## 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>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12CS701</td>
<td>Object Oriented Modeling and Design</td>
<td>4+0+0</td>
<td>50</td>
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<tr>
<td>2</td>
<td>12CS702</td>
<td>Advanced Computer Architecture</td>
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<td>Software Architecture</td>
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<td>4</td>
<td>12CS704</td>
<td>Business Intelligence &amp; its applications</td>
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<td>50+50</td>
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<td>5</td>
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<td>Elective –IV</td>
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<td>8</td>
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<td>Seminar + Technical Paper Writing</td>
<td>0+2+0</td>
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31 Hours/week
** Elective – IV

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>12CS711</td>
<td>Advanced Computer Networks</td>
</tr>
<tr>
<td>12CS712</td>
<td>Network Management</td>
</tr>
<tr>
<td>12CS713</td>
<td>Image Processing</td>
</tr>
<tr>
<td>12CS714</td>
<td>Web 2.0 and rich internet applications</td>
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<tr>
<td>12CS715</td>
<td>Programming interactivity</td>
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<tr>
<td>12CS716</td>
<td>Multimedia Processing</td>
</tr>
<tr>
<td>12CS717</td>
<td>Entrepreneurship Development</td>
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** Elective – V

<table>
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<tr>
<th>Code</th>
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<tr>
<td>12CS721</td>
<td>Artificial Intelligence and Machine learning</td>
</tr>
<tr>
<td>12CS722</td>
<td>Cryptography and Network Security</td>
</tr>
<tr>
<td>12CS724</td>
<td>Service Oriented architecture</td>
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<tr>
<td>12CS725</td>
<td>Bio-informatics</td>
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<tr>
<td>12CS726</td>
<td>Heterogeneous Parallel Computing</td>
</tr>
<tr>
<td>12CS727</td>
<td>Mobile Application Development Lab</td>
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</table>

** 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.

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** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

** SCHEME OF TEACHING

** VIII Semester (22 credits)  

24 hours/week

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Code</th>
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<th>Hours/week</th>
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<th>S.E.E</th>
<th>Credits</th>
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<td>12CS82Y</td>
<td>Elective-VII</td>
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<td>12CS8XY</td>
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<td>Project</td>
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** Total: 22 **
Open Electives offered by CSE Dept for non-IT streams. 12CS8X14: Object Oriented Programming with C++
12CS8X15: 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.

<table>
<thead>
<tr>
<th>Elective –VI</th>
<th>Elective –VII</th>
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<tbody>
<tr>
<td>12CS812. Decision Support System</td>
<td>12CS821. CAD for VLSI &amp; VHDL</td>
</tr>
<tr>
<td>12CS813. Soft Computing Techniques</td>
<td>12CS822. Supply Chain Management &amp; ERP</td>
</tr>
<tr>
<td>12CS815. Game Theory</td>
<td>12CS825. Advanced Compilation Techniques</td>
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OBJECT ORIENTED MODELING AND DESIGN

Subject Code: **12CS701**
Credits:04
Hours/Week: 04
Total Hours: 52

UNIT-I

10Hrs

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;

UNIT-II

11Hrs

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.

UNIT-III

11Hrs

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.

UNIT-IV

System Design: Overview of system design; Estimating performance; Making a reuse plan; Breaking a system in to 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.

UNIT-V

10Hrs

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.

TEXTBOOKS:

REFERENCE BOOKS:

ADVANCED COMPUTER ARCHITECTURE

Sub code: 12CS702
Credits: 04
Hours/week: 04
Total Hours: 52

UNIT-I

10 Hrs

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)

UNIT-II

10 Hrs

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).
UNIT-III

10Hrs

**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)

UNIT-IV

12Hrs


UNIT-V

10Hrs

**HARDWARE AND SOFTWARE FOR VLIW AND EPIC** (Text 1, Appendix G)

TEXT BOOKS:


SOFTWARE ARCHITECTURE

Subject Code: **12CS703**

Credits: 04

Hours/ Week: 04

Total Hours: 52

UNIT-I

10Hrs

**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.

UNIT-II  
10Hrs

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.

UNIT-III  
11Hrs


UNIT-IV  
11Hrs

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

UNIT-V  
10Hrs

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.

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: 12CS704
Crédits: 03
Hours/week: 03
Total Hours: 52

UNIT-I

7Hrs

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

UNIT-II

8Hrs

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;

UNIT-III

8Hrs

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.

UNIT-IV

8Hrs

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;

UNIT-V

8Hrs

Classification and Prediction - Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Prediction, Cluster Analysis - Types of Data in Cluster Analysis, Hierarchical Methods.

