CSC-801
SOFT COMPUTING

UNIT-I
Soft Computing:- Introduction of soft computing, soft computing vs hard computing, various types of soft computing techniques, applications of soft computing.

Introduction to Neural Network:- Concept, biological neural network, evolution of artificial neural network, McCulloch-Pitts neuron models, Learning (Supervise & Unsupervised) and activation function, Models of ANN-Feed forward network and feedback network, Learning Rules Hebbian, Delta, Perceptron Learning and Windrow-Hoff, winner take all.

UNIT – II
Supervised Learning:- Perceptron learning,- Single layer/multilayer, linear Separability, Adaline, Madaline, Back propagation network, RBFN. Application of Neural network in forecasting, data compression and image compression.

UNIT – III
Unsupervised learning:- Kohonen SOM (Theory, Architecture, Flow Chart, Training Algorithm) Counter Propagation (Theory, Full Counter Propagation NET and Forward only counter propagation net), ART (Theory, ART1, ART2), Application of Neural networks in pattern and face recognition, intrusion detection, robotic vision.

UNIT – IV
Fuzzy Set:- Basic Definition and Terminology, Set-theoretic Operations, Member Function, Formulation and Parameterization, Fuzzy rules and fuzzy Reasoning, Extension Principal and Fuzzy Relations, Fuzzy if-then Rules, Fuzzy Inference Systems. Hybrid system including neuro fuzzy hybrid, neuro genetic hybrid and fuzzy genetic hybrid, fuzzy logic controlled GA. Application of Fuzzy logic in solving engineering problems.

UNIT – V
Genetic Algorithm:- Introduction to GA, Simple Genetic Algorithm, terminology and operators of GA (individual, gene, fitness, population, data structure, encoding, selection, crossover, mutation, convergence criteria). Reasons for working of GA and Schema theorem, GA optimization problems including JSPP (Job shop scheduling problem), TSP (Travelling salesman problem), Network design routing, timetabling problem. GA implementation using MATLAB.

REFERENCES:-
1. S.N. Shivnandam, "Principle of soft computing", Wiley
2. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.
3. Klir & Yuan, Fuzzy sets & Fuzzy Logic: Theory & Appli., PHI Pub.
4. S, Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications, PHI Publication.

LIST OF EXPERIMENTS

1. Form a Perceptron Net for basic gates with binary input and output

2. Using ADALINE Net, generate XOR function with bipolar inputs and targets

3. To Study the ADALINE NET and their training algorithm

4. To study the MADALINE NET and their training algorithm

5. Learn pattern, target output, learning rate and activation function

6. To implement AND function using Mc-Culloch Pitts neuron model

7. Design fuzzy inference system for a given problem

8. Implement Travelling salesman problem using Genetic algorithm

9. To study the training algorithm of ART

CSC 802
WEB ENGINEERING

UNIT-1

Web Engineering: Introduction, History, Evolution and Need, Time line, Motivation, Categories & Characteristics of Web Applications, Web Engineering Models, Software Engineering v/s Web Engineering. World Wide Web: Introduction to TCP/IP and WAP, DNS, Email, TelNet, HTTP and FTP. Browser and search engines: Introduction, Search fundamentals, Search strategies, Directories search engines and Meta search engines, Working of the search engines. Web Servers: Introduction, Features, caching, case study-IIS, Apache.

UNIT- 2

Information Architecture: Role, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites parameters and Intranets Website Design: Development, Development phases, Design issues, Conceptual Design, High-Level Design, Indexing the Right Stuff, Grouping Content. Architectural Page Mockups, Design Sketches, Navigation Systems. Searching Systems, Good & bad web design, Process of Web Publishing. Web-site enhancement, submission of website to search engines. Web security: issues, security audit. Web effort estimation, Productivity Measurement, Quality usability and reliability. Requirements Engineering for Web Applications: Introduction, Fundamentals, Requirement Source, Type, ,Notations Tools. Principles Requirements Engineering Activities, Adapting RE Methods to Web Application.

UNIT- 3

Technologies for Web Applications I: HTML and DHTML: Introduction, Structure of documents, Elements, Linking, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers, Audio and Video Support with HTML Database integration, CSS, Positioning with Style sheets, Forms Control, Form Elements. Introduction to CGI, PERL, JAVA SCRIPT, JSP, PHP, ASP & AJAX. Cookies: Creating and Reading

UNIT-4

Technologies for Web Applications II: XML: Introduction, HTML Vs XML, Validation of documents, DTD, Ways to use, XML for data files, Embedding XML into HTML documents, Converting XML to HTML for Display, Displaying XML using CSS and XSL, Rewriting HTML as XML, Relationship between HTML, SGML and XML, web personalization , Semantic web, Semantic Web Services, Ontology.

UNIT- 5

E- Commerce: Business Models, Infrastructure, Creating an E-commerce Web Site, Environment and Opportunities. Modes & Approaches, Marketing & Advertising Concepts. Electronic Publishing issues, approaches, legalities and technologies, Secure Web document, Digital Signatures and Firewalls, Cyber crime and laws, IT Act. Electronic Cash, Electronic Payment Systems: RTGS, NEFT, Internet Banking, Credit/Debit Card. Security: Digital Certificates & Signatures, SSL, SET, 3D Secure Protocol.

Recommended Books:

1. Roger S.Pressman, David Lowe, "Web Engineering", Tata Mc Graw Hill Publication, 2007
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill
3. Gopalan N P , Akilandeswari, "Web Technology: A Developer s Perspective" , PHI
4. Neil Gray, "Web server Programming" Wiley
5. Chris Bates, "Web Programming: Building Internet applications" Wiley
6. Moller, "An Introduction to XML and Web Technologies", Pearson Education New Delhi, 2009
7. "Web Technologies: Black Book", Kogent, Dreamtech
8. Internet & World Wide Web How to Program, Pearson education, 3rd edition, by: H.M. Deitel, P.J. Deitel, A.B. Goldberg.
9. C. Xavier, "Web Technology & Design ", Tata McGraw Hill.
10. Ivan Bay Ross, "HTML,DHTML,Java script,Perl CGI" , BPB

LIST OF EXPERIMENTS

1. Program to show HTML Page Structure.
2. Program to show the Impact of HTML Headings.
3. Program to show the id attribute in HTM page.
4. Program to show The HTML <style> Element
5. Create The IT Department website home page for various tags.
6. Program to Make a hyperlink of an image IN HTML.
7. Program to implement table in HTML.
8. Program for HTML Document, which provides a form that collects names and phone numbers.
9. JavaScript program to show factorial of a number.
10. Design a Home Page for IT Department OIST using various HTML Tags.

CSC 803 A
MOBILE COMPUTING

UNIT I   INTRODUCTION
Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile
Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA-
TDMA- FDMA- CDMA

UNIT II   MOBILE TELECOMMUNICATION SYSTEM
Introduction to Cellular Systems – GSM – Services & Architecture – Protocols – Connection
Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS-
UMTS – Architecture – Handover – Security

UNIT III   MOBILE NETWORK LAYER
Mobile IP – DHCP – AdHoc– Proactive protocol-DSDV, Reactive Routing Protocols – DSR,
AODV , Hybrid routing –ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks (
VANET) –MANET Vs VANET – Security.

UNIT IV   MOBILE TRANSPORT AND APPLICATION LAYER
Mobile TCP– WAP – Architecture – WDP – WTLS – WTP –WSP – WAE – WTA Architecture
– WML

UNIT V   MOBILE PLATFORMS AND APPLICATIONS
Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile
Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone –
 M Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues

TEXT BOOKS:
1. Jochen Schiller, ―Mobile Communications‖, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall, ―Fundamentals of Mobile Computing‖, PHI
    Learning Pvt.Ltd, New Delhi – 2012

REFERENCES
1. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile
    systems",Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, ―Principles
    of Mobile Computing‖, Springer, 2003.
3. William.C.Y.Lee,―Mobile Cellular Telecommunications-Analog and Digital
    Systems‖, Second Edition,TataMcGraw Hill Edition ,2006.
4. C.K.Toh, ―AdHoc Mobile Wireless Networks‖, First Edition, Pearson Education,
    2002.
5. Android Developers : http://developer.android.com/index.html
6. Apple Developer : https://developer.apple.com/
7. Windows Phone DevCenter : http://developer.windowsphone.com
8. BlackBerry Developer : http://developer.blackberry.com

CSC 803 B
PATTERN RECOGNITION

UNIT 1
Introduction and mathematical preliminaries
Introduction and mathematical preliminaries - What is pattern recognition?, Clustering vs. Classification; Applications; Linear Algebra, vector spaces, probability theory, estimation techniques.

UNIT 2
Classification
Classification: Bayes decision rule, Error probability, Error rate, Minimum distance classifier, Mahalanobis distance; K-NN Classifier, Linear discriminant functions and Non-linear decision boundaries.Fisher's LDA, Single and Multilayer perceptron, training set and test sets, standardization and normalization.

