

R.T.M. Nagpur University, Nagpur
Four Year B.Tech. Course
(Revised curriculum as per AICTE Model Curriculum)
B.Tech. V Semester (Computer Technology) Scheme

Subject code	Subject	Teaching Scheme			Evaluation Scheme			Credits	Category
		L	T	P	CA	UE	Total		
BTCT501T	Design and Analysis of Algorithms (TH)	3	0	0	30	70	100	3	PCC
BTCT501P	Design and Analysis of Algorithms Lab (PR)	0	0	2	25	25	50	1	PCC
BTCT502T	Database Management System(TH)	3	0	0	30	70	100	3	PCC
BTCT502P	Database Management System(PR)	0	0	2	25	25	50	1	PCC
BTCT503T	Software Engineering and Project Management (TH)	3	0	0	30	70	100	3	PCC
BTCT504T	Effective Technical Communication (TH)	2	0	0	15	35	50	2	HSMC
BTCT505P	Artificial Intelligence (TH)	3	0	0	30	70	100	3	PCC
BTCT506T	Elective - I	3	0	0	30	70	100	3	PEC
BTCT507T	Professional Ethics (Audit Course)	2	0	0	0	0	0	0	Audit
Total		19	0	4	215	435	650	19	

Elective - I BTCT506T
BTCT506T-1 TCP/IP
BTCT506T-2 Computer Graphics
BTCT506T-3 System Software and Device Driver

PCC-CS Professional Core Courses **ESC** – Engineering Science Courses **LC** – Laboratory Course
OEC-CS Open Elective Courses **MC** – Mandatory Course **PROJ-CS** Project (Min. one month internship is derirable)
BSC – Basic Science Courses **PEC-CS** Professional Elective Courses
HSMC- Humanities and Social Sciences including Management Courses

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B. Tech. Fifth Semester CT
Design and Analysis of Algorithms

Total Credits: 3	Subject Code: BTCT501T
Teaching Scheme :	Examination Scheme :
Lectures: 3 Hours/Week	Duration of University Exam: 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment : 30 Marks
Practical: 2 Hours/Week	University Assessment: 70 Marks

Course Objectives:

1. Analyze the time complexity of recursive function
2. Analyze the asymptotic performance of algorithms.
3. Apply important algorithmic design paradigms and methods of analysis.

Course Outcomes:(Please follow Bloom's Taxonomy words in Course outcome)

After completing the course, students will be able to

CO1. Argue the correctness of algorithms using inductive proofs and Analyze worst-case running times of algorithms using asymptotic analysis

CO2. Explain and apply Divide-and-Conquer and Greedy algorithmic design paradigms

CO3. Explain and apply Dynamic-Programming algorithmic design paradigms

CO4. Explain and apply Backtracking Database Management System (PR) algorithmic design paradigms

CO5. Describe the classes P, NP, and NP Complete and prove NP-Completeness of certain problem.

Unit I (8 Hrs)

Algorithm, Properties of Algorithm, Summation of arithmetic and geometric series, Recurrence relations, Solutions of recurrence relations using following techniques: Characteristic equation, Recursion tree method and Master method. Asymptotic notations of analysis of algorithms, Time complexity of program segments, Best case and worst case analysis of Insertion sort.

Unit II (8 Hrs)

Divide and Conquer strategy: Binary search, Merge sort, Quick sort, Strassen's matrix multiplication.

Greedy Approach: Fractional Knapsack Problem, Huffman coding algorithm, Traveling Salesman Problem, Activity Selection Problem, Job sequencing with deadlines problem, Minimum cost spanning trees, Single source shortest path.

Unit III (9 Hrs)

Dynamic Programming strategy: Longest Common Subsequence, Single source shortest paths, Traveling salesman problem, All pairs shortest path, Matrix Chain Multiplication, Multistage graphs, Optimal binary search trees, 0/1 Knapsack problem.

Unit IV (6 Hrs)

Backtracking strategy: n-Queen's problem, Sum of subsets, Graph coloring, Hamiltonian cycles.

