technologies behind AJAX, Examples of usage of AJAX; Asynchronous communication and AJAX application model XMLHttpRequest Object – properties and methods, handling different browser implementations of XMLHttpRequest; AJAX Patterns (Only algorithms – examples not required): Predictive fetch pattern, Submission throttling pattern, Periodic refresh, Multi stage download, Fall back patterns. Introduction to Jquery. 6 Hrs

UNIT – II
SOAP: The Case for SOAP; What Does SOAP Define? SOAP Message Structure; SOAP Message Elements; SOAP Processing Model; SOAP Encoding;
WSDL: Describing a Web Service; Describing Functional Characteristics of Services; WSDL 1.2; 4 Hrs
UDDI: Discovering Web Services; Categorizing Services; Identifiers; Business Entity Relationships; UDDI's SOAP Interfaces; UDDI and SOAP/WSDL Relationships; Publishing WSDL Service Interfaces in UDDI; Internationalization and Multiple Languages; Extending a UDDI Registry; Private UDDI Registries; ebXML: Architectural Overview of ebXML. 4 Hrs

UNIT – III
Java Web Service Developer Pack: Setting up Java WSDP, Java WSDP components.
JAXP: JAXP Architecture; SAX; DOM; When to Use SAX; When to Use DOM; When Not to Use Either; JAXP and XML Schemas; XSLT; XSLTc; JDOM; JAXP RI; 4 Hrs
JAX-RPC: JAX-RPC Service Model; Data Types and Serialization; JAX-RPC Development; Advanced JAX-RPC; JAX-RPC Interoperability; JAX-RPC and J2EE; 4 Hrs

UNIT – IV
JAXM: Messaging and MOM; Messaging and Web Services; Messaging in Java; JAXM Architecture; Designing with JAXM; Developing with JAXM;
JAXR: Registries and Repositories; JAXR Architecture; The JAXR Information Model; The JAXR API; JAXR to UDDI Mapping; JAXR and ebXML Registry; 4 Hrs

JAXB: The Need for Binding and JAXB; When to Use JAXB; JAXB Architecture; Developing with JAXB; XML-to-Java Mapping; The JAXB API; Validation with JAXB; Customizing JAXB; When to Use Custom Declarations; 4 Hrs

UNIT – V

Transaction Management: Concepts; A Transaction Model for Web Services; New Transaction Specifications; JSRs for Web Service Transaction Support; 3Hrs

Security: Security Considerations for Web Services; Web Services Security Initiatives; Canonical XML; XML Digital Signatures; Apache XML Security; XML Encryption; Security Assertions Markup Language; Web Services Security Assertions; XML Access Control Markup Language; XML Key Management Specification; WS-I Specifications; SOAP and Firewalls; 3Hrs

TEXT BOOKS:
3. 

REFERENCE BOOKS:
PROGRAMMING INTERACTIVITY

Subject code : CS715  Credits : 03
Hrs/week : 3  Total Hours : 39

UNIT - I


8 Hrs

UNIT - II

openFrameworks: Introduction, Starter & Tour on oF, First Program, Drawing in 2D, Displaying Video Files and Images, Importing Libraries, Compilation & Debugging in different OS.
Sound & Audio: Sound as feedback & interaction, How Sound works on a Computer, Audio in Processing, Using Minim, oF, FMOD Ex, Sound Object libraries for Sound processing, Magic of FFT, Physical manipulation of Sound with Arduino, PWM, Creating Interactions with Sound.
Physical Input: Interacting with Physical Controls, Thinking about Kinetics, Controlling Controls, Turning Knobs, Using Lights like LED, Detecting Touch & Vibration with Piezo Sensors, Communication with other Apps, Arduino message framework, Detecting Motion, Reading Distance from an IR Sensor, Detecting Forces & Tilt, I2C, Physical Interface.

8 Hrs

UNIT - III

Physical Feedback: Using DC & Stepper Motors, Using Servos,

**UNIT - IV**

**Protocols & Communication:** Network Communication, Using XML, Understanding Networks & the Internet, Handling Network Communication in Processing, Understanding Protocols in Networking, Using ofXNetwork, Creating Networks with the Arduino, Communicating with Carnivore, Bluetooth & MIDI.  

**Detection & Gestures:** Computer Vision, OpenCV, Using Blobs & Tracking, OpenCV in Processing, Detecting Gestures, Face Recognition, Touch Devices with oF.  

**Movement & Location:** Using Movement as & in Interaction, Software based Serial Ports, Using GPS, Storing Data, Logging GPS data into Arduino, Sending GPS data, Determining Location by IP Address.  

**UNIT - V**

**Interfaces & Controls:** Examining tools, Affordances & Aesthetics, Reexamining Tilt, Exploring InputShield, Understanding Touch, Exploring OpenSource Touch Hardware, Communicating using OSC, Using the Wiimote.  

**Spaces & Environments:** Using Architecture & Space, Sensing Environmental Data, Using an Xbee with Arduino, Placing objects in 2D, Using the X10 Protocol, Setting up an RFID Sensor, Reading Heat & Humidity.  

**Future Directions:** Software tools, Construction Processes, Artificial Intelligence, Physics, Hardware Platforms  

**TEXT BOOK:**  

**REFERENCE BOOKS :**  
ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Subject code : CS721  
Credits : 03
Hrs/Week : 3  
Total Hours : 39

UNIT - I
Introduction to Artificial Intelligence, Applications of AI, Natural Language Processing, semantic analysis  8 Hrs

UNIT - II
Expert Systems: knowledge base and inference engine; case studies, Game Playing, AI languages -Introduction  8 Hrs

UNIT - III
What is Machine learning; Discriminative VS Generative, Concept Learning and the General-to-Specific Ordering, Decision Tree Learning, Artificial Neural Networks (only overview)  8 Hrs

UNIT - IV
Evaluating Hypotheses, Bayesian Learning, Computational Learning Theory Instance-Based Learning, Learning Sets of Rules  8 Hrs

UNIT - V
Analytical Learning, Combining Inductive and Analytical Learning, Reinforcement Learning, ML Applications  7 Hrs

TEXT BOOKS:

REFERENCE BOOK:
1. Artificial Intelligence by Patterson
### CRYPTOGRAPHY AND NETWORK SECURITY

**Subject code**: CS722  
**Credits**: 03  
**Hrs/Week**: 3  
**Total Hours**: 39

#### UNIT - I

#### UNIT - II
The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operations. Triple DES, Blowfish, Random Number Generation. **8 Hrs**

#### UNIT - III

#### UNIT - IV

#### UNIT - V

### TEXT BOOK:

REFERENCE BOOKS:

ADVANCED JAVA PROGRAMMING
Subject Code : CS723
Credits : 03
Hrs/Week : 3
Total Hours : 39

UNIT - I
Event Handling: - Two Event Handling Mechanisms, The Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Using the Delegation Event Model, Adapter Classes, Inner Classes, Anonymous Inner Classes. 8 Hrs

UNIT - II
Using AWT Controls, Layout Managers and Menus - Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckBox Group, Choice Controls, Using Lists, Using a Text Field, Using a TextArea, Understanding Layout Managers, Menu Bars and Menus. 8 Hrs

UNIT - III
File Handling - Serial Access Files, File Methods, Redirection, Command Line Parameters, Random Access Files, Serialization.
**Java Database Connectivity (JDBC)** - The Vendor Variation Problem, SQL and Versions of JDBC, Creating an ODBC Data Source, Simple Database Access, Modifying the Database Contents, Transactions, Meta Data, Scrollable *ResultSets* in JDBC 2.0, Modifying Databases via Java Methods. **8 Hrs**

**UNIT - IV**

**Network Programming with Java** - Basic Concepts, Protocols and Terminology, Clients, Servers and Peers, Ports and Sockets, The Internet and IP Addresses, Internet Services, URLs and DNS, TCP, UDP. The *InetAddress* Class, Using Sockets (TCP and UDP), Example Programs.

**Remote Method Invocation (RMI)** - The Basic RMI Process, Implementation Details, Compilation and Execution, Using RMI Meaningfully, Example Programs. **7 Hrs**

**UNIT - V**

**Java Servlets** - Servlet Basics, Setting up the Servlet API, Creating a Web Application, The Servlet URL and the Invoking Web Page, Servlet Structure, Testing a Servlet, Passing Data, Sessions, Cookies, Accessing a Database Via a Servlet.

