



1ST SEMESTER

Course Code	Course Title	Contact Hrs. / Week			Credit
		L	T	P	
Theory					
TIU-PEN-S101	Career advancement and Skill Development (Communicative ENGLISH and other related topics)	1	1		2
TIU-PMA-T119	Computer Based Operations Research	3	1	0	4
TIU-PCA-T123	Cryptography and Information Security	2	1	0	3
TIU-PCA-T125	Advanced Database Management Systems (ADBMS)	2	1	0	3
TIU-PCA-T127	Design and Analysis of Algorithms	3	1	0	4
TIU-PMG-T117	Principles of Management	2	0	0	2
TIU-PCA-T129	Tools and Techniques of Programming using Python	3	1	0	4
Practical					
TIU-PMA-L119	Computer Based Operations Research Lab	0	0	2	2
TIU-PCA-L125	ADBMS Lab	0	0	3	2
TIU-PCA-L129	Python programming Lab	0	0	3	2
TIU-PCA-L127	Design and Analysis of Algorithms Lab	0	0	3	2
TIU-PCA-L123	Information Security Lab	0	0	3	2
Sessional					
TIU-PES-S199	Entrepreneurship Skill Development	0	0	3	2
	Total Credits				35

Approved by:

External Expert-1 (Prof. Subhadip Basu, J.U.)

External Expert-2 (Prof. Amlan Chakraborty, C.U.)

HOD - (Prof. A.B. Chaudhuri)

Industry Expert(Mr. J. Rudra,CTL):



DETAILED SYLLABUS

Career advancement and Skill Development

TIU-PEN-T101

L-T-P: 2-0-1

Credit: 3

Objectives

1. Acquire knowledge of soft skill
2. making and acquiring knowledge on basic communication skill

COURSE OUTCOME:

After completion of this course the student should be able to:

After completion of this course the student should be able to:

CO1: Participate effectively in critical conversations and demonstrate the ability to prepare, organize, and deliver their work to the public.

CO2: Read critically and interpret texts with attention to form and genre, ambiguity and complexity, considering how aesthetic experiences fostered by works of literature are central to their meaning and ethical force.

CO3: Practice a deliberate writing process with emphasis on inquiry, audience, research, and revision.

CO4: Differentiate between genres of writing, understand the formal elements of language use in those genres, and write in appropriate genres and modes for a variety of purposes and audiences, in print and/or digital contexts.

CO5: Read works of criticism and theory, situating their own readings of primary and secondary texts in relation to larger critical debates.

Course Code	Topics	Credit
#Employability Skill Development	Body Language	1
	Presentation Skill	
	Time Management & Stress Management	
Global Skill	SPANISH/FRENCH	1
Applied Communicative English	Developing fluency in the language	
Total		2

Career advancement and Skill Development for IMCA2

TIU-PCA-T101

L-T-P: 2-0-1

Credit: 3

Introduction to PL/SQL.

Presentation on Modern Technologies.

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Industry Expert(Mr. J. Rudra,CTL):



DESIGN AND ANALYSIS OF ALGORITHMS
TIU-PCA-T113

L-T-P: 3-1-0

Credit: 4

Course Objectives :

1. To know the basics of computational complexity analysis and various algorithm design paradigms.
2. Provide students with solid foundations to deal with a wide variety of computational problems.
3. To provide a thorough knowledge of the most common algorithms and data structures.
4. To analyze a problem and identify the computing requirements appropriate for its solutions

Course Outcomes :

1. Apply Knowledge of Mathematics to perform asymptotic analysis of algorithms.
2. Demonstrate a familiarity with major algorithms and data structures.
3. Apply important algorithmic design paradigms and methods of analysis.
4. Synthesize efficient algorithms in common engineering design situations.

UNIT-I:

REVISION OF BASIC CONCEPTS

1D Array, Multi Dimensional Array, Function, Structure and Union, Pointer, Linear Data Structures, Links Lists, Graph Representation and Tree Representation in C.

INTRODUCTION TO ANALYSIS OF ALGORITHMS

Analysis of Algorithm, Efficiency Analysis framework, asymptotic notations . Analysis of Non-recursive and recursive algorithms. Solving Recurrence Equations.

UNIT-II:

DIVIDE AND CONQUER METHOD:

Divide & Conquer: General method, Binary search. Analysis of Sorting Techniques. Large integer multiplication, Strassen's Matrix multiplication.