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

BUSINESS INTELLIGENCE LABORATORY

Subject Code: 12CS704
Credits: 01
Hours/Week : 2
Experiments using Business Intelligence Development Studio (BIDS), MySQL/SQL Server
Mini Projects for creating data warehouse and designing reports - Project: Data warehouse creation and designing reports; Introduction to SSRS Architecture, Enterprise reporting using SSRS; Use of Business Intelligence Development Studio (BIDS)
Experiments using Clementine Data Mining software

ADVANCED COMPUTER NETWORKS

Subject Code: 12CS711
Hours/Week: 03
Total Hours: 39

UNIT-I

Application Layer

UNIT-II

Wireless and Mobile Networks

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

UNIT-IV

Security in Computer Networks

UNIT-V
Network Management 7Hrs
Infrastructure of Network Management: The internet standard management Framework: SMI, MIB, SNMP protocol operations and transport mappings, security and administration., ASN.1 syntax.

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
Sub Code: 12CS712 Credits:03
Hours/week: 03 Total Hours: 39

UNIT-I 8Hrs
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

UNIT-II 8Hrs
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.

UNIT-III 8Hrs
SNMPv1 Network management: Organization and Information Models

UNIT-IV

SNMPv1 Network management: Communication and Functional Models

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

UNIT-V

Broadband Network management
ATM Technology, ATM Network management, HFC Management, DSL Technology and ADSL Management, Network management applications

TEXT BOOK:

IMAGE PROCESSING

Sub. Code: 12CS713
Credits: 03
Hours/week: 03
Total hours: 39

UNIT-I


Image Enhancement in the Spatial Domain - Background, Some Basic Gray Level Transformations, Histogram Processing.

UNIT- II

8Hrs

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,

UNIT- III

8Hrs

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

UNIT- IV

8Hrs

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

UNIT- V

8Hrs


TEXT BOOKS:

REFERENCE BOOKS:

WEB 2.0 AND RICH INTERNET APPLICATIONS

Course Code: 12CS714  
Crédits: 03  
Hours / Week: 03  
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.

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.

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;

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.

**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;  
4 Hrs

**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**:  
REFERENCE BOOKS:


PROGRAMMING INTERACTIVITY

Subject code: 12CS715  
Credits:03  
Total hours: 39

UNIT-I  
8Hrs


UNIT-II  
8Hrs

ockenFrameworks: 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.

UNIT-III

8Hrs


UNIT-IV

8Hrs

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

8Hrs

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:
MULTIMEDIA PROCESSING

Sub Code: 12CS716
Credits: 03
Total Hours: 39

UNIT-I
8Hrs

Multimedia Communications: Introduction to Multimedia Systems and Processing, multimedia information representation, multimedia networks, multimedia applications, network QoS and application QoS.

Information Representation: text, images, audio and video,

UNIT-II
7Hrs

Image compression: GIF format, TIFF format, digital Pictures, Raster scan principles, transform encoding, entropy encoding, differential encoding

UNIT-III
9Hrs


UNIT-IV
9Hrs

Video: broadcast TV, color signals, NTSC, PAL, Digital formats: 4:2:2, 4:2:0, HDTV format, SIF, CIF, QCIF, PC video.

Video compression: video compression principles, frame types, motion estimation and compensation, encoding of frames, implementation issues, video compression standards: H.261, H.263, P1.323

UNIT-V
6Hrs

MPEG 1, MPEG 2, MPEG 4, MPEG 7, MPEG 21 multimedia framework, Significant features of JPEG 2000, Synchronization

TEXT BOOKS:
3. NPTEL materials on multimedia processing, IIT Kharagpur (make reference)

REFERENCE BOOKS:

ENTREPRENEURSHIP DEVELOPMENT

Subject Code : 12CS717
Credits : 03
Hours / Week : 03
Hours:39

Course objectives:
1. To develop and strengthen entrepreneurial quality and motivation in students.
2. To impart basic entrepreneurial skills and understandings to run a business efficiently and effectively.
3. To provide insights to students on entrepreneurship opportunities

UNIT-I:

Module 1
6Hrs
Entrepreneur: Meaning of entrepreneur: Evolution of the concept: Functions of an Entrepreneur, Types of Entrepreneur, Intrapreneur- an emerging class, Concept of Entrepreneurship-Evolution of Entrepreneurship: Development of Entrepreneurship; The Entrepreneurial Culture; Stages in entrepreneurial process.

Module 2:
4Hrs

UNIT-II:

Module 3
6Hrs
Business Planning Process: Meaning of business plan, Business plan process, Advantages of business planning, Marketing plan, Production/operations plan, Organization plan, financial plan, final project report with feasibility study, preparing a model project report for starting a new venture.

UNIT-III:

Module 4
4Hrs
Institutions Supporting entrepreneurs: Small industry financing developing countries, A brief overview of financial institutions in India, Central level and state level institutions, SIDBI,NABARD, IDBI,SIDCO, Indian Institute of Entrepreneurship, DIC, Single Window, Latest Industrial Policy of Government of India
UNIT-IV:

Module 5

**Family Business:** Importance of family business, Types, History, Responsibilities and rights of shareholders of a family business, Succession in family business, Pitfalls of the family business, strategies for improving the capability of family business, improving family business performance.