Unit V (5 Hrs)

NP-hard and NP-complete problems: Non-deterministic algorithms, NP-hard and NP-complete, decision and optimization problems, Clique, Polynomial Reduction, Cook's theorem, graph based problems on NP Principle.

Text Books:

1. Introduction to Algorithms By Thomas H. Cormen et.al. Prentice Hall of India.

Reference Books:

1. Design & Analysis of Algorithms By Parag Himanshu Dave, Himanshu Bhalchandra Dave, second Edition, Pearson Publication.
2. Computer Algorithms- Introduction to Design and Analysis By Sara Baase, Allen Van Gelder, Third Edition, Pearson Publication.
3. The Design and Analysis of Algorithms By Alfred V. Aho, John E. Hopcraft, Jeffrey D. Ullman, Pearson Publication.
4. Ellis Horowitz, Sartaj Sahni, 'Fundamentals of Computer Algorithms', Galgotia Pubs.

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B. Tech. Fifth Semester CT
Design and Analysis of Algorithms (PR)

Total Credits: 1	Subject Code: BTCT501P
Teaching Scheme : Lectures: 0 Hours/Week Tutorials: 0 Hours/Week Practical: 2 Hours/Week	Examination Scheme : Duration of University Exam: College Assessment : 25 Marks University Assessment: 25 Marks

Minimum ten experiments should be conducted based on the Theory Syllabus

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B.Tech. Fifth/Sixth Semester CT
Database Management System

Total Credits: 3	Subject Code: BTCT502T
Teaching Scheme :	Examination Scheme :
Lectures: 3 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment : 30 Marks
Practical: 2 Hours/Week	University Assessment: 70 Marks

Course Objectives:

1. To present an introduction to database management systems,.
2. To emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.
3. To Implement relational databases using a RDBMS

Course Outcomes:(Please follow Bloom's Taxonomy words in Course outcome)

After completing the course, students will be able to

CO1. Explain the basic concepts of Database management system and database architecture and illustrate the concepts of Relational algebra.

CO2. functional dependencies , apply concepts of normalization and construct ER Diagrams.

CO3. Compare various indexing techniques and to illustrate the concepts of PL/SQL programming.

CO4. Select Query Optimization techniques and to evaluate the performance of Query and transaction Processing.

CO5. Define and illustrate the concepts of advanced database techniques.

Unit I (8 Hrs)

Introduction: Database system architecture, Database applications, Data Abstraction, Data Independence, Data Definition and models, Relational query languages: Relational algebra, tuple and domain relational calculus, SQL and QBE.

Unit II (7 Hrs)

SQL: Data definition, basic SQL query structure, set operations, nested subqueries, aggregation, null values, database modification, join expressions, views. Concepts of PL/SQL, Triggers and Assertions.

Unit III (7 Hrs)

Database Design: E-R model, E-R diagram, reduction to relational schema, E-R design issues, database integrity, specifying integrity constraints in SQL, triggers. Functional Dependency theory, decomposition using functional dependency and normal forms.

Unit IV (8 Hrs)

Query processing and optimization Evaluation of relational algebra expressions, query equivalence, join strategies, query optimization algorithms. Storage strategies Indices, B-trees, hashing. Transaction processing Recovery and concurrency control, locking and timestamp based schedulers, multiversion and optimistic Concurrency Control schemes.

Unit V (6 Hrs)

Advanced topics Object-oriented and object relational databases, logical databases, web databases, distributed databases, data warehousing and data mining (**6 Hrs**)

Text Books:

1. H Garcia-Molina, JD Ullman and Widom, Database Systems: The Complete Book, 2nd Ed., Prentice-Hall, 2008.
2. A Silberschatz, H Korth and S Sudarshan, Database System Concepts, 6th Ed., McGraw-Hill, 2010.

Reference Books:

1. R Elmasri, S Navahe, Fundamentals of Database Systems, 6th edition, Addison-Wesley, 2010.
2. R Ramakrishnan, J Gehrke, Database Management Systems, 3rd Ed., McGraw-Hill, 2002.

