Subject Name: Computer Networks   **Subject Code:** TMC 301

Unit No.	CONTENT	CONTACT HOURS
1	**Introduction**: Data Communication Basics, History of Computer Networking and the Internet. Internet, Protocol, Services. Computer Network: Hardware, Media and topology. **Protocol layering:** The OSI Reference Model and the TCP/IP protocol stack. Internet Access Networks. Circuit and Packet Switching, Delays: Processing, Queuing, Transmission and Propagation delays.	8
2	**Application Layer**: Principles and Architectures of Network Applications. **Application Layer Protocols**- The Web and http: Persistent and Non-persistent connections, http message format, cookies, proxy server, conditional GET, File Transfer Protocol. **Email**: SMTP, mail message formats, mail access protocols: POP3, IMAP, MIME. **DNS**: Services, how it works, Root, Top-Level and Authoritative DNS servers, Resource Records, DNS messages. A simple Introduction to p2p files distribution: Bit Torrent	10
3	**Transport Layer**: Introduction and Services, Transport layer in internet, Difference between Connection Oriented and Connectionless services. **UDP**: Segment structure, checksum in UDP. **TCP**: the principles behind connection-oriented data transfer, designing a connection-oriented protocol, stop-and-wait, Go Back N, Selective Repeat. Connection Establishment, TCP header, Sequence and acknowledgement numbers, Round Trip Time, Flow Control.	8
4	**Network Layer:** Network Layer Design Issues, Difference between Virtual Circuits and Datagram networks, The Internet Protocol (IP), Datagram format, IP fragmentation, IPv4 addressing, subnets, CIDR, classful addressing, DHCP, Network Address Translation (NAT). IPv6 Header, Moving from IPv4 to IPv6: tunneling, dual stack and header translation. **Routing Algorithms:** Link state (LS), Distance Vector (DV). **Routing in the Internet:** RIP, OSPF & BGP.	10
5	**Link Layer and Local Area Network**: **Introduction and Services:** Service provided by the LL, Implemented. **Error-Detection and Correction Techniques:** Parity checks, Cyclic Redundancy Check (CRC). **Multiple Access protocols:** Channel partitioning, Random access. **Ethernet:** CSMA/CD, Ethernet technologies, Ethernet Frame structure. **Signals-** analog and digital signals, periodic and a periodic signal, Digital Data Conversion: unipolar, polar, bipolar. **Analog data conversion**: - PAM, PCM, sampling. **Modulation techniques**: - ASK, FSK, PSK, AM, FM, PM.	12
	TOTAL	48

11 Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1	"Computer Networking – A Top Down Approach", James F. Kurose and Keith W. Ross, Pearson Fifth Edition.	**2014**
2	"Computer Networks" 4th Edition, Andrew S. Tanenbaum, Pearson.	**2006**

NAME OF DEPARTMENT: Computer Applications

Subject Name: Internet Technologies and Applications **Subject Code:** TMC 303

Details of the Course:

Unit No.	CONTENT	CONTACT HOURS
1	**Internet & HTML Basic** - Introduction to Internet, Client Server architecture, WWW, Web Browsers. Web Servers, Domain Name System (DNS), HTTP, Plug-ins, FTP, Telnet, DHCP, E-Mail architecture, Searching tools and Search engine, Security on Web. **HTML** -Structure of HTML documents, HTML Elements, Linking in HTML, Anchor Attributes, Image Maps, Meta Information, Layouts, Tables, Audio and Video Support with HTML. **Basic Interactivity and HTML:** Interactive Layout with Frames, FORMS, Form Control, New and emerging Form Elements. use of <div> & <span>.	7
2	**CSS:** Introduction, Benefits of CSS, types of CSS, Selector and types, text formatting properties, CSS Border, margin properties, Positioning, color properties, Classes in CSS, concept of Ids pseudoclasses. **XML understanding** Introduction, Syntax, Document structure, Document type definitions, Namespaces, XML schemas.	10
3	Overview of Javascript, Object orientation and Javascript, JavaScript identifiers, operators, control & Looping structure, Intro of Array, Array with methods, User defined & Predefined functions, Errors and Exception Handling. DOM objects, Event handling, Validations on Forms, The DOM 2 event model, DOM tree traversal and modification.	7
4	jQuery – Overview , Syntax, Selectors, Attributes, traversing, jQuery-HTML, jQuery-CSS, jQuery-DOM, jQuery-Events, jQuery-effects.	12
5	Introduction to PHP**,** A First PHP Web Page **,** Variables, Operators and Expressions **,**Control Statements **,** Functions **,** Arrays**,** String Handling in PHP, Using Ms-Access/MySQL Databases in PHP Pages.	12
	TOTAL	48

11 Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1	**Computer Networks and Internets with Internet Applications (Third Edition)** Author: Douglas E. Comer Publisher: Prentice Hall, ISBN: 0-13-091449-5.	2001
2	Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication.	2002
3	Thomas A Powell, HTML-The Complete Reference, Tata McGraw Hill.	2003
4	Deitel M., Deitel P. J., Goldberg, A. B.: Internet & World Wide Web How to Program, 3rd Edition, Pearson education.	2004

Subject Name: Database Management System   **Subject Code:** TMC 304

Unit No.	CONTENT	CONTACT HOURS
1	**Introduction to DBMS:** An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models, schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.	6
2	**Data Modeling and Entity Relationship Model:** ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree. **Relational Data Base Model (RDBMS)**: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra.	10
3	**Introduction to SQL:** Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, DDL, DML & DCL statements, SQL operators and their use, Tables, views and indexes, Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus. Overview of PL/SQL, Triggers and cursors.	14
4	**High Level Data Base Design & Normalization:** Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs.	8
5	**Transaction Processing Concepts:** Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling. **Concurrency Control**: Concurrency control mechanism, locking Techniques for concurrency control.	10
	TOTAL	48

