FIFTH SEMESTER

Sl. No.	Course Category	Subject Code	Subject Title	L	T	P	Contact Hours/week	Credit	Full Marks
1.	Humanities Science -5	HU 601	Professional Practice, Law and Ethics	2	0	0	2	2	100
2.	Program Core-13	PC CS 502	Design and Analysis of Algorithm	3	0	0	3	3	100
3.	Program Core-14	PC CS 503	Database Management Systems	3	0	0	3	3	100
4.	Program Core-15	PC CS 504	Formal Language & Automata Theory	3	0	0	3	3	100
5.	Program Core-16	PC CS 505	Artificial Intelligence	3	0	0	3	3	100
6.	Program Core-17	PC CS 506	Computer Networks	3	0	0	3	3	100
7.	Program Core-18	PC CS 507	Algorithm Lab	0	0	2	2	1	100
8.	Program Core-19	PC CS 508	Database Management System Lab	0	0	2	2	1	100
9.	Program Core-20	PC CS 509	Computer Hardware & Network Lab	0	0	4	4	2	100
10.	Summer Internship-1	SI CS 510	Industry Internship - I	0	0	0	0	1	100
Total :				17	0	8	25	22	1000

Professional Practice, Law and Ethics

Course Code	HS 501
Course Title	Professional Practice, Law & Ethics
Number of Credits	2 (L: 2, T: 0, P: 0)
Prerequisites	-
Course Category	Humanities Science (HS)
Number of classes	26 hours

Course Outcome:-

After completion of the course, students will be able to:

CO Number	CO Description	K Level
CO 1	Develop ideas of the professionalism, values and ethics in a profession	K3
CO 2	Develop a good insight into contracts and contracts management in engineering, arbitration and dispute resolution mechanisms	K3
CO 3	Interpret laws governing engagement of labour in construction related works and other related areas	K2
CO 4	Demonstrate an understanding of Intellectual Property Rights and Patents	K2

Module1: Professionalism, Values and Ethics in Profession (6hrs)

Professionalism: Professional characteristics, professional education, professional development in Industry.
Values and Ethics in Profession- Value system- goodness, means and ends; Ethics-ethical premises, expectation, conflicts and practices; Moral and ego, Ethics and morality
Right, virtue ethics and justice, utility and justice, privacy, challenges to privacy, privacy on the Internet.

Professional Ethics–Definition of Ethics, Professional Ethics, Business Ethics, Corporate Ethics, Engineering Ethics, Personal Ethics; Code of Ethics as defined in the website of Institution of Engineers(India); Profession, Professionalism, Professional Responsibility, ProfessionalEthics;ConflictofInterest,GiftVsBribery,Environmentalbreaches,Negligence, Deficiencies in state-of-the-art;VigilMechanism,Whistleblowing,protecteddisclosures.

Module2: General Principles of Contracts Management and Arbitration (10hrs)

Indian Contract Act, 1972 and amendments covering General principles of contracting; Valid & Voidable Contracts; Prime and Subcontracts Tenders, Request For Proposals, Bids & Proposals; Bid Evaluation; Cost escalation; Delays, Suspensions & Terminations; Time

extensions & Force Majeure; Delay Analysis; Liquidated damages & Penalties; Insurance & Taxation.

Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system*:* Arbitration–meaning, scope and types–distinction between laws of 1940 and 1996; Arbitration agreements–essential and kinds, validity, reference and interim measures by court; Arbitration tribunal–appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Award including Form and content, Grounds for setting aside an award, Enforcement, Appeal and Revision.