**Java Server Pages** - The Rationale behind JSPs, Compilation and Execution, JSP Tags, Implicit JSP Objects, Collaborating with Servlets, JSPs in Action, Error Pages. **8 Hrs**

**TEXT BOOKS:**

**REFERENCE BOOKS:**
SERVICE ORIENTED ARCHITECTURE

Subject Code : CS724  
Credits : 03  
Hrs/ Week : 3  
Total Hours : 39

UNIT – I
INTRODUCTION TO SOA, EVOLUTION OF SOA:
Fundamental SOA; Common Characteristics of contemporary SOA; Common tangible benefits of SOA; An SOA timeline (from XML to Web services to SOA); The continuing evolution of SOA(Standards organizations and Contributing vendors); The roots of SOA (comparing SOA to Past architectures).  8 Hrs

UNIT – II
WEB SERVICES AND PRIMITIVE SOA: The Web services framework; Services (as Web services); Service descriptions (with WSDL); Messaging (with SOAP).  4 Hrs
WEB SERVICES AND CONTEMPORARY SOA – 1: Message exchange patterns; Service activity; Coordination; Atomic Transactions; Business activities; Orchestration; Choreography.  4 Hrs

UNIT – III
WEB SERVICES AND CONTEMPORARY SOA – 2: Addressing; Reliable messaging; Correlation; Policies; Metadata exchange; Security; Notification and eventing.  4 Hrs
PRINCIPLES OF SERVICE – ORIENTATION: Services-orientation and the enterprise; Anatomy of a service-oriented architecture; Common Principles of Service-orientation; How service orientation principles interrelate; Service-orientation and object-orientation; Native Web service support for service-orientation principles.  4 Hrs

UNIT – IV
SERVICE LAYERS: Service-orientation and contemporary SOA; Service layer abstraction; Application service layer, Business service layer, Orchestration service layer; Agnostic services; Service layer configuration scenarios.  4 Hrs
BUSINESS PROCESS DESIGN: WS-BPEL language basics; WSCoordination overview; Service-oriented business process design;
WS: Addressing language basics; WS: Reliable Messaging language basics.  

**UNIT – V**  
**SOA PLATFORMS:** SOA platform basics; SOA support in J2EE; SOA support in .NET; Integration considerations.  

**TEXT BOOK:**  

**REFERENCE BOOK:**  

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**BIOINFORMATICS**

Subject Code: CS725  
Credits : 03  
Hrs/Week : 3  
Total Hours : 39

**UNIT - I**

**Introduction to Basics of Molecular Biology**  
Basic Cell Architecture, The Structure, Content and Scale of DNA, History of Human Genome, genes and proteins, Current Knowledge and ‘central dogma’, Why proteins are important, Gene and Cell regulation, what is Bioinformatics.

**Introduction to Problems and Challenges**  
Introduction, Genome, Transcription, Proteome, Interference Technology, viruses and immune system.  

**UNIT - II**

**DATABASES**  
Database, Types of database (Flat file, RDBMS (E-R diagram and Object Oriented), SQL), Sequence Database: Nucleotide and protein sequence database. Primary (Genbank, EMBL, DDBJ) and Secondary database. Sequence File Formats .Genbank flat file-A dissection. Structure Database: Protein structure databases (PDB). PDB format A dissection. Protein Structure viewers (RASMOL). Search engine, Entrez.
UNIT - III
DATABASE SEARCHES AND SEQUENCE ALIGNMENT
Introduction to sequence alignment, Local alignment, Global alignment, Methods of sequence alignment (Pairwise and multiple), Dot plot, optimal alignment, Dynamic programming (Needleman and Wunsch, Smith waterman), Gap penalties. Database similarity searching-BLAST, FASTA, Progressive alignment methods, Practical issue of alignment. 8 Hrs

UNIT - IV
Introduction to Artificial Intelligence and Computer Science
Introduction to search
Search algorithms Heuristic search methods, Optimal search strategies, Problems with search techniques, Complexity of search, Use of graphs in bioinformatics, Grammars, languages and automata, Classes of problems. Introduction to probability, Bayes’ Theorem, Bayesian networks, Markov networks. 8 Hrs

UNIT - V
Nearest Neighbor and Clustering Approaches
Introduction, nearest neighbor method, nearest neighbor approach for secondary structure protein folding prediction, Clustering, Advanced clustering techniques Application guidelines. Identification (Decision) Trees, Method Application guidelines, Bioinformatics applications 8 Hrs

TEXTBOOKS:
1. Intelligent Bioinformatics, The application of artificial intelligence techniques to bioinformatics problems by Edward Keedwell and Ajit Narayanan.
2. Fundamental concept of bioinformatics by Dan E.Krane and Michael L. Raymer, pearson publication
3. Bioinformatics databases and algorithms by N.Gautham, Narosa publication
4. Essential bioninformatics by Jin Xiong, Cambridge university press

REFERENCE BOOKS:
HETEROGENEOUS PARALLEL COMPUTING

Subject code : CS726  
Credits : 03
Hrs/Week : 3  
Total Hours : 39

UNIT – I
Introduction to Parallel Programming: Introduction, OpenCL, Thinking Parallel, Concurrency & Parallel Programming Models, Threads & Shared Memory, Message-Passing Communication, Different grains of Parallelism, Data Sharing & Synchronization.

4 Hrs


6 Hrs

UNIT – II

7 Hrs

UNIT – III
Basic OpenCL Examples: Introduction, Simple Matrix Multiplication, Image Rotation, Image Convolution, etc., Compiling OpenCL host applications.

7 Hrs

UNIT – IV
Introduction to some of the GPU Programming Languages: CUDA, Aparapi, WebCL, Microsoft Accelerator, Shaders - glsl.

9 Hrs

UNIT – V
OpenCL profiling and debugging: Profiling with events, Parallel Processing Profiler & Kernel Analyzer, Debuggers. A case study of real time OpenCL application.

6 Hrs

TEXTBOOK:
**REFERENCE BOOKS:**
3. Aparapi: http://code.google.com/p/aparapi/ and Gary Frost’s blog
5. Shaders: www.lighthouse3d.com/opengl/glsl

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**MOBILE APPLICATION DEVELOPMENT LAB**

<table>
<thead>
<tr>
<th>Subject Code : CS727</th>
<th>Credits : 03</th>
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<tr>
<td>Hrs/Week : 3</td>
<td>Course Content</td>
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<table>
<thead>
<tr>
<th>Week (3 Hrs /Week)</th>
<th>1st Week</th>
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<tbody>
<tr>
<td></td>
<td>Introduction to Android</td>
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<td></td>
<td>Android Documentation (Docs)</td>
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<td>Creating first Android Project application “Hello World”</td>
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<td>Examining the Android Created Files</td>
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<td>Android Manifest.xml file</td>
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<td>Referenced Libraries</td>
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<td>Hello World! Using an Image</td>
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<td>Hello World! Code-Based UI</td>
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<td>Hello World! XML-Based UI</td>
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<td>Use Text View and Image View</td>
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<tr>
<th>2nd Week</th>
<th>Activities: Building and running Activities</th>
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<tr>
<td></td>
<td>Storing Image in the Drawable</td>
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<td>Customizing the Image of the activity in emulator</td>
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<td>Building and running Multiple Activities</td>
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<td>Android System Architecture</td>
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<tr>
<th>3rd Week</th>
<th>Intents and Views: Pieces of Intent</th>
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<tr>
<td></td>
<td>Sending and Receiving the data through the intent</td>
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<td>Communication between the two Activities using intent</td>
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</table>
A Sample example: “**User Name and Password**” Application
Creating “Log” → A Debugging utility
Life, Death, and Your Activity:
  →  `onCreate()`, `onDestroy()`, `onStart()`, `onRestart()`, `onStop()`, `onResume()`;
Touch Events, Click Events, Game Loop, Loop Handlers;

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<tr>
<th>Week</th>
<th>Topics</th>
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<tr>
<td><strong>4&lt;sup&gt;th&lt;/sup&gt; Week</strong></td>
<td>XML Layouts:</td>
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<td>→ Linear Layout Concepts and Properties:</td>
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<td>• Orientation, Fill Model, Weight, Gravity, Padding</td>
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<td>• Linear Layout Example</td>
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<td>→ Relative Layout Concepts and Properties</td>
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<td>• Positions Relative to Container</td>
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<td>• Relative Notation in Properties</td>
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<td>• Positions Relative to Other Widgets</td>
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<td>• Order of Evaluation</td>
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<td>• Relative Layout Example</td>
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<td>→ Table Layout Concepts and Properties → Self Study portion</td>
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<td>→ Grid Layout → Self Study Portion</td>
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<td><strong>5&lt;sup&gt;th&lt;/sup&gt; Week</strong></td>
<td>Some Example Applications on these above layouts</td>
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<td>→ A simple Example of Stack Application</td>
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<td>→ A Simple Example of Calculator Application</td>
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<td><strong>6&lt;sup&gt;th&lt;/sup&gt; Week</strong></td>
<td>Animation Application: Moving Ball</td>
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<td><strong>7&lt;sup&gt;th&lt;/sup&gt; Week</strong></td>
<td>Creating and Using Bitmap;</td>
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<td>Image Animation Applications: Running Wanda, Flying Bat, and Falling Kyle Applications</td>
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<td><strong>8&lt;sup&gt;th&lt;/sup&gt; Week</strong></td>
<td>Creating a SQLite Database</td>
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<td>Creating a Custom Content Provider</td>
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<td>Editing the <code>strings.xml</code></td>
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<td>Creating Your Content Provider</td>
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<td>Creating the <code>FindAFriend</code> Activity</td>
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<td>Editing <code>AndroidManifest.xml</code></td>
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<td>Creating the <code>NameEditor</code> Activity</td>
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<td>Creating the <code>LocationEditor</code> Activity</td>
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<td>Creating the <code>FriendsMap</code> Activity</td>
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<tr>
<td></td>
<td>Creating the <code>FindAFriend</code> Activity</td>
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<tr>
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<td>Running the <code>FindAFriend</code> Activity</td>
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<td>Try This: Real-Time Location Updating</td>
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<td><strong>9&lt;sup&gt;th&lt;/sup&gt; Week</strong></td>
<td>And</td>
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<tr>
<td></td>
<td>Creating the <code>LocationEditor</code> Activity</td>
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<tr>
<td></td>
<td>Creating the <code>FriendsMap</code> Activity</td>
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<tr>
<td></td>
<td>Creating the <code>FindAFriend</code> Activity</td>
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<td></td>
<td>Running the <code>FindAFriend</code> Activity</td>
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<td>Try This: Real-Time Location Updating</td>
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</table>
1. Develop an android application to read first student’s details in first activity. Clicking of the “next” button will take us to second activity to read second student’s details. In first activity, clicking of the “Display” button will take us to fifth activity that will display the details of first student. In second activity, clicking of the “next” button, will take us to third activity to read third student’s details. Clicking of the “Display” button in second activity will take us to sixth activity that will display the second student’s details. In third activity, clicking of the “Finish” button will take us to fourth activity that will display the icons of three students using radio buttons. Clicking of the “OK” button in fourth activity, the selected student’s details in the above mentioned activities should be displayed.

