

Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL-506 009
Department of Computer Science & Engineering

B. Tech. (CSE) VII SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PE-III*	Professional Elective – III*	3	1	0	4	30	70	4
2	PE-IV*	Professional Elective – IV*	3	1	0	4	30	70	4
3	PE-V*	Professional Elective – V*	3	1	0	4	30	70	4
4	PE-VI*	Professional Elective – VI*	3	1	0	4	30	70	4
5	PE-III**	Professional Elective – III Lab**	0	0	3	3	25	50	1.5
6	PE-IV**	Professional Elective – IV Lab**	0	0	3	3	25	50	1.5
7	PW4108CS	Mini Project – II			3	3	25	50	1.5
Total			12	4	9	25	195	430	20.5

*(PE-III) Professional Elective – III	
PE4101CS	Python

** (PE-III) Professional Elective – III Lab	
PE4109CS	Python Lab

*(PE-IV) Professional Elective – IV	
PE4102CS	Software Testing
PE4103CS	Object Oriented Analysis and Design

** (PE-IV) Professional Elective – IV Lab	
PE4110CS	Software Testing Lab
PE4111CS	Object Oriented Analysis and Design Lab

*(PE-V) Professional Elective – V	
PE4104CS	Machine Learning
PE4105CS	Soft Computing

*(PE-VI) Professional Elective – VI	
PE4106CS	Cryptography & Network Security
PE4107CS	Cloud Computing

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B.Tech. (CSE) VII SEMESTER

Professional Elective - III
PYTHON PROGRAMMING (PE4101CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

UNIT – I

Python -Introduction to Python, History, installation, Versions of python, tools for working with data in Python, Features of python, applications; Basic Syntax, Variables, expressions and Data Types, Working with Python: Numbers and String, Python Operators, Python General Programs, Input and output statements in python, reading data from keyboard, type conversions, Conditional Statements - if statements, if-else statement, nested if-else statement: Syntax and executions.

UNIT – II

Control Structures in Python:

Looping statements -For and For with else , For with range, While and While with Else , Syntax and executions. Control Statements - break, continue and pass – Syntax and executions.

Python Function: Design with functions: hiding redundancy, complexity ,basic syntax , scope of variables, arguments and return value, formal vs actual arguments ,types of function, variable function arguments – default argument ,keyword argument ,arbitrary argument , recursion

UNIT – III

List, Tuples, Set and Dictionaries

Python List: Introduction, accessing List, List operations, Working with Lists, List functions and methods.

Python Tuple:- Introduction, accessing Tuple, operations on Tuple, Working with Tuple ,Functions and Methods.

Python Set - Introduction, accessing Set, Set operations, working with Set, Functions and Methods.

Python Dictionaries – Introduction, working with dictionaries, Properties, Functions. Dictionaries Operations, List Comprehension.

UNIT – IV

Python String Manipulations - Accessing String, Basic Operations, String slices, Functions and Method, String formatting.

Python Modules - Importing Modules, Math Module, Random Module, Packages-creation of packages, importing, Compositions.

Python file handling: Reading files, writing files, loading data, working with and saving data. Enumerate.

UNIT– V

Python Object-Oriented Programming: objects and classes, Encapsulation; Inheritance; Polymorphism, Exception and Error Handling, Regular Expression-match function, searching, Patterns, modifiers., High Order Functions - Lambda, Filter, Map, Reduce.

Creating simple GUI; buttons, labels, entry fields, dialogs; widget attributes - sizes, fonts, colours layouts, nested frames, Database connection- Sqlite

TEXT BOOKS:

1. “Learning Python”, Fifth Edition by Mark Lutz, Published by O’Reilly Media, ISBN: 978-1-449-35573-9.
2. Yashavant Kanetkar, Let Us Python (1 ed.), BPB Publishers, 2019. ISBN 978-9388511568.

