CS701 Compiler Design

Unit-I Introduction to compiling & Lexical Analysis

Introduction of Compiler, Major data Structure in compiler, BOOT Strapping & Porting, Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, Lexical analysis: Input buffering , Specification & Recognition of Tokens, LEX.

Unit-II Syntax Analysis &Syntax Directed Translation

Syntax analysis: CFGs, Top down parsing, Brute force approach, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence parsing, LR parsers (SLR,LALR, LR),Parser generation.Syntax directed definitions: Construction of Syntax trees, Bottom up evaluation of S-attributed definition, L-attribute definition, Top down translation, Bottom Up evaluation of inherited attributes Recursive Evaluation, Analysis of Syntax directed definition.

Unit-III Type Checking & Run Time Environment

Type checking: type system, specification of simple type checker, equivalence of expression, types, type conversion, overloading of functions and operations, polymorphic functions. Run time Environment: storage organization, Storage allocation strategies, parameter passing, dynamic storage allocation , Symbol table

Unit –IV Code Generation

Intermediate code generation: Declarations, Assignment statements, Boolean expressions, Case statements, Back patching, Procedure calls Code Generation: Issues in the design of code generator, Basic block and flow graphs, Register allocation and assignment, DAG representation of basic blocks, peephole optimization, generating code from DAG.

Unit –V Code Optimization

Introduction to Code optimization: sources of optimization of basic blocks, loops in flow graphs, dead code elimination, loop optimization, Introduction to global data flow analysis, Code Improving transformations ,Data flow analysis of structure flow graph Symbolic debugging of optimized code.

List of Experiments:

- Develop a lexical analyzer to recognize a few patterns.
- Write a programme to parse using Brute force technique of Topdown parsing.
- Develop LL (1) parser (Construct parse table also).
- Develop an operator precedence parser (Construct parse table also)
- Develop a recursive descent parser
- Write a program for generating for various intermediate code forms

i) Three address code ii) Polish notation

- Write a program to simulate Heap storage allocation strategy
- Generate Lexical analyzer using LEX
- Generate YACC specification for a few syntactic categories.

☐ Given any intermediate code form implement code optimization techniques
☐ Study of an Object Oriented Compiler.

References:

1. A. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools , Pearson Education
2 Raghavan, Compiler Design, TMH Pub.
3. Louden. Compiler Construction: Principles and Practice, Cengage Learning
4. A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
5. Mak, writing compiler & Interpreters, Willey Pub.

CS702 Distributed System

Unit-I
Introduction to distributed systems
Architecture for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages & Disadvantage distributed system, Issues in designing Distributed System,

Unit-II
Distributed Share Memory And Distributed File System
Basic Concept of Distributed Share Memory (DSM), DSM Architecture & its Types, Design & Implementations issues In DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing. Desirable features of good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault tolerance. Naming: - Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

Unit-III
Inter Process Communication And Synchronization
API for Internet Protocol, Data Representation & Marshaling, Group Communication, Client Server Communication, RPC- Implementing RPC Mechanism, Stub Generation, RPC Messages. Synchronization: - Clock Synchronization, Mutual Exclusion, Election Algorithms:- Bully & Ring Algorithms**.**

Unit-IV
Distributed Scheduling And Deadlock
Distributed Scheduling-Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues. Deadlock-Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms,

Unit-V
Distributed Multimedia & Database system
Distributed Data Base Management System(DDBMS), Types of Distributed Database, Distributed Multimedia:- Characteristics of multimedia Data, Quality of Service Managements. Case Study of Distributed System:- Amoeba, Mach, Chorus

References:
☐ Sinha, Distributed Operating System Concept & Design, PHI
☐ Coulouris & Dollimore, Distributed System Concepts and Design, Pearson Pub
☐ Singhal & Shivratari, Advance Concept in Operating System, McGraw Hill
☐ Attiya & Welch, Distributed Computing, Wiley Pub.