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B. Tech. Fifth Semester CT
Database Management System (PR)

Total Credits: 1	Subject Code: BTCT502P
Teaching Scheme : Lectures: 0 Hours/Week Tutorials: 0 Hours/Week Practical: 2 Hours/Week	Examination Scheme : Duration of University Exam : . College Assessment : 25 Marks University Assessment: 25 Marks

Minimum ten experiments should be conducted based on the Theory Syllabus

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B.Tech. Fifth/Sixth Semester CT
Software Engineering and Project Management (TH)

Total Credits: 03	Subject Code: BTCT503T
Teaching Scheme : Lectures: 3 Hours/Week Tutorials: 0 Hours/Week Practical: 0 Hours/Week	Examination Scheme : Duration of University Exam: 03 Hrs. College Assessment : 30 Marks University Assessment:70 Marks

Course Objectives:

1. To provide an understanding of the working knowledge of the techniques for analysis, design, testing, estimating and quality management of large software development projects.
2. To develop an understanding of the working methods and procedures for software development that can scale up for large systems and that can be used consistently to produce high quality software at low cost with a small cycle time.

Course Outcomes: (Please follow Bloom's Taxonomy words in Course outcome)

After completing the course, students will be able to

1. Explain evolution and impact of Software Engineering and to demonstrate and compare different software development process models.
2. Explain Agile process model, System Engineering and to list and explain different steps in Requirement Engineering Process.
3. Understand, analyze and apply different analysis and design models in software development process.
4. To explain and compare different software testing strategies, types and their significance and to understand and apply the concept of Software Quality Assurance and estimation.
5. To estimate the quality metrics for process and product and to list and analyze different software risk management strategies, software quality management process and to understand Software Configuration Management.

Unit I (06 Hrs)

Introduction: Software Characteristics, Software Engineering, A Layered Technology, Software Process Framework, Software Process Models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, , The Unified Process Model

Unit II (06 Hrs)

Agile Process Models, System engineering and modeling Requirements Engineering: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

Unit III (08 Hrs)

Software Analysis & Design : Modeling Approaches, Data Modeling, Object, Oriented Modeling, Scenario Based Modeling, Flow Oriented Modeling, Class based Modeling, Behavioral Model. Design Engineering Concepts, Design Model, Pattern Based Software design, Design Concepts: Abstraction Architecture, pattern modularity, information hiding, design classes, refactoring.

Unit IV (08 Hrs)

Software Testing : Testing Fundamentals , Black Box Testing, White Box Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Debugging.

Product metrics: Software quality, Quality Concepts, Software Quality Assurance , Metrics for Analysis & Design Models, Metrics for Source Code, Metrics for Testing & Maintenance.

Unit V (08 Hrs)

Metrics for process & Product: – Software measurement, Metrics for software quality, Project scheduling.

Risk management – Risk strategies, Software risks, Risk identification, Risk refinement, RMMM Quality Management, Software Reliability, Change Management, and Software Configuration Management

Text Books:

1. Software Engineering: A Practitioner's Approach (Sixth Edition), Roger Pressman (TMH)
2. Software Engineering (Ninth Edition), Ian Sommerville (Pearson Education)
3. Software Engineering : Theory and Practice (Fourth Edition) – Pfleeger (Pearson Education)

Reference Books:

1. Software Engineering Schaum's Series (TMH)
2. Software Engineering for Students –(Fourth Edition) – Bell (Pearson Education)
3. The Unified modeling language

Faculty of Engineering and Technology
Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
B.Tech. Vth sem (CT)
Effective Technical Communication (Theory)

CREDITS: 02

Teaching Scheme: 2 Hours/Week (Theory) + 1 Hour/Week (Tutorial)

Examination Scheme: University Assessment: 35 Marks College Assessment: 15 Marks

Objective: At the end of the semester, students will have enough confidence to face competitive examinations (IELTSES/ TOEFL/CAT/ MAT/ XAT/SNAP/GMAT/GATE etc.) to pursue master's degree. They will also acquire language skills required to write their Reviews/Projects/Reports. They will be able to organize their thoughts in English and hence face job interviews more confidently.

Course Outcomes: After completing the course, students will

1. Acquire knowledge of structure of language.
2. be able to face competitive exams and the interview process and can become employable.
3. Develop business writing skills.
4. become familiar with technology enabled communication and can develop technical and scientific writing skills.

Unit 1. Functional Grammar: (7Hrs)

Common errors, Transformation of Sentences- Change the Voice, Change the Narration, Simple, Compound Complex sentences, Use of Phrases, Idioms & Proverbs.

Unit II. English for Competitive Exams & Interview Techniques: (5 Hrs)

Word building, **English** words /phrases derived from other languages, Prefixes and Suffixes, Synonyms/Antonyms, Technical Jargons, Verbal Analogies, Give one word for, Types & Techniques of Interview.

Unit III. Formal Correspondence (5 Hrs)

Business Letters, (Enquiry, Quotation, Order, Complaint), Job applications and Resume Writing, e-mail etiquette, Writing Memorandum, Circulars, notices, Analytical comprehension

Unit IV. Technical & Scientific Writing: (7 Hrs)

Features of Technical Writing, Technical Report writing (Accident, Feasibility, Trouble, Progress), Writing Scientific Projects, Writing Manuals, Writing Project Proposals, Writing Research papers.

Reference Books:

1. Effective technical Communication by Barun K. Mitra, Oxford University Press,
2. Technical Communication-Principles and Practice by Meenakshi Raman & Sharma, Oxford University Press, 201,
3. Functional English for Technical Students by Dr. Pratibha Mahato and Dr. Dora Thompson, Himalaya Publishing House
4. How to Prepare a Research Proposal: Guidelines for Funding and Dissertations in the Social and Behavioral Sciences by Krathwohl & R David
5. Technical Writing- Process and Product by Sharon J. Gerson & Steven M. Gerson, 3rd edition, Pearson Education Asia, 2000
6. Developing Communication skills by Krishna Mohan & Meera Banerjee

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B. Tech. Fifth Semester CT
Artificial Intelligence (TH)

Total Credits: 3	Subject Code: BTCT505T
Teaching Scheme : Lectures: 3 Hours/Week Tutorials: 0 Hours/Week Practical: 0 Hours/Week	Examination Scheme : Duration of University Exam : 3 hrs. College Assessment : 30Marks University Assessment: 70Marks

Course Objectives:

To make students

1. To understand necessary depth of the fundamental techniques of Artificial Intelligence.
2. To capable of using heuristic search techniques.
3. To aware of knowledge based systems.
4. To learn various applications domains AI.
5. To able to use fuzzy logic and neural networks and Genetic algorithm.

Course Outcomes:

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

1. Explain the basics of the theory of AI and different informed and uninformed search algorithms.
2. Formulate and solve given problem using Propositional and First order logic.
3. Describe various knowledge representation techniques and to apply reasoning for non-monotonic AI problems.
4. Describe various application domain of AI such as Expert system, Game Playing, Natural Language Processing.
5. Apply neural network learning and evolutionary algorithms such as Genetic Algorithms for solving AI problems.

UNIT I (8 Hrs)

Introduction to AI: Definition of AI, Early work in AI, Importance of AI and related fields, Task domains of AI systems, Intelligent agents, Generic architecture of intelligent agent.

Basics of problem solving: Defining the problem on a state space search, Production systems, Problem characteristics, Production system characteristics, Issues in the design of search programs.

UNIT II (8 Hrs)

Heuristic search techniques: Generate and test, Hill climbing, Best-first search, Problem reduction, Constraint satisfaction, Means-ends analysis.

Knowledge Representation: Representation and mapping, Approaches and Issues. Introduction to proposition logic, Knowledge representation using predicate logic, Unification and resolution. Representing knowledge using rules, procedural Vs declarative knowledge, logic programming, forward Vs backward reasoning, matching.

UNIT III (8 Hrs)

Knowledge representation: Network representation schemes - Semantic networks, conceptual graphs, Conceptual dependency, Structured representation schemes – Frames, Scripts.