Module 3: Engagement of Labour & other construction-related Laws (5hrs)

Role of Labour in Civil Engineering; Methods of engaging labour-on rolls, labour sub-contract, piece rate work; Industrial Disputes Act,1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act,1923; Building & Other Construction Workers (regulation of employment and conditions of service) Act(1996) and Rules (1998); RERA Act2017, NBC 2017

Module 4: Law relating to Intellectual property (5 hrs)

Introduction–meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets; Copy Rights Act, 1957, Meaning of copyright–computer programs, Ownership of copyrights and assignment, Criteria of infringement, Piracy in Internet–Remedies and procedures in India; LawrelatingtoPatentsunderPatentsAct,1970 including Concept and historical perspective of patents law in India. Process of obtaining patent–application, examination, opposition and sealing of patents. Duration of patents–law and policy considerations, Infringement and related remedies;

Text/Reference Books:

1. B.S. Patil, Legal Aspects of Building and Engineering Contracts, 1974.
2.TheNationalBuildingCode,BIS,2017
3.MeenaRao(2006), Fundamental conceptsinLawof Contract, 3rdEdn. ProfessionalOffset
4.NeelimaChandiramani(2000),TheLawofContract:AnOutline,2ndEdn. AvinashPublications Mumbai
5.Avtarsingh(2002),Lawof Contract,EasternBookCo. 7.Dutt(1994), IndianContractAct,Eastern LawHouse
6.T. Ramappa(2010),Intellectual PropertyRightsLawinIndia,AsiaLawHouse
9.Baretext(2005),RighttoInformationAct
7.O.P.Malhotra,Lawof Industrial Disputes,N.M. TripathiPublishers
8.Ethics inEngineering- M.W.Martin&R.Schinzinger, McGraw-Hill
9.EngineeringEthics,National InstituteforEngineeringEthics,USA.
10.Ethics&Mgmt andEthos , Ghosh, VIKASH
11.Business Ethics; Concept and Cases, Velasqez, Pearson

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Design and Analysis of Algorithm

Course Code	PC CS502
Course Title	Design and Analysis of Algorithm
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	ES204,PCCS306
Course Category	Program Core(PC)
Number of classes	38 hours

Course Outcome:

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.	K4
CO-2	Synthesize divide-and-conquer algorithms and Derive and solve recurrence relation.	K4
CO-3	Develop the dynamic programming algorithms, and analyze it to determine its computational complexity	K5
CO-4	Develop the greedy algorithms for a given problem.	K5
CO-5	Develop an understanding of Tractable and Intractable problems	K3

Course Content:

Module 1: Introduction (5 Hours)

Characteristics of algorithms. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem

Module 2: Divide and Conquer (9Hours)

Structure of divide-and-conquer algorithms; examples: binary search, quick sort, Strassen Matrix Multiplication; merge sort, heap sort and Analysis of divide and conquer run time recurrence relations.

Module 3: Dynamic Programming and Backtracking (10 Hours)

Principles of dynamic programming. Applications: Factorial calculation, Rod cutting problem, Floyd-Warshall algorithm for all pair shortest paths. Matrix multiplication, Travelling salesman Problem, Longest Common sequence, **Back tracking**: Overview, Find all subsequences of a string, 8-queen problem, and Knapsack problem, Traveling Salesman problem.

Module 4: Greedy Algorithms (14 Hours)

Overview of the greedy paradigm examples of exact optimization solution: minimum cost spanning tree, approximate solutions: Knapsack problem, Kruskal's algorithm and Prim's algorithm for finding Minimum cost Spanning Trees, Dijkstra's and Bellman Ford Algorithm for finding Single source shortest paths, Huffman coding, Activity Selection Problem. Tractable and Intractable Problems: Computability of Algorithms, Computability classes - P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques

Suggested books:

1. T .H . Cormen, C . E . Leiserson, R .L . Rivest "Introduction to Algorithms", 3rd Ed., PHI, 2011

2. E. Horowitz, S. Sahni, and S. Rajsekaran, "Fundamentals of Computer Algorithms,"

Suggested reference books:

1. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company

2. Algorithm Design, Jon Kleinberg and ÉvaTardos, Pearson.

3. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.

4. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA

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Database Management Systems

Course Code	PC CS 503
Course Title	Database Management Systems
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	Operating System
Course Category	PC
Number of classes	36 hours

Course Outcome:

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Illustrate relational algebra expressions for a given query and optimize the developed expressions.	K2
CO-2	Design the databases using E-R method for a given specification of the requirement and normalize them.	K3
CO-3	Construct the SQL queries in Open source and commercial DBMS -MYSQL, ORACLE for a given specification and optimize its execution using Query optimization algorithms	K3
CO-4	Implement the isolation property, including locking, time stamping based on concurrency control and serializability of scheduling	K4
CO-5	Develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.	K2

Course Content:

Module 1: Introduction (8 Hours)

Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML).
Data models: Entity-relationship model, network model, relational and object oriented data models, integrity constraints, data manipulation operations.

Module 2: Relational Model (12 Hours)

Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.

Relational database design: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design.
Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms

Module 3: Transaction Processing (8 Hours)

Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic, Concurrency Control schemes,
Database recovery: Failure Classification, Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions, Advance Recovery systems, Remote Backup.

Module 4: Database Security (8 Hours)

Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.
Advanced Topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and Data mining.

References / Suggested Learning Resources:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.
2. "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.
3. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education
4. "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley

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Formal Language & Automata Theory

Course Code	PC CS 504
Course Title	Formal Language & Automata Theory
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	NIL
Course Category	Program Core(PC)
Number of classes	38 hours

Course Outcome:

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Construct a formal notation for strings, languages and machines and design finite automata to accept a set of strings of a language	K3
CO-2	Identify whether the given language is regular or not	K4
CO-3	Analyze context free grammars to generate strings of context free language and determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars	K4
CO-4	Classify computability and non-computability and Decidability and undecidability.	K4

Course Content:

Module 1: Regular Language and Finite Automata (10 Hours)

Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages. Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, minimization of finite automata)

Module 2: Context Free Language and Pushdown Automata (10Hours)

Context-free languages and pushdown automata: Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic push down automata, closure properties of CFLs.

Module 3: Context Sensitive language and Turing Machines (10 Hours)

Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG. Turing machines: The basic model for Turing machines (TM), Turing recognizable(recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators

Module 4: Undecidability (8 Hours)

Undecidability: Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rices theorem, undecidable problems about languages.

Suggested books:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.
2. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
3. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
4. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
5. John Martin, Introduction to Languages and The Theory of Computation, TataMcGraw Hill., PEARSON.
6.Dr. R.B.Patel, Theory of Computation, Khanna Publishing House

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Artificial Intelligence

Course Code	PC CS 505
Course Title	Artificial Intelligence
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	Data Structure & Algorithm, Mathematics, Basic Programming
Course Category	Program Core
Number of classes	38 hours

Course Outcome:

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Explain the biological foundations to intelligent systems and searching.	K2
CO-2	Apply knowledge representation and implement logic programming.	K3
CO-3	Explain the fundamentals of experts systems.	K2
CO-4	Formulate reasoning under uncertainty.	K6

COURSE CONTENT

Module 1: Introduction (10 lectures)

Concept of AI, history, current status, Defining the Problem as a State Space Search, Search: BFS, DFS; Heuristic Search Techniques: Hill Climbing, Best-First Search, A* Algorithm, Problem Reduction, AO*Algorithm, stochastic annealing, Minimax Search, Alpha-Beta Pruning.

Biological foundations to intelligent systems: Overview of different forms of learning, Learning Decision Trees, Artificial neural networks, Back-propagation networks, Radial basis function networks, and recurrent networks. Fuzzy logic, Genetic algorithm, and fuzzy neural networks.

Module 2: (10 lectures)

Knowledge representation and logical inference Issues in knowledge representation, Knowledge-based systems structures, and its components. Propositional Logic, First Order Predicate Logic: Representing Instance and is-a Relationships, Computable Functions and Predicates, Syntax and Semantics of FOPL, Normal Forms, Unification and Resolution, Representation Using Rules, Natural Deduction; Structured Representations of Knowledge: Semantic Nets, Frames, Conceptual Dependency, Scripts.