Module 6

**International Entrepreneurship Opportunities:** The nature of international entrepreneurship, Importance of international business to the firm, International versus domestic entrepreneurship, Stages of economic development, Entrepreneurship entry into international business, exporting, Direct foreign investment, barriers to international trade.

UNIT V:

Module 7

**Informal risk capital and venture capital:** Informal risk capital market, venture capital, nature and overview, venture capital process, locating venture capitalists, approaching venture capitalists. Social Entrepreneurship: Social enterprise-need, types, characteristics and benefits of social enterprises-Social entrepreneurship, Rural entrepreneurship-need and problems of rural entrepreneurship, challenges and opportunities-Role of government.

Case studies in Entrepreneurship Development

Practical component:

1. Make a business plan for your intended business, talk to bankers to find out what they look for in a business plan, modify accordingly and present it in the class
2. Analyze the performance of listed family firms. How is their performance compared to the performance of other firms? Does a family firm successfully manage to create wealth for non-family investors?
3. Interview a local entrepreneur to find out his/her major motivations to start a business, which of the skills and characteristics do you find in the entrepreneur?
4. Study a local for-profit business and try to list out the positive social impacts of the business
5. Visit a trade show and try to compare the marketing activities of various stalls in that show, make a list of good practices you come across in the show
6. Research on innovation that has been done in the Indian setting that has alleviated the life in rural India. Find out extent of its commercial success and analyze the reasons behind the same. Present your thoughts in the class
7. Choose an NGO in your locality. Interview the founder and present the case in class on
the motivations, challenges, ecosystem support and their impacts, arrive at possible solutions and convey back to NGO.

RECOMMENDED BOOKS:

REFERENCE BOOKS:
1. Dr. Mathe J Manimala, Entrepreneurship Theory at crossroads, Biztantra, 2007
4. Rajiv Roy, Entrepreneurship, Oxford University Press, 2/e, 2011

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Subject code: 12CS721
Credits: 03
Total Hours: 39

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

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

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

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

UNIT-V

Analytical Learning, Combining Inductive and Analytical Learning, Reinforcement Learning, ML Applications

TEXT BOOKS:

REFERENCE BOOK:
1. Artificial Intelligence by Patterson

CRYPTOGRAPHY AND NETWORK SECURITY

Subject code: 12CS722
Hours/Week: 03
Credits: 03
Total Hrs: 39

UNIT-I


UNIT-II


UNIT-III

UNIT-IV

8Hrs


UNIT-V

7Hrs


TEXT BOOK:


REFERENCE BOOKS:


SERVICE ORIENTED ARCHITECTURE

Subject Code: 12CS724
Hrs/ Week: 03
Credits:03
Total Hours: 39

UNIT-1
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).

UNIT-II

WEB SERVICES AND PRIMITIVE SOA: The Web services framework; Services (as Web services); Service descriptions (with WSDL); Messaging (with SOAP).

WEB SERVICES AND CONTEMPORARY SOA – 1: Message exchange patterns; Service activity; Coordination; Atomic Transactions; Business activities; Orchestration; Choreography.

UNIT-III

WEB SERVICES AND CONTEMPORARY SOA – 2: Addressing; Reliable messaging; orrelation; Polices; Metadata exchange; Security; Notification and eventing.

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.

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.

BUSINESS PROCESS DESIGN: WS-BPEL language basics; WSCoordination overview; Service-oriented business process design; WSaddresing language basics; WS-Reliable Messaging language basics.
UNIT-V

SOA PLATFORMS: SOA platform basics; SOA support in J2EE; SOA support in .NET; Integration considerations.

7Hrs

TEXT BOOK:


REFERENCE BOOK:


BIOINFORMATICS

Subject Code: 12CS725 Credits: 03
Hours/Week: 03 Total Hours: 39

UNIT-I

4Hrs

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 7Hrs
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.

UNIT-IV

8Hrs

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.

UNIT-V

8Hrs

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

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

Sub code: 12CS726  
Credits: 03  
Hours/Week: 03  
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.  


UNIT-II


UNIT-III

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

UNIT-IV

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

UNIT-V

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

TEXTBOOK:

REFERENCE BOOKS:

5. Shaders: [www.lighthouse3d.com/opengl/gls](http://www.lighthouse3d.com/opengl/gls)

MOBILE APPLICATION DEVELOPMENT LAB

Subject Code: 12CS727
Credits: 03
Total Hrs: 39

UNIT-I 8Hrs

USER INTERFACE DESIGNING
Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android Platform, setting up the mobile app development environment along with an emulator.
App user interface designing – mobile UI resources (Layout, UI elements, Drawable, Menu), Activity – states and life cycle, interaction amongst activities.

UNIT-II 8Hrs

APP FUNCTIONALITY BEYOND USER INTERFACE
App functionality beyond user interface – Threads, Async task, Services – state and lifecycle, Notifications, Broadcast receivers, Telephony and SMS APIs.