11   Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1	Elmasri and Navathe: Fundamentals of Database Systems, 5th Edition, Pearson Education.	2007
2	Silberschatz, Korth and Sudharshan: Data base System Concepts, 5th Edition, Mc-GrawHill.	2006
3	C.J. Date, A. Kannan, S. Swamynatham: A Introduction to Database Systems, 8th Edition, Pearson education.	1996
4	Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, 3rd Edition, McGraw-Hill.	2003

Subject Name: JAVA Programming   **Subject Code:** TMC 302

Unit No.	CONTENT	CONTACT HOURS
1	**Introduction and Evolution of Java:** Evolution of Java, Byte Code, JDK, JVM, JRE, Data type, Variable, Arrays, Operator, Control Statements, Classes & Objects, Constructor, Methods, this, super keyword, Inheritance, static blocks. Packages, Defining Packages, Using Packages, import and static import, jar utility, classes modifiers: abstract, final; member modifiers: public, protected, default, private, static, final, abstract, synchronized, native, transient, volatile, strictfp, instance of operator.	10
2	**Interface:** Defining Interfaces, abstract methods declarations, implementing interfaces, extended interfaces, interface references and constants in interfaces **Fundamental Classes:** Object class, Wrapper classes, String class, immutability, StringBuffer and StringBuilder. **Exception handling:** Exception Types, Exception class, RuntimeException Class, Error Class, Checked and unchecked Exceptions, Defining new exceptions; Handling: try, catch and finally; throw statement, throws clause.	8
3	**Thread:** Overview of threads, thread Creation; implementing the runnable interfaces, extending the thread class, Thread States, methods: Running, Yielding, sleeping, joining, waiting and notifing. Synchronized and static synchronized threads.**Object Lifetime:** Garbage Collection, Reachable Objects, Object Finalization. **Nested and Inner Classes**	10
4	**I/O:** The File class, FilenameFilter, Byte Streams: Input and Output streams, Character streams: readers and writers; object serialization **Applet**: Applet basics, Applet Architecture, Applet Life cycle; Event Handling: Event handling mechanisms, the Delegation Event Model, Event classes, sources of events, Event Listener Interfaces, Adapter classes **AWT**: AWT Controls, Layout Managers, Frame, Images, Graphics, Fonts, Cursors, Colors, FileDialog box. **Swing-** Introduction**,** Advantages over AWT, Swing applications.	12
5	**Networking:** Networking Basics, Java and the Net, TCP/IP Client sockets, URL, URLConnection, TCP/IP Server sockets, Datagram **Introduction to RMI (Remote Method Invocation):** RMI, remote Interfaces, Stubs and skeletons, RMI registry, Bind and Rebind, a simple client server application using RMI. **Introduction to Generic Classes and Collection (List, Set, Map)** Vector, ArrayList etc.	8
	TOTAL	48

11   Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1	Naughton, Schildt, "The Complete Reference JAVA2", TMH, 7th edition	2007
2	Khalid A. Mughal: A Programmer's Guide To JAVA, Addison Wesley, 3rd edition.	2008

Subject Name: Theory of Computation   **Subject Code:** TMC 305(1)

Unit No.	CONTENT	CONTACT HOURS
1	Introduction to Sets, logic, relation, Predicate Calculus, Finite Automata (FA), Nondeterministic finite Automata (NFA), Deterministic finite Automata (DFA), Construction of DFA from NFA and Minimization of Automata, Myhill-Nerode theorem.	10
2	FA with output: Moore machine, Mealy machine and Equivalence, Applications and Limitation of FA, Introduction to languages – Chomsky hierarchy. Regular Grammar- Regular expressions, Arden Theorem, Pumping Lemma for regular language.	8
3	Context free grammar: Ambiguity, Simplification of CFGs, Normal forms for CFGs, Decidability of CFGs, and Ambiguous to Unambiguous CFG. Properties of recursive and recursively enumerable languages	9
4	Push Down Automata (PDA): Description and definition, Working of PDA, Acceptance of a string by PDA, PDA and CFG.	10
5	Turing machines (TM): Basic model, definition and representation, Language acceptance by TM, properties of TM, unsolvable Decision problem, undecidability of Post correspondence problem, Church's Thesis.	11
	TOTAL	**48**

11   Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1	Hopcroft, Ullman, "Introduction to Automata Theory, Language and Computation", Nerosa Publishing House	1979
2	K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science(Automata, Languages and Computation)", PHI	2008

Subject Name: Career skill – I   **Subject Code:** TMC 306

Unit No.	CONTENT	CONTACT HOURS
1	Written communication Paragraphing, Paraphrasing. Email writing, Proof reading	10
2	Soft skills Presentation Skills Group Discussions.	8
3	Introduction to Reasoning, basics, concepts and practice of arrangement-based questions (Linear, Vertical, Circular, any other). Concepts and practice of Tabular or Grid based questions. Blood Relations concepts, types of questions and their practice. Concepts and practice of Grouping or condition-based questions.	9
4	Concepts and practice of direction sense, coding-decoding and series completion. Syllogism, visual reasoning and mathematical reasoning.	10
5	Miscellaneous problems including set theory, cubes and dice and puzzles. Introduction to Data Interpretation (DI), quick calculations, concepts and practice. Introduction to Data Sufficiency concepts and practice.	11
	TOTAL	**48**

11   Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1	Advanced Technical communication by Malti Agarwal	2011
2	R.S.Aggarwal, Verbal and Non-Verbal Reasoning for competitive exams.	2008