CS703 INFORMATION STORAGE AND MANAGEMENT

Unit-I

Introduction to Storage Technology: Data proliferation, evolution of various storage technologies, Overview of storage infrastructure components, Information Lifecycle Management, Data categorization.

Unit-II

Storage Systems Architecture: Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing, Front end to host storage provisioning, mapping and operation.

Unit-III

Introduction to Networked Storage: JBOD, DAS, NAS, SAN & CAS evolution and comparision. Applications, Elements, connectivity, standards, management, security and limitations of DAS, NAS, CAS & SAN.

Unit -IV

Hybrid Storage solutions; Virtualization: Memory, network, server, storage & appliances.

Data center concepts & requirements, Backup & Disaster Recovery: Principles

Managing & Monitoring: Industry management standards (SNMP, SMI-S, CIM), standard framework applications, Key management metrics (Thresholds, availability, capacity, security, performance).

Unit-V

Information storage on cloud :Concept of Cloud, Cloud Computing, storage on Cloud, Cloud Vocabulary, Architectural Framework, Cloud benefits, Cloud computing Evolution, Applications & services on cloud, Cloud service providers and Models, Essential characteristics of cloud computing, Cloud Security and integration.

References:
1. G. Somasundaram & Alok Shrivastava (EMC Education Services) editors; Information Storage and Management: Storing, Managing, and Protecting Digital Information; Wiley India.
2. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, Rainer Wolafka, Nils Haustein; Storage Network explained : Basic and application of fiber channels, SAN, NAS, iSESI, INFINIBAND and FCOE, Wiley India.
3. John W. Rittinghouse and James F. Ransome; Cloud Computing : Implementation , Management and Security, CRC Press, Taylor Frances Pub.
4. Nick Antonopoulos, Lee Gillam; Cloud Computing : Principles, System & Application, Springer.
5. Anthony T. Velete, Toby J.Velk, and Robert Eltenpeter, Cloud Computing : A practical Approach, TMH Pub.
6. Saurabh , Cloud Computing : Insight into New Era Infrastructure, Wiley India.
7. Sosinsky, Cloud Computing Bible, Wiley India.

Course: CS 7101 Network Management

Unit-I
Introduction to Network Managements, Network Management Framework, Network Based Managements, Evolution of Network Management: SGMP, CMIP, SNMP. Network Implementation and Management Strategies, Network Management Categories: Performance Management, Fault Management, Configuration Management, Security Managements, Accounting Managements. Network Management Configuration: Centralized Configuration, Distributed Configuration. Selected Management Strategy.

Unit –II
Management Information Base (MIB), Structure of Management Information, NMS Presentation of the SMI, NMS Meter-ware Network View. Remote Monitoring (RMON), RMON Group. Desktop Management: Desktop Management Interface(DMI), DMI Architecture, DMI Browser, DMI/SNMP Mapping, Desktop SNMP Extension Agents. Setting up LAN Access, SNMP Configuration.

Unit-III
Introduction, layering, OSI Layering, TCP/IP Layering, Protocols & Standards, Internet standards, Internet administration, Internet Addresses, Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet mask, special case of IP addresses, Comparative Study of IPV4 & IPV6, port numbers Address Resolution Protocol, ARP packet format, Proxy ARP, ARP command, ARP Example, Reverse Address Resolution Protocol (RARP): Introduction, RARP Packet format, RARP Examples, RARP server design

Unit-IV
Delivery and Routing of IP Packets, Routing Methods, Static versus Dynamic Routing, Routing table and Routing Module, Classless Addressing: CIDR. Internet Protocol (IP), Datagram, Fragmentation, Options, IP Package. Interior and Exterior Routing, Routing information protocol (RIP), Open shortest path first protocol (OSPF), BGP, GGP. Private Networks. Virtual Private Network (VPN), Network Address Translation (NAT).