Statistical reasoning: Symbolic Vs Statistical reasoning, Nonmonotonic and monotonic reasoning, Probability and Bayes' theorem, Certainty factors and rule based systems, Bayesian networks, Introduction to fuzzy logic.

UNIT IV (6 Hrs)

Expert systems: Characteristic features of expert system, Architecture of expert system, Expert system shell.

Game playing: Minimax search procedure, adding alpha-beta cutoffs.

Natural Language Processing: Overview of linguistics, Grammar and languages, basic parsing techniques, semantic analysis and representation structures.

UNIT V (6 Hrs)

Artificial Neural Network: Introduction, Neural Network representation, neural learning, Knowledge representation in ANN, application of neural networks.

Genetic Algorithm: Motivation, GA cycle, genetic operators, GA based Machine Learning, illustrative example.

TEXT BOOK:

1. E. Rich & K. Knight, S. B. Nair "Artificial Intelligence", Tata McGraw Hill Publications, 2008.
2. D. W. Patterson, "Introduction to Artificial Intelligence and Expert System", PHI Pub., 1997.
3. K. Uma Rao, "Artificial Intelligence and Neural Networks" Pearson Education, 2011.
4. [David E. Goldberg](#), "Genetic Algorithms in search, optimization and machine learning", Pearson Education, 2002.

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B.Tech. Fifth/Sixth Semester CT
Elective – I : TCP/IP (Th)

Total Credits: 3	Subject Code: BTCT506T
Teaching Scheme : Lectures: 3Hours/Week Tutorials: 0 Hours/Week Practical: 0 Hours/Week	Examination Scheme : Duration of University Exam : 3 hrs. College Assessment : 30Marks University Assessment: 70Marks

Course Objectives:

1. Define fundamental concepts of TCP/IP architecture and protocols
2. Basic Concept on the network layer, transport layer, and application layer of the suite
3. Basic Concept of Network management and internet Security.

Course Outcomes:(Please follow Bloom's Taxonomy words in Course outcome)

After completing the course, students will be able to

1. Identify protocols and standards in the Internet.
2. Concept of basic addressing and setup, connectivity and communications, name resolution, and fundamental network services.
3. Learn real-time IP-based protocols and services including Voice over IP (VoIP) and Instant Messaging (IM) applications,
4. Basic concept of Network configuration with other services like mail services.
5. Basic Concept of Network Management Protocols and internet security.

Unit I (6 Hrs)

Introduction and Overview: Comparison of OSI Model and TCP/IP model. Networking Technologies: LANS, WANS, Connecting Devices. Internetworking concept and Architectural model. Internet Backbones, NAP, ISP's, RFC's, Internet Standards.

Unit II (8 Hrs)

Internet Addresses: IP address classes, subnet mask, CIDR, ARP, RARP, Internet Protocol, Routing IP Datagrams, ICMP and IGMP, Introduction to IPv6 and ICMPv6

Unit III (8 Hrs)

UDP, TCP, Sockets and socket Programming, Routing in Internet, Routing protocols- RIP, OSPF and BGP. Introduction to Multicasting and Multicast routing.

Unit IV (6 Hrs)

Host Configuration: BOOTP, DHCP; Services: Domain Name System, FTP, TFTP and **Electronic Mail:** SMTP, MIME, IMAP, POP.

Unit V (6 Hrs)

Network Management: SNMP, WWW: HTTP, Mobile IP. **Multimedia** : RTP, RTCP. **Middle wares** : RPC, RMI.

Internet Security:IPSec, PGP, Firewalls, SSL

Text Books:

1. Internetworking and TCP/IP: Principles, Protocols and Architectures, Douglas Comer, Pearson Education.
2. TCP/IP Protocol suite, Behrouz A. Forouzan, Third Edition, TMH.
3. Computer Networking – A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W. Ross, Pearson Education, Asia.
4. Computer Networks: A systems approach by Larry L. Peterson and Bruce S. Davie, 3rd Edition, Morgan Kaufmann Publishers

Reference Books:

1. Stevens W. R. TCP/IP Illustrated, volume 1,2,3, Pearson education.
2. “Hands-On Networking with Internet Technologies”• by Douglas E. Comer, Pearson Education, Asia, 2002.

