

Summary of the Courses

4th Year 2nd Semester

Sl. No.	Course No.	Course Title	Theory hrs/week	Sessional hrs/week	Credits
1.	CSE-4000	Project & Thesis	0	3	3.00*
2.	CSE-4621	Computer Graphics & Multimedia	4	0	4.00
3.	CSE-4622	Computer Graphics & Multimedia Sessional	0	3/2	0.75
4	CSE-4623	Artificial Intelligence	3	0	3.00
5	CSE-4624	Artificial Intelligence Sessional	0	3/2	0.75
6.	CSE-4721	Software Engineering	3	0	3.00
7.	Option – I		3	0	3.00
8.	Option – II		3	0	3.00
Total			16	6	20.50*

Contact Hours: 16T + 6S = 22 hrs/week	No. of Theory Courses: 5
Total credits: 20.50	No. of Lab / Sessional courses: 3

*1.5 Credit transfer from 1st semester

Option-I & II : 2 Courses should be selected from the following courses:

Sl. No.	Course No.	Course Title	Theory hrs/week	Sessional hrs/week	Credits
1	CSE-4625	Neural Networks & Fuzzy System	3	0	3.00
2.	CSE-4521	Parallel & Distributed Processing	3	0	3.00
3.	CSE-4627	Robotics and Computer Vision	3	0	3.00
4.	CSE-4821	Advanced Computer Architecture	3	0	3.00
5.	CSE-4723	Decision Support System	3	0	3.00
6.	CSE-4629	Machine Learning	3	0	3.00
7.	CSE-4725	Fault Tolerant System	3	0	3.00
8.	CSE-4727	Information System Management	3	0	3.00
9.	CSE-4641	Knowledge Engineering	3	0	3.00

Detailed Syllabus

CSE-4000 Project & Thesis

3 Hours/week

1.50 Credits

Study of problems in the field of Computer Science and Engineering.

CSE-4621 Computer Graphics & Multimedia

4 Hours/week

4.00 Credits

Language for graphics, display file compilers, system software for interaction coordinate, vector and matrix, representation of 3D objects and transformations. Architecture of display device and connective to a computer, implementation of graphics contents of 2-D and 3-D viewing windowing, clipping and transformations. Hidden surfaces and lines algorithms. Light color and shading. Curves and fractals. Adding faces for visual realism. Raster graphics concepts: architecture, algorithms and other image synthesis methods. Design of interactive graphics conversion. Future trends in computer graphics.

Definition, multimedia system architecture. Objects for multimedia system: text; images and graphics: basic concepts, computer image processing. Sound/Audio: basic concepts, music, midi, speech; video and animation: basic concepts, computer-based animation. Data compression techniques: JPEG, H.261 (px64), MPEG, Intel's DVI, Microsoft AVI, audio compression, fractal compression. Multimedia file Standards: RTF, TIFF, RIFF, MIDI, JPEG DIB, AVI Indeo; MPEG multimedia storage and retrieval technology, magnetic media technology; optical media technology; basic technology, CD digital audio, CD-ROM, its architecture and further development, CD-Write only (CD-WO), CD Magnetic Optical (CD-MO). Architecture and multimedia communication systems, pen input, video and image display systems, specialized processors: DSP; memory systems, multimedia board solutions, multimedia communication system, Multimedia Database System (MDBMS). User Interfaces: general design, Video and Audio at the user interface. Multimedia applications: imaging, image-video

processing and recognition, optical character recognition. Communication: tele service, massaging. Entertainment: virtual reality, interactive audio and video, games.

CSE-4622 Computer Graphics & Multimedia Sessional

3/2 Hours/week

0.75 Credits

Sessional based on Computer Graphics & Multimedia (CSE-4621)

CSE-4623 Artificial Intelligence

3 Hours/week

3.00 Credits

Introduction to knowledge representation, propositional and first order logic, inference in first order logic, frame problem, search techniques in AI, game playing, planning, probabilistic reasoning, learning in symbolic and non-symbolic representation, natural language processing.

CSE-4624 Artificial Intelligence Sessional

3/2 Hours/week

0.75 Credits

Sessional based on Artificial Intelligence (CSE-4623).