UNIT-III 8Hrs

DATA HANDLING
Native data handing – on device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access.

UNIT-IV

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

UNIT-V
**TESTING MOBILE APPS** and **TAking APPS TO MARKET**

Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps using suitable tools like JUnit.

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

**Text Books:**
- Barry Burd, Android Application Development All in one for Dummies
- Teach Yourself Android Application Development in 24 Hours, Publication: SAMS
UNIT-I

Management: Meaning – Functions of Management


Objectives – Meaning, Characteristics/Qualities of Sound Objective.

Forecasting – Meaning, Methods of Forecasting (Qualitative methods and Quantitative methods – simple moving average method, weighted moving average method, exponential smoothing method, simple regression model)

UNIT-II

Organizing: Meaning, Legal Forms of Organization – Sole Proprietorship, Partnership, Corporation/Company, Co-operatives – Meaning and Features only)

Delegation of Authority and Span of Control – Meaning, Factors Determining the Span of Control.


Performance Appraisal – aims and formal schemes/methods of performance appraisal, 360 degree performance appraisal.

UNIT-III

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, Simple Interest, Compound Interest, Effective Rate of Interest, Payback Time, Present Worth, Future Worth, Annual Worth Calculations.

**UNIT-V**

8Hrs

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

**Depreciation** – Types and Causes, Computing Depreciation (using straight line method only) – Estimation of Sunk Cost.

**TEXT BOOKS :**

**REFERENCE BOOKS :**

**DECISION SUPPORT SYSTEMS**

**Subject Code:** 12CS812  
**Credits:** 03  
**Hours/Week:** 03  
**Total Hours:** 39

**UNIT-I**

8Hrs

**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 framework for decision support, the concept of Decision Support systems, Group
UNIT-II

8Hrs

Decision Making and Computerized Support (Contd...)

UNIT-III

7Hrs

Decision Support Systems-I

UNIT-IV

8Hrs

Decision Support Systems – II

UNIT-V

8Hrs

Knowledge Based DSS:

TEXT BOOK:

REFERENCE BOOKS:

SOFT COMPUTING TECHNIQUES

Sub Code: 12CS813
Hours/week : 03
Crédits :03
Total Hours: 39

UNIT-I

INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence.
UNIT-II

8Hrs

GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT-III

8Hrs

NEURAL NETWORKS

Introduction to Neural Network, Adaptive Networks – Feed forward Networks.

UNIT-IV

8Hrs

FUZZY LOGIC


UNIT-V

8Hrs

NEURO-FUZZY MODELING


TEXT BOOKS:


4. Simon Haylion “Neural Networks”, Prentice-Hall of India

REFERENCE BOOKS:


AD HOC WIRELESS NETWORKS

Sub. Code: 12S814 Credits : 03
Hours/week:03 Total Hours:39


UNIT-I

8 Hrs

UNIT-II

8 Hrs

UNIT-III

8 Hrs

UNIT-IV

8 Hrs

Transport Layer Protocols in Ad Hoc Networks – II: Feedback-Based TCP, TCP with ELFN, Ad-hoc Transport Protocol, Split TCP.

UNIT-V  
7 Hrs


Textbooks:


Reference Books:


GAME THEORY

Sub Code: 12CS815  
Credits: 03

Hours/week: 03  
Total Hours: 39

UNIT-I  
8Hrs
Introduction; Strategic Games
What is game theory? Four elements, Classification of games, The theory of rational choice; Interacting decision makers, Strategic games; Example: The prisoner’s dilemma; Nash equilibrium; Examples of Nash equilibrium; Best- response functions; Dominated actions; Equilibrium in a single population: symmetric games and symmetric equilibria, Interpretation of Nash Equilibrium.

UNIT-II
8Hrs

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.

UNIT-III
7Hrs

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

UNIT-IV
8Hrs
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.

UNIT-V
8Hrs
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

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

REFERENCE BOOK:

CAD FOR VLSI AND VHDL

Sub code: 12CS821  Credits: 03
Hours/Week: 03  Total Hours: 39

UNIT-I

8Hrs


UNIT-II

8Hrs


UNIT-III

8Hrs

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.

UNIT-V

VHDL, language constructs, entity and architecture, behavioral description, structural description, examples, Sequential Statements, Testbenches

TEXT BOOKS & REFERENCE BOOKS:

1. VLSI CAD – Niranjan N.Chiplunkar and Manjunath Kothari, PHI Learning Pvt. Ltd. NewDelhi, 2011
3. VHDL Programming: Douglas Perry, TMH
5. Logic synthesis and Verification Algorithms – Gary Hatchel and Fabio somenzi, Kluwer Academic

SUPPLY CHAIN MANAGEMENT AND ENTERPRISE RESOURCE PLANNING

Subject Code: 12CS822
Credits: 03
Hours/Week: 03
Total Hours: 39

UNIT-I


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

Pricing and Revenue Management in a Supply Chain: Role of pricing and Revenue Management in the supply chain, Revenue management and pricing for: Multiple customer segments, perishable assets, seasonal demand, bulk and spot contracts, Role of IT in pricing and revenue management, Using Pricing and Revenue management in practice.