2. Create an android application to generate electricity bill. Bills are to be generated for two categories namely, Domestic and Commercial. The first activity should contain two radio buttons corresponding to each category. It should also contain two buttons: “Pay Bill” and “Info”. On clicking the “Info” button, application should take us to second activity that displays the bill tariff. On clicking the “pay bill” button in the first activity, the application should take us to the third or fourth activity depending upon the category selected, which reads the number of units consumed by the consumer and generates the corresponding bill. The second activity that displays the bill tariffs should have a “Home” button which should take the application to the first activity.

3. Create an android application for the following actions: The first activity should contain two radio buttons namely: “Canvas”, and “Rectangle” and an “OK” buttons. Clicking the “OK” button if “Canvas” is selected, the application will take us to the second activity that performs the following actions:

<table>
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<tr>
<th>10th Week</th>
<th>Students have to build their project during this time.</th>
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<tr>
<td>11th Week</td>
<td>Students have to build their project during this time.</td>
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<td>12th Week</td>
<td>Students have to build their project during this time.</td>
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<tr>
<td>13th Week</td>
<td>LAB Test.</td>
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</table>
A ball is moving in the canvas either in the horizontal or in the vertical direction (as you like). On clicking the moving ball, the following actions should happen:

(i) If the ball is moving horizontally, then it should change the direction and move vertically.

(ii) If the ball is moving vertically, then it should change the direction and move horizontally.

Clicking the “OK” button if “Rectangle” is selected, the application will take us to the third activity that restricts the ball’s movement within the newly drawn rectangle. A ball is moving in the canvas either in the horizontal or in the vertical direction (as you like) in the rectangle. On clicking the moving ball, the following actions should happen:

(i) If the ball is moving horizontally, then it should change the direction and move vertically.

If the ball is moving vertically, then it should change the direction and move horizontally.

4. Create an android application for the following actions:
The first activity should contain two radio buttons namely: “Jumping Wanda”, “Flying Forward Bat” and an “OK” button. On clicking the “OK” button, the above mentioned animations need to be shown in separate activities.

Reference Books:
- Beginning Android 2, Mark L. Murphy, Apress Publisher.
ENGINEERING MANAGEMENT
(Institution Level Core Paper)

Subject Code : HU801
Credits : 03
Hrs/Week : 3
Total Hours : 39

UNIT - I
Management: Meaning – Functions of Management
Objectives – Meaning, Characteristics/Qualities of Sound Objective, Management By Objectives (MBO).
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
Organizing: Meaning, Legal Forms of Organization – Sole Proprietorship, Partnership, Corporation/Company, Co-operatives – Meaning and Features only)
Span of Control – Meaning, Significance, Factors Determining the Span of Control, Types of Spans, Current Trends in Span of Control.
Authority and Power – Sources of Power, Delegation – Reasons for Delegation, Barriers to Delegation.
Performance Appraisal – aims and formal schemes/methods of appraisal, performance appraisal and pay review.

UNIT - III
Motivation and Leadership:
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
Project Evaluation Techniques – Interest Rate Calculations, Payback Time, Present Worth, Future Worth, Annual Worth Calculations.

Creativity – Creative Process, Characteristics of Creative People, Protection of Ideas – Patents, Copyrights, Trade Marks, Trade Secrecy Laws.

Planning Production Activity – Plant Location, Quantitative Tools in Production Planning – Inventory Control – Economic Order Quantity (EOQ), Break Even Analysis, Learning Curves.

UNIT - V
Project Planning Tools – Gantt (Bar) Charts, Network Analysis – PERT and CPM – Crashing the Project completion duration using network analysis.


TEXT BOOKS:


REFERENCE BOOKS :

CLIENT SERVER AND AGENT TECHNOLOGY

Subject Code : CS811
Credits : 03
Hrs/week : 3
Total Hours : 39

UNIT - I
Introduction: Client Server Concepts, Building Blocks, 2-tier and 3-tier Systems, Components, Middleware Building Block, Stateful and Stateless Servers, Stream Servers, Intergalactic Servers 7 Hrs

UNIT - II
Middleware: NOS-Creating the single system image, The transparent illusion, peer-to-peer communications, RPC and RMI, IPC’s, Stubs and Skeletons, Sockets, Data Marshalling, Pipes and FIFOs, SNA, IBM LAN Server, DCE –the post modern NOS, DFS, OSF’s DCE releases. 8 Hrs

UNIT - III
SQL Database Services: Fundamentals, Database servers, Functions, Stored Procedures, triggers and rules, SQL Middleware and Federated databases, The Options, SQL, API, Open SQL Gateways, Data Warehouses Concepts OLTP, Information at the fingerprints, Information Warehouses 8 Hrs
UNIT - IV
Client Server Transaction Processing: Transactions, concepts, ACID properties, Transaction models, Transaction processing Monitors, transaction Management Standards, TP-lite, Origins and Concepts, TP-lite vs TP-heavy, Client-server Group Ware, Concepts and importance of Group Ware 8 Hrs

UNIT - V
Agent Technology: AGENT ARCHITECTURE: Agents for Information Gathering - Open Agent Architecture - Communicative Action for Artificial Agent. MOBILE AGENTS: Mobile Agent Paradigm - Mobile Agent Concepts - Mobile Agent Technology – Aglets 8 Hrs

TEXT BOOKS:

DECISION SUPPORT SYSTEMS
Subject Code : CS812 Credits : 03
Hrs/Week : 3 Total Hours : 39

UNIT - I
Decision Making and Computerized Support
Managers and Decision Making, Managerial Decision Making and Information Systems, Managers and Computerized Support, The need for Computerized Support technologies, a frame work for decision support, the concept of Decision Support systems, Group Decision Support Systems. Executive systems and Information (support) Systems, Expert Systems, Artificial Neural Networks, and Hybrid Support Systems. 8 Hrs
UNIT - II
Decision Making and Computerized Support (Contd...)

UNIT - III
Decision Support Systems-I

UNIT - IV
Decision Support Systems – II

UNIT - V
Knowledge Based DSS:
Acquisition, Machine Learning, Intelligent Agents, Selecting an appropriate Knowledge Acquisition Method, Knowledge Acquisition from Multiple Experts, Validation and Verification of Knowledge Base, Analyzing and Coding, Documenting and Diagramming, Numeric and Documented Knowledge Acquisition, Knowledge Acquisition and Internet/Intranet, Induction and Table Example.

8 Hrs

TEXT BOOK:

REFERENCE BOOKS:

SOFT COMPUTING TECHNIQUES

Subject Code: CS813  Credits: 03
Hrs/week: 3  Total Hours: 39

UNIT - I
INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS
Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence. 7 Hrs

UNIT - II
GENETIC ALGORITHMS
Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition. 8 Hrs
UNIT - III
NEURAL NETWORKS
Introduction to Neural Network, Adaptive Networks – Feed forward Networks. 8 Hrs

UNIT - IV
FUZZY LOGIC

UNIT - V
NEURO-FUZZY MODELING
Fuzzy Expert Systems – Fuzzy Decision Making. 8 Hrs

TEXT BOOKS:
3. Simon Haylioni “Neural Networks”, Prentice-Hall of India

REFERENCE BOOKS:
AD HOC WIRELESS NETWORKS

Subject Code : CS814
Credits : 03
Hrs/week : 3
Total Hours : 39

UNIT - I
Review of Wireless Networks: Overview of 802.11 Networks, 802.11 Network Operations, Mobility Support. The 802.11 MAC: MAC Access Modes and Timing, Contention-Based Access Using the DCF, Contention-Free Access Using the PCF.
Wireless Internet: IP Limitations, Mobile Internet Protocol, Issues in Mobile IP.

