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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE401	DCC	Electrical Machines I	3	1	2	5	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks

Course Educational Objectives (CEOs):

1. To prepare the students to have a basic and practical knowledge of transformers.
2. To prepare the students to have a basic knowledge of induction motors.
3. To introduce students with the concept of Single phase induction machine.

Course Outcomes (COs):

Upon completion of this course students will be able to:

1. Demonstrate various parts of a electrical machine.
2. Conduct Different test on transformer.
3. Choose suitable Induction machine for specific applications.
4. Demonstrate constructional details, principle of operation of Special Machines.

Syllabus

UNIT I **9 Hrs.**

Single Phase Transformer: Working principle, Construction, types, EMF equation, Transformer on no load and on load, exact and approximate equivalent circuit, O.C & S.C. test on transformer, regulation of transformer, losses & efficiency, condition for maximum efficiency, All day efficiency, Efficiency curve, Sumpner's test, Parallel operation, Conditions, Parallel with equal and unequal voltage ratio.

UNIT II **8 Hrs.**

Auto Transformer: comparison with ordinary transformer, equivalent circuit and phasor diagram, saving of conductor material. PU system of calculation.

UNIT III **9 Hrs.**

Polyphase Transformer: Construction, Various connections and groups, choice of connections, open delta connection, Scott connection, three phase to two phase conversion and vice-versa, Applications.

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BTEE401	DCC	Electrical Machines I	3	1	2	5	60	20	20	30	20

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UNIT IV **9 Hrs.**

Polyphase Induction Motor: Construction, types, rotating magnetic field, principle of operation, equivalent circuit, slip, frequency of rotor current, rotor emf, rotor current, expression for torque, conditions for maximum torque, torque slip characteristics, starting torque in squirrel cage and slip ring motors, relation between full load torque and maximum torque, Power stages in induction motor, speed control of 3 phase motor, starting methods for 3 phase induction motor.

UNIT V **8 Hrs.**

Single Phase Induction Motor: Introduction, construction, principal, double revolving field theory, equivalent circuit, performance calculations, starting methods, and their types, torque slip characteristics of various types.

Textbooks:

1. P.S. Bhimbra 2008. *Electrical Machinery*, Khanna Pub., Delhi
2. A. Husain & H. Ashfaq 2016, *Electric Machines*, Dhanpat Rai & Co. (P) Ltd. New Delhi.

References:

1. M.G. Say, Performance & design of AC machines, CBS publishers & distributors, Delhi, 3rd edition
2. A.E. Clayton & N.N. Nancock, The Performance & design of DC machines CBS publications & distributors, Delhi, 3rd edition
3. P.S. Bhimbra, Generalized theory of Electrical Machines, Khanna publishers, Delhi,
4. Ashfaq Husain, Electric Machines, Dhanpat Rai, New Delhi.
5. Syed A. Nasar, Electric Machines & Power Systems, Volume I , Tata McGraw Hill, New Delhi
6. E. Fitzerald, C. Kingsley & S.D. Umans , Electric Machinery Tata McGraw Hill ,New Delhi ,5 edition.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE401	**DCC**	**Electrical Machines I**	3	1	2	5	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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List of Experiments:

Experiments can cover any of the above topics, following is a suggestive list:

1. Evaluation of turn's ratio and polarity test on 1-phase transformer.
2. Performance analysis of load test on a 1-phase transformer and plot its load characteristic
3. Performance analysis of OC and SC tests on a 3-phase transformer and determine its equivalent circuit. Also find its efficiency and regulation at different load and power factor.
4. Separation of No Load Losses in 1 Φ Transformer.
5. Performance analysis of Sumpner's test on two 1-phase transformer and determine its efficiency at various load.
6. Performance analysis of No-load and block rotor test on a 3-phase IM and determine its equivalent circuit.
7. Perform load test on a 3-phase IM and plot its performance characteristics.
8. Study various types of starters used for 3-IMs.
9. Perform No-load and block rotor test on a 1-phase IM and determine its equivalent circuit.
10. Realization of Scott connection.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC402	DCC	Digital Electronics	60	20	20	30	20	2	1	2	4

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Course Educational Objectives (CEOs):
The objective of this course is to-
1. Use of Boolean algebra and Karnaugh Map to simplify logic function.
2. Describe the operation of different Combinational and Sequential Logic Circuits.