GREEDY METHOD:

General method and characteristics, Prim's method for MST , Kruskal method for MST (using $n \log n$ complexity), Dijkstra's Algorithm, Huffman Trees ($n \log n$ complexity), Job Sequencing.

UNIT-III :

DYNAMIC PROGRAMMING

General strategy, Principle of optimality, Warshal's and Floyd's Algorithm , Optimal Binary Search Trees, 0/1 knapsack Problem, Travelling Salesman Problem, Matrix Chain Multiplication.

UNIT-IV:

BACKTRACKING

General method, Recursive backtracking algorithm, iterative backtracking method. 8-queens problem, Sum of subsets, Graph coloring, Hamiltonian Cycle , 0/1 Knapsack Problem.

UNIT -V:

BRANCH AND BOUND

The method, Control abstractions for Least Cost Search, Bounding, FIFO branch and bound,

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LC branch and bound, 0/1 Knapsack problem – LC branch and bound and FIFO branch and bound solution, traveling sales person problem, 15 Puzzle Problem.

UNIT-VI:

COMPUTATIONAL COMPLEXITY AND PARALLEL ALGORITHMS

Non Deterministic algorithms, the classes P, NP, NP Complete, NP hard Proofs for NP Complete Problems.

Text Books for Main Reading:

1. Horowitz and Sahani, "Fundamentals of computer Algorithms", Galgotia. ISBN 81
2. R.C.T.Lee, S S Tseng, R C Chang, Y T Tsai " Introduction to Design and Analysis of Algorithms, A Strategic approach" Tata McGraw Hill. ISBN
3. Gilles Brassard, Paul Bratle "Fundamentals of Algorithms ", Pearson ISBN 978

Reference Books:

4. Thomas H Cormen and Charles E.L Leiserson, "Introduction to Algorithm" PHI, ISBN:81
- Anany Levitin,"Introduction to the Design & Analysis of Algorithm ",Pearson ISBN 81
5. Steven S Skiena , The Algorithm Design Manual, Springer,2nd edition,
6. George T. Heineman, Gary Pollice, Stanley Selkow "Algorithms in a Nutshell, A Desktop Quick Reference", O'Reilly.

Computer Based Operations Research

TIU-IMA-T201

L-T-P: 3-1-0

Credit: 4

Course Objectives:

1. Define and formulate linear programming problems and appreciate their limitations.
2. Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained and translate solutions into directives for action.
3. Conduct and interpret post-optimal and sensitivity analysis and explain the primal-dual relationship.
4. Develop mathematical skills to analyze and solve integer programming and network models arising from a wide range of applications.

Course Outcomes:

Knowledge and technical competence

Coherent and advanced knowledge of the underlying principles and concepts in one or more disciplines.

Problem-solving

Cognitive skills to review critically, analyze, consolidate and synthesis knowledge to identify and provide solutions to complex problems with intellectual independence.

Communication

Communication skills to present clear and coherent exposition of knowledge and ideas to a variety of audiences.Ethics

Application of knowledge and skills with responsibility and accountability for own learning and professional practice, and in collaborations with others within broad parameters.

Detailed syllabus

Linear Programming: OR Models, Convex Sets, Graphical Method, Simplex Method, Big M Method, Two Phase Method

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Duality and Sensitivity Analysis : Primal – Dual construction, Symmetric and Asymmetric Dual, Weak Duality Theorem, Complimentary Slackness Theorem, Main Duality Theorem, Dual Simplex Method, Sensitivity Analysis

Transportation and Assignment Formulation of Transportation Problem, Initial Feasible Solution Methods, Optimality Test, Degeneracy in TP; Assignment Problem, Hungarian Method, Travelling Salesman Problem

Game Theory and Sequencing : Two Person Zero Sum Game, Pure and Mixed Strategies, Algebraic Solution Procedure, Graphical Solution, Solving by Linear Programming; Sequencing Problem, Processing of n Jobs Through Two Machines and m Machines, Graphical Method of Two Jobs m Machines Problem

Inventory and Queuing Models: Classical EOQ Models, EOQ Model with Price Breaks, EOQ with Shortage, Probabilistic EOQ Model, Newsboy Problem. Elements of Queuing Model, Pure Birth Death Model, Single Server and Multi-server Markovian Models with Infinite and Finite Capacity, Machine Repair Model, Networks of Queues.

Recommended Books:

Main Reading:

1. Hamdy A Taha, Operations Research-an introduction, Jain Books, 8th edition.
2. Kanti Swarup, P.K.Gupta & Man Mohan Operations Research , 17th edition, latest reprint 2014,Jain Books.