CSE-4721 Software Engineering

3 Hours/week

3.00 Credits

The Product and the Process. Managing Software Projects: Project Management Concepts, Risk Analysis and Management, Project Scheduling and Tracking, Software Quality Assurance, Software Configuration Management. **Conventional Methods for Software Engineering:** System Engineering, Analysis Concepts and Principles, Design Concepts and Principles, User Interface Design , Component Level Design, Software Testing Techniques, Software Testing Strategies, Technical Metrics for Software. **Object-Oriented Software Engineering:** Object-Oriented Concepts and Principles, Object-Oriented Analysis, Object-Oriented Design, Testing. **Component Based Software Engineering, Web Engineering, Computer-Aided Software Engineering**

Option-I& II: (Two Subjects should be taken)

CSE-4625 Neural Networks & Fuzzy Systems

3 Hours/week

3.00 Credits.

Neural network definition, biological neural networks, history of artificial neural networks (ANN), Pattern recognition: feature vector and feature space, discriminant functions. Classification techniques: linear classifier, statistical techniques, modeling and learning a single neuron, network properties, working principles, network layers, network connections. Neural network models: signal-layer perceptions and multi layer perceptions. Back propagation algorithm and network, nearest neighbour network, Hopfield network. Bidirectional Associative Memory (BAM), Radial Basis Function (RBF) network, Adaptive Resonance Theory (ART) network, Kohonen network, Boltzman machine. Neural network learning : definition of learning, supervised and unsupervised learning. Hebbian learning: rule-based neural network, network training, network revision, fuzzy machine intelligence. Fuzziness, fuzzy entropy theory; fuzziness and probability, Fuzzy Associative Memory (FAM): Hebb FAMs, adaptive FAMs; fuzzy and neural control systems.

CSE-4521 Parallel and Distributed Processing

3 Hours/week

3.00 Credits

Parallel processing: importance, architecture, hardware and software issues, architecture for parallel processing, classification, comparative study of different architectures. Issues in parallel processing, parallel programming and parallel algorithms.

Distributed processing: definition, impact of distributed processing on organizations, pitfalls in distributed processing. Forms of distributed Processing, function distribution, hierarchical distributed systems, horizontal distributed systems. Strategies of distributed data processing, control of complexity, problem of incompatibility , centralization vs. decentralisation, cost and benefit analysis. Design of distributed data, distributed data, location of data, multiple copies of data, conflict analysis, database

management, distributed database and applications. Software and network strategy: software strategy, the ISO seven layers, architectural interfaces, physical link control and network management.

CSE-4627 Robotics and Computer Vision

3 Hours/ week

3.00 Credits

Robotics manipulation, direct kinematics: the arm equation, inverse Kinematics : solving the arm equation, work space analysis and trajectory planning differential motion and static manipulation dynamics, robot control, task planning.

Relationship between image and world structure, image representation, segmentation pattern perspective transformation camera calibration, shape analysis, object recognition and picture languages.

CSE-4821 Advanced Computer Architecture

3 Hours/week

3.00 Credits

Pipe lined processor design, cache memory, memory system design, concurrent processors, vector processors and multi-processors, array processors. Parallelism in multi-processors and multi-computers, computer-intensive processors and multi-computers, automatic vectorization. Hypercube systems and key application, data flow computation.

CSE-4723 Decision Support System

3 Hours/week

3.00 Credits

An introduction to computer-based decision support. The nature of management, theories of decision making, approaches to decision support, decision support technologies, the development of decision support systems, executive information systems, and group decision support systems. Assessment will include the development of a small decision support system using common spreadsheet software to illustrate the concepts presented in lectures. Students will be expected to spend a significant amount of personal study time early in the semester learning the software and developing skills in representing decision situations.

CSE-4629 Machine Learning

3 Hours/week

3.00 Credits

Introduction to machine learning, supervised, unsupervised and reinforcement learning. Unsupervised learning algorithms, attribute based and relational supervised learning algorithms, neural network based learning algorithms, genetic algorithms and genetic programming, reinforcement learning algorithms, computational learning theory.

CSE-4725 Fault Tolerant Systems

3 Hours/week

3.00 Credits

Introduction to redundancy theory, limit theorems, decision theory in redundant systems. Hardware fault tolerance: Computer redundancy techniques- detection of faults-replication and compression techniques- self repairing techniques- concentrated and distributed voters, models of fault tolerant computer - case study of existing systems. Software fault-tolerance: Fault tolerance versus fault intolerance, fault tolerance objectives; errors and their management strategies, implementation of error management strategies. Software fault tolerance techniques-software defence, protective redundancy. Architectural support of fault-tolerant software protection mechanisms, recovery mechanisms.

CSE-4727 Information Systems Management

3 Hours/week

3.00 Credits

Information systems management importance of IS management, IS management's leadership role, strategic role of IS, IS planning. Managing essential technologies-distributed systems, building the network system, managing information resources and IS operations. End user computing. Managing software development. New technologies, acquisition of hardware, software and services. Information systems and people. Managing the human side of IS.

Knowledge engineering basic knowledge representation and utilization: Production System (PS), semantic networks, frames, logic, object-oriented paradigm, logic programming, probability theory, dempster-shafer theory, fuzzy set theory. Application, diagnosis, knowledge acquisition and machine learning, problems of and application to knowledge acquisition, knowledge acquisition support systems, machine learning meta-reasoning and meta-knowledge, knowledge system development environment all languages, shells.