UNIT - II

UNIT - III

UNIT - IV
Transport Layer Protocols in Ad Hoc Networks: TCP and Ad-hoc Networks. Modified TCP, ELFN, Split TCP, Ad-hoc Transport Protocol. 8 Hrs

UNIT - V
Security in wireless Ad hoc wireless Networks, Network Security requirements, Issues & Challenges in security provisioning, Network security attacks, Key Management, Secure routing in Ad hoc wireless Networks. 7 Hrs
TEXTBOOKS:

REFERENCE BOOKS:

GAME THEORY

Subject Code : CS 815  
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 Equillibrium. 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. 7 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 8 Hrs

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

REFERENCE BOOK:
CAD FOR VLSI AND VHDL

Subject code : CS821
Credits : 03
Hrs/Week : 3
Total Hours : 39

UNIT - I

UNIT - II

UNIT - III
Data Path Allocation in High level Synthesis, Introduction, Allocation Tasks, Unit Selection, Functional- Unit Binding, Storage Binding, Interconnection Binding, Interdependence and Ordering, Allocation Methods, Greedy Constructive Approaches, Decomposition Approaches, Clique Partitioning, Left-Edge Algorithm, Weighted Bipartite-Matching Algorithm. 8 Hrs

UNIT - IV
Logic Synthesis: Algebraic and Boolean Division Shannon’s expansion theorem, Binary Decision Diagrams (BDD), ROBDD, ITE graphs, Combinational Optimization, PLAs, Two level optimization – PLA Folding, Multilevel logic circuits and Optimization, Physical Synthesis: Floor Planning Placement and Routing, Compaction. 8 Hrs

UNIT - V
VHDL, language constructs, entity and architecture, behavioral description, structural description, examples, Sequential Statements, Testbenches 7 Hrs
TEXT BOOKS & REFERENCE BOOKS:

VLSI CAD – Niranjan N.Chiplunkar and Manjunath Kothari, PHI Learning Pvt. Ltd. NewDelhi, 2011

2. VHDL Programming: -Douglas Perry, TMH
3. High level synthesis Introduction to chip and system design – Daniel Gajski, Nikhil Dutt, Allen C-HWunand Steve Y-L Lin, Kluwer Academic
4. Logic synthesis and Verification Algorithms – Gary Hatchel and Fabio somenzi, Kluwer Academic

SUPPLY CHAIN MANAGEMENT AND ENTERPRISE RESOURCE PLANNING

Subject Code : CS822
Credits : 03
Hrs/Week : 3
Total Hours : 39

UNIT - I
Introduction to SCM: Concept of SCM, importance of SCM, Cost and service implications of SCM, impact of SCM on customer service, Inventory, Transportation, Order processing.
Logistics and Competitive Strategy: system views of logistics, Coordination and management of transportation, purchasing warehouse, Material handling, packaging and customer service standards, Distributions network design, channels of distribution. 8 Hrs

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, transportation network in support of Indian cooperative endeavor-milk run for milk.

**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.  

UNIT - III

**Total distribution cost analysis:** Total cost concept, customer service level, transportation cost, warehousing cost, order processing and information cost, inventory carrying cost.

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

UNIT - IV

Benefits, business engineering, ERP and management concerns, Buisness Modelling for ERP. ERP implementation, customization, post implementation options.  

UNIT - V

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

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
NANOTECHNOLOGY AND QUANTUM COMPUTING

Subject Code : CS823  Credits : 03
Hrs/Week : 3  Total Hours : 39

UNIT - I
Introduction to nanotechnology and nano concept
Introduction to Solid state physics – Structures, Energy bands
Methods of measuring Properties – Structure, Microscopy, Spectroscopy, Measuring the surface 8 Hrs

UNIT - II
Structure and working of various microscopes (SEM, STM, AFM etc), size determination
Carbon Nanotube – Structure, Synthesis, properties and applications. 8 Hrs

UNIT - III
Bottom up and top down Technology and Nano robotics, Nano mechanical and computational Systems, quantum Dots. Nano electronics, MEMS, NEMS 7 Hrs

UNIT - IV
Nano Computers, DNA Computing and DNA gates. Examples of DNA computing. Quantum
Computers, introduction and overview, quantum computation, quantum algorithms, Quantum circuits, qubit operation, controlled operations, measurements. 8 Hrs

UNIT - V
Universal quantum gates, simulation of quantum systems, introduction to different types of quantum computers. Applications of Nanotechnology in Computation (Memory, Processing, Communication), Example of various computer component design using nano concepts. 8 Hrs

TEXT BOOKS:
1. Introduction to Nanotechnology, Charles P Poole, Frank J Owns, John Wiely Publications. (Chapters 2, 3, 5, 4, 9,13)
4. Other reference materials given in moodle as courseware

ADVANCED COMPILATION TECHNIQUE

**Subject Code :** CS825  
**Credits :** 03  
**Hrs/week :** 3  
**Total Hours :** 39

**UNIT - I**
Importance of code optimization, structure of optimizing compilers, Placement of optimizations in aggressive optimizing compilers, Intermediate representation –LIR, MIR HIR, automatic code generation.  
7 Hrs

**UNIT - II**
Control flow analysis, approaches, dominators, reducibility, interval analysis and control trees, structural analysis, Data Flow analysis, taxonomy of data flow problems, lattices of flow functions.  
8 Hrs

**UNIT - III**
Control tree based data flow analysis, interval and structural analysis, UDchains, SSA form. Dependence analysis, dependence in loops, program dependency graphs, alias analysis, gatherer and propagator.  
8 Hrs

**UNIT - IV**
Optimization, algebraic simplification, copy propagation, redundancy elimination, loop optimization, Procedural optimization, Register allocation, control flow and low level optimization.  
8 Hrs

**UNIT - V**
Inter procedural analysis and optimization, data cache optimization, case studies, Garbage collection: Mark-and-sweep collection, reference counts, copying collection, Baker’s algorithm, JIT compilation.  
8 Hrs
TEXT BOOK:
1. Advanced compiler design implementation – Steven S. Muchnick, Morgan Kaufmann publishing, 1997

REFERENCE BOOKS:
Open Electives Offered in VIII Semester for the year 2014-15

MA8X 01 Graph Theory  
MA8X 02 Linear Algebra  
HU8X 03 Intellectual Property Rights  
PH8X 04 Advanced Materials Technology for CV & ME  
BT8X 05 Nano Technology  
BT8X 06 Instrumental methods of Analysis for CV & ME  
CV8X 07 Environmental Impact Assessment  
ME8X 08 Industrial Pollution Control  
ME8X 09 Management and Entrepreneurship  
EE8X 10 Non-Conventional Energy Systems  
EE8X 11 Linear Systems Theory  
EC8X 12 Information and Electronic Communication Technology  
EC8X 13 Robotics  
CS8X 14 Object Oriented Prog. with C++  
CS8X 15 Essentials of Information Technology  
EC8X 18 Consumer Electronics  
PH8X 19 Optoelectronic devices for EE, EC, CSE & ISE  
HU8X 20 Value Education  
CH8X 21 Natural Products Chemistry for Bio-Tech  
CS8X 22 Essentials of IT Service Industry  
MA8X 23 Statistical design and analysis of experiments  
HU8X 24 Professional & Cognitive Communique  
MA8X 25 Introduction to Topology

GRAPH THEORY

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<th>Hrs/Week</th>
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<tr>
<td>MA8X01</td>
<td>03</td>
<td>3</td>
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UNIT - I  
Introduction to graphs, digraphs, sub graphs-spanning and induced graphs, paths, cycles, connectivity, cut points, bridges,blocks.  
8 Hrs.

UNIT – II  
Trees, Eularian graphs, characterizations, Hamiltonian graphs.  
8 Hrs.
UNIT – III
Planar graphs, outer planar graphs, Euler’s polyhedron formula, Colorability: chromatic number, Five colour theorem, four colour conjecture, Chromatic polynomial

8 Hrs.

UNIT – IV
Representations of graphs: The adjacency matrix and incidence matrix. Circuit matrix, cutest matrix, Shortest paths in weighted graphs, Dijkstra’s algorithm to find shortest paths.

8 Hrs.

UNIT – V

8 Hrs.

Text Book:
1. F. Harary, Graph theory, Narosa Publishing House, 1988
2. Narsing Deo, Graph Theory with applications to Engg. and Comp. Sciences- PHI

Reference Books:
2. D.B.West, Introduction to Graph Theory, PHI

LINEAR ALGEBRA

Subject code : MA8X02
Hrs/Week : 3  Credits : 03
Total Hours : 39

UNIT - I
Linear equations: System of linear equations and its solution sets; elementar row operations and echelon forms; matrix operations; invertible matrices, LU-factorization.

7 Hrs

UNIT - II
Vector spaces: Vector spaces; subspaces; bases and dimension; coordinates; summary of row-equivalence; computations concerning subspaces.