Supplementary Reading:

1. J. K. Sharma,-Operations Research Theory and Applications-Theory and applications, Jain Books.

Cryptography and information security

(Modified syllabus for 2 year MCA effected by 2020-21 batch)

TIU -PCA-T117

L-T-P: 2-1-0

Credit:3

Objectives:

COURSE OBJECTIVE

To be able to secure a message over insecure channel by various means.

To learn about how to maintain the Confidentiality, Integrity and Availability of a data.

COURSE OUTCOME:

After completion of this course the student should be able to:

CO1: Explain the fundamentals of Cryptography.

CO2: Explain knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.

CO3: Explain the various key distribution and management schemes.

CO4: Design security applications in the field of Information technology.

Detailed syllabus

Unit 1: Security in Computing Environment: Need for Security; Security Attack – Threats, Vulnerabilities, and Controls, Types of Threats (Attacks); Security Services – Confidentiality, Integrity, Availability; Information Security; Methods of Protection.

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Unit 2: Basics of Cryptography: Terminologies used in Cryptography; Substitution Techniques – The Caesar Cipher, One-Time Pads Vernam Cipher, monoalphabetic cipher, hill cipher Transposition Techniques – Encipherment/Decipherment Complexity, Digrams, Trigrams, and Other Patterns.

Unit 3: Encryption and Decryption: Characteristics of Good Encryption Technique; Properties of Trustworthy Encryption Systems; Types of Encryption Systems – Based on Key, Based on Block; Confusion and Diffusion; Cryptanalysis.

Unit 4: Symmetric Key Encryption: Data Encryption Standard (DES) Algorithm – Overview of the DES Algorithm; Double and Triple DES – Double DES, Triple DES; Security of the DES; Advanced Encryption Standard (AES) Algorithm – Overview of Rijndael, Strength of the Algorithm; DES and AES Comparison.

Unit 5: Public Key Encryption: Characteristics of Public Key System; RSA Technique – Encryption-Method; Key Exchange; Diffie-Hellman Scheme; Cryptographic Hash Functions; Digital Signature – Properties of Digital Signature, Public Key Protocol; Certificates; Certificate Authorities.

Unit 5 : Information security : Concept of information security and information systems, needs of information security, various types of information systems nature of information systems in the success and failure of modern organizations.

Unit 6: Concept of cyber security and types of cyber attack

Needs of cyber security, social engineering, example of active and passive attack, types of phishing and ID theft, Password Cracking, Key loggers and Spywares, Virus and Worms, Stegnography, DoS, DDoS Attacks, SQL Injection, Buffer Over Flow

Unit 7: Security Features in Operating System: Objects to be Protected; Protection Methods of Operating Systems; Memory Protection; File Protection – All-None Protection, Group Protection, User Authentication – Use of Passwords, Additional Authentication Information, Attacks on Passwords, Exhaustive Attack, Password Selection Criteria.

Unit 8: Network Security: Network Concepts; Threats in Networks – Who Attacks Networks? Threats in Transit: Eavesdropping and Wiretapping, Protocol Flaws, Impersonation; Network Security Controls – Architecture, Encryption, Virtual Private Networks, Public Key Infrastructure (PKI) and Certificates, Overview of IP security, IP security architecture

Unit 9 : Electronic Mail Security: Threats to E-Mail; Requirements and Solutions – Confidentiality, Integrity; Encryption for Secure E-Mail; Secure E-Mail System – PGP (Pretty Good Privacy), S/MIME (Secure Multipurpose Internet Mail Extensions).

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Unit 10 : Planning and Enforcing Security Policies: Planning Security Policies; Risk Analysis; Security Policies for an Organization; External Security.

Advanced Database Management Systems

TIU-PCA-T105

L-T-P: 3-1-0

Credit: 4

Course Objective

1. To revise the previous concepts of database management systems
2. To provide the concepts of various types of dependencies and their interrelationships
3. To learn the uses of advanced SQL
4. To help students acquire the theoretical foundation of Database Management Systems.
1. To provide the concepts of Query Processing and Optimization
2. To provide the concepts of Distributed Databases
3. To provide the concepts of enhanced database models

Course Outcome

- 1 Explain the advanced features of database management systems and Relational databases.
- 2 Design conceptual models of a database UML- based modeling for real life applications
- 3 The knowledge of indexing and query optimization
- 4 Knowledge of using advanced SQL
- 5 Knowledge of advanced database models

Detailed syllabus

Module 1:

Revisionary Concepts

General introduction to database systems, Theory of functional dependency and normalization

- Multi value dependency and 4NF
- Join Dependency and 5NF
- Inclusion Dependencies and Template Dependency
- PJNF/DKNF
- Modeling temporal data
- Closure and its accuracy

Module 2:

Database implementation and Tools

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Use of UML and its support for database design specifications

- Representing specialization and generalization in UML Class diagram.
- UML based design tools
- Automated database design tools.