REFERENCE BOOKS:

1. Chun, J Wesley, Core Python Programming, 2nd Edition, Pearson, 2007 Reprint 2010.
2. C. Dierbach, Introduction to Computer Science Using PYTHON: A Computational Problem-Solving Focus (1 ed.), Wiley, 2015. ISBN 978-8126556014. b)
3. Martin C. Brown, Python: The Complete Reference (1 ed.), McGraw-Hill, 2001. ISBN 978-0072127188.
4. Programming Python, 4TH Edition by Mark Lutz, O’Reilly

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B. Tech. (CSE) VII SEMESTER
Professional Elective - IV
SOFTWARE TESTING (PE4102CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

UNIT – I

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs, Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT – II

Transaction Flow Testing: Transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT – III

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT – IV

Paths, Path products and Regular expressions : Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection, Logic Based Testing Overview, decision tables, path expressions, kv charts, specifications.

UNIT – V

State, State Graphs and Transition testing: State graphs, good & bad state graphs, state testing, matrix of graph, relations, power of a matrix, node reduction algorithm.

TEXT BOOKS

1. Software Testing techniques – Boris Beizer, Dreamtech, second edition.

REFERENCE BOOKS

- 1.The craft of software testing - Brian Marick, Pearson Education.
- 2.Software Testing,3rd edition,P.C.Jorgensen,Aurbach Publications(Dist.by SPD).
- 3.Software Testing,N.Chauhan,Oxford University Press.
- 4.Introduction to Software Testing, P.Ammann&J.Offutt, Cambridge Univ. Press.
- 5.Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.
- 6.Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.
- 7.Software Testing, M.G.Limaye, TMH.
- 8.Software Testing, S.Desikan, G.Ramesh, Pearson.
- 9FOUNDATIONS of Software Testing, D.Graham & Others, Cengage Learning.
- 10.Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

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B. Tech. (CSE) VII SEMESTER

Professional Elective - IV

OBJECT ORIENTED ANALYSIS AND DESIGN (PE4103CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

UNIT – I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT – II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT – III

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT – IV

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT – V

Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application, ATM application.

TEXT BOOKS

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education 2nd Edition.
2. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.

REFERENCE BOOKS

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TMH.
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Object Oriented Analysis, Design and Implementation, B. Dathan, S. Ramnath, Universities Press.

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B. Tech. (CSE) VII SEMESTER

Professional Elective- V
MACHINE LEARNING (PE4104CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT-I

Introduction: Review of Linear Algebra, Definition of learning systems; Designing a learning system, Goals and applications of machine learning; Classification of learning system, Basic concepts in Machine Learning.

UNIT-II

Regression: introduction, Linear Regression, Multivariate Regression.

Decision Tree Learning: Introduction, decision tree representation, appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning,

UNIT-III

Decision Tree Learning: inductive bias in decision tree learning, issues in decision tree learning.

Bayesian learning: Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting Probabilities, minimum description length principle.

UNIT-IV

Bayesian learning: Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, Bayesian belief networks, the EM algorithm.

Artificial Neural Networks: Introduction, neural network representation, appropriate problems for Neural network learning, perceptions, multilayer networks and the back-propagation algorithm.

UNIT-V

Instance-Based Learning: Introduction, k-nearest neighbour algorithm, locally weighted regression, Radial basis functions, case-based reasoning, remarks on lazy and eager learning.

TEXT BOOKS:

1. Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997.
2. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

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B. Tech. (CSE) VII SEMESTER
Professional Elective – V
SOFT COMPUTING(PE4105CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

UNIT I**INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS**

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics. Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning and Unsupervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning -Neural Networks – Adaptive Resonance architectures.

UNIT II**FUZZY LOGIC:**

Fuzzy Logic - Crisp set and Fuzzy set - Basic concepts of fuzzy sets, membership functions. Basic operations on fuzzy sets, Properties of fuzzy sets, Fuzzy relations., Applications

UNIT-III

Propositional logic and Predicate logic, fuzzy If – Then rules, fuzzy mapping rules and fuzzy implication functions, Particle Swarm Optimization

UNIT-IV

Genetic algorithm - Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling - Inheritance operator, cross over, mutation operator, Bitwise operator, Generation Cycle, Applications of GA

UNIT-V

Rough Sets, Rule Induction, Discernibility Matrix, Integration of Soft Computing Techniques.

