4th YEAR EVEN SEMESTER

CSE 4000 Contact Hours/week: 6
Project / Thesis II C r e d i ts:3.00
Prerequisite: None
Continuation of Project/Thesis Topic Under Taken in CSE 4000.

CSE 4201 Contact Hours/week: 3
Computer Graphics and Animations Credits:3.00
Prerequisite: None
Introduction: History, Application of Computer Graphics (Computer Aided Design Animation), a Survey of Graphics I/O Devices and Types.
Graphics Software Design: Survey of Desired Function, Toward a Universal Graphic Language. Display Files, Databases for Pictorial Applications.
Graphics Techniques: Point-Plotting Techniques, Line Drawing, Geometric Transformations, Windowing and Clipping, Raster Graphics.

Hardware for Computer Graphics: Typical Small and Large System, Graphic Terminals,
Plotters, Graphic Display Processors, Device Independent Graphics Systems.
Graphics Software: A Simple Graphic Package, Segmented Display Files, Geometric Models, Picture Structure.
Interactive Graphics: Input Techniques, Event Handling, Three-Dimensional Graphics, Curves and Surfaces, 3-D Transformation.
Hidden Surface Problem: Back Face Removal, Hidden-Line Removal Curved Surfaces,
Describing Points, Lines and Polygons, Some Hints for Building Polygonal Models, Color
Perception, RGBA and Color Index Mode, Dithering, Blending, 3-D Blending with the Depth Buffer, Antialiasing, Fog, Fog Equations, the OpenGL ARB.
API Specifies: Data Types, Function Naming Conventions, Platform Independence, Drawing Shapes with OpenGL, Animation with OpenGL and GLUT.
Drawing in Space: Lines, Points and Polygons.
Co-ordinate Transformations: Understanding Transformations, Matrix Munching Projections, Matrix Manipulation Color Lighting and Materials, Texture Mapping.

CSE 4202 Contact hours/week: 3/2
Sessional based on CSE 4201 Credits: 0.75
Prerequisite: None
Sessional based on the theory of course CSE 4201.

CSE 4203 Contact Hours/week: 3
Neural Networks and Fuzzy Systems Credits:3.00
Prerequisite: None
Introductory Concept: Introduction Human Brain Mechanism, Neural Machine Intelligence.
Fundamental Concept of Neural Network: Basic Models of Artificial Neuron, Activation
Function, Network Architecture, Neural Network Viewed as Directed Graph, Basic Learning Rules, Overview of Perceptrons, Single Layer of Perceptrons, Mathematical

Model of Single Layer Perceptrons, Perceptrons Learning Algorithm, Delta Learning Rule,
Multi-Layer Perceptrons, Back Propagation Learning Algorithm, Mathematical Model of MLP Network.
Function Approximation: Basis Function Network, Radial Basis Function Networks (RBF), MLP vs. RBF Networks, Support Vector Machine (SVM).
Competitive Network and Associative Memory Network: Adaptive Resonance Theory
(ART), ART-1 Architecture and Algorithm, Kohonen Self-Organizing Maps (SOMs), Linear
Feed-Forward Associative Memory Network, Recurrent Associative Memory Network, Bidirectional Associative Memory Network (BAM), Hopfield Networks.
Fuzzy System: Introduction to Fuzzy System, Fuzzy Relations, Fuzzy Numbers, Linguistic Description and their Analytical Form, Fuzzy Control.
Defuzzification: Defuzzification Methods, Centroid Method, Center of Sum Method, Mean
of Maxima Defuzzification, Applications, Equilibrium of Learning System, Concept of Neuro-Fuzzy and Neuro-GA Network.
Genetic Algorithm: Basic Concepts, Offspring, Encoding, Reproduction, Crossover, Mutation Operator, Application of GA.
CSE 4204 Contact hours/week: 3/2
Sessional based on CSE 4203 Credits: 0.75
Prerequisite: None
Sessional based on the theory of course CSE 4203.
CSE 4206 Contact hours/week: 3/2
Seminar Credits: 0.75
Prerequisite: None
Students will Works in Groups or Individually to Prepare Review Papers on Topics Assigned by the Teachers and will Present before Audience.
Optional I
CSE 4207 Contact Hours/week: 3
VLSI Design C r e dits:3.00
Prerequisite: None
VLSI Design Methodology: Top-Down Design Approach, Technology Trends.
MOS Technology: Introduction to Microelectronics and MOS Technology, Basic Electrical
Properties and Circuit Design Processes of MOS and Bi CMOS Circuits,, MOS, NMOS, CMOS Inverters, Pass Transistor and Pass Gates, DC and Transient Characteristics.
Overview of Fabrication Process: NMOS, PMOS, CMOS, Bi-CMOS Process.
NMOS and CMOS Layout: Color Plate Stick Diagram, and Design Rules.
CMOS Circuit Characteristics: Resistance and Capacitance, Rise and Fall Time, Power
Estimation.