7 Hrs
UNIT - III
Linear Transformations: Linear transformations; algebra of linear transformations; isomorphism; representation of transformations by matrices; linear functions; transpose of a linear transformation. Determinants and elementary properties. 10 Hrs

UNIT - IV
Canonical Forms: Characteristic values; similarity of matrices, Cayley Hamilton theorem, annihilating polynomials; invariant subspaces; direct –sum decompositions; invariant direct sums; diagonalization of symmetric matrices, iterative estimates of characteristic values. 8 Hrs

UNIT - V
Inner Product Spaces: Inner products; inner product spaces; orthogonal sets and projections; Gram-Schmidt process; QR-factorization; least-squares problems; symmetric and unitary operators. 7 Hrs

Text Books:

INTELLECTUAL PROPERTY RIGHTS (IPR)
Subject Code : HU8X03 Credits : 03
Hrs/week : 3 Total hours : 39

UNIT - I
Introduction to Intellectual Property
Invention and Creativity - Intellectual Property (IP) – Importance, Jurisprudential definition and concept of property, rights, duties and their correlation; History and evaluation of IPR – like Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications 8 Hrs
UNIT - II

Agreements and Treaties

UNIT - III

Basics of Patents and Concept of Prior Art
Introduction to Patents; Types of patent applications: Ordinary, PCT, Conventional, Divisional and Patent of Addition; Specifications: Provisional and complete; Forms and fees, Invention in context of “prior art”; Patent databases; Searching International Databases; Country-wise patent searches (USPTO, EPO, WIPO, IPO, etc.) 8 Hrs

UNIT - IV

Patent filing procedures
National & PCT filing procedure; Time frame and cost; Status of the patent applications filed; Structure of Patent document, Precautions while patenting – disclosure/non-disclosure; Financial assistance for patenting – introduction to existing schemes, Patent licensing and Agreement, Patent infringement- meaning, scope, litigation. 8 Hrs

UNIT - V

Case Studies on Patents (Basumati rice, turmeric, Neem, etc.) non-biological cases may be included– Copyright and related rights – Trade Marks – Trade secrets - Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition Technology transfer and license agreement. 7 Hrs

References:
5. Intellectual Property Today: Volume 8, No. 5, May 2001,
    - Rachna Singh Puri
    - Arvind Vishwanathan
    I.K. International Publishing House Pvt. Ltd.,

**Important Links:**
http://www.w3.org/IPR/
http://www.wipo.int/portal/index.html.en
http://www.ipr.co.uk/IP_conventions/patent_cooperation_treaty.html
www.patentoffice.nic.in
www.iprlawindia.org/ - 31k - Cached - Similar page

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**ADVANCED MATERIALS TECHNOLOGY**

Subject Code : PH8X04  Credits : 03
Hrs/Week : 3  Total Hours : 39

The objectives of the course:
1. To provide our students adequate education in materials technology to have a basis for a complete understanding of current and future scientific and technological developments
2. To provide our students, adequate education regarding the material properties to handle the design problem involving materials, effectively.
3. To select a right material for a specified application from the thousands of available materials available.
4. To select a cost effective material to reduce the cost of finished product.
UNIT - I
Structures and Properties of Ceramics- Introduction, Ceramic structures: Crystal structures, Silicate Ceramics, Carbon, Imperfection in ceramics, ceramic phase diagram, Mechanical properties: Brittle Failure of Ceramics, Stress-Strain Behavior, mechanisms of plastic deformation, Miscellaneous mechanical Considerations.

Types, processing and Applications of Ceramics - Glasses and Glass Ceramics, clay Products, Refractories, Abrasives, Cements, Advanced Ceramics, Fabrication and processing of Ceramics and applications, Fabrication and processing of Glasses and applications, Fabrication and processing of Clay Products, Powder Pressing, Tape casting 8 Hrs

UNIT - II

Polymer Synthesis and Processing-Polymerization, polymer additives, Forming Techniques for Plastics, Fabrication of fibersandFilmsandapplications 8 Hrs

UNIT - III

UNIT - IV
Shape memory alloys and Metallic glasses:
Introduction to shape memory alloys, Fundamental characteristics, shape memory effect (psuedoelasticity),Advantages and disadvantages
of SMA, Methods of processing, Commercial shape memory alloys and applications. 
Introduction to metallic glasses, principle, properties, processing, applications - bulk metallic glass in nanotechnology, metallic glasses for air craft structure.

**UNIT - V**

**Introduction to Nano materials:** Properties of individual nanoparticles, **Semiconducting nanoparticles:** optical properties, photofragmentation, coulombic explosion, **Carbon clusters:** small carbon clusters, $C_{60}$ crystals, alkali doped $C_{60}$, larger and smaller fullerenes, other bucky balls, **nanostructured crystals:** natural nanocrystals, photonic crystals, **nanostructured ferromagnetism:** Dynamics of nanomagnets, nanopore containment of magnetic particles, ferrofluids.

7 Hrs.

**Text books**


**REFERENCE BOOKS:**

1. Van Vlack L.H. “Elements of Material Science” Addison-Wesley Publishers

**Scheme:**

1) SEE to be conducted out of 100 marks and will be reduced to 50 marks
2) Two Questions are to be set from each unit, carrying 20 marks each.
3) Students have to answer any one full question from each Unit.
NANOTECHNOLOGY

Subject Code : BT8X0  
Credits : 03  
Hrs/Week : 3  
Total Hours : 39

OBJECTIVE
The objectives of this course includes introduction to nanotechnology, detailed study of MEMS, applications of nanotechnology. Beneficiary Branches of Engineering: EC, Mechanical, Civil.

UNIT - I
INTRODUCTION
Introduction to nanoscience, A Brief History of the Super Small, Definition of nanotechnology, Nanobiotechnology, scope of nanobiotechnology, Bottom-Up versus Top-Down; Discussions on nanofabrication, Nanolithography(Dip pen, photo, X-ray, Electron beam), nanosphere lithography, Structure-property relationships in materials, biomolecule-surface interactions. Fabrication of Hard Materials. 6 Hrs

UNIT - II
NANOMATERIAL AND NANO TOOLS
Buckyballs (Fullerenes), Nanotubes, nanowire, Dendrimers, Nanoshells, magnetic nanoparticle, Quantum Dot (Nanocrystals), self assembled monolayers, Scanning probe microscopy (Scanning tunneling microscopy, Atomic force microscopy). 8 Hrs

UNIT - III
NANOTECHNOLOGY FOR DRUG DISCOVERY & DRUG DELIVERY

UNIT - IV
MICROFLUIDICS
Microflows (Laminar flow), Hagen-Pouiselle equation, micromixing, microvalves & micropumps, Need for the microfluidics, Fabrication of Soft Materials, application of microfluidics. 8 Hrs
UNIT - V

MEMS & APPLICATIONS

Introduction and Overview, Design of MEMS, Sensors, Electromagnetic Transducers, Mechanical Transducers, Chemical Transducers, Optical Transducers - Applications of optical and chemical transducers. Recent Developments in MEMS and Nanochips. DNA based MEMS, application of MEMS. 9 Hrs

Text books:
2. Transducers and instrumentation, D.V.S. Murthy, Prentice Hall of India.
5. Micro fluidics for biotechnology by Jean Berthier Pascal Silberzan

INSTRUMENTAL METHODS OF ANALYSIS

Subject Code : BT8X06
Credits : 03
Hrs / Week : 3
Total Hours : 39
Beneficiary Branches of Engineering: Mechanical, Civil.

UNIT - I

INTRODUCTION
Types of analytical instrumental methods and their selection, role of computers in analytical methods, performance requirements of analytical instruments, and instrument calibration techniques. Principle of microscopy, light field microscopy, scanning electron microscopy, tunneling electron microscopy and applications 7 Hrs

UNIT - II

SPECTROSCOPIC TECHNIQUES
Basic principles and applications of UV-Visible spectrometry, infrared spectrometry, nuclear magnetic resonance spectrometry, molecular mass spectrometry. Surface spectroscopic techniques: electron spectroscopy and ion spectroscopy; atomic absorption spectroscopy.
UNIT - III
CHROMATOGRAPHIC TECHNIQUES
Introduction to chromatographic separations. Basic principles and theory. Gas chromatography and HPLC: principle, instrumentation, column, detector, mobile phase, sample preparation. Application of chromatographic techniques. 9 Hrs

UNIT - IV
THERMAL AND ELECTROCHEMICAL TECHNIQUES
Principles and applications of thermo-gravimetric analysis (TGA), differential thermal analysis (DTA), differential scanning calorimetry (DSC). Electrochemical methods for analysis, electrochemical cells, types of electrodes, electrode potentials. 8 Hrs

UNIT - V
ENVIRONMENTAL APPLICATIONS
Types and concentration of various gas pollutants, instrumental techniques and measurement range for carbon dioxide, sulfur dioxide, nitrogen oxides, hydrocarbons and ozone. Types of water pollutants and detection techniques. 6 Hrs

Text Book:

Reference Books:
1. R. S. Khandpur, Handbook of analytical instruments, TMH.
ENVIRONMENTAL IMPACT ASSESSMENT

Subject Code : CV 8X07  
Credits : 03  
Hrs/ Week : 3  
Total Hours : 39

Objective: To equip the students with the various key elements of EIA.

Pre-requisites of the course: CV 113

UNIT - I
Developmental activity and ecological factors; EIA, EIS, FONSI. Need for EIA studies, Baseline information, Procedure for conducting EIA, Limitation of EIA; Environmental Acts/policies.  

UNIT - II
Frame work of impact assessment in developmental projects; Environmental setting, EIA- Objective, content, methodologies, techniques, Rapid and comprehensive EIA.

UNIT - III

UNIT - IV
Public participation in environment decision making, practical consideration in preparing EIA and EIS, salient features of the project activity, Environmental parameter – activity relationship matrices

UNIT - V
EIA for construction project, power projects, mining projects.

TEXT BOOKS

REFERENCE BOOKS
1. Guidelines for EIA of developmental projects, Ministry of Environment and Forest, GOI
INDUSTRIAL POLLUTION CONTROL

Subject Code : ME 8X08  Credits : 03
Hrs/ Week : 3  Total Hours : 39

UNIT - I

1. Introduction to Pollution
Man and the environment, environmental degradation due to energy generation, consequences of pollution, sustainable industrial growth, air water and soil pollution, carbon audit. III effects of pollutants, Photochemical Smog, permissible concentrations. 8 Hrs

UNIT - II

2. Meteorology
Meteorology, Wind rose, plume dispersion studies & Numerical problems 8 Hrs

UNIT - III

3. Separation techniques
Particulates and fly ash separation techniques. Sources of Particulates Matter, fly ash properties, theory of settling processes- (problems), Single & parallel plate ESP- (problems), Bag House, Cyclone separator, Spray Tower, Scrubbers & Venturi Scrubber, merits and demerits of each. 8 Hrs

UNIT - IV

4. Smoke and gaseous pollutants
Smoke and gaseous pollutants: formation, measurement and control techniques T.T.T.O principle-(Ringlemann Chart, Smokescope, Bosch smoke meter), Coal firing- Under feed and overfeed stocker, Domestic and Industrial Incinerators, Pollutant gaseous (So2, Co, UBHC & NOx) Their sources, measurement and control.
So2-Colorimetric, scrubbing & lime stone injection method. CO-Colorimetric, IR CO analyzer & control by oxidation. UBHC- Gas chromatography, Control by after burning & floating tanks. NOx- Iso-kinetic sampling, colorimetric method, control methods in brief for Low peak combustion temperature. 7 Hrs

UNIT - V

Water, soil, noise, plastic and odor pollution, their control methods.
Pollution control Acts, Legal aspects of pollution control. 8 Hrs

Reference Books:
2. "Air Pollution control", W. L. Faith, John Wiley
3. "Environmental Pollution Control Engineering, Wiley Eastern Ltd.,

**Scheme Examination:**
TWO questions to be set from each UNIT and Students shall answer FIVE full questions choosing at least ONE question from each UNIT.

**MANAGEMENT & ENTREPRENEURSHIP**

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<td>ME 8X09</td>
<td>03</td>
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**UNIT - I**

**MANAGEMENT:** Introduction - Meaning - nature and characteristics of Management, Scope and Functional areas of management - Management as a science, art of profession, Management & Administration, Roles of Management, Levels of Management, Development of Management Thought - early management approaches, Modern management approaches.

**PLANNING:** Nature, importance and purpose of planning process - Objectives - Types of plans (Meaning Only), Steps in planning & planning premises, Hierarchy of plans.

9 Hrs

**UNIT - II**


**DIRECTING & CONTROLLING:** Meaning and nature of directing - Leadership styles Classification and meaning only), Motivation Theories (Meaning of motivation and Classification of theories; content, process and contemporary), Communication - Meaning and importance. Coordination - meaning, importance and Techniques of Coordination. Meaning and steps in controlling - Essentials of a sound control system - Methods of establishing control (in brief).

10 Hrs
UNIT - III
ENTREPRENEURSHIP: Concept of Entrepreneurship, Evolution of Entrepreneurship, Stages in entrepreneurial process; Role of entrepreneurs in Economic Development; Entrepreneurship in India; Entrepreneurship - its Barriers. Meaning of Entrepreneur; Functions of an Entrepreneur, Types of Entrepreneurs, Intrapreneur - an emerging Class. Identification of business opportunities: Market Feasibility Study; Technical Feasibility Study; Financial Feasibility Study & Social Feasibility Study. 8 Hrs

UNIT - IV
SMALL SCALE INDUSTRIES: Definition; Characteristics; Need and rationale; Objectives; Scope; role of SSI in Economic Development. Advantages of SSI, Steps to start and SSI, Government policy towards SSI; Different Policies of SSI, Impact of Liberalization, Privatization, Globalization on SSI. Effect of WTO/GATT on SSI, Supporting Agencies of Government for SSI, Ancillary Industry and Tiny Industry (Definition Only) INSTITUTIONAL SUPPORT: Different Schemes; TECKSOK; KIADB; KSSIDC; KSIMC; DIC Single Window Agency; SISI; NSIC; SIDBI; KSFC. 7 Hrs

UNIT - V
PREPARATION OF PROJECT: Meaning of Project; Project Identification; Project Selection; Project Report; Need and Significance of Report; Contents; Formulation; Guidelines by Planning Commission for Project report; Errors of Project Report; Project Appraisal, Network Analysis (Simple numerical problems to find early and late, start and finish times, critical path and total project duration). 8 Hrs

TEXT BOOKS:
2. Dynamics of Entrepreneurial Development & Management - Vasant Desai - Himalaya Publishing House

REFERENCE BOOKS:
1. Management Fundamentals - Concepts, Application, Skill Development - Robers Lusier - Thomson -
NON CONVENTIONAL ENERGY SYSTEMS
Subject Code : EE8X10
Credits : 03
Hrs / Week : 3
Total Hours : 39

UNIT – I
Energy Sources: Introduction, Importance of Energy Consumption as Measure of Prosperity, Per Capita Energy Consumption, Classification of Energy Resources; Conventional Energy Resources - Availability and their limitations; Non-Conventional Energy Resources – Classification, Advantages, Limitations; Comparison of Conventional and Non-Conventional Energy Resources; World Energy Scenario; Indian Energy Scenario. 3 Hrs


Solar Thermal Systems: Principle of Conversion of Solar Radiation into Heat, Solar Water Heaters (Flat Plate Collectors), Solar Cookers – Box type, concentrating dish type, Solar driers, Solar Still, Solar Furnaces, Solar Green Houses 4 Hrs


UNIT – II


UNIT – III
Energy from Ocean: Tidal Energy – Principle of Tidal Power, Components of Tidal Power Plant (TPP), Classification of Tidal Power Plants, Estimation of Energy – Single basin and Double basin type TPP (no derivations. Simple numerical problems), Advantages and Limitation of TPP. Ocean Thermal Energy Conversion (OTEC): Principle of OTEC system, Methods of OTEC power generation – Open Cycle (Claude cycle), Closed Cycle (Anderson cycle) and Hybrid cycle (block diagram description of OTEC); Site-selection criteria, Biofouling, Advantages & Limitation of OTEC.


TEXT BOOKS:

REFERENCE BOOKS:

LINEAR SYSTEMS THEORY
Subject Code : EE8X11
Credits : 03
Hrs / Week : 3
Total Hours : 39

UNIT - 1
State variable analysis & design: Introduction, concept of state, state variables & state model, state model of linear systems, linearization of state equations.

State space representation using physical variables, phase variables & canonical variables.
Derivation of transfer function from state model, diagonalisation, eigen values, Eigen vectors, generalized Eigen vectors.  

**UNIT - 2**
Solution of state equation, state transition matrix & its properties, computation using Laplace transformation, power series method, Cayley-Hamilton method, 

8 Hrs

Concept of controllability & observability, methods of determining the same.  

6 Hrs

**UNIT - 3**
Pole placement techniques: stability improvements by state feedback, necessary & sufficient conditions for arbitrary pole placement. 

5 Hrs

Liapunov stability criteria, Liapunov functions, direct method of Liapunov & the linear system, Hurwitz criterion & Liapunov’s direct method 

5 Hrs

**Text Books:**

**Reference Books:**
INFORMATION AND ELECTRONIC COMMUNICATION TECHNOLOGY

Subject Code : EC 8X12 `           Credits : 03
Hrs/ Week : 3                      Total Hours : 39

Common elective from Electronics and Communication department - for the students of Other branches

UNIT - I
Introduction: measure of information, information content, symbols, entropy, communication channel, noise and channel capacity, discrete channels, error control, codes.
Noise & signal processing, AM/FM/PM..., sampling, PAM, TDM, PCM.,
Concept of spread spectrum, multiple access, cells, mobility, inter-cell handshake. 15 Hrs

UNIT - II
Microwaves: microwave devices, microwave systems and antennas, propagations, reflections and refractions terrestrial communications, ground and space components, SNR, FDMA, TDMA Etc, satellite systems and services.
Optical fiber: optical devices, transmission networks, multiplexing, WDM, OTDM, n/w management, lasers. 16 Hrs

UNIT - III
Computers communications: OSI, TCP/IP, languages, adhoc networks, security, multimedia, audio/video compression, 3G/4G N/Ws, latest trends. 8 Hrs

REFERENCE BOOKS:
R2. Kamilo Feher, "Wireless Communication &Application ", PHI.
R3. Faraouz'an, "Data Communication", TMH.
R4. Gerd keiser, "Optical fiber Communication", MGH.
R5. Fred Halsall, "Multimedia Communication", Pearson Education.

ROBOTICS

Subject Code : EC 8X13  
Credits : 03  
Hrs/ Week : 3  
Total Hours : 39

Common elective from Electronics and Communication department - for Students from other branches

UNIT - I
Introduction: Historical developments, arm kinematics and dynamics, manipulated trajectory, planning and control, sensing, robot languages, machine intelligence.
Robot arm kinematics: Direct kinematics problem and inverse kinematics solution.
Robot arm dynamics: Lagrange-Euler formulation, Newton -Euler formulation equation of motion.
Planning trajectories: General considerations, joint interpolated trajectories, planning Cartesian path trajectories.  

UNIT - II
Sensing: Range, proximity, touch, force and torque sensing.
Low level vision: Image acquisition, illumination, geometry preprocessing.
High level vision: Segmentation, description, 3D structure recognition, interpretation.
Robot programming languages: Characteristics of robot languages, task languages.