Module 3:

Advanced SQL

- Assertion and views
- Cursors, triggers and stored procedures
- PL/SQL, Embedded SQL, dynamic SQL, SQLJ
- Advanced Features of SQL
- Examples of above in Oracle

Module 4:

OVERVIEW OF STORAGE AND INDEXING, DISKS AND FILES

Data on external storage; File organizations and indexing; Index data structures;

Comparison of file organizations; Indexes and performance tuning. Memory hierarchy.

RAID; Disk space management; Buffer manager; Files of records; Page formats and record formats.

TREE STRUCTURED INDEXING: Intuition for tree indexes; Indexed sequential access method.

B trees and B+ trees, Search, Insert, Delete, Duplicates, B+ trees in practice.

HASH-BASED INDEXING: Static hashing; Extendible hashing, Linear hashing, comparisons.

Module 5:

Query Processing, Evaluation and Optimization

Query Execution: Introduction to Physical-Query-Plan Operators, One-Pass Algorithms for Database, Operations, Nested-Loop Joins, Two-Pass Algorithms Based on Sorting, Two-Pass, Algorithms Based on Hashing, Index-Based Algorithms, Buffer Management, Parallel Algorithms for Relational Operations, Using Heuristics in Query Optimization, Basic Algorithms for Executing Query Operations.

Measures of Query Cost

- Selection Operation,
- Sorting
- Join Operation
- other Operations
- Evaluation of Expression
- Transformation of Relational Expressions
- Role of Relational Algebra and Relational Calculus in query optimization
- Estimating Statistics of Expression
- Choice of Evaluation Plans
- Views and query processing
- Storage and query optimization

Module 6:

Distributed Databases

- Centralized versus non centralized Database
- Homogeneous and Heterogeneous DDBMS and their comparison
- Functions and Architecture
- Distributed database design, query processing in DDBMS
- Distributed concurrency management, deadlock management
- Distributed Commit Protocols: 2 PC and 3 PC
- Concepts of replication servers

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Module 7

ENHANCED DATABASE MODELS

Unit 1: Object Oriented Database

- Limitations of Relational databases
- The need of Object oriented databases
- Complex Data Types
- Structured Types and Inheritance in SQL
- Table Inheritance
- Data types (arrays, multi-set etc) and structure in Object oriented databases using SQL
- Object-Identity and Reference Types in SQL
- ODL and OQL
- Implementing O-R Features
- Persistent Programming Languages
- Object-Oriented versus Object-Relational
- An Example of Object oriented and object relational database implementation

Unit 2: Database and XML

- Structured Semi structure and unstructured data
- XML hierarchical tree data model
- Documents DTD and XML schema
- XML Documents & Database
- XML query and transformations

- Storage of XML data
- XML database applications

Unit 3: Emerging Database Models, Technologies and Applications I

- Multimedia database
- Geography databases, Gnome databases
- Knowledge databases, deductive databases and semantic databases
- Spatial database
- Information visualization

Unit 4: Emerging Database Models, Technologies and Applications II

- Mobile databases
- Web databases (JDBC, ODBC)
 - Personal databases
- Digital libraries
 - Data grids
- Wireless networks and databases

Recommended Books:

Main Reading:

1. Elmasri, Navathe. Fundamentals of Database Systems (Third Edition), Pearson Education, 2004.
2. Database System Concepts, Fifth Edition, AviSilberschatz, Henry F. Korth, S. Sudarshan
3. Thomas M. Connolly, Carolyn Begg, Database Systems: practical approach to design, implementation, and management, Pearson Education Limited, (6th edition), 2015 1292061189 978-

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Supplementary Reading:

1. Introduction to Database Systems by CJ Date
2. Data base Systems design, Implementation, and Management by Rob & Coronel, Thomson, 5th Edition
3. P. Bhattacharyya and A.K. Majumder, Data base management system, TMH