Introduction to Bi-CMOS Circuits: Shifter, an ALU Sub-System, Adder, Counter, Multipliers, Multiplexer, Data Path And Memory Structures, Buffer Circuit Design, DCVS Logic.

Design and Test-Ability: Circuit Partitioning, Floor Planning and Placement, Routing, Practical Aspects of Design Tools and Test-Ability MOS Design, Behavioral Description, Structural Description, Physical Description and Design Verification.

CSE 4209 Contact Hours/week: 3
Impact of Computer on Society Credits:3.00
Prerequisite: None
Introduction: History of Computer Hardware, Software, Networking; Overview of Technological Change; Impact of Information Technology on Some Sectors.
Privacy and Personal Information: Personal Privacy, Computer Technology Effect Privacy, Moral Problems from Privacy Violation, Privacy Protection: Ethical and Legal Basis, Technological Strategies, Implications of Database Systems.
Freedom of Expression in Cyberspace: Offensive Speech and Censorship in Cyberspace, Pornography, Anonymity, Spam.
Computer & Software Reliability: Liability in Hardware and Software Failure, Responsibility s. Liability vs. Accountability, Historical Software Risks (such as the Therac-
25 Case).
Intellectual Property: Intellectual Property, Copyrights, Patents, and Trade Secrets, Software Piracy, Software Patents, Pirated Software, Use of Licensed Software.
Computer Crime: History and Examples of Computer Crime; "Cracking" ("Hacking") and
its Effects; Viruses, Worms, and Trojan Horses; Online Scams, Identity Theft; Moral Issues Related to These Crimes.
Computer and Work: Impact of Employment, Work Environment, Employee Monitoring,
Health Issues.
Professional Ethics and Responsibilities: Ethics, Computer Ethics, Ethical Guidelines
for Computer Professionals, Examine and Discuss Professional Codes of Ethics, Conduct,
and Practice (IEEE, ACM, SE, AITP, and so forth).
Optional II
CSE 4211 Contact Hours/week: 3
Network Planning Credits:3.00
Prerequisite: None
Introduction: Network components, Theoretical Network, Real World Networks.
Network Architectural Design: Designing the LAN, Configuring the Network Server and
Client, Network Administration, Remote Access, Expanding the Network, Wide Area Network Troubleshooting, Major Protocol Suites.
Network Simulation: Network Simulation and Optimization, Network Operations, Control
and Maintenance, Network Administration, Network Management Database and Tools, Capacity Planning.
Network Optimization: Network Security and Integrity, Linear Programming and Network

Algorithms for Planning, Reliability Theory and Network Planning.

CSE 4213 Contact Hours/week: 3
Knowledge Engineering C r e d its:3.00
Prerequisite: None
Introduction: Key Concepts of Knowledge Representation and Reasoning, Language of
First Order Logic, Syntax, Semantics Pragmatics, Expressing Knowledge, Levels of
Representation, Knowledge Acquisition and Sharing, Sharing Ontologies, Language
Ontologies, Language Patterns, Tools for Knowledge Acquisition.
Resolution and Reasoning: Proportional Case, Handling Variables and Qualifies,
Dealing with Intractability, Reasoning with Horn Clauses, Procedural Control of
Reasoning, Rules in Production, Description Logic, Vivid Knowledge, Beyond Vivid.
Representation: Object Oriented Representations, Frame Formalism, Structured
Descriptions, Meaning and Entailment, Taxonomies and Classification, Inheritance,
Networks, Strategies for Defensible Inheritance, Formal Account of Inheritance
Networks.
Defaults, Uncertainty and Expressiveness: Closed World Reasoning,
Circumscription,
Default Logic Limitations of Logic, Fuzzy Logic, Non-monotonic Logic, Theories and
World, Semiotics, Auto epistemic Logic, Vagueness, Uncertainty and Degrees of Belief,
Noncategorical Reasoning, Objective and Subjective Probability.
Actions and Planning: Explanation and Diagnosis, Syntax, Semantics of Context, First
Order Reasoning, Modal Reasoning in Context, Encapsulating Objects in Context,
Agents,
Actions, Situational Calculus, Frame Problem, Complex Actions, Planning,
Strips – Planning as Reasoning – Hierarchical and Conditional Planning.