UNIT - III
Robot intelligence: State space search, predicate logic, means-ends analysis, robot learning, task planning expert systems.

TEXT BOOK:
T1. Fu K S. etal, "Robotics-control, sensing, machine and intelligence", McGraw Hill

REFERENCE BOOKS:
R2.Groover MP etal., "Industrial robotics", TMH
OBJECT ORIENTED PROGRAMMING with C++

Subject Code : CS 8X14
Credits : 03
Hrs/ Week : 03
Total Hours : 39

UNIT - I
Principles of object-oriented programming:
A look at Procedure Oriented Programming, object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits of OOP, Object oriented languages, Applications of OOP.

Beginning with c++:
What is c++, Applications of C++, Structure of C++ program, Basic Data types, derived data types, user defined data types, variables in c++, dynamic initialization of variables, reference variables, operators in c++, scope resolution operator, memory management operators, type cast operators, manipulators, namespace. 7 Hrs

UNIT - II
Functions in C++:
Function prototyping, Inline Functions, Default Arguments, Function Overloading

Classes and objects:
Introduction, C Structure Revisited, Specifying a Class, Defining Member Functions, Static Data Members, and Static Member Functions. Arrays of Objects, Objects as Functions Arguments, this pointer, Friend Functions, Returning Objects, Constant Member Functions. 8 Hrs

UNIT - III
Constructors and Destructors
Introduction, Constructors, Parameterised Constructors, Multiple Constructors in a Class. Constructors with Default Arguments, Copy Constructors, Dynamic Constructors, Constant Objects, Destructors.

Operator Overloading and Type Conversions
Introduction, Defining Operator Overloading, Overloading the Various Operators, Overloading the Increment and the Decrement Operators (Prefix and Postfix), Overloading the Unary Minus and the
Unary Plus Operator, Overloading the Arithmetic Operators, Overloading the Relational Operators, Overloading the Assignment Operator, Overloading the Insertion and Extraction Operators, Rules for overloading operators. Type Conversions.  

8 Hrs

UNIT - IV

Inheritance
Introduction, Defining Derived Classes, Single Inheritance, Protected Access Specifier, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Nesting of Classes.

8 Hrs

UNIT - V

Pointers, Virtual Functions and Polymorphism
Introduction, Pointers, Pointers to Objects, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions.

8 Hrs

Templates and Exception Handling

8 Hrs

Working with files
Classes for Files Stream Operations, Opening and Closing a File, Error Handling during File Operations.

8 Hrs

Text Books:
1. E.Balagurusamy: Object - Oriented Programming with C++, Third Edition, Tata McGraw Hill. (Chapters 1.3 to 1.8, 2.1, 2.2, 2.6, 3.5 to 3.7, 3.10 to 3.18, 4.3, 4.6 to 4.9, 5, 6, 7, 8, 9, 11, and 12).

Reference:
1. Robert Lapore: Object - Oriented Programming in Turbo C++
3. K.R. Venugopal: Mastering C++
ESSENTIALS OF INFORMATION TECHNOLOGY

Subject Code : CS 8X15  
Credits : 03
Hrs / Week : 03  
Total Hours : 39

Introduction to Computer Systems (Self-Study)
Introduction to Computer Systems - Basics of computer systems - Various hardware components - Data storage and various Memory units - Central Processing Unit - Execution cycle - Introduce to software and its classifications.

UNIT - I
Operating Systems
6 Hrs

UNIT - II
Problem Solving Techniques
Introduction to problem solving - Computational problem and it's classification - Logic and its types - Introduction to algorithms - Implementation of algorithms using flowchart - Flowcharts implementation through RAPTOR tool - Searching and sorting algorithms - Introduction and classification to Data Structures - Basic Data Structures - Advanced Data Structures.  
7 Hrs

UNIT - III
Programming & Testing
8 Hrs
UNIT - IV


UNIT - V

RDBMS
- RDBMS- data processing - the database technology - data models
- ER modeling concept -notations - Extended ER features
- Logical database design - normalization
- SQL - DDL statements - DML statements - DCL statements
- Joins - Sub queries - Views
- Database design Issues

Integrated Project:
Project based on C/C++/JAVA & RDBMS.

References:
4. Andrew Tanenbaum, Modern Operating Systems, Pearson Education
6. Charles Crowley, "Operating Systems: A Design-Oriented Approach"
7. DromeY, R.G., How to solve it by computers, Prentice Hall, 2005
14. Programming Pearls , by Jon Bentley, Pearson Education publication
16. Tharp Alan L, File Organization and Processing, John Willey and Sons.

Note:
1. Courseware for the subject (power point and the notes) is provided by the teacher. List of references is only for additional reading.
2. Project is a team work with 3 or 4 students in a team. Project need to be carried out offline (outside the lecture hours).
3. Project work includes implementation of some information system using the concepts of programming, testing and RDBMS. Following activities are involved in the project:
   □ Preparation of High level design and Detailed design document.
   □ Unit Test Plan and Integrated Test Plan.
   □ Coding and Unit Testing, Integration Testing.

Students can use the following to implement the Project:
   □ Programs using C/C++/JAVA Language
   □ Embedded SQL can be used to connect the Front-End with the backend Database systems
   □ Visual studio .NET 2005 (or Visual studio 6), RAPTOR tool and oracle 9i/10g to be used for the project.

4. CIE carries 50 Marks which includes Theory Assessment (40 Marks) and Project Work (10 marks). Theory Assessments will be conducted based on CAMP methodology. Project evaluation will be done using Rubrics methodology.
5. Number of hours listed for each unit are only for the class room teaching. Students are expected to give much more time to study each of the topics outside the class hours.
CONSUMER ELECTRONICS

Subject Code : EC 8X18           Credits : 03
Hrs/ Week : 03                    Total Hours: 39

Common elective from Electronics and Communication department - for the students Of other branches

UNIT - I
FUNDAMENTALS: Electricity, Particle and Wave Motions, Conduction and Radiations, dielectrics, inductors, Vac. tubes, S.S. devices, IC's further advances, Power supply, Circuit functions.
SOUND: Transducers (Micro Phone, Loud Speakers), enclosures, Recordings - disc, Magnetic, Optical, mono-stereo, Amplifiers, Multiplexers, mixers, Synthesizers, Theatre Sound, Studios, Editing.  

15 Hrs

UNIT - II
VISION: B/W TV, CTV, Video tapes/discs, recording/ play back, Standards, Broad-casting, Video systems, Studios, editing, B/W, Displays, Filters, Cameras, Color displays.

15 Hrs

UNIT - III
UTILITIES: - Fax, Xerox, Calculators, Microwave ovens, Washing Machines, A/C & refrigeration, Dishwashers, ATMS, Set -Top boxes, Auto Electronics, Industrial Electronics, Robotics, Electronics in health / Medicine, nano-technologies.

9 Hrs

TEXT BOOK:

REFERENCES:
R2. Kamilo Feher, "Wireless Communication & Application", PHI
OPTO ELECTRONIC DEVICES

Subject Code : PH 8X19 Credits : 03
Hrs/ Week : 03 Total Hours : 39

The objectives of the course:
* To know the basics of solid state Physics and understand the nature and characteristics of light
* To understand different methods of luminescence, display devices and laser types and applications
* To learn the principle of optical detection, mechanisms in different detection devices
* To understand different light modulation techniques and the concepts and applications optical switching
* To study the integration process and application of optoelectronic integrated circuits in transmitters and receivers.

PART-A
UNIT – I
Display Devices
Introduction- Fluorescence, Phosphorescence, Photo Luminescence, Cathode Luminescence, Electro Luminescence, LED, plasma displays, Liquid Crystal displays, Numeric displays. 7 Hrs

UNIT – II
Lasers & Fibre Optics
Optical fibre - Principle construction & working, Propagation of light, signal distortion and Attenuation 8 Hrs

PART-B
UNIT - III
Optical Detectors
Photo detector- thermal detectors, thermoelectric detectors-types, Photon Devices-types, Photoconductive detectors, Junction detectors-Photo diodes (PIN and APD), Photo Transistors, Detector Performance – characteristics, frequency response, noise aspect and sensitivity. 8 Hrs
UNIT - IV
Optoelectronic Modulators
Introduction, Polarization, Birefringence, Optical activity, Electro-optic effect, Kerr modulators, scanning & switching, Magneto-optic devices, Acoustop-optic effect  
8 Hrs

UNIT - V
Optoelectronic Waveguides
Hybrid and Monolithic Integration, Applications of Optoelectronic waveguide devices, Construction and working of integrated transmitters and receivers - Front end photo receiver, PIN-HBT Photo receiver & OEIC transmitters  
8 Hrs

TEXT BOOK:
J Wilson and J Haukes “Optoelectronics-An Introduction”, Prentice Hall of India Pvt., Ltd., New Delhi

References:
Bhattacharya “Semiconductor Optoelectronic Devices” Prentice Hall of India Pvt., Ltd., New Delhi
Ghatak and Thyagarajan, “Introduction to Opto Electronics” New Age International Publishers

Scheme:
1) SEE to be conducted out of 100 marks and will be reduced to 50 marks
2) Two questions carrying 20 marks each will be set from each unit and students have to answer any one.
VALUE EDUCATION

Subject Code : HU 8X20  
Credits : 03  
Hrs/ Week : 3  
Total Hours : 39  

The Objectives of the course:
1. To make the students realize the significance of values in self-development.
2. To train the students in techniques of mind control, time management and stress management.
3. To make students use the fundamentals learnt in the course in solving
   a) The problems in their own lives like intoxication, gambling, extra marital relations, generation gap, ragging, peer pressure, addiction to social networking sites.
   b) The problems pertaining to the society in general like corruption, irresponsible media, distractions among youth, gender discrimination, westernization, child abuse & animal cruelty.
4. To make students understand value of sustainable civilization, simple living and high thinking.