UNIT 3
Clustering
Clustering: Different distance functions and similarity measures, Minimum within cluster distance criterion, K-means clustering, single linkage and complete linkage clustering, MST, medoids, DBSCAN, Visualization of datasets, existence of unique clusters or no clusters.

UNIT 4
Feature selection
Feature selection: Problem statement and Uses, Probabilistic separability based criterion functions, interclass distance based criterion functions, Branch and bound algorithm, sequential forward/backward selection algorithms, (l,r) algorithm. Feature Extraction: PCA, Kernel PCA

UNIT 5
Recent advances in Pattern Recognition
Recent advances in PR: Structural PR, SVMs, FCM, Soft-computing and Neuro-fuzzy.

REFERENCES
1. Devi V.S.; Murty, M.N.(2011) Pattern Recognition:An Introduction, Universities Press, Hyderabad.
2. R. O. Duda,P.E. Hart and D. G.Stork,Pattern Classification, Wiley, 2000.
3. R.O.Duda, P.E.Hart and D.G.Stork, Pattern Classification, John Wiley, 2001.
4. Statistical pattern Recognition; K. Fukunaga; Academic Press, 2000.
5. S.Theodoridis and K.Koutroumbas, Pattern Recognition, 4th Ed., Academic Press, 2009

CSC 803 C
ANDROID TECHNOLOGY

Unit 1:
Introduction: What is Android, Android versions and its feature set The various Android devices on the market , The Android Market application store ,Android Development Environment - System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs)

Unit 2:
Android Architecture Overview and Creating an Example Android Application: The Android Software Stack, The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework, Creating a New Android Project ,Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files,

Unit 3:
 Android Software Development Platform
Understanding Java SE and the Dalvik Virtual Machine , The Directory Structure of an Android Project , Common Default Resources Folders , The Values Folder , Leveraging Android XML, Screen Sizes , Launching Your Application: The AndroidManifest.xml File ,
Creating Your First Android Application

Unit 4:
Android Framework Overview
Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications Content Providers: Data Management, Android Intent Objects: Messaging for Components
Android Manifest XML: Declaring Your Components

Unit 5:
Understanding Android Views, View Groups and Layouts
Designing for Different Android Devices, Views and View Groups, Android Layout Managers, The View Hierarchy, Designing an Android User Interface using the Graphical Layout Tool.

Reference Books:
1. **Android** App Development for Dummies.
2. Head First **Android** Development.
3. Hello, **Android**: Introducing Google's Mobile Development Platform.
4. Professional **Android** 4th edition.

CSC-804 A
BIG DATA ANALYTICS

UNIT 1 Understanding Data:
Data Wrangling and Exploratory Analysis, Data Transformation & Cleaning, Feature Extraction, Data Visualization. Introduction to contemporary tools and programming languages for data analysis like R and Python.

UNIT 2 Statistical & Probabilistic analysis of Data:
Multiple hypothesis testing, Parameter Estimation methods, Confidence intervals, Bayesian statistics and Data Distributions.

UNIT 3 Introduction to machine learning:
Supervised & unsupervised learning, classification & clustering Algorithms, Dimensionality reduction: PCA & SVD, Correlation & Regression analysis, Training & testing data: Overfitting & Under fitting.

UNIT 4 Introduction to Information Retrieval:
Boolean Model, Vector model, Probabilistic Model, Text based search: Tokenization,TF-IDF, stop words and n-grams, synonyms and parts of speech tagging.

UNIT 5 Introduction to Web Search& Big data:
Crawling and Indexes, Search Engine architectures, Link Analysis and ranking algorithms such as HITS and PageRank, Hadoop File system & MapReduce Paradigm

Text Books:

1.Field Cady, "The Data Science Handbook" , 1/e ,2018,Publisher: Wiley

2. Sinan Ozdemir, "Principles of Data Science ", 1/e, 2016Packt Publishing Limited

CS-804 (B)
Optical Fiber Communication

UNIT –I

OVERVIEW OF OPTICAL FIBER COMMUNICATION: Introduction, Historical development, general system, advantages, disadvantages, and applications of optical fiber communication, optical fiber waveguides, Ray theory, cylindrical fiber (no derivations in article 2.4.4), single mode fiber, cutoff wave length, mode filed diameter. Optical Fibers: fiber materials, photonic crystal, fiber optic cables specialty fibers.

UNIT –II

TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS: Introduction, Attenuation, absorption, scattering losses, bending loss, dispersion, Intra modal dispersion, Inter modal dispersion.