TEXT BOOKS

1. Soft Computing – Advances and Applications - Jan 2015 by B.K. Tripathy and J. Anuradha – Cengage Learning
2. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, Pearson Edn., 2003.
3. S. N. Sivanandam, S. Sumathi and S. N. Deepa, “Introduction to Fuzzy Logic using MATLAB”, Springer, 2007
4. S.N.Sivanandam · S.N.Deepa, “Introduction to Genetic Algorithms”, Springer, 2007.

REFERENCE BOOKS

1. David E. Goldberg, “Genetic Algorithms-In Search, optimization and Machine learning”, Pearson Education.
2. J. S. R. Jang, C.T. Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, Pearson Education, 2004.
3. G.J. Klir & B. Yuan, “Fuzzy Sets & Fuzzy Logic”, PHI, 1995.
4. Melanie Mitchell, “An Introduction to Genetic Algorithm”, PHI, 1998.
5. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, McGraw- Hill International editions, 1995

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B. Tech. (CSE) VII SEMESTER
Professional Elective - VI
CRYPTOGRAPHY AND NETWORK SECURITY (PE4106CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

UNIT I

Security Attacks: Interruption, Interception, Modification and Fabrication, Security Services: Confidentiality, Authentication, Integrity, Non-repudiation, Access Control and Security Mechanisms, A model for Network Security.

UNIT II

Conventional Encryption: Principles, Feistel Cipher Model, Conventional encryption algorithms (DES, RC4 and Blowfish, cipher block modes of operation, location of encryption devices, key distribution, Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT III

Public key cryptography principles, Euclid's Algorithm, Fermat's and Euler's Theorem, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management: Kerberos, X.509 Directory Authentication Service.

UNIT IV

Email Security: Pretty Good Privacy (PGP) and S/MIME.

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security, Associations and Key Management.

UNIT V

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Intruders, Viruses and related threats, Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS

1. Cryptography and Network Security by William Stallings 5th Edition, Pearson Education.
2. Information Security, Principles and Practice by Mark Stamp, Wiley India.

REFERENCE BOOKS

1. Applied Cryptography by Bruce Schneier, 2007.
2. Cryptography and Data Security, Denning D, Addison Wesley, 1982.
3. Cryptography and Network Security : Forouzan, Mukhopadhyay, MC Graw Hill, 2nd Edition.

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B. Tech. (CSE) VII SEMESTER

Professional Elective - VI

CLOUD COMPUTING (PE4107CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

UNIT I

Introduction to Cloud Computing, Roots of Cloud Computing , Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud.

UNIT II

Principles of Parallel and Distributed Computing : Eras of computing, Parallel vs. distributed computing. Elements of parallel computing, Hardware architectures for parallel processing Approaches to parallel programming Levels of parallelism. Elements of distributed computing Components of a distributed system Architectural styles for distributed computing, Models for inter process communication.

Virtualization Characteristics of virtualized environments, Virtualization and cloud computing Pros and cons of virtualization and Advantages of virtualization

UNIT III

Cloud Architecture- Layers and Models Layers in cloud architecture, Software as a Service (SaaS), features of SaaS and benefits, Platform as a Service (PaaS), features of PaaS and benefits, Infrastructure as a Service (IaaS), features of IaaS and benefits, Service providers, challenges and risks in cloud adoption. Cloud deployment model: Public clouds – Private clouds – Community clouds - Hybrid clouds - Advantages of Cloud computing

UNIT IV

Cloud Platforms: Aneka—Integration of Private and Public Clouds

Introduction , Technologies and Tools for Cloud Computing , Aneka Cloud Platform , Aneka Resource Provisioning Service, Hybrid Cloud Implementation , Visionary thoughts for Practitioners

CometCloud: CometCloud Architecture , Autonomic Behavior of CometCloud , Overview of CometCloud-based Applications , Implementation and Evaluation

T-Systems' Cloud-Based Solutions

UNIT V

Cloud Platforms in Industry: Amazon web services: Computer services, Storage services, Communication services