Course Outcomes (COs):
After completion of this course the students will be able to-
1. Design an optimal digital logic circuit to meet the given specifications.
2. Evaluate the performance of the given digital logic circuit based on specific criteria for reliable system implementation.

Syllabus

UNIT I **9 Hrs.**
Logic Function Optimization and Arithmetic Circuits
Logic Function, Sum of Product and Product of Sum form, Karnaugh Map minimization, Incompletely specified functions. Arithmetic Circuits- Half Adder, Full Adder, Half Subtractor, Full Subtractor, Parallel Adders/Subtractors- Ripple Carry Adder, Carry Look Ahead Adder, Serial Adders /Subtractors.

UNIT II **9 Hrs.**
Combinational Circuits
Multiplexers, Demultiplexers, Encoders- Binary Encoders, Priority Encoders, Decoders, Synthesis of logic functions using Multiplexers and Decoders. Structural modeling of higher order circuits using lower order circuits, Code converters.

UNIT III
Sequential Design Elements **9 Hrs.**
S-R Latch, D- Latch, Flip Flops- Master Slave and Edge Triggered, S-R, D, J-K, T , State Table, State Equation, Timing Diagram, Excitation Table, Flip Flop Conversions, Setup and Hold Time. 555 Timer chip and its application in multivibrators.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
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UNIT IV

Sequential Circuits **8 Hrs.**

Registers, Shift Registers, Counters- Synchronous and Asynchronous counters, Design Examples, Synchronous Sequential Circuits, State Machines, Mealy and Moore Model, State Diagram, State Table, State Assignment, State Minimization, Design Examples.

UNIT V

Logic Families **8 Hrs.**

Characteristics of Digital ICs- Voltage Levels, Speed, Power, Noise Margin, Fan In, Fan Out. Logic Families- TTL, MOS- NMOS, PMOS, CMOS, ECL, IIL.

Text Books:

1. M. Morris Mano, "Digital Logic Design", Fifth Edition, Pearson Education, 2015
2. Salivahanan and Ari Vahagan, "Digital Circuits and Design", Fifth Edition, Vikas Publishing House, 2018

References:

1. Anand Kumar, "Fundamentals of Digital Circuits", Third Edition, PHI, 2014.
2. Floyd and Jain, "Digital Fundamentals", Eighth Edition, Pearson Education, 2005.
3. Roland J. Tocci, Widmer, Moss, "Digital Systems Principles and Applications", , Eleventh Edition, Pearson Education, 2010.
4. Stephen Brown I Zvanko Vranesic "Fundamentals of Digital Logic Design", Second Edition, The Mc Graw Hill, 2006

List of Experiments:

1. Implementation of Adders and Subtractors.
2. Realization of multiplexers and demultiplexers.
3. Synthesis of logic function using multiplexer.
4. Design and analysis of Encoder and Decoders.
5. Analysis of various flip flops with Preset and Clear capability.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC402	DCC	Digital Electronics	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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6. Design of Astable, Monostable and Bistable multivibrator using 555 Timer.
7. Design of various Shift registers.
8. Design of Johnson and Ring counter.
9. Design of synchronous and asynchronous up/down counters.
10. Design of logic functions using PLDs.
11. Design of some minor projects based on digital circuits to solve real life problems.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE403	DCC	Power System I	3	0	2	4	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To introduce the concepts and phenomenon of different sources of Power Generation.
2. Give an idea about the fundamental concepts of electrical power distribution, both AC & DC
3. Impart the knowledge of different turbines used in the generating stations.

Course Outcomes (COs):

After the successful completion of this course students will be able to:

1. Understand mechanical design of transmission line.
2. Calculate line parameters (Resistance, inductance and capacitance)
3. Compare DC and AC distribution.
4. Explain the representation of different power system components and loading capability of a generator.
5. Describe underground cables.

Syllabus

UNIT I **8 Hrs**

Electrical Energy Generation: General background, structure and components of power network Steam/ Thermal Power Plant, Hydel Power Plant, Nuclear Power plant. Non-conventional & distributed generation, Effect of transmission voltage on power system economy. Isolated & interconnected power system. Power Plant Economics - Load curves, base load, peak load, load factor, demand factor, diversity factor, capacity factor, utilization factor, cost of electricity, capital cost, fuel and operation cost.