Unit –V
Internet Control Message Protocols (ICMP):- Types of message, message format, error reporting, query, checksum, ICMP Package. IGMP, IGMP Message and its Operation, IGMP Package.Transmission control protocol, Process-to-Process Communication, TCP Services Flow Control, TCP Timers. TCP Operation, TCP Package.. Application layers protocol, Telnet Protocol, File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), X-Window system protocol, Remote procedure call, and Network file system.

References:
☐ Forouzan, TCP/IP Protocol Suite 4th edition, TMH
☐ J.Richard Burkey, Network Management Concept and Practice, PHI
☐ Stevens, TCP/IP Illustrated Volume-I, Pearson
☐ Tittel: TCP/IP, Cenage Learning
☐ Uyless Black, TCP/IP and related protocols, McGraw Hill.
☐ Doughals E. Comer, Internetworking with TCP/IP Vol. I, Principles, Protocols, and Architecture, Prentice Hall, India.

CS 7102 Real Time Fault Tolerant Systems

Unit-I
Structure of Real Time System, Performance Measure for real time system, Task Assignments,Fault Tolerant Scheduling, Real Time Vs General purpose Data Bases, Data Bases for Hard Real Time System, Real Time Communication

Unit-II
Fault Tolerance, Fault-Error-Failure. Redundancy, Error Detection, Damage Confinement, Error Recovery, Fault Treatment, Fault Prevention, anticipated and unanticipated Faults. Error models: General coding scheme Error detection techniques: Watchdog processors, Heartbeats, consistency and capability checking, Data audits, Assertions, Control-flow checking, Error control coding. Application: DHCP

Unit-III
Fault tolerance: Coding technique-fault tolerant self checking and fail safe circuits-fault tolerance in combinatorial and sequential circuits- synchronous and asynchronous fail safe circuits. Software fault tolerance: Process pairs, robust data structures, N version programming, Recovery blocks, Replica consistency & reintegration, multithreaded programs Application: VAX. Network fault tolerance: Reliable communication protocols, Agreement protocols, Database commit protocols -Application: Distributed SQL server Check pointing & Recovery - Application: Micro check pointing, IRIX Checkpoints

Unit-IV
Experimental Evaluation: Modelling and simulation based, Fault injection based - Application: NFTAPE fault injector . Modelling for performance, dependability and perform ability: dependability-specific methods (fault trees, reliability block diagrams), queues, stochastic Petri nets and stochastic activity networks - Application: Ultra SAN

Unit-V
Practical Systems for Fault Tolerance: - Application: Ad-hoc wireless network - Application: NASA Remote Exploration & Experimentation System Architecture: Fault tolerant computers - general purpose commercial systems-fault tolerant multiprocessor and VLSI based communication architecture. Fault tolerant software: Design-N-version programming recovery block - acceptance tests-fault trees- validation of fault tolerant systems.

REFERENCES :-
1. K.K.Pradhan, "Fault Tolerant computing theory and techniques" volume III. Prentice Hall,1989.
2. Krishna, Real Time System, TMH
3. Anderson and Lee, "Fault Tolerant principles and practice" ,PHI 1989.
4. Siewert, Real Time Embeded System, Cengage Learning.
5. Rajiv Mall, Real Time System, Pearson Edu.
6. Parag K. Lala, "Fault Tolerant and Fault Testable, Hardware design" PHI 1985.
7. Shem , toy Levei , Ashok K.Agarwala , "Fault Tolerant System design", Tata McGraw Hill

CS 7103 Embedded Computer Systems

Unit – I
Introduction to Embedded systems
Embedded Systems Vs General Computing Systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Purpose of Embedded systems ,Core of the Embedded system, Memory, Sensors and Actuators, Communication Interface, Embedded firmware, PCB and Passive Components, Characteristics and Quality attributes of a Embedded System .

Unit – II
Design of Embedded Systems with 8bit Microcontrollers-8051
Factors for considering in selecting a Controller ,Designing with 8051 microcontroller Different addressing modes supported by 8051 , Instruction set for 8051 microcontroller. Fundamental issues in Hardware Software Co-Design , Computational models in Embedded Design .

Unit – III
Embedded Hardware & Firmware Design and Development
Analog &Digital Electronic components, VLSI & Integrated circuit design, Electronic Design Automation tools , PCB layout Design and its fabrication .Embedded firmware design approaches , Embedded firmware Development Languages ,Programming in Embedded C . Integration and testing of Embedded Hardware and Firmware , Safe & robust Design, Reliability, Faults, errors & Failure, Functional Design, Architecture Design, Prototyping.

Unit -IV
Embedded System Development Environment
Integrated Development Environment (IDE) , Types of files Generated on Cross-Compilation , Disassembler / Decompiler, Simulators, Emulators and Debugging, Boundary Scan.

Unit – V
Embedded Product Development Lifecycle(EDLC) and Trends in Embedded Industry
What is EDLC ,Objectives of EDLC , Different phases of EDLC , EDLC Approaches-Linear or waterfall model , Iterative Model , Prototyping/Evolutionary Model, Spiral Model . Processor trends in Industry , Embedded OS Trends , Development Language trends Open Standards, Frameworks and Alliances , Bottlenecks.

References:
1. Shibu, Introduction to Embedded System:, TMH
2. Barrett ,Embedded Systems :Design and Applications ,Pearson Education
3. Rajkamal, Embeded System, TMH
4. Vahid ,Givargis ,Embedded System Design ,Wiley
5. Balbno, Embedded Micro Computer System Cengage Learning
6. Siewert, Real Time Embedded System & Components, Cengage Learning
7. Peckol, Embedded System, Willey Indi

CS 7201 Network & Web Security

UNIT I
Introduction to Network Security, Computer Securit y and Cyber Security. Security Terminologies and Principle, Security Threats, Types of attacks (Operating System, application level, Shrink Wrap code, Misconfiguration attacks etc.). Introduction to Intrusion, Terminologies, Intrusion Detection System (IDS), Types of Intrusion Detection Systems, System Integrity Verifiers (SIVS).Indication of Intrusion: System Indications, File System Indications Network Indications. Intrusion Detection Tools ,Post attack IDS Measures & Evading IDS Systems. Penetration Testing, Categories of security assessments, Vulnerability Assessment, Types of Penetration Testing. Risk Management.

UNIT II
Cryptography, Classical Cryptographic Techniques, Encryption, Decryption, Code Breaking: Methodologies, Cryptanalysis, Cryptography Attacks, Brute-Force Attack, Use of Cryptography. Public key cryptography, Principles of Public key Cryptosystems, Cryptographic Algorithms RSA, Data Encryption Standard (DES), RC4, RC5, RC6, Blowfish, Key Management, Diffie-Hellman key exchange, elliptic curve cryptography.

UNIT III
Hash Functions, One-way Hash Functions, SHA (Secure Hash Algorithm), Authentication Requirements, Authentication Functions, Kerberos. Message Authentication codes ,Message Digest Functions, MD5, SSL (Secure Sockets Layer), SSH (Secure Shell), Algorithms and Security, Disk Encryption, Government Access to Keys (GAK)

Digital Signature: Analysis, Components, Method, Applications, Standard, Algorithm: Signature Generation/Verification, ECDSA, EIgamal Signature Scheme, Digital Certificates.

UNIT IV
Trojans and Backdoors: Overt and Covert Channels, Working, Types (Remote Access Trojans, Data-Sending Trojans, Destructive Trojans, Trojans, Proxy Trojans, FTP Trojans, Security Software Disablers).
Viruses and Worms: Characteristics, Working, Infection Phase, Attack Phase. Sniffers: Definition, spoofing, Sniffing, Vulnerable Protocols, Types.
Phishing: Methods, Process, Attacks Types (Man-in-the-Middle Attacks, URL Obfuscation Attacks, Hidden Attacks, Client-side Vulnerabilities, Deceptive Phishing, Malware-Based Phishing, DNSBased Phishing, Content-Injection Phishing, Search Engine Phishing).
Web Application Security- Secured authentication mechanism, secured session management, Cross-site Scripting, SQL Injection and other vulnerabilities