Google App Engine: Architecture and core concepts, Application lifecycle, Cost model

Microsoft Azure: Azure core concepts, SQL Azure, Windows Azure platform appliance

Cloud Applications: Healthcare: ECG analysis in the cloud. Biology: protein structure prediction, Biology: gene expression data analysis for cancer diagnosis, Geo science: satellite image processing, Social networking, Media applications

TEXT BOOKS:

1. Cloud Computing (Principles and Paradigms) :Rajkumar Buyya, James Broberg, Andrzej Goscinski, John Wiley & Sons, Inc
2. Mastering Cloud Computing: Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, McGraw Hill Education 978-1259029950

REFERENCE BOOKS:

1. Cloud computing for dummies- Judith Hurwitz , Robin Bloor , Marcia Kaufman ,Fern• Halper, Wiley Publishing, Inc, 2010
2. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter, TATA McGraw- Hill , New Delhi – 2010
3. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate

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B. Tech. (CSE) VII SEMESTER
Professional Elective – III Lab
PYTHON PROGRAMMING LAB (PE4109CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	3	1.5	External Marks: 50

Lab Exercises

Exercise:1Basics

1. Running instructions in Interactive interpreter and a Python Script
2. Write a program to purposefully raise Indentation Error and Correct it

Exercise 2: programs on operators & I/O operations.

1. Write a program that takes 2 numbers as command line arguments and prints its sum.
2. Implement python script to show the usage of various operators available in python language.
3. Implement python script to read person's age from keyboard and display whether he is eligible for voting or not.
4. Implement python script to check the given year is leap year or not.

Exercise 3: programs on basic control structures &loops.

1. Write a program for checking the given number is even or odd.
2. Using a for loop, write a program that prints the decimal equivalents of 1/2, 1/3, 1/4, ., 1/10
3. Write a program for displaying reversal of a number.
4. Write a program for finding biggest number among 3numbers.
5. Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
6. Develop a program that will read a list of student marks in the range 0 ... 50 and tell you how many students scored in each range of 10. how many scored 0 - 9, how many 10 -19, 20 - 29 ... and so on.

Input:

Enter list of Marks: 11 42 33 42 13 3 43

Output:

No of Students Between 1-10 : 1
No of Students Between 11-20 : 2
No of Students Between 21-30 : 0
No of Students Between 31-40 : 1
No of Students Between 41-50 : 1

Exercise 4: programs on Python Script.

1. Implement Python Script to generate first N natural numbers.
2. Implement Python Script to check given number is palindrome or not.
3. Implement Python script to print factorial of a number.
4. Implement Python Script to print sum of N natural numbers.
5. Implement Python Script to check given number is Armstrong or not.
6. Implement Python Script to generate prime numbers series up to n

Exercise 5: programs on functions.

1. Define a function max_of_three() that takes three numbers as arguments and returns the largest of them.
2. Write a program which makes use of function to display all such numbers which are divisible by 7 but are not a multiple of 5, between 1000 and 2000.
3. Write a python program to demonstrate all types arguments in a function with examples.
4. Exercise programs on recursion & parameter passing techniques.
5. Define a function which generates Fibonacci series up to n numbers.
6. Define a function that checks whether the given number is Armstrong
7. Implement a python script for factorial of number by using recursion
8. Write function to compute gcd, lcm of two numbers

Exercise 6: programs on Lists, Sets, Tuple and Dictionary.

1. Finding the sum and average of given numbers using lists.
2. To display elements of list in reverse order.
3. Finding the minimum and maximum elements in the lists.
4. Write a function reverse to reverse a list. Without using the reverse function.
5. Python Program to Put Even and Odd elements in a List into Two Different Lists.
6. Python program to explain the various operations on Tuple.
7. Python Program to Count the Number of Vowels Present in a String using Sets
8. Python Program to Check Common Letters in Two Input Strings
9. Python Program that Displays which Letters are in the First String but not in the Second
10. Python Program to Add a Key-Value Pair to the Dictionary
11. Python Program to Concatenate Two Dictionaries Into One
12. Python Program to Check if a Given Key Exists in a Dictionary or Not