UNIT-IV

IT in a supply chain: The role of IT in a supply chain, The Supply Chain IT framework, CRM, Internal SCM, SRM, The Transaction Management Foundation, The future of IT in Supply chain, risk management in IT, Supply chain IT in practice, IT system selection processes-Indian approach and experiences.

UNIT-V

ERP: Benefits, business engineering, ERP and management concerns, Business Modeling for ERP, ERP implementation, customization, post implementation options. ERP and competitive advantage, ERP domain: SAP, BAAN, SAP r/3, MGF/PRO, IFS/Avalon.

TEXT BOOKS:

Reference Book:
1. Martin Christopher, ”Logistics and supply chain management”
NANOTECHNOLOGY AND QUANTUM COMPUTING

Subject Code: 12CS823  Credits: 03
Hours/Week: 03  Total Hours: 39

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

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

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

UNIT-IV
8Hrs
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.

UNIT-V
8Hrs
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.

TEXT BOOKS:
• 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 TECHNIQUES

Subject Code: 12CS825

Total Hours: 39 Hrs

UNIT-1

7Hrs

Introduction and Review: Language processors; The structure of a Compiler; The evolution of programming languages; The science of building a compiler; Applications of Compiler technology; Programming language basics.

UNIT-II

8Hrs

Topics in Code Generation: Issues in the design of Code Generator; Peephole optimization; Register allocation and assignment; Instruction selection by tree rewriting; Optimal code generation for expressions; Dynamic programming code generation.

UNIT-III

8Hrs

Machine-Independent Optimizations: The principle sources of optimization; Introduction to data flow analysis; Foundations of data flow analysis; Constant propagation; Partial-redundancy elimination; Loops in flow graphs; Region-based analysis; Symbolic analysis.

UNIT-IV

8Hrs

Instruction-Level Parallelism: Process architectures; Code-scheduling constraints; Basic-block scheduling; Global code scheduling; Software pipelining.

UNIT-V

8Hrs

Optimizing for Parallelism and Locality: Basic concepts; An example of matrix multiplication; Iteration spaces; Affine array indexes; Data reuse; Array data –
dependence analysis; Finding synchronization-free parallelism; Synchronization between parallel loops; Pipelining; Locality optimizations.

TEXT BOOKS:

REFERENCE BOOKS:

OPEN ELECTIVES OFFERED IN VIII SEMESTER FOR THE YEAR 2014-15

MA8X 01 Graph Theory
MA8X 02 Linear Algebra
HUBX 03 Intellectual Property Rights
PHB8X 04 Advanced Materials Technology
BTBX 05 Nano Technology
BTBX 06 Instrumental methods of Analysis
CVBX 07 Environmental Impact Assessment
MEBX 08 Industrial Pollution Control
MEBX 09 Management and Entrepreneurship
EEBX 10 Non-Conventional Energy Systems
EEBX 11 Linear Systems Theory
ECCBX 12 Information and Electronic Communication Technology
ECCBX 13 Robotics
12CCBX14 Object Oriented Prog. with C++
12CCBX15 Essentials of Information Technology
ECCBX 18 Consumer Electronics
PHBX 19 Optoelectronic devices
HUBX 20 Value Education
CHBX 21 Natural Products Chemistry for Bio-Tech
12CSBX22 Essentials of IT Service Industry
MA8X 23 Statistical design and analysis of experiments
HUBX 24 Professional & Cognitive Communicate’

GRAPH THEORY

Sub code: MA8X01
Hours/Week: 3
Credits: 3
Total Hours: 39

UNIT-I
Introduction to graphs, digraphs, sub graphs-spanning and induced graphs, paths, cycles, connectivity, cut points, bridges, blocks.

UNIT-II
Trees, Eularian graphs, characterizations, Hamiltonian graphs.

UNIT-III
Planar graphs, outer planar graphs, Euler’s polyhedron formula, Colorability: chromatic number, Five colour theorem, four colour conjecture, Chromatic polynomial.

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.

UNIT-V

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

Sub code: MA8X02
Credits: 3
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.
Vector spaces: Vector spaces; subspaces; bases and dimension; coordinates; summary of row-equivalence; computations concerning subspaces.

UNIT-III 10Hrs

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.

UNIT-IV 8Hrs

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.

UNIT-V 7Hrs

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

Text Books:
5. 

INTELLECTUAL PROPERTY RIGHTS (IPR)

Subject Code: HU8X03 Credits: 03
Hours/week: 3 Hrs Total hours: 39

UNIT-I 8Hrs

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

UNIT-II 8Hrs
Agreements and Treaties

UNIT-III
8Hrs
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.)