UNIT –III

OPTICAL SOURCES AND DETECTORS: Introduction, LED's, LASER diodes, Photo detectors, Photo detector noise, Response time, double hetero junction structure, Photo diodes, comparison of photo detectors.

UNIT –IV

FIBER COUPLERS AND CONNECTORS: Introduction, fiber alignment and joint loss, single mode fiber joints, fiber splices, fiber connectors and fiber couplers. WDM concepts, overview of WDM operation principles.

UNIT –V

OPTICAL RECEIVER: Introduction, Optical Receiver Operation, receiver sensitivity, quantum limit, eye diagrams, coherent detection, burst mode receiver operation, Analog receivers. Analog links – Introduction, overview of analog links, CNR, Radio over fiber links. optical amplifiers, basic applications.

TEXT BOOKS:
 1. Optical Fiber Communication – Gerd Keiser, 4th Ed., MGH, 2008.
 2. Optical Fiber Communications– – John M. Senior, Pearson Education. 3 rd Impression, 2007.

REFERENCE BOOK:
 1. Fiber optic communication – Joseph C Palais: 4th Edition, Pearson Education

CSC-804 (C)
DATA MINING & WAREHOUSING

UNIT I

Data Mining: Basic concept, technology and rules, DM techniques, Mining problems, Issues and Challenges in DM, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining, DM Application areas. Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

UNIT II

Mining Association Rules in Large Databases: Association Rule Mining, SingleDimensionalBoolean Association Rules, Multi-Level Association Rule, Apriori Algorithm, FpGrowthAlgorithm, Time series mining association rules, latest trends in association rules mining.

UNIT III

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori,Partition, Pincersearch etc. Clustering paradigms; Partitioning algorithms like K-Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH,CURE; Categorical Clustering algorithms, STIRR, ROCK, CACTUS.

UNIT IV

Data Mining of Image and Video:A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis,E-Metrics.

UNIT V

Data Warehousing: Need for data warehousing , Basic elements of data warehousing,Data Mart, Data Warehouse Architecture, extract and load Process, Clean and Transform data,Star,Snowflake and Galaxy Schemas for Multidimensional databases, Fact and dimension data,Partitioning Strategy-Horizontal and Vertical Partitioning.

References Books:-
1. Han,Kamber, "Data Mining Concepts & Techniques".
2. M.Kaufman.Data Mining Techniques;Arun K.Pujari ; University Press.
3. Mastering Data Mining; Berry Linoff; Wiley
4. Data Mining; Adriaans & Zantinge; Pearson education.

CSC-805 (A)
NETWORK & WEB SECURITY

UNIT-I

Symmetric Ciphers -Overview: Services, Mechanisms and Attacks, The OSI Security Architecture, A Model of Network Security. Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. System Security-Intruders, Malicious Software, Viruses and Related Threats, Counter Measures, Firewalls and its Design Principles.

UNIT-II

Block Cipher and the Data Encryption Standard: Simplified DES, Block Cipher Principles, The DES, The Strength of DES, Differential and Linear Cryptanalysis. Symmetric Ciphers: Triple DES, Blowfish. Confidentiality using Conventional Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation

UNIT-III

Public Key Encryption, Digital Signatures-Number Theory, Prime Numbers, Format's and Euler "s Theorems. Public Key Cryptography and RSA: Principles of Public Key Cryptosystems, The RSA Algorithms, Key Management, Diffie Hellman Key Exchange.

UNIT-IV

Authentication Protocols-Message Authentication:-Authentication Requirements, Authentication Functions, Message Authentication Codes, MD5 Message Digest Algorithms, Digital Signatures and Authentication Protocols: -Digital Signatures, Authentication Protocols, Digital Signature Standards.

UNIT-V

Network Security-Authentication Applications: Kerberos, X.509 Directory, Authentication Service. Electronic Mail Security: Pretty Good Privacy. IP Security: -Overview, IP Security Architecture, Authentication Header, Encapsulation Security Payload. Web Security: Web Security Requirements, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

References Books:
1.Charlie Kaufman, Radia Perlman, Mike Speciner, Network Security: Private Communication in PublicWorld, 2ndEdition,2011, Pearson Education.
2.Atul Kahate, Cryptography and Network Security, TMH. (2003)
3. William Stallings, Cryptography and Network Security,
4 Edition, Pearson Education/PHI. 2006

CSC-805 (B)
OPTIMIZATION TECHNIQUES

UNIT-1
Mathematical preliminaries: Linear algebra and matrices, Vector space, eigen analysis, Elements of probability theory, Elementary multivariable calculus.