UNIT II **9 Hrs.**

Transmission Lines Inductance and capacitance of single-phase, three-phase single circuit and double circuit lines, concept of GMD, transposition of lines, effect of earth on capacitance of transmission lines. Characteristics and performance of transmission lines, transmission lines as four terminal networks, nominal-T, nominal-π, equivalent-T, and equivalent-π representation of transmission lines, A, B, C, D constants, distributed parameters of long lines, hyperbolic solutions, Ferrantii effect, surge impedance loadings.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE403	DCC	Power System I	3	0	2	4	60	20	20	30	20

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UNIT III **9 Hrs.**

Over head lines and cables Type of overhead conductors, solid conductors, stranded conductors, bundled conductors, skin effect, proximity effects, principle of corona Types of cables, insulation resistance of cables, capacitance of cables dielectric stress, capacitance grading of cables, use of inter sheaths

UNIT IV **8 Hrs.**

Main components of overhead lines, conductor materials, line supports, towers, insulators, types of insulators, potential distribution over suspension insulators, string efficiency, methods of improving string efficiency, sag in over head lines, sag and tension calculations, stringing of conductors, sag template, vibration and vibration dampers

UNIT V **9 Hrs.**

Voltage control & Distribution system Ac single phase, 3 phase, 3wire & 4 wire distribution, Kelvin's law for most economical size of conductor Substation layout showing substation equipment, bus bar single bus bar and sectionalized bus bar, main and transfer for bus bar system, sectionalized double bus bar system, ring mains.

Textbooks:

1. William Stevenson, Elements of Power System Analysis, McGraw Hill.
2. C.L. Wadhwa, Electrical Power System Analysis, New Age International.
3. D.P. Kothari, I.J. Nagrath, Modern Power System Analysis TMH, III Ed. Reprint 2008.

References:

1. John Grainger and William Stevenson, Power system Analysis, McGraw Hill.
2. Ashfaq Husain, Electrical Power Systems, Vikas Publishing House.
3. T. Wildi, Electrical Machines, Drives and Power Systems, Pearson Education.

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							THEORY			PRACTICAL	
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BTEE403	**DCC**	**Power System I**	3	0	2	4	60	20	20	30	20

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List of Experiments:

1. Study and Analysis of Thermal Power plant.
2. Study and Analysis of Hydro Power plant.
3. Study and Analysis of Nuclear Power plant.
4. Study of different types of insulator.
5. Analysis of Ferranti effect and voltage distribution in H.V. long transmission line using transmission line model.
6. Determine the ABCD, H, Z & Image parameters of short transmission line.
7. Determine the ABCD, H, Z & Image parameters of medium transmission line For T network.
8. Determine the ABCD, H, Z & Image parameters for long transmission line.
9. Measure the receiving end voltage of each line under no load or lightly load condition to understand Ferranti effect.
10. Understand the performance of transmission line under different loads with varies Resistive, Inductive, and Capacitive load in different steps.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI401	DCC	Microprocessor and Microcontroller	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
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Course Educational Objectives (CEOs):

1. To gain knowledge of basics of Microprocessor & Microcontroller & Learn development of assembly language programs.
2. To learn the programming skills of 8086 Microprocessor & 8051 Microcontroller.
3. To learn the interfacing of external devices (LED, LCD, ADC, DAC) with the microcontroller 8051.

Course Outcomes (COs):

The students will be able to:

1. Apply the concept of buses, Microprocessor & Microcontroller architecture and interrupts.
2. Interface memory and I/O devices with 8051 Microcontroller
3. Program assembly language / C programming of 8051 & 8086.
4. Design Microcontroller based small system
5. Interface 8051 with LED, LCD, ADC, DAC etc.

Syllabus

UNIT I **8Hrs.**

Introduction to 8086 Microprocessor

Overview of 8086 microprocessor. Architecture of 8086, Signals and pins of 8086 microprocessor, Concept of Memory Segmentation in 8086. Maximum Mode , Minimum Mode, Timing diagram, Comparative study of Salient features of 8086, 80286 & 80386.

UNIT II **10Hrs.**

Microprocessor 8086 programming

8086 Instructions set . Addressing mode of 8086, Assembly directives. Stack , Interupts of 8086, Assembly language programs of 8086.