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B.Tech. Fifth/Sixth Semester CT
Elective – I : Computer Graphics (Th)

Total Credits: 3	Subject Code: 8 BTCT506T
Teaching Scheme : Lectures: 3Hours/Week Tutorials: 0 Hours/Week Practical: 0 Hours/Week	Examination Scheme : Duration of University Exam : 3 hrs College Assessment : 30Marks University Assessment: 70Marks

Course Objectives:

On successful completion of the course, students will be able to:

1. Understand the core concepts of computer graphics, Graphics devices.
2. Understand and implement various Scan conversion techniques.
3. Understand and apply the windowing, clipping and various transformations principles.

Course Outcomes:(Please follow Bloom's Taxonomy words in Course outcome)

After completing the course, students will be able to

1. Explain the basic concepts of computer graphics, identify the importance of computer graphics and its wide spread applications.
2. Categorize and apply basic raster graphics algorithms for drawing 2D primitives and various polygon filling algorithms.
3. Categorize and apply 2D Clipping algorithms for regular and irregular windows ; Compare various types of curves.
4. Compare, contrast and apply various 2D Transformations.
5. Explain 3D System Basics, compare and contrast various 3D Transformations and various hidden surface removal algorithms.

Unit I : (6 Hrs)

Introduction to Graphics : Introduction to Computer Graphics & its application, Origin of Computer Graphics, Graphics Areas, Graphics Pipeline, Graphics APIs, Hardcopy Technologies, Display Technologies – Raster scan Display System, Video Controller – Vector scan display system, Random Scan Display Processor, Input Devices for Operator Interaction.

Unit II : (9 Hrs)

Line generation Algorithms: DDA, Bresenham's Algorithm, Bresenham's Circle Generation algorithm, Polygon filling methods: Scan Conversion Algorithms: Simple Ordered edge list, Edge Fill, Fence fill and Edge Flag Algorithm. ,Seed fill Algorithms: Simple and Scan Line Seed Fill Algorithm.

Unit III : (7 Hrs)

Windowing & Clipping: The viewing transformations. Line Clipping: Sutherland-Cohen algo, Midpoint Subdivision algo, Cyrus Beck algo. Polygon Clipping: Sutherland-Hodgman algo. Curves: Bezier & B-spline Curves.

Unit IV : (6 Hrs)

Transformation 2-Dimension Transformation: Basic Transformation: Scaling, Rotation, Translation, Matrix representation, Homogeneous Coordinates & Composite transformations, rotation about an arbitrary point, other transformation: Reflection Shear.

Unit V : (8 Hrs)

3-Dimension Transformation – 3D geometry, 3D primitives, Scaling, Translating, Rotation about an arbitrary axis, Parallel and Perspective projections, Hidden line/surface Removal Algorithms. painter's algorithm, Z -buffers, Warnock's algorithm.

Text Books:

1. Rogers; Procedural Elements of Computer Graphics; 3rd Edition; McGraw Hill, 2001.
2. Newman and Sproull; Principles of Interactive Computer Graphics; McGraw Hill, 1989.
3. Ivan Harrington; Computer Graphics - A Programming Approach; McGraw Hill Publications, 1987

Reference Books:

- 1 Hearn and Baker; Computer Graphics; 2nd Edition; PHI, India, 1994
2. James D. Foley, Andries Van Dam, Feiner Steven K. and Hughes John F. – Computer Graphics: Principles & Practise, Addison Wesley Publishing House

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B.Tech. Fifth/Sixth Semester CT
Elective – I: System Software and Device Driver (Th)

Total Credits: 3	Subject Code: 8 BTCT506T
Teaching Scheme : Lectures: 3Hours/Week Tutorials: 0 Hours/Week Practical: 0 Hours/Week	Examination Scheme : Duration of University Exam: 3 hrs. College Assessment : 30Marks University Assessment: 70Marks

Course Objectives:

1. Learn basic concepts of operating systems and system software's.
2. Design of operating systems and system software's.