UNIT-2
Linear Programming: Introduction to linear programming model, Simplex method, Duality, Karmarkar's method.

UNIT-3
Unconstrained optimization:One-dimensional search methods,Gradient-based methods,Conjugate direction and quasi-Newton methods.

UNIT-4
Constrained Optimization:Lagrange theorem,FONC, SONC, and SOSC conditions.

UNIT-5
Non-linear problems:Non-linear constrained optimization models, KKT conditions,Projection methods.

Reference Books:
1.An introduction to Optimization byEdwin P K Chong, Stainslaw Zak
2.Nonlinear Programming by Dimitri Bertsekas.
3. J K Sharma, Operations Research Theory and Applications, MacMillan India Ltd.
4. N D Vohra, Quantitative Techniques in management, Tata McGraw Hill.
5. Handy A Taha, Operations Research – An Introduction, Prentice Hall of India, New Delhi.
6. Wagner H M, Principles of Operations Research: With Applications to Management Decisions, Prentice-Hall of India, New Delhi.

CSC-805 (C)
BIOMETRICS

UNIT-I
The Basics of Biometrics: Overview of field and applications. Development of biometric authentication. Basic terms, biometric data, biometric characteristics, biometric features, biometric templates and references. Expected properties of biometric identifiers. Basics in biometric errors estimation. Enrollment, verification and identification.

UNIT-II
Face Recognition: Introduction to the face processing pipeline: acquisition, face detection, alignment, feature extraction, matching. Classic subspace methods. Hand-tuned feature descriptors. Deep learning architectures for face representation learning. Distance, similarity and learning-based matching. Face recognition in video. Describable visual attributes. Face pair matching, verification, and identification. Data sets for evaluation. Face image quality. Considerations for social media, mobile authentication, surveillance and other real-world applications.

UNIT-III
Fingerprint Recognition: Fingerprint capture, sensor types, latent fingerprints. Fingerprint image preprocessing, segmentation, binary and skeletal images. Fingerprint singularities, detection of loops, deltas, whirls and cores, using singularities in fingerprints classification. Galton's details, base and complex minutiae, detection of minutiae. Fingerprint recognition, minutiae- and correlation-based methods. Fingerprints in forensics and biometrics, similarities and differences.

UNIT-IV
Iris Recognition: Eye and iris morphogenesis, genetic penetrance. Principles of iris image capture, iris sensors. Iris image preprocessing, segmentation, formatting and filtering. Daugman's method, iris code, statistical properties of the iris code. Other iris coding methods, wavelet analysis.
Multi-Biometric Fusion Levels of fusion: sensor, feature, rank, decision. Score normalization and fusion rules. Quality-based fusion and failure prediction.

UNIT-V
Spoofing (2 Lectures) Static and dynamic liveness features. What we want to detect (subversive actions) vs. what we can detect (suspicious actions). Liveness detection in biometrics. Selected liveness detection techniques, frequency analysis for paper printouts detection, pupil dynamics and blood pulse analyses for detection of sophisticated eye and finger spoofing trials.

References:
1. Digital Image Processing using MATLAB, By: Rafael C. Gonzalez, Richard EugeneWoods, 2nd Edition, Tata McGraw-Hill Education 2010
2. Guide to Biometrics, By: Ruud M. Bolle, Sharath Pankanti, Nalini K. Ratha, Andrew W.Senior, Jonathan H. Connell, Springer 2009
3. Pattern Classification, By: Richard O. Duda, David G.Stork, Peter E. Hart, Wiley 2007
4.Samir Nanavathi, Michel Thieme, and Raj Nanavathi : "Biometrics -Identity verification in a network", 1st Edition, Wiley Eastern, 2002.
5..John Chirillo and Scott Blaul : "Implementing Biometric Security", 1st Edition, Wiley Eastern Publication, 2005.

CSC – 806 INDUSTRIAL TRAINING PROJECT – II

Industrial Training Project - II should be the outcome of the training done/performed during after 7th semester .It should be submitted in hardware form (proto type)or simulation form along with proper data and certificates issued during project training. It should cover the electrical engineering aspects learned during training. A Power point presentation should also be submitted at the time of submission. It can be in the form of major project.

CSC- 807 General Proficiency

This course objective is to develop the ability to handle all the tasks associated with the job and

Ethics refers to behavior that adheres to societal norms and human conscience. In other words, a

way of working that is honest and transparent.