UNIT-IV
8Hrs
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.

UNIT-V
7Hrs
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 agreements

References:
5. Intellectual Property Today: Volume 8, No. 5, May 2001,
    - Rachna Singh Puri
    - Arvind Vishwanathan
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
8Hrs

Structures and Properties of Ceramics - Introduction, Ceramic structures: Crystal structures, Silicate Ceramics, Carbon, Imperfection in ceramics, ceramic phase diagram, Mechanical properties: Brittle Fracture 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.

UNIT-II
8Hrs


Polymer Synthesis and Processing - Polymerization, polymer additives, Forming Techniques for Plastics, Fabrication of fibers and Films and applications

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.

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
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
6Hrs
INTRODUCTION

UNIT-II
8Hrs
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).

UNIT-III
8Hrs
NANOTECHNOLOGY FOR DRUG DISCOVERY & DRUG DELIVERY

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

UNIT-V
9Hrs
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.

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
Hours / Week: 3
Total Hours: 39

Beneficiary Branches of Engineering: Mechanical, Civil.

UNIT-I
INTRODUCTION
7Hrs
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.

UNIT-II
SPECTROSCOPIC TECHNIQUES
9Hrs
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
9Hrs

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.

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.

Text Book:

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

ENVIRONMENTAL IMPACT ASSESSMENT
Sub Code: CV 8X07
Credits: 03
Hours/ Week: 03
Total Hrs: 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
8Hrs
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
7Hrs
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: 03 Total Hrs: 39

UNIT-I
8Hrs
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.

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

UNIT-III
8Hrs
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.

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.

UNIT-V

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

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

Sub Code: ME 8X09
Credits: 03
Total Hours: 39

UNIT-I

Introduction to Production/ Operations Management: Concept of production, Classification of production systems, Production Management, Concept of operations, Distinction between Manufacturing Operations and Service Operations, Objectives of Operations Management (Customer Service and Resource utilization/ Competitive advantage through Quality-Delivery-Cost), Scope of Operations Management. Introduction to Customer Relationship Management (CRM) and Enterprise Resource Planning (ERP)

UNIT-II

9Hrs
**Introduction to Quality Concepts:** The Meaning of Quality and Quality Improvement, Key dimensions of Quality, Concept of cost of quality, Customers’ perception of quality.

**TOTAL Quality Management:** Definition, Principles of TQM, Gurus of TQM, Benefits of TQM.

**Managing Quality:** Quality circles, Continuous Improvement- Juran’s Trilogy, PDSA cycle, Kaizen, 7 QC tools,

**Philosophy of statistical process control and modeling process quality:** Normal distribution tables, Finding the Z score, Central limit theorem, Chance and assignable causes of variation, Statistical Basis of the Control Charts (basic principles, choices of control limits, significance of control limits, warning limits)

**UNIT-III**

**Control charts for variables:** Control Charts for X-Bar and R- Charts, Type I and Type II errors, Simple Numerical Problems,

**Process capability:** The foundation of process capability, Natural Tolerance limits, $c_p$ – process capability index, $c_{pk}$, $c_{pk}$ – process performance index, summary of process measures. Numerical problems. Concept of Six sigma.

Introduction to reliability, Mean time to failure, Mean time between failures, Bath tub curve.

Reliability of series and parallel systems.

**UNIT-IV**

**ENTREPRENEURSHIP:** Concept of Entrepreneurship, Stages in entrepreneurial process, Role of entrepreneurs in Economic Development, Barriers to Entrepreneurship, 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.

**Application of Operations Management concepts in Facility/ Business Location:** General procedure for making locations decisions, Numerical Problems on application of Break even analysis and Transportation method to make location decisions.

**UNIT-V**

**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.

**TEXT BOOKS:**

5. **Dynamics of Entrepreneurial Development & Management** – Vasant Desai – Himalaya Publishing House

**REFERENCE BOOKS:**

**NON CONVENTIONAL ENERGY SYSTEMS**

**Subject Code:** EE8X10  
**Credits:** 3  
**Hours / Week:** 3  
**Total Hours:** 39

**UNIT-I**

3Hrs

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-Convention Energy Resources – Classification, Advantages, Limitations; Comparison of Conventional and Non-Convention Energy Resources; World Energy Scenario; Indian Energy Scenario.


**5Hrs**

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 Furnces, Solar Green Houses.

4Hrs


UNIT-II


3 Hrs


5 Hrs


7 Hrs

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.