UNIT - I
Three components of human personality (IQ, EQ and SQ), separating men from animals, real problems of life, how to acquire knowledge.
Why sense gratification is opium of the masses, three kind of people and their symptoms, ethical degradation of the society today, how mind gets out of control, anger management, different levels of consciousness (bodily platform, sensual platform, mental and intellectual), regulative principles of freedom, difference between moderation and abstinence.

UNIT - II
Intoxication, harmful effect of alcohol on liver, central nervous system, blood, gastro intestinal tract, muscles, etc. myths and facts regarding alcohol. Harmful effect of smoking on respiratory health, strokes and heart diseases, cognitive dysfunction, passive smoking myths and facts about smoking, Drug addiction, common neurological effects of drug addiction, physical effects.
Negative impacts of gambling, gambling vs. substance abuse, Forms of illicit sex, forms of animals cruelty, alternatives for animal experimentation.
Knowledge, attitudes and skills needed to achieve a sustainable value based global culture.
UNIT - III
Generation gap, ragging, peer pressure, addiction to social networking sites, corruption, irresponsible media, distractions among youth, gender discrimination, westernization, child abuse, euthanasia, capital punishment, female feticide, terrorism.  

Scheme:
1) SEE to be conducted out of 100 marks and will be reduced to 50 marks.
2) Three questions from units 1&2 each and two questions from unit 3 shall be set, carrying 20 marks each.
3) Students have to answer 5 full questions, selecting at least two questions from units 1&2 each and one from unit 3.
4) Break Up of CIE (50 marks) :
   - First Mid Semester Exam - 10 marks
   - Second Mid Semester Exam - 10 marks
   - Class Quiz - 05 marks
   - Students' solution of problems discussed in the form of video skits - 25 marks

NATURAL PRODUCTS CHEMISTRY

Subject Code : CH8X21  
Credits : 03
Hrs/Week : 3  
Total Hours : 39

UNIT - I
Terpenoids: Introduction and classification, isoprene rules, general methods of determination of structure of terpenoids. Structure elucidation, synthesis and biosynthesis of the following terpenoids; Monoterrpenoids-Geraniol, α-pinene, and camphene. Sesquiterpenods-Farnesol, and α-santonine, Diterpenoids- gibberillic acid. Triterpenoids-Squaline, Cyclisation of squaline into α-lanosterol and friedelene.  

UNIT - II
Sex hormones: Chemistry of estrogen, progesterone, androsterone and testosterone. Structure and synthesis of cortisone and aldosterone.
UNIT - III

Prostaglandins: Introduction, nomenclature, classification and biological role of prostaglandins. Structure elucidation and stereochemistry of PGE1, PGE2 and PGE3. Total synthesis of PGE1 (Corey’s method). 7 Hrs

UNIT - IV


Chemistry of Porphyrins: Introduction to porphyrins, structure and degradation products of haemoglobin and chlorophyll 8 Hrs.

UNIT - V

Alkaloids: Definition, Classification and isolation of alkaloids. General methods of structural determination of alkaloids. Detailed study of structure elucidation, rearrangement, synthesis and biogenesis of the following alkaloids- papaverine, cinchonine, and morphine. 8 Hrs

References:

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# ESSENTIALS OF IT SERVICE INDUSTRY
## (SPAN TECHNOLOGIES)

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## UNIT - I
**Fundamentals of Software Industry**  
3 Hrs  
Introduction to SDLC Process; Life cycle models; Requirement Gathering Techniques; Functional, Non Functional, Statutory and Regulatory Requirements; Configuration Mgmt; Workshop on Requirement Analysis.

## UNIT - II
**Relational Database**  
6 Hrs  
Fundamentals of Relational Databases; Primary key, Unique Key, Foreign keys and Indexes; Logical & Physical Databases; Simple Queries.

## UNIT - III
**Basics of DOTNET & coding techniques**  
9 Hrs  
Introduction to .NET framework 3.5 with additional features of .NET 4.0; Language construct C#; Visual Studio Developer environment IDE; Coding Standards and General Coding guidelines.

## UNIT - IV
**ASP.NET**  
12 Hrs  
Page life cycle; Web.config; types of apps, control structure; HTML controls; Server controls; Custom controls; User controls; Form validation; Master Pages, Themes, Skins, CSS, Passing data between forms, Session object, view state, Request / Response; ADO.Net.

## UNIT - V
**Code Enabler**  
9 Hrs  
Error/Exception handling; XML – Overview; Creating XML; XML validation; XPATH; XML schema, attributes, XML in SQL; Usage of Code Analysis Tools – Face, Style Cop; Jquery;IIS.

**Note:**

1. Courseware for the subject (Power Point Presentation) will be provided by the teacher. List of references is only for additional reading.
2. Assignment will be provided for each theory sessions. These assignments need to be carried out by each student (outside the lecture hours) independently and must be submitted within the timeframe specified by the instructor.

3. Tests will be conducted on each topics separately and test assignment score will be used for final evaluation.

4. Test score will carry a weightage of 20%, assignment 30% and rest 50% weightage would be given to the final examination.

STATISTICAL DESIGN AND ANALYSIS OF EXPERIMENTS

Subject code : MA8X23
Credits : 03
Hrs/Week : 3
Total Hours : 39

UNIT – I
Curve fitting and Regression: Least square principle, curve fitting of linear, quadratic and exponential. Correlation and properties, correlation coefficients, regression analysis. 8 Hrs

UNIT – II
Probability Theory: Review of pdf’s, expectation, variance, moment generating function and properties, Moment generating functions and their properties, random samples, sampling distributions, central limit theorem and applications. 10 Hrs

UNIT - III
Estimation and Testing of hypothesis: Consistency and unbiased statistics, point and interval estimation, mean and variance, tests of hypothesis concerning mean and variances. 8 Hrs

UNIT - IV
Functions of random variables, t, F and chi-square distributions 7 Hrs

UNIT - V
Analysis of variance of one-way, two-way classified data, experimental designs: CRD, RBD, LSD, factorial experiments. 6 Hrs
Text Books:
1. Irwin Miller, John E. Frund, “Probability and Statistics for Engineers” 3rd edition

Reference books:

PROFESSIONAL & COGNITIVE COMMUNIQUÉ

Subject Code : HU8X24  CIE Marks : 50
Hrs/Week    : 3     Total Hours : 39

UNIT - I
Common sense: Understand the term ‘common sense’ & commonsensical consensus, unsettling commonsensical consensus. (Role of language in the growth of an individual)
Emotional Intelligence: Nature, function and types of intelligence; emotion, intelligence and creativity; Growth and development of emotional intelligence. 8 Hrs

UNIT - II
Manners and Etiquettes - work place etiquettes, Significance of Cross Cultural understanding; Cultural Sensitivity, Impact of social Media Self-Presentation Skills.
Workplace: Physical and Psychological working conditions; Workplace Readiness Skills. 8 Hrs

UNIT - III
Writing: Creative Writing, Formal writings/Informal writing, Plagiarism.
Reading and Interpretation: Styles of reading, scanning, skimming, detailed reading. 8 Hrs
UNIT - IV

Presentation Skills: Event planners coordinate and manage conferences meetings and parties.  

UNIT - V


Diaspora: exile, migration, old and new diasporas, the heterogeneity of diasporas, groups, especially by gender, class, sexuality, caste, religion, the role of language and other cultural practices in migratory experiences; Films and Indian Diaspora.  

References:
Ray French : Cross Culture Management, Universities Press  
Urmila Rai : Business Communication, Himalaya Publishing House  
Neil Fiore; The Now Habit at Work: Perform Optimally, Maintain Focus, and Ignite Motivation in Yourself and Others ,Publisher: Wiley ISBN: 9780470593462  
V. Geetha; Gender  
http://writingexercises.co.uk/index.php  
http://www.studyskills.soton.ac.uk/studytips/reading_skills.htm  
http://pages.minot.k12.nd.us/votech/File/workplace.htm
### INTRODUCTION TO TOPOLOGY

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**UNIT – I**

**Basics of set theory and logic:** Functions, relations, arbitrary cartesian products, principle of recursive definition, countable and uncountable sets, infinite sets and axiom of choice, well ordered set and maximum principle. **8 Hrs.**

**UNIT - II**

Topological spaces, basis for a topology, order topology, product topology on $X \times Y$, The subspace topology, closed sets and limit points, continuous functions. **8 Hrs.**

**UNIT - III**

Product topology, Metric topology, Examples. **8 Hrs.**

**UNIT - IV**

**Connectedness and compactness:** Connected spaces, connected sets in the real line, compact spaces, compact sets in the real line. **8 Hrs.**

**UNIT - V**

Countability and separation axioms. $T_1,T_2,T_3,T_4$ Spaces. **7 Hrs**

**Reference books:**