Tools and Techniques of Programming using Python

TIU-PCA-T115

L-T-P: 3-1-0

Credit: 4

Course Objectives

1. Basics of Python programming
2. Decision Making and Functions in Python
3. Object Oriented Programming using Python
4. Files Handling in Python
5. GUI Programming and Databases operations in Python
6. Network Programming in Python

Course Outcomes

1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
2. Express different Decision-Making statements and Functions
3. Interpret Object oriented programming in Python
4. Understand and summarize different File handling operations
5. Explain how to design GUI Applications in Python and evaluate different database operations
6. Design and develop Client Server network applications using Python

Detailed Syllabus:

Module 1: Introduction, Basic Advantages of Python, Python Execution System, ways of Python Code Development, Python character set, Python Words, Data Types in Python, Python Variables, Constants and Literals, Unicode in Python, Python operators, Precedence and associativity in Python Operators, Basics of Python Programming, Installation of Python, Syntax and semantics in Python, Running Python as a displayer, Python as a Desk Calculator.

Module 2: The Procedural Features of Python: Characteristics of a Procedural language, Logic structures in structured programming, Sequence logic structure in Python. Illustrative examples.

Module 3: The selection logic structure of Python; simple, compound and nested selection logic with syntax; Ternary operation in Python; illustrative examples with all the logic structures.

Module 4: Programming with the ITERATION Logic (Loop); THE Iteration structures supported by Python; Nested iteration; illustrative examples with iteration logic.

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Module 5: Strings in Python; How to create and use a string; Empty string; Length of a string; Concatenation and repetition of strings; The in membership operator in strings; Indexing and Slicing of strings; Changing individual characters of a string; String Methods; String formatting in Python; Translating characters in a string; The format() Method for Formatting Strings; String Formatting Operators; Formatting literals with f-string; Illustrative examples for implementing the features.

Module 6: Composite Data Types in Python; List; operations on lists: Concatenation; Slicing; Replication of a list; Use of in operator; Comparison of lists; any() and all() on lists; Copying a list; Built in functions for lists; Methods for lists; application of lists; programming with lists; Lists and the random module; List comprehensions; The use of else in list comprehension constructs; Working with two-dimensional lists; Arrays in Python; important methods used on Arrays; Tuple: Updating Tuples; Accessing Tuples; Deletion and other operations on tuples; Sets in Python: Basic Operations on sets; Operations on multiple sets; Membership and Iteration operations on sets; Frozensets; Dictionaries; Salient features of a dictionary in Python; Modifications in a dictionary; Important methods for dictionary type of data; Iteration over dictionaries; Merging two or more dictionaries; Nested Dictionaries; Applications of dictionaries.

Module 7: User-defined functions in Python; Basics of Python Functions; Functions with parameters; Docstrings in Python; Function arguments with default values; Defining a function with an arbitrary number of arguments; Defining a function with an arbitrary number of keyword arguments; Anonymous/lambda functions; Defining a function with optional argument; Defining a function with optional mutable arguments; Argument passing and mutability; Recursive functions; Recursive Lambda using assigned variable; Local and global Scope; The global Statement; illustrative examples.

Module 8: Various Implementations of Python; Code object in Python; Built-in Functions in Python; Dates and times; Simple date arithmetic; The Math Module; Implementation of Switch-Case logic structure in Python; Multithreading in Python; Pattern Matching with Regular Expressions. The itertools and collections modules; Exception handling; Modules; Packages; Garbage Collection in Python.

Module 9: Arrays, vectors and data frames in Python for manipulation of data

Module 10: Text Files: Reading from files; Writing to files. CSV files; Reading and Writing CSV files; JSON files; Database Access in Python.

Module 11: Graphical representation of data in Python

Module 12: Object-Oriented Programming in Python; Implementation of linked list, stack and Queue using class concept.

Module 13: Introduction to GUI programming in Python.

Books for Main Reading:

1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
2. R. Nageswara Rao, "Core Python Programming", dreamtech
3. Wesley J. Chun. "Core Python Programming - Second Edition", Prentice Hall

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4. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, “Data Structures and Algorithms in Python”, Wiley.

Books for Supplementary Reading:

1. Kenneth A. Lambert, “Fundamentals of Python – First Programs”, CENGAGE Publication
2. Luke Sneeringer, “Professional Python”, Wrox
3. “Hacking Secret Ciphers with Python”, Al Sweigart, URL <https://inventwithpython.com/hacking/chapters>

Principles of Management
TIU-PMG-T111

Course Objectives

1. Understanding with a broad and integrative introduction to the theories and practice of management.
2. In particular, this course focuses on the major areas of the management process: planning, organizing, leadership and control from an organizational viewpoint.