5 Hrs


3Hrs

TEXT BOOKS:

REFERENCE BOOKS:

LINEAR SYSTEMS THEORY

Subject Code: EE8X11
Credits: 03
Hours / Week: 3
Total Hours: 39

UNIT-I

State variable analysis & design: Introduction, concept of state, state variables & state model, state model of linear systems, linearization of state equations.  
3Hrs

State space representation using physical variables, phase variables & canonical variables.  
6Hrs

Derivation of transfer function from state model, diagonalisation, eigen values, Eigen vectors, generalized Eigen vectors.  
6Hrs

UNIT-II

Solution of state equation, state transition matrix & its properties, computation using Laplace transformation, power series method, Cayley-Hamilton method,  
8Hrs

Concept of controllability & observability, methods of determining the same.  
6Hrs

UNIT-III

Pole placement techniques: stability improvements by state feedback, necessary & sufficient conditions for arbitrary pole placement  
5Hrs

Liapunov stability criteria, Liapunov functions, direct method of Liapunov & the linear system, Hurwitz criterion & Liapunov’s direct method  
5Hrs

Text Books:

**Reference Books:**

**INFORMATION AND ELECTRONIC COMMUNICATION TECHNOLOGY**

**Subject Code:** EC 8X12  
**Credits:** 03  
**Hours/ Week:** 03  
**Total Hours:** 39

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

**UNIT-I**  
15 Hrs  
**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.

**UNIT-II**  
16 Hrs  
**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.

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

**REFERENCE BOOKS:**
R2. Kamilo Feher, "Wireless Communication &Application ", PHI.  
R3. Farauzan, "Data Communication", TMH.  
R4. Gerd keiser, "Optical fiber Communication", MGH.
ROBOTICS

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

UNIT-I
16 Hrs

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
16 Hrs

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

UNIT-III
7 Hrs

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

TEXT BOOK:

REFERENCE BOOKS:
R2. Groover MP etal., "Industrial robotics", TMH

OBJECT ORIENTED PROGRAMMING with C++

Subject Code: 12CS 8X14  
Credits: 03  
Total Hrs: 39

UNIT-I
7 Hrs

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.

**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.

**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.

**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.

**Pointers, Virtual Functions and Polymorphism**
UNIT-V

**Templates and Exception Handling**

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

**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:** 12CS 8X15  
**Credits:** 03  
**Hours / Week:** 03  
**Total Hrs:** 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

**Problem Solving (Self-Study)**
Problem Solving skills - Algorithm Representation using Psuedo Code - Pseudo code Testing-Dry Run - Algorithm Properties

UNIT-I

**Object Oriented Programming using JAVA – I**

**Data Structures** - Linear Data Structures-Arrays, Linked List, Stacks, Queues - Non Linear Data Structure- Trees, Binary Search Tree

**Programming in JAVA** - Programming Constructs in JAVA - Type Casting - Control Structures
SDLC & UML - SDLC Overview and need for Object Oriented Approach - Object Oriented Concepts - Introduction to UML

Object Oriented Fundamentals & Implementation in JAVA - OO fundamentals - Coding Standards - Reference Variables & Objects in Memory - Methods- Pass by Values, Pass by References, Recursive Methods - this Reference

UNIT-II

Object Oriented Programming using JAVA - II

OO Constructs in JAVA in Java-I - Arrays-Revisit - Strings - Constructors: Default, Parameterized - Static - Command Line Arguments & Revisiting Main - Algorithm Design Techniques -


UNIT-III

Relational Database Management System - I

RDBMS- Database Model - Relational Database Model - Keys in RDBMS - Database life Cycle - Database Design.

ER modeling concept –Notations – Extended ER features - Conversion of ER Diagram into Relational Schema

Logical database design - Normalization - Functional Dependency - 1NF - 2NF - 3NF

UNIT-IV

Relational Database Management System - II

SQL – DDL statements - Create, Alter, Drop, Truncate – DML statements- Insert, Update, Delete, Select – DCL statements- Grant, Revoke - TCL statements-Commit, Rollback.

Joins - Sub queries – SQL Best Practices - Views - Transaction - Procedural Language SQL – Cursor

Database design Issues

UNIT-V

Software Engineering & User Interface
Introduction to UI Concepts & Web Technologies - Internet Basics - Types of Networks, Topologies, Connecting Devices, Network Architecture, IP Address - Web Fundamentals - HTML & CSS - Javascript - Introduction to DOM


Integrated Project:
Project based on JAVA & RDBMS.

References:
- Dromey, R.G., How to solve it by computers, Prentice Hall, 2005
- Alfred V. Aho, Ullman, Hopcroft, Data Structures and Algorithms, Addison-wesely.
- Lipschutz, Seymour & G A V Pai, Data Structures, Tata McGraw – Hill
- Baldwin, Douglas & Scragg, Greg W., Algorithms and Data Structures The Science of Computing, Dreamtech
- Schaum series, Programming in C, Third Edition
- Programming Pearls, by Jon Bentley, Pearson Education publication
- Aho, Alfred V, Compiler Principles, Techniques and Tools, Pearson Education
- Tharp Alan L, File Organization and Processing, John Willey and Sons
- C.J.Date, ”An introduction to Database Systems”, Sixth ed, Narosa Publications

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 analysis, design, 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 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
Hours/ 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.