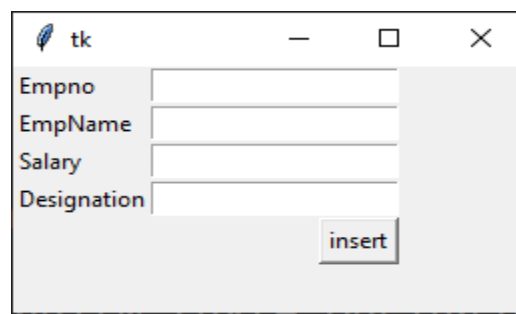
Exercise 7: programs on Strings, Modules and Files.

1. Implement Python Script to perform various operations on string using string libraries.
2. Implement Python Script to check given string is palindrome or not.
3. Write a program to count the numbers of characters in the string and store them in a dictionary data structure
4. Write a program to use split and join methods in the string.
5. Python Program to Detect if Two Strings are Anagrams
6. Python Program to Count the Number of Vowels in a String

7. Create a module with two functions one for finding Armstrong number, and second is for testing whether the given string is palindrome or not. Write a python application to import the above module some other application
8. Create a python package contains 2 modules of your name functions (minimum 2 functions in each module) and import the packages and modules in other application which perform some task.
9. Write Python script to display file contents.
10. Write Python script to copy file contents from one file to another.
11. Write a python program that accepts filename as an input from the user .Open the file and
12. Count the number of times a character appears in the file.

Exercise 8: Programs on OOPS, Exception Handling, GUI

1. Write a program that has a class Circle. Use a class variable to define the value of constant PI. Use this class variable to calculate area and circumference of a circle with specified radius.
2. Program to raise value error and handle using try-except.
3. Write a python program to validate given phone number is correct or not using regular expression
4. Create a student table in python and insert at least 5 records and display the all table entries
5. Write a python program to read group of words into a string and print the results as which words are ended with 'at' by using regular expression
6. Create a GUI application using tkinter where it will accept two numbers and when click the submit button the addition of 2 numbers will be display in sum filed.
7. Design a GUI application using tkinter, it look likes



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B. Tech. (CSE) VII SEMESTER
Professional Elective – IV Lab
SOFTWARE TESTING LAB (PE4110CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	3	1.5	External Marks: 50

LIST OF EXPERIMENTS

1. Write a program to demonstrate the working of Do...while construct and write the test cases.
2. Write a program to demonstrate the working of While construct and write the test cases.
3. Write a program to demonstrate the working of If...else construct and write the test cases.
4. Write a program to demonstrate the working of for loop and write the test cases.
5. Write a program to demonstrate the working of If condition and write the test cases.
6. Write a program to demonstrate the working of Switch construct and write the test cases
7. Write the test cases for any ATM Application
8. Write the test cases for any e-ticketing Application
9. GUI checkpoint for window.
10. GUI checkpoint for multiple objects
11. Bitmap checkpoint for screen area
12. Bitmap checkpoint for window
13. Database checkpoint for Default check
14. Database checkpoint for runtime record check

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B. Tech. (CSE) VII SEMESTER
Professional Elective – IV Lab
OBJECT ORIENTED ANALYSIS AND DESIGN LAB (PE4111CS)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	3	1.5	External Marks: 50

LIST OF EXPERIMENTS

1. To develop a problem statement
2. To develop IEEE standard SRS document.
3. To identify Use Cases and develop Use Case model.
4. To identify Classes and develop Class diagram.
5. To develop Activity diagram.
6. To develop State chart diagram.
7. To develop Component diagram.
8. To develop Deployment diagram.

Above tasks are to be implemented for following applications

Case Study 1: ATM System

Case Study 2: Library Information System

Case Study 3: Online Course reservation System

Case Study 4: E-Trading

Case Study 5: E-Ticketing

9. Forward Engineer Class diagrams for the following.
 - (a) Generalization Relationship Example
 - (b) Interface Example
10. Reverse Engineer
 - (a) Aggregation Relationship Example
 - (b) Generalization Relationship Example
 - (c) Interface Example.