Course Outcomes:(Please follow Bloom's Taxonomy words in Course outcome)

After completing the course, students will be able to

1. Explain the basics concept of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
2. Design and describe the various concepts of assemblers, the various phases of compiler and compare its working with assembler.
3. Explain and describe the various concepts of macro -processors.
4. Explain the basic concepts of linker and loader, create an executable program from an object Unit created by assembler and compiler.
5. Explain various Device drivers, its types and installation.

Unit I Introduction to System Software and IBM 360 Machine: (8 Hrs.)

Evolution of components of programming system, Operating System, Overview, Functions and Facilities o, Goals of System software, Views of System Software, Virtual machine. General machine structure IBM 360/370, Machine Language Assembly language.

Unit II Assembler: (8 Hrs.)

Design of Pass-I and Pass-II Assemblers, Table Processing, Searching and Sorting, Problems based on symbol table, Base table and Literal table generation, Machine code generation and Searching and sorting. Phases of Compiler, Compiler writing tools, Lex and YACC.

Unit III Macro Language and Macro Processor: (7 Hrs.)

Macro instruction, Features of Macro facility, Implementation of 1-Pass, 2-Pass Macro processor, Macro calls within macro, macro definition within macros.

Unit IV : (8 Hrs)

Different Loading Schemes, Binders, Overlays, Linking loaders, Design of absolute loaders, Design of Direct Linking loaders.

Unit V UNIX Device Drivers: (5 Hrs.)

Introduction to Device drivers, Types of Device Drivers, Design issues in Device Drivers, Driver installation with example, character driver-A/D Converter, Block Driver-RAM Disk driver, Terminal Driver-The COM1 port driver .

Text Books:

1. J. J. Donovan; System Programming; TMH, 2012
2. D.M. Dhamdhare; System Programming; THM; 2011
3. George Pajari; Writing Unix Device Drivers; Pearson Education; 2011

Reference Books:

1. Leland Beck, D. Manjula; System Software; An Introduction to Programming; Pearson Education; 2013
2. Alfred Aho, J. Ullman; Principles of Compiler Design; Narosa Pub. 2010

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B.Tech. Fifth/Sixth Semester CT
Subject: Professional Ethics (Theory)
Audit Course

Teaching Scheme
Lectures: 2 Hours/Week

Course Objective: The objective of this course is to inculcate the sense of professional and social responsibilities along with moral and ethical values among learners and to make them realize the significance of ethics and Intellectual Property Rights in professional environment so as to make them a global citizen

Course Outcomes: After completing the course, the students will be able to

- CO1: Realize their roles of applying ethical principles and morals at professional levels
- CO2: understand their constructive roles in understanding corporate culture and maintaining work-life balance.
- CO3: become responsible and contributing members of society
- CO4: acquire knowledge of Intellectual property rights.

Unit I (6hrs)

Engineering Ethics, Senses of 'Engineering Ethics', Codes of Ethics, moral issues, Moral dilemmas, Moral Autonomy, Kohlberg's theory, Gilligan's theory

Unit II (6hrs)

Meaning of corporate governance, gender equality at work place, concept of whistle blower, respect for environment, work-life balance.

Unit III (6hrs)

Corporate social responsibility (CSR)- need and importance, corporate environment responsibility (CER) need and importance, real life examples of CSR projects in India.

UNIT IV (6hrs)

Introduction and the need of intellectual property rights (IPR), kinds of intellectual property rights - Patents, Copy rights, Trade Mark, Plagiarism, types of plagiarism – Global plagiarism, verbatim plagiarism, paraphrasing plagiarism, patch work plagiarism, Plagiarism checking software.

Reference Books:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S. Chand Publications
3. Ethics in Engineering by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill – 2003.
4. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
5. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill – 2013
6. [Dr. Vaibhav Ramesh Bhalerao, Dr. Mayur Subhash Punde, Dr. Shrikant Waghulkar](#), Thakur Publications, 2021
7. Corporate Social Responsibility in India, Sanjay K Agrawal, Sage Publications Pvt. Ltd; 2008
8. Fundamentals of Intellectual Property for Engineers, Kompal Bansal, BS publications, 2014