UNIT-II

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

UNIT-III

UTILITIES: - Fax, Xerox, Calculators, Microwave ovens, Washing Machines, A/C & refrigeration, Dishwashers, ATMS, Set -Top boxes, Auto Electronics, Industrial
TEXT BOOK:
REFERENCES:
R2. Kamilo Feher, "Wireless Communication & Application", PHI

OPTO ELECTRONIC DEVICES

Subject Code: PH 8X19
Credits: 03
Hours/ 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 of optical switching
* To study the integration process and application of optoelectronic integrated circuits in transmitters and receivers.

PART-A
UNIT-I

Display Devices

UNITT-II

Lasers & Fibre Optics
Optical fibre - Principle construction & working, Propagation of light, signal distortion and Attenuation

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
UNIT-IV

Optoelectronic Modulators
Introduction, Polarization, Birefringence, Optical activity, Electro-optic effect, Kerr modulators, scanning & switching, Magneto-optic devices, Acousto-optic effect

UNIT-V

Optoelectronic Waveguides
Hybrid and Monolithic Integration, Applications of Optoelectronic wave guide devices, Construction and working of integrated transmitters and receivers-Front end photo receiver, PIN-HBT Photo receiver & OEIC transmitters

TEXT BOOK:

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 50marks
2) Two questions carrying 20 marks each will be set from each unit and students have to answer any one.

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VALUE EDUCATION

Subject Code: HU 8X20 Credits: 03
Hours/ Week: 03 Total Hrs: 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, gastrointestinal 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
Hours/ Week: 03
No. of credits: 03
Total Hrs: 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; Monoterpenuoids-Geraniol, α-pinene, and camphene. Sesquiterpenoids-Farnesol, and α-santonine, Diterpenoids-gibberillic acid. Triterpenoids-Squaline, Cyclisation of squaline into α-lanosterol and friedelene.

UNIT-II

**Steroids:** Introduction and nomenclature of steroids, Blanc’s rule, Barbier-Wielman degradation, Oppener oxidation, Dile’s hydrogenation. Chemistry of estrogen, Vitamin D and bile acids.  
**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).

UNIT-IV

**Carotenoids:** Introduction and geometrical isomerism of carotenes. Structure and synthesis of β-carotene and chlorophyll.  
**Chemistry of Porphyrins:** Introduction to porphyrins, structure and degradation products of haemoglobin and chlorophyll.

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.

References:

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Essentials of IT Service Industry (SPAN Technologies)

Subject Code: 12CS8X22  Credits: 03
Hours/week: 03  Total no. of hrs: 39

UNIT-I

3 Hrs

Fundamentals of Software Industry
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

6 Hrs

Relational Database
Fundamentals of Relational Databases; Primary key, Unique Key, Foreign keys and Indexes; Logical & Physical Databases; Simple Queries.

UNIT-III

9 Hrs

Basics of DOTNET & coding techniques
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

12 Hrs

ASP.NET
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

9 Hrs

Code Enabler
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.

5.

Statistical Design and Analysis of Experiments

Sub code: MA8X23
Hours/Week : 3

Total Hours: 39

UNIT-I

8 Hrs

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

UNIT-II

10 Hrs

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.

UNIT-III

8 Hrs

Estimation and Testing of hypothesis: Consistency and unbiased statistics, point and interval estimation, mean and variance, tests of hypothesis concerning mean and variances.

UNIT-IV

7 Hrs

Functions of random variables, t, F and chi-square distributions

UNIT-V

6 Hrs

Analysis of variance of one-way, two-way classified data, experimental designs: CRD, RBD, LSD, factorial experiments.

Text Books:
1. Irwin Miller, John E. Frund, “Probability and Statistics for Engineers” 3rd edition

Reference books:
Introduction to Topology

Sub code: MA8X25
Hours/Week: 03
No. of credits: 3
Total Hours: 39

UNIT-I
8 Hrs

**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.

UNIT-II
8 Hrs

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

UNIT-III
8 Hrs

Product topology, Metric topology, Examples.

UNIT-IV
8 Hrs

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

UNIT-V
7 Hrs

Countability and separation axioms. \( T_1, T_2, T_3, T_4 \) Spaces.

**Reference books:**

Professional & Cognitive Communiqué

Subject Code: HU8X24
Hours/Week: 03
Total Hours: 39

UNIT-I
8 Hrs

**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.

UNIT-II
8 Hrs
**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.**

**UNIT-III**

8 Hrs

**Writing:** Creative Writing, Formal writings/Informal writing, Plagiarism.

**Reading and Interpretation:** Styles of reading, scanning, skimming, detailed reading.

**UNIT-IV**

8 Hrs

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

**UNIT-V**

7 Hrs

**Impact of Gender Perspectives:** Development, Ecology and Globalization -Social movement studies- Process of socialization & gendering.

**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