Outcomes:

1. This course and its outcomes support the Information Systems Learning Outcomes of **Problem Solving and Critical Thinking (PS&CT)**, **Communication and Interpersonal Skills (C&IS)**, and **Ethical and Professional Responsibilities (E&PR)**.
2. These Information Systems Learning Outcomes are tied directly to the University Wide Outcomes of **Critical Thinking and Problem Solving, Communication, and Values and Ethics**

Detailed Syllabus:

Introduction to Management:

Definition; Characteristics of management; Principles of management; Process and functions of management; Managerial hierarchy and levels; Managerial Skills and roles; Emerging issues and challenges for management.

Management Theories:

The classical, behavioural, management science, systems, contingency, and contemporary perspectives on management.

The Environmental Context of Management:

Concept; Organization-environment interface; Types and components of organizational environment; Emerging business environment in Nepal.

Organizational Goal Setting and Planning:

Organizational goals – purpose and functions; The planning function – planning system, methods, types, and steps in the planning process; Concept of strategic planning – situational analysis; Tools to aid strategic planning.

Managerial Decision Making:

Concept; The decision-making process; Types and conditions of decision making; **Group decision making; Techniques to aid decision making.**

Organizational Structure and Design:

Principles, process, and approaches to organizing; Organizational design – major types; Departmentation; Authority, power and responsibility; Delegation and decentralization of authority; Informal organization; Emerging concepts in organizing and design.

Staffing:

Concept, objectives, importance and components of staffing; Human resource management system.

Leadership:

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Concept and functions; Leadership versus management; Qualities of good leadership; Leadership traits and styles; Approaches to leadership.

Employee Motivation:

Concept and types; Theories of Maslow and Herzberg; Techniques of employee motivation.

Basic Texts

1. Robbins, S. P., & DeCenzo, A. D. Fundamentals of Management. New Delhi: Pearson Education.
2. Pant, P. R. Principles of Management. Kathmandu: Buddha Academic Enterprises.

References

1. Griffin, R. W. Management. New Delhi: AITBS Publishers and Distributors.
2. Bateman, T.S. & Snell, S.A. Management: Competing in the New Era. New Delhi: Tata McGraw Hill.
3. Wehrich, H., Cannice, M. V. & Koontz, H. Management: A *Global Perspective*. New Delhi: Tata McGraw Hill.

Computer Based Operations Research Lab

TIU-PCA-L101

L-T-P: 0-0-2

Credit: 2

Implementation of Simplex method, Travelling Salesman problem, Sequencing problem, EOQ elimination and simulation of queuing model.

ADBMS Lab

TIU-PCA-L105

L-T-P: 0-0-3

Credit: 2

Study of commercial DBMS package (Oracle-latest version).

Developing database application with Oracle, creation of a database, writing SQL queries and retrieving data.

Python programming Lab

TIU-PCA-L115

L-T-P: 0-0-3

Credit: 2

Based on the concerned faculty of the respective subject.

DAA Lab

TIU-PCA-L113

L-T-P: 0-0-3

Credit:2

Lab :1 : Divide and Conquer : > Implement Binary Search using Divide and Conquer approach.

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Lab :2 : Divide and Conquer : > Implement Sorting techniques using Divide and Conquer approach > Find Maximum and Minimum element from a array of integer using Divide and Conquer approach.

Lab :3 : Greedy method(implement any one of the following problem) : >Job sequencing with deadlines.

Lab :4 : Greedy method (implement any one of the following problem) : >Minimum Cost Spanning Tree by Prim's Algorithm >Minimum Cost Spanning Tree by Kruskal's Algorithm.

Lab :5 : Dynamic Programming : > Find the minimum number of scalar multiplication needed for chain of matrix.

Lab :6 : Dynamic Programming : >Implement all pair of Shortest path for a graph (Floyd- Warshall Algorithm) >Implement Traveling Salesman Problem.

Lab :7 : Dynamic Programming : >Implement Single Source shortest Path for a graph (Dijkstra , Bellman Ford Algorithm).

Lab :8 : Backtracking (implement any one of the following problem): >Graph Coloring Problem >Hamiltonian Problem.

Lab :9 : Backtracking: > 8-queens problem.

Lab :10: Brunch and Bound : > Implement 15 Puzzle Problem.

Information Security Lab
TIU-PCA-L117

L-T-P: 0-0-3

Based on the concerned faculty of the respective subject.

Credit:2

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