Denial-of Service Attacks: Types of Attacks (Smurf Attack, Buffer Overflow Attack, Ping of Death Attack, Teardrop Attack, SYN Attack, SYN Flooding), DDoS Attack(Distributed DoS Attack.), Session Hijacking, Spoofing v Hijacking, TCP/IP hijacking, CAPTCHA Protection

UNIT V

IP Security, Web Security, Firewalls: Types, Operation, Design Principles, Trusted Systems. Computer Forensics, Need, Objectives,Stages & Steps of Forensic Investigation in Tracking Cyber Criminals, Incident Handling.

Hacking, Classes of Hacker (Black hats, grey hats, white hats, suicide hackers), Footprinting, Scanning (Types-Port, Network, Vulnerability), E-Mail Spiders, Overview of System Hacking Cycle.

List of Experiments:

1. Footprinting using footprinting tools(Open Source & Free)(ex-nslookup, ARIN, Whois, Google Earth etc..)
2. Scanning for vulnerabilities using (Angry IP, HPing2, IPScanner, Global Network Inventory Scanner, Net Tools Suite Pack.)
3. NetBIOS Enumeration Using NetView Tool, Nbtstat Enumeration Tool (Open Source).
4. Steganography using tools: Tool: Merge Streams, Image Hide, Stealth Files, Blindside, STools, Steghide, Steganos, Pretty Good Envelop, Stegdetect,.
5. Steganalysis - Stego Watch- Stego Detection Tool, StegSpy.
6. How to Detect Trojans by using – Netstat, fPort, TCPView, CurrPorts Tool, Process Viewer.
7. Lan Scanner using look@LAN, wireshark.
8. Understanding DoS Attack Tools- Jolt2 , Bubonic.c, Land and LaTierra, Targa, Nemesy Blast, Panther2, Crazy Pinger, Some Trouble, UDP Flood, FSMax.

Suggested Reading:

1. William Stallings, "Cryptography and Network Security: Principles and Practice" Pearson
2. Charlie Kaufman, Radia Perlman, Mike Speciner, Michael Speciner, " Network Security -
Private communication in a public world" TMH
3. Fourozon, "Cryptography & Network Security" TMH
4. Joseph Migga Kizza, Computer Network Security, , Springer International Edition
5. Atul Kahate,"Cryptography and Network Security" Mc Graw Hill
6. Carl Endorf, Eugene Schultz, Jim Mellander **"INTRUSION DETECTION & PREVENSION"** TMH
7. Neal, Krawetz, Introduction to Network Security,Cengage Learning

CS 7202 Simulation and Modeling

Unit-I
Introduction to Modeling and Simulation
Nature of Simulation. Systems , Models and Simulation, Continuous and Discrete Systems, system modeling, concept of simulation, Components of a simulation study, Principles used in modeling Static and Dynamic physical models, Static and Dynamic Mathematical models Introduction to Static and Dynamic System simulation , Advantages ,Disadvantages and pitfalls of Simulation.

Unit-II
System Simulation and Continuous System Simulation
Types of System Simulation, Monte Carlo Method, Comparision of analytical and Simulation methods, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model.
Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, Continuous system simulation languages ,Hybrid simulation ,Real Time simulations.

Unit –III
System Dynamics & Probability concepts in Simulation
Exponential growth and decay models, logistic curves ,Generalization of growth models , System dynamics diagrams, Multi segment models , Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.
Unit-IV
Simulation of Queueing Systems and Discrete System Simulation
Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue. Application of queuing theory in computer system. Discrete Events ,Generation of arrival patterns, Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization, Recording Distributions and Transit times .

