GUJARAT TECHNOLOGICAL UNIVERSITY

INTRODUCTION TO ARTIFICIAL INTELLIGENCE
SUBJECT CODE: 2720509
SEMESTER: II

Type of course: Open Elective

Prerequisite: Fundamentals of data communication theory

Rationale: This course will cover the basic concepts of computer network and firm foundation for understanding how data communication occurring using computer network. It is based around the OSI reference model which deals with the major issues and related protocol studies in the various layers (Physical, Data Link, Network, Transport, Session, Presentation and Application) of the model. The course will be driven from the engineering perspective

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	2	5	70	30	20	10	10	10	150

Content:

Sr No	Course Content	No of Hrs	% Weight
1	Introduction: Applications of computer networks, various hardware/softwares, OSI and TCP/IP reference model and its comparative study.	04	10
2	Physical layer: Data communication theory, study of electromagnetic spectrum, Guided and unguided media and their comparisons.	04	10
3	Data link layer: Design issues, Framing concepts, error detection-correction techniques, data link layer elementary and sliding windows protocols, MAC sub-layer, channel allocation problem and various access protocols. Ethernet protocol.	08	20
4	Network layer: Design issues, concepts of connection-oriented and connection less services, routing optimality and fairness principles, shortest-path, flooding, distance-vector, link-state, hierarchical, broadcast and multicast routing algorithms, congestion control algorithms, Internetworking, IP protocol and its addressing concepts, IPv6, OSPF and BGP.	10	25
5	Transport layer: The basic design issues and its services, elements of transport layer protocols, simple transport protocol, UDP, TCP for wired networking.	08	20
6	Application layer: Domain name system, Electronic mail and its architecture, architecture of world wide web, HTTP, IMAP and POP3 protocol study	06	15

Reference Books:

1. Computer Networks by Andrew S. Tennenbaum, Pearson education, 4th edition.

2. Computer Networking and the Internet (5th edition),Fred Halsall, Addison Wesley
3. Data Communications and Networking (4th edition), Behrouz Forouzan, McGraw Hill
4. TCP/IP Protocol Suite (3rd edition), Behrouz Forouzan, McGraw Hill
5. Computer Networking- A Top-Down approach, 5th edition, Kurose and Ross, Pearson

Course Outcome:

Upon completion of this course, students will be able to:

- analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;
- specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols;
- analyze, specify and design the topological and routing strategies for an IP based networking infrastructure
- Have a working knowledge of datagram and internet socket programming

List of Experiments:

- Experiments will be based on the topics taught in the theory.

Open ended problems:

- Solve the travelling salesman problem (TSP) with optimal and shortest routing algorithm.
- Compatibility issues of IPv6 with existing IPv4.
- Adaptability of the wired networking protocols in wireless network environments.

Major Equipments:

1. Computer systems
2. LAN trainer kit

List of Open Source Software/learning website:

1. Wireshark packet analyzer, Boson network simulator
2. Netsim
3. NS2

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.