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BTEI401	DCC	Microprocessor and Microcontroller	60	20	20	30	20	3	1	2	5

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Input-Output interfacing: Peripherals I/O. PPI 8255 Architecture and modes of operation, Interfacing to 16-bit microprocessor and programming, DMA controller (8257) Architecture, Programmable interval timer 8254, USART 8251.

UNIT III **8 Hrs.**

Introduction to 8051 Microcontroller

Introduction, Difference between Microprocessors and Microcontrollers. Overview of 8051 Microcontroller family, Architecture of 8051 Microcontroller, The program counter and ROM space in the 8051, registers, 8051 register banks.

UNIT IV **10Hrs.**

8051 Assembly Language Programming

Introduction to 8051 assembly programming, Structure of Assembly language, Assembling and running an 8051 program, 8051 data types and directives, interrupts

8051 Addressing Modes & Instruction set

Addressing modes, Accessing memory using various Addressing modes, Bit addresses for I/O and RAM, Arithmetic instructions, Signed number concepts and arithmetic operations, Logic and compare instructions, Rotate instruction, Jump, Loop, And Call Instructions, Call instructions time delay for various 8051 chips.

UNIT V **10 Hrs.**

8051 Programming in C

Data types and time delay in 8051 C, I/O programming in 8051 C, Logic operations in8051 C, Data conversion programs in 8051 C, Accessing code ROM space in 8051 C, Interfacing with LEDs, LCDs ADCs, DACs.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI401	DCC	Microprocessor and Microcontroller	60	20	20	30	20	3	1	2	5

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Text Books:

1. 1.A.K. Ray & K.M. Bhurchandi, "Advanced Microprocessors and peripheral-Architecture, Programming and Interfacing", Tata McGraw –Hill, 2012.
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems Using Assembly and C, 2/e", Second Edition, Pearson Education 2008.
3. Kenneth J. Ayala, Dhananjay V. Gadre ,"The 8051 Microcontroller & Embedded Systems using Assembly and C",Cengage Learning , India Edition, 2008.

References:

1. Douglas V. Hall ,"Microprocessor and interfacing", Revised second edition, Macmillan, McGraw Hill 2006.
2. Han Way Huang,"Using the MCS-51 Microcontrollers" , Oxford Uni Press,2000.
3. Rajkamal ,"Microcontrollers Architecture, programming, interfacing and system design" Pearson education,2009.

List of Experiments:

1. Introduction to 8086 & 8051 kit, hardware features & modes of operationand Technique of programming & basic commands of kit.
2. Design programs for Arithmetic Operations.
3. Develop a program to find 1's complement and then 2's complement of a 16-bit numbers.
4. Develop a program to find larger of two numbers.
5. Write a program to shift an 8-bit number left by 2-bits.
6. Write a program to generate a square wave of 2 KHz Frequency on input pin.
7. Introduction to IDE and Assembler directives.
8. Develop 8051 Assembly language programs using Arithmetic/ Logical instructions.
9. 8051 Assembly language programming for block data transfer between internal and external memory including overlapping blocks.

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COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI401	DCC	Microprocessor and Microcontroller	60	20	20	30	20	3	1	2	5

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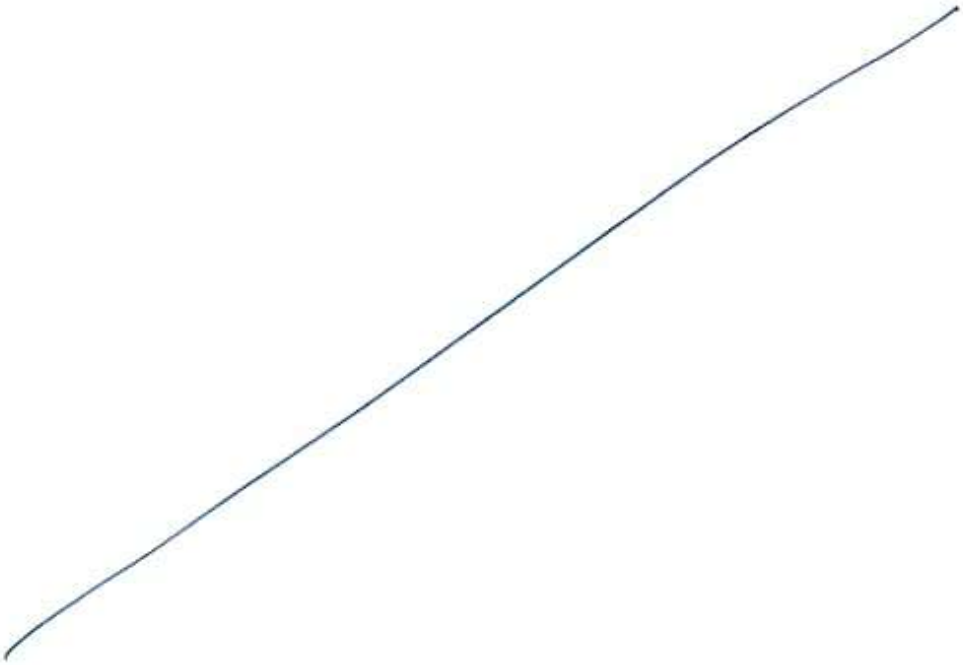
10. 8051 Assembly language programming for
    a. code conversions
    b. Timers in different modes.
    c. I/O port programming in embedded C.
    d. Programming of LCD in embedded C.