Unit-V

Introduction to Simulation languages and Analysis of Simulation output
GPSS: Action times, Succession of events, Choice of paths, Conditional transfers, program control statements . SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements . Estimation methods , Relication of Runs, Batch Means , Regenerative techniques , Time Series Analysis , Spectral Analysis and Autoregressive Processes.
List of Experiments:-
1. Simulate CPU scheduling algorithm using queueing system
a) FCFS b) SJF c) Priority Algo
2. Simulate multiplexer/concentrator using queuing system
3. Simulate congestion control algorithms.

4. Simulate disk scheduling algorithms.
5. Simulate a Manufacturing shop and write a program in GPSS.
6. Simulate Telephone system model and write a program in SIMSCRIPT.

References:
☐ Gorden G., System simulation, Prentice Hall.
☐ Seila, Simulation Modeling, Cengage Learning
☐ Law .,Simulation Modeling And Analysis, McGraw Hill
☐ Deo, System Simulation with Digital Computer, PHI
☐ Harrington, Simulation Modeling methods, McGraw Hill
☐ Severance, " System Modeling & Simulation, Willey Pub

CS 7203 Data Mining & Knowledge Discovery

Unit-I
Introduction, to Data warehousing, needs for developing data Warehouse, Data warehouse systems and its Components, Design of Data Warehouse, Dimension and Measures, Data Marts:-Dependent Data Marts, Independents Data Marts & Distributed Data Marts, Conceptual Modeling of Data Warehouses:-Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model & Aggregates.

Unit-II
OLAP, Characteristics of OLAP System, Motivation for using OLAP, Multidimensional View and Data Cube, Data Cube Implementations, Data Cube Operations, Guidelines for OLAP Implementation, Difference between OLAP & OLTP, OLAP Servers:-ROLAP, MOLAP, HOLAP Queries.

UNIT-III
Introduction to Data Mining, Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing :- Data Cleaning, Data Integration and Transformation. Data Reduction, Data Mining Statistics. Guidelines for Successful Data Mining.

Unit-IV
Association Rule Mining:-Introduction, Basic, The Task and a Naïve Algorithm, Apriori Algorithms, Improving the efficiency of the Apriori Algorithm, Apriori-Tid, Direct Hasing and Pruning(DHP),Dynamic Itemset Counting (DIC), Mining Frequent Patterns without Candidate Generation(FP-Growth),Performance Evaluation of Algorithms,.

Unit-V
Classification:-Introduction, Decision Tree, The Tree Induction Algorithm, Split Algorithms Based on Information Theory, Split Algorithm Based on the Gini Index, Overfitting and Pruning, Decision Trees Rules, Naïve Bayes Method.
Cluster Analysis:- Introduction, Desired Features of Cluster Analysis, Types of Cluster Analysis Methods:- Partitional Methods, Hierarchical Methods, Density-Based Methods, Dealing with Large Databases. Quality and Validity of Cluster Analysis Methods.

References:
1. Berson: Data Warehousing & Data Mining &OLAP , TMH
2. Jiawei Han and Micheline Kamber, Data Mining Concepts & Techniques, Elsevier Pub.
3. Arun.K.Pujari, Data Mining Techniques, University Press.
4. N.P Gopalan: Data Mining Technique & Trend, PHI
5. Hand, Mannila & Smith: Principle of Data Mining, PHI
6. Tan, Introduction to Data Mining, Pearson Pub.

CS704- Industrial Training

SCHEME OF STUDIES
Duration: 6 weeks after the VI semester in the summer break, Assessment in VII semester.
SCHEME OF EXAMINATION
For the assessment of industrial training undertaken by the students, following components are considered with their weightage.
(a) Term work
In Industry Marks allotted
1. Attendance and General Discipline 10
2. Daily diary Maintenance 10
3. Initiative and participative attitude during training 10
4. Assessment of training by Industrial Supervisor 20

TOTAL 50

(b) Practical/Oral Examination (Viva-Voce)
In Institution Marks allotted
1. Training Report 25
2. Seminar and cross questioning (defense) 25
--
TOTAL 50

Marks of various components in industry should be awarded to the students, in consultations with the
Training and Placement Officer/Faculty of Institute and I/c of training from Industry.
During training students will prepare a first draft of training report in consultation with section in-charge. After training they will prepare final draft with the help of T.P.O./Faculty of the institute. Then they will present a seminar on their training and they will face viva-voce on training in the institute.