Module 3: (08 lectures)

Overview of an Expert System, Structure of an Expert Systems, Different Types of Expert Systems- Rule Based, Model Based, Case Based and Hybrid Expert Systems, Knowledge Acquisition and Validation Techniques, Black Board Architecture, Knowledge Building System Tools, Expert System Shells, Fuzzy Expert systems.

Module 4: (10 lectures)

Uncertain Knowledge and Reasoning, Probabilities, Reasoning under uncertainty: Probabilistic reasoning, belief networks, hidden Markov model.

Truth Maintenance Systems, Logics for Non-Monotonic Reasoning, Statistical Reasoning: Bayes Theorem, Certainty Factors and Rule-Based Systems, Bayesian Probabilistic Inference, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic: Crisp Sets, Fuzzy Sets, Fuzzy Logic Control, Fuzzy Inferences and Fuzzy Systems.

BOOKS AND REFERENCES

1. Artificial Intelligence, George F Luger, Pearson Education Publications
2. Artificial Intelligence, Elaine Rich and Knight, Mcgraw-Hill Publications
3. Introduction to Artificial Intelligence & Expert Systems, Patterson, PHI
4. Multi Agent systems- a modern approach to Distributed Artificial intelligence, Weiss. G, MIT Press.
5. Artificial Intelligence : A modern Approach, Russell and Norvig, Printice Hall

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Computer Networks

Course Code	PC CS 506
Course Title	Computer Networks
Number of Credits	03 (L: 3, T: 0, P: 0)
Prerequisites	Nil
Course Category	Program Core-17
Number of classes	38 hours

Course Outcome:

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Interpret the different building blocks of communication network and its architecture.	K2
CO-2	Identify and analyze error and flow control mechanisms in data link layer.	K4
CO-3	Design subnetting and analyze the performance of network layer	K3
CO-4	Construct and examine various routing protocols	K4
CO-5	Illustrate the suitable Application layer protocols for specific applications and its respective security mechanisms	K2

Course Content:

Module 1: Networking Principles and layered architecture (9)

Data Communications and Networking: A Communications Model – Data Communications - Evolution of network, Requirements, Applications, Network Topology (Line configuration, Data Flow), Protocols and Standards, Network Models (OSI, TCP/IP)

Switched Communications Networks – Circuit Switching – Packet Switching – Comparison of Circuit Switching and Packet Switching – Implementing Network Software, Networking Parameters (Transmission Impairment, Data Rate and Performance)

Module 2: Data link layer (10)

Error Detection and Correction – Hamming Code , CRC, Checksum- Flow control mechanism – Sliding Window Protocol - GoBack - N - Selective Repeat - Multiple access Aloha - Slotted Aloha - CSMA, CSMA/CD – Multiple Access Networks (IEEE 802.3), Token Ring (IEEE 802.5) and Wireless Networks (IEEE 802.11, 802.15)

Module 3: Network layer (10)

IPV4 Address Space – Notations – Classful Addressing – Classless Addressing – Network Address Translation – IPv6 Address Structure – IPv4 and IPv6 header format.

Routing-Link State and Distance Vector Routing Protocols- Implementation-Performance Analysis- Packet Tracer.

Module 4: Transport layer & Application layer (9)

TCP and UDP-Congestion Control-Effects of Congestion-Traffic Management-TCP Congestion Control-Congestion Avoidance Mechanisms-Queuing Mechanisms-QoS Parameters
Application layer-Domain Name System-Case Study : FTP-HTTP-SMTP-SNMP.
Recent Trends in Computer Networks.

References / Suggested Learning Resources:

1. D., Voet, Voet, J.G. & Pratt, C. W., "Fundamentals of Biochemistry", John Wiley & Sons, 2nd ed, 2006
2. Pavel Pevzner, "Computational Molecular Biology: An Algorithmic Approach", MIT Press, 2000
3. Neil C. Jones, "An Introduction to Bioinformatics Algorithms", The MIT Press 2004
4. Richard Durbin, Sean R. Eddy, Anders Krogh, Graeme Mitchison, "Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids", Cambridge University Press 1998
5. David W. Mount, "Bioinformatics: Sequence and Genome Analysis", Cold Spring Harbor Laboratory Press 2001
6. Ewens, W. J. & Grant, G. R., "Statistical methods in bioinformatics: an introduction", New York. Springer, 2001