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BTEC 507	DCC	Programming in Python	0	0	0	30	20	0	0	2	1

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Course Objective:

1. Learn Syntax and Semantics and create Functions in Python.
2. Handle Strings and Files in Python.
3. Understand Lists, Dictionaries and Regular expressions in Python.
4. Implement Object Oriented Programming concepts in Python.

Course Outcome:

After learning the course, the student will be able:

1. To develop proficiency in creating applications using the Python Programming Language.
2. To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
3. To be able to do testing and debugging of code written in Python.
4. To be able to draw various kinds of plots using PyLab.
5. To be able to do text filtering in Python.

Syllabus

UNIT I

Introduction: History of Python, Need of Python Programming, Running Python Scripts, Variables, Assignment, Operators and Expressions: Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations.

UNIT II

Data Structures: Lists, Tuples, Sets, Dictionaries, Sequences.
Control Flow - if, if-elif-else, for, while, break, continue. Functions - Defining Functions, Calling Functions, Passing Arguments. Modules: Creating modules, import statement, from, import statement, name spacing.

UNIT III

Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages

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BTEC 507	DCC	Programming in Python	0	0	0	30	20	0	0	2	1

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UNIT IV

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data Hiding.

UNIT V

File Handling: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data.

List of Experiments:

1. Develop programs to understand the control structures of python.
2. Develop programs to learn different types of structures (list, dictionary, tuples) in python.
3. Write a Python program to sum all the items in a list.
4. Write a Python program to get the largest and smallest number from a list.
5. Develop programs for data structure algorithms using python – searching and sorting.
6. Write a Python Program to perform Linear Search.
7. Write a Python Program to perform Binary Search.
8. Write a Python Program to perform Selection sort.
9. Write a Python Program to perform Insertion sort.
10. Write a Python Program to perform Merge sort.
11. Write a Python program to get a list, sorted in increasing order by the last element in each tuple from a given list of non-empty tuples: Sample List: [(2, 5), (1, 2), (4, 4), (2, 3), (2, 1)] Expected Result: [(2, 1), (1, 2), (2, 3), (4, 4), (2, 5)]
12. Write a Python program to check a list is empty or not.
13. Write a Python program to remove duplicates from a list.
14. Programs that take command line arguments (word count).
15. Write a Program that Reads a Text File and Counts the Number of Times a Certain Letter Appears in the Text File.
16. Write a Program to Read a Text File and Print all the Numbers Present in the Text File.

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17. Write a Program to find the most frequent words in a text read from a file.
18. Implement Object Oriented Programming concepts in Python.
19. Write A Program to Append, Delete and Display Elements of a List Using Classes.
20. Write A Program to Create a Class and Compute the Area and the Perimeter of the Circle.
21. Write A Program to Create a Class which Performs Basic Calculator Operations.
22. Write A Program to Create a Class in which One Method Accepts a String from the User and another prints it.
23. Learn to plot different types of graphs using PyPlot.

References:

1. John V Guttag. "Introduction to Computation and Programming Using Python", 3nd edition,Prentice Hall of India, 2021
2. Wesley J. Chun. "Core Python Programming" 3rd Edition, Prentice Hall, 2012
3. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python", Wiley, 2013
4. Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication, 2nd edition, 2018.

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