1.1 OBJECTIVE OF INDUSTRIAL TRAINING

The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved. The student should take this course as a window to the real World of Work and should try to learn as much as possible from real life experiences by involving and interacting with industry staff. Industrial training also provides an opportunity to students to select an engineering problem and possibly an industry guide for their Major Project in final semester.

Industrial training of the students is essential to bridge the wide gap between the classroom and industrial environment. This will enrich their practical learning and they will be better equipped to integrate the practical experiences with the classroom learning process.

1.2 LEARNING THROUGH INDUSTRIAL TRAINING

During industrial training students must observe following to enrich their learning:
- Industrial environment and work culture.
- Organisational structure and inter personal communication.
- Machines/ equipment/ instruments - their working and specifications.
- Product development procedures and phases.
- Project planning, monitoring and control.
- Quality control and assurance.
- Maintenance system.
- Costing system.
- Stores and purchase systems.
- Layout of Computer/ EDP/MIS centres.
- Roles and responsibilities of different categories of personnel.
- Customer services.
- Problems related to various areas of Work etc.

Faculty and TPO are supposed to plan industrial training in such a manner that students get exposure on most of the above arena in the field (world of work). Students are supposed to acquire the knowledge on
above by -
1. Observation,
2. Interaction with officials at the workplace
3. Study of Literature at the workplace (e.g. User Manual, standards, maintenance schedules, etc.)
4. "Hand's on" experience
5. Undertaking / assisting project work.
6. Solving problems at the work place.
7. Presenting a seminar.
8. Participating in-group meeting/ discussion.
9. Gathering primary and secondary data/ information through various sources, Storage, retrieval and analysis of the gathered data.
10. Assisting officials and managers in their working.
11. Undertaking a short action research work.
12. Consulting current technical journals and periodicals in the library.
13. Discussions with peers.

1.2 GUIDANCE TO THE FACULTY/TPO FOR PLANNING AND IMPLEMENTING THE INDUSTRIAL TRAINING

The industrial training programme, which is spread to 6 weeks' duration, has to be designed in consultation with the authorities of the work place, keeping in view the need of the contents. Following are some of the salient points:
☐ Spelling out the objectives of the industrial training in behavioral terms and same is informed in advance to the 1) students, 2) authorities of the work place and 3) supervising faculty members.
☐ Discussing and preparing students for the training for which meetings with the students has to be planned.

☐ Meeting with industrial personnel and orienting them regarding the objective of the training and the expectations of the programme.

☐ Correspondence with the authorities of the work place.

☐ Orientation classes for students on how to make the training most beneficial - monitoring daily diary, writing weekly reports, how to interact with various categories of industrial personnel, how to behave and undertake responsibilities, how to gather information from the workplace, ethics etc.

☐ Guiding students to make individual plans (week wise/ day wise) to undertake industrial training

☐ Developing a system of maintaining training records, by teachers for every batch of students for

convenient retrieval.

☐ Inviting industrial personnel to deliver lectures on some aspects of training.

1.4 ACTION PLAN FOR PLANNING STAGES AT THE INSTITUTION LEVEL

S.No. Activity Commencing Week Finishing week Remarks

----

1. Meeting with Principal
2. Meeting with Colleagues
3. Correspondence with work place

(Industries concerned)

4. Meeting with authorities of work place
5. Orientation of students for industrial training
6. Scrutinizing individual training plan of students
7. Commencement of industrial training
8. First monitoring of industrial training
9. Second monitoring of industrial training
10. Finalization of Training report
11. Evaluation of performance at Industry level
12. Evaluation of industrial programme in the institution.