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Algorithm Lab

Course Code	PC CS 507
Course Title	Design and Analysis of Algorithm
Number of Credits	1 (L: 0, T: 0, P: 2)
Prerequisites	ES208, PC CS306
Course Category	Program Core (PC)
Number of classes	24 hours

Course Outcome:

After completion of the course, students will be able to:

CO	CO Description	K-level
CO-1	Implement sorting algorithms	K3
CO-2	Synthesize divide-and-conquer algorithms. Derive and solve recurrence relation.	K4
CO-3	Develop the dynamic programming algorithms, and analyze it to determine its computational complexity.	K5
CO-4	Develop the greedy algorithms for a given problem	K5

List of Experiments (*Minimum 6 experiments are to be performed. Use of virtual laboratory to perform few experiments may be explored, if available****):***

1. Implement Binary Search using Divide and Conquer approach Implement Merge Sort , quick sort using Divide and Conquer approach.
2. Search and replace character in a string using divide and conquer approach.
3. Find subsequences of a string using divide and conquer approach.
4. Find Maximum and Minimum element from a array of integer using Divide and Conquer approach
5. Find the minimum number of scalar multiplication needed for chain of matrix
6. Implement n Queen problem
7. Implement Travelling sales man problem
8. Implement knapsack problem
9. Solve factorial calculation dynamic programming way.
10. Problems on graph search
11. Problems on Dynamic programming

References / Suggested Learning Resources:

1. “Algorithm Design Manual “ By Steve Skiena

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Database Management System Laboratory

Course Code	PC CS 508
Course Title	Database Management System Laboratory
Number of Credits	1 (L: 0, T: 0, P: 2)
Prerequisites	OS
Course Category	PC
Number of classes	30 hours

Course Outcome:

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Execute DDL,DML and TCL commands	K3
CO-2	Create views, partitions and locks for a particular database	K4
CO-3	Create and execute procedure for an application using exception handling and cursors	K4
CO-4	Create and execute procedure for an application using triggers	K4

List of Experiments (*Minimum 6 experiments are to be performed. Use of virtual laboratory to perform few experiments may be explored, if available****):***

Structured Query Language

1. Creating Database
    - Creating a Database
    - Creating a Table
    - Specifying Relational Data Types
    - Specifying Constraints
    - Creating Indexes
2. Table and Record Handling
    - INSERT statement
    - Using SELECT and INSERT together
    - DELETE, UPDATE, TRUNCATE statements
    - DROP, ALTER statements
3. Retrieving Data from a Database
    1. The SELECT statement
    2. Using the WHERE clause
    3. Using Logical Operators in the WHERE clause
    4. Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING Clause
    5. Using Aggregate Functions
    6. Combining Tables Using JOINS

7. Subqueries

4. Database Management
   - Creating Views
   - Creating Column Aliases
   - Creating Database Users
   - Using GRANT and REVOKE
5. Cursors in Oracle PL / SQL
6. Creating database triggers and functions PL/SQL
7. Writing Oracle PL / SQL Stored Procedures

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Computer Hardware & Network Lab

Course Code	PC CS 509
Course Title	Computer Hardware & Network Lab
Number of Credits	02 (L: 0, T: 0, P: 4)
Prerequisites	Nil
Course Category	Program Core-20
Number of classes	44 hours

Course Outcome:

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Identify and describe the functions of common networking devices.	K3
CO-2	Construct a local area network (LAN) using a switches/hubs and configure TCP/IP for the LAN.	K3
CO-3	Construct and implement wide area network (WAN) using routers	K3
CO-4	Relate / understand the need of PC Hardware, internet & world wide web and office suites	K2
CO-5	Apply the knowledge of installation for different system & application software	K3

List of Experiments (*Minimum 6 experiments are to be performed. Use of virtual laboratory to perform few experiments may be explored, if available****):***

1. Study of different types of cross-wired cable and straight through cable.
2. Study of different types of Network cables and Practically implement the
1. Cross-wired cable and straight through cable using clamping tool.
2. Study of Basic network commands and network configuration commands.
3. Study of network IP.
4. Study of Network Devices in Detail.
5. Socket programming using Java or C programming language.
6. Connect the computers in Local Area Network.
7. Study of basic network command and Network configuration commands.
8. Configure a Network topology using packet tracer software.
9. Configure a Network using Distance Vector Routing protocol.
10. Configure Network using Link State Vector Routing protocol.
11. Network topology configuration of static routing using using packet tracer software
12. Routing Protocol Configuration of a network using any using packet tracer software
13. (Eg. Static routing, RIP, RIP Version 2 etc)
14. Firewall Configuration using IP tables and IP chains and solve different general problems in Linux OS.
15. Practical on Server Configuration Example, Web Server, Mail Server, FTP Server, DHCP, NFS etc.

List of Experiments related to PC Hardware

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1. To be familiar with and to be able to troubleshoot motherboard.
2. Identifying external ports and interfacing
3. Identifying PC cards and interfacing.
4. Identifying PC cards and interfacing.
5. Preventive maintenance of a PC
6. Understanding CMOS set up
7. Partitioning and formatting Hard disks.
8. Installing Different Operating System, Device Drivers and application software.
9. Understanding control panel settings.
10. To be familiar with SMPS.
11. To install video card, sound card, etc.
12. To install DMP, inkjet and laser printing; to undertake preventive maintenance and to troubleshoot DMP.
13. To disassemble and reassemble a total PC system.
14. Working with antivirus software
15. To practice anti-virus software installation and virus removal.
16. Working with Backups and Archival utilities

References / Suggested Learning Resources:

1. Hands on networking essentials with projects / M.J. Palmer
2. Internet working with TCP-IP / D.E. Comer and D. Stevens / Prentice Hall of India
3. CISCO Internetworking / Charles Riley / SPD Pvt. Ltd.
4. Networking Cabling handbook / Chris Clark / Tata McGraw Hill
5. Designing and implementing local and WANs / M.J. Palmer and R.B. Sinclair / Vikas Publishing House.

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Industry Internship – I

Course Code	SI CS 510
Course Title	Industry Internship – I
Number of Credits	1 (L: 0, T: 0, P: 0)
Prerequisites	Nil
Course Category	Summer Internship (SI)
Number of classes	20 hrs

Course Outcome:-

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Solve real life challenges in the workplace by analysing work environment and conditions, and selecting appropriate skill sets acquired from the course of study	K3
CO-2	Develop a right work attitude, self-confidence, interpersonal skills and ability to work as a team in a real organisational setting	K3
CO-3	Demonstrate the skill to communicate and collaborate effectively and appropriately with different professionals in the work environment through written and oral means	K2
CO-4	Show professional ethics by displaying positive disposition during internship.	K2
CO-5	Decide career options by considering opportunities in company, sector, industry, professional, educational advancement and entrepreneurship;	K5

Course Content:-

The industry internship aims to provide the student with:

1. A practice-oriented and 'hands-on' working experience in the real world or industry, and to enhance the student's learning experience.

2. An opportunity to develop a right work attitude, self-confidence, interpersonal skills and ability to work as a team in a real organisational setting.

3. An opportunity to further develop and enhance operational, customer service and other life-long knowledge and skills in a real world work environment.

4. Pre-employment training opportunities and an opportunity for the company or organisation to assess the performance of the student and to offer the student an employment opportunity after his/her graduation, if it deems fit.

Each student shall

1) Identify an internship program of relevance in his/her branch of engineering to undergo during summer break between 4^{th} and 5^{th} semester,
2) Get approval of the concerned HOD,
3) Undergo the industry internship program for minimum 4 weeks duration
4) Prepare their own report
5) Present in the class among fellow students and faculty members / deliver viva voce.
6) Submit the report and participation/course completion certificate.

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