CSE 4215 Contact Hours/week: 3
Network Security Credits:3.00
Prerequisite: None
Introduction: Network Security Policies, Strategies and Guidelines; Network Security
Assessments and Matrices.
Different Attacks: Denial of Service (Dos) Attack, Distributed Denial of Service (Ddos)
Attack, Eavesdropping, IP Spoofing, Sybil Attack, Blackhole Attack, Grayhole Attack,
Man-
In-The-Middle Attack, Passwords-based Offline Attacks.
Network Security Threats and Attackers: Intruders, Malicious Software, Viruses and
Spy-Ware; Security Standards: DES, RSA, DHA, Digital Signature Algorithm (DSA),
SHA,
AES; Security At Transport Layer: Secure Socket Layer (SSL) and Transport Layer
Security (TLS).
Security on Network Layer: Ipsec; Network Security Applications: AAA Standards,
EMail
Securities, PGP, S/MIME; PKI Smart Cards; Sandboxing; Firewalls and Proxy Server;
Security for Wireless Network Protocols: WEP, WPA, TKIP, EAP, LEAP; Security
Protocols for Ad-Hoc Network; Security Protocols for Sensor Network; Security for

Communication Protocols; Security for Operating System and Mobile Agents; Security for
E-Commerce; Security for LAN and WAN; Switching and Routing Security; other State-Of-
The-Art Related Topics.

Optional III
CSE 4217 Contact Hours/week: 3
Decision Support System C r e d i ts:3.00
Prerequisite: None
Introduction to Decision Support System: DSS Characteristics, Applications of
Decision Support Systems, Capabilities of Decision Support Systems, Components of
Decision Support Systems, Benefits of using DSS Systems.
Making Decisions in the Decision Support Systems Environment: Activities in the
Decision Support Systems Environment, the Decision Making Process, Information Use
for Strategic Management, Making Decisions in the Decision Support Systems.
Environment: Strategic Analysis for the Organization, Types of Problems in the
Decision
Making Process.
Developing Decision Support System: Approaches to DSS Development, DSS
Software Tools, DSS Hardware and Operating System Platforms, Building and
Implementing Decision Support Systems. Decision Support Systems in Detail: Types of
Decision Support Systems, DSS Models, Data Mining, Group Decision, Support
Systems,
Executive Information Systems (EIS). Artificial Intelligence and Expert Systems,
Systems
Integration and the Future of DSS: Brainstorming.

CSE 4219 Contact Hours/week: 3
Computer Vision C r e d its:3.00
Prerequisite: None
Introduction: Introduction to Computer Vision, Case Study-Face Recognition, Linear
Algebra/Probability Review.
Image Structure: Linear Filters, Finding Lines-From Detection to Model Fitting,
Clustering
and Segmentation.
Camera Models: Camera Models, Camera Calibration, Epipolar Geometry, Stereo &
Multi-view Reconstruction.
Recognition (Building blocks)**:** Detectors and Descriptors, SIFT & Single Object
Recognition, Optical Flow & Tracking.
Recognition (Objects, Scenes, and Activities)**:** Introduction to Object Recognition and
Bag-of-Words Models, Object Classification and Detection- A Part-based Generative
Model (Constellation Model), Object Classification and Detection: A Part-Based
Discriminative Model (Latent SVM), Human Motion Recognition.
Computer Vision: State-of-the-art and the Future.

CSE 4221 Contact Hours/week: 3
Data Mining Credits:3.00
Prerequisite: None

Data Mining and Applications: Relational Databases, Data Warehouses, Transactional
Databases, Advanced Data and Information Systems, Characterization and Discrimination, Mining Frequent Patterns, Associations, and Correlations, Classification and Prediction, Cluster Analysis, Outlier Analysis, Evolution Analysis.
Data Preprocessing: Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

Classification, Clustering and Prediction: Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Backpropagation, Support Vector Machines, Clustering by Partitioning/ Hierarchical/ Density-based/ Gridbased/
Model-based Methods, Clustering High-Dimensional Data, Outlier Analysis, Prediction, Linear Regression, Nonlinear Regression, Other Regression-Based Methods of Prediction, Evaluating the Accuracy and Error Measures of a Classifier or Predictor.
Web Mining: Anatomy of a Search Engine, Crawling the Web, Web Graph Analysis, Extracting Structured Data from the Web, Classification and Vertical Search, Web Log Analysis.
Advanced Analysis: Mining Stream, Time-Series, and Sequence Data, Graph Mining, Social Network Analysis, and Multirelational data Mining, Mining Object, Spatial, Multimedia, and Text Data.