

Elective (ELP - I): Computer Science Practical - I (2 Credits)

Sr. No.	Heading	Particulars
1	Description the course (Including but not limited to)	Introduction, Relevance, Usefulness, Application, Interest, Connection with other courses, Demand in the Industry, Job Prospects etc.
2	Vertical:	Major/Minor/Open Electives /Skill Enhancement / Ability Enhancement/Indian Knowledge System
3	Type:	Practical
4	Credits:	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a Semester)
5	Hours:	60 Hours
6	Marks Allotted:	50 Marks
7	Course Objective (CO): The students are expected to:	
	CO 1.	apply assembly language programming on 8031/8051/89C51 for arithmetic, logic, and data manipulation.
	CO 2.	demonstrate microcontroller I/O operations by interfacing LEDs and switches with conditional logic control.
	CO 3.	design and implement embedded applications integrating hardware and assembly programming concepts.
	CO 4.	develop Python programs for mathematical, logical, and string/data structure problems using iterative and recursive methods.
	CO 5.	compare low-level microcontroller programming with high-level Python to solve computational and real-world problems.
8	Course outcomes (OC): After successful completion of this course, the students will be able to:	
	OC 1.	apply microcontroller assembly language and Python programming to solve computational and hardware problems.
	OC 2.	analyze and design solutions for arithmetic, logic, and interfacing tasks using LEDs, switches, and ports.
	OC 3.	utilize modern tools and programming techniques to implement and test embedded and software applications.
	OC 4.	work effectively as individuals or in teams, documenting and communicating solutions clearly.
	OC 5.	engage in continuous learning to adapt to evolving technologies in embedded systems and high-level programming.
9	List of Experiments: <u>Experiments for 8031/8051/89C51</u> 1. 8031/51/89C51 assembly language programming: Simple data manipulation programs. (8/16-bit addition, subtraction, multiplication, 8/16-bit data transfer, cubes of nos., to rotate a 32- bit number, finding greatest/smallest number from a block of data, decimal / hexadecimal counter) 2. Study of IN and OUT port of 8031/51/89C51 by Interfacing switches, and LEDs: Interface 4 LEDs to one of the microcontrollers PORT. Write ALP to display bit pattern on LED's. (i) 1000 0100 0010 0001 continuously (ii) 1100 0110 0011 continuously	

3. Interface 4 switches and 4 LEDs to one of the microcontrollers PORT. Develop various types of logic to control LEDs depending on the status/states/conditions of the 4 switches. For example: Write ALP such that when all four switches are ON all four LEDs should glow. But when any two switches become OFF then all four LEDs should become OFF. And so on.....

Python Programming Exercises

1. Assume a suitable value for temperature of a city in Fahrenheit degrees. Write a program to convert this temperature into Centigrade degrees and print both the temperatures.
2. Write a program that swaps the values of two variables using a third variable and without a third variable.
3. Write a program to find the roots of the quadratic equation.
4. Write a program to find if a given number is a prime number.
5. Write a program to find the factorial of a positive integer using looping.
6. Write a program to generate if a three-digit number entered is an Armstrong number or not
7. Write a program to find the GCD and LCM of two positive integers.
8. Write a program that reverses the user defined value and finds the sum of the digits in the reversed number.
9. Write a program to check whether a number is the perfect number or not.
10. Write a program to generate the Fibonacci series.
11. Write a recursive function to print the factorial for a given number.
12. Write a function that takes a character (i.e. a string of length 1) and returns True if it is a vowel, False otherwise.
13. Define a function that computes the length of a given list or string.
14. Write a Python program to check whether the string is Symmetrical or Palindrome.
15. Write a Python Program to Reverse words in a given String.
16. A pangram is a sentence that contains all the letters of the English alphabet at least once, for example: The quick brown fox jumps over the lazy dog. Write a function to check a sentence to see if it is a pangram or not.
17. Write a program that takes two lists and returns True if they have at least one common member.
18. Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements.
19. Write a Python script to sort (ascending and descending) a dictionary by value.
20. Write a Python script to concatenate two dictionaries to create a new one.
21. Write a Python program to sum all the items in a dictionary

Minimum 10 experiments from the list of experiments must be completed and reported in the journal.

General Instructions:

- All the measurements and readings should be written with proper units in SI system only.
- After completing all the required number of experiments in the semester and recording them in journal, student will have to get their journal certified and produce the certified journal at the time of practical examination to be eligible to appear in the Semester End Practical Examination
- While evaluating practical, weightage should be given to diagram, observations, tabular representation, experimental skills and procedure, graph, calculation and result.
- Skill of doing the experiment and its concepts should be more important than the accuracy of result.

	Instruction Regarding Semester End Practical Examination - For practical examinations, the learner will be examined in One experiment from the list of experiments. - Evaluation in viva voce will be based on regular experiments and skill experiments. - A candidate will be allowed to appear for the Semester End Practical Examination only if the candidate submit a certified journal at the time of practical examination or provide a certificate from the Head of the Department / Institute to the effect that the candidate has completed the practical course of that semester of T.Y.B. Sc. Physics as per the minimum requirement.													
10	Reference Books: - Programming & customizing the 8051 Microcontroller By Myke Predko, TMH. - The 8051 Microcontroller & Embedded Systems by M.A. Mazidi, J.G. Mazidi and R.D.Mckinlay, Second Edition, Pearson - Paul Gries, et al., Practical Programming: An Introduction to Computer Science Using Python 3, Pragmatic Bookshelf, 2/E 2014 - Python Programming for Students: Mahesh Bhawe & Sunil Patekar, Shroff Publishers & Distributors Pvt Ltd. First Edition August 2021 - Starting out with Python, Tony Gaddis, Fourth Edition Pearson - Python Programming, Anurag Gupta, G Biswas, 1st Edition McGraw Hill - The Complete Reference: Python Martin C Brown, 1st Edition In addition to the reference books internet web-sites & MOOC can be used wherever necessary.													
11	Scheme of Examination:													
	Semester End Practical Examination: - The duration of Each Experiment in Semester End External Practical Examination will be of Two hours. - The Semester End External Practical Examination will be for 30 marks as per the marking scheme given below: <table border="1"> <thead> <tr> <th>Sr. No.</th><th>Activity</th><th>Total 30 Marks</th></tr> </thead> <tbody> <tr> <td>1</td><td>One Experiments</td><td>20 Marks</td></tr> <tr> <td>2</td><td>Certified Journal</td><td>05 Marks</td></tr> <tr> <td>3</td><td>Viva</td><td>05 Marks</td></tr> </tbody> </table>		Sr. No.	Activity	Total 30 Marks	1	One Experiments	20 Marks	2	Certified Journal	05 Marks	3	Viva	05 Marks
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	Internal Practical Examination: - The duration of Internal Practical Examination per experiment will be of Two hours. - The Internal Practical Examination Pattern for 20 marks (During the Semester), will be as per the marking scheme given below: <table border="1"> <thead> <tr> <th>Sr. No.</th><th>Activity</th><th>Total 20 Marks</th></tr> </thead> <tbody> <tr> <td>1</td><td>Skill testing related any One Experiments</td><td>10 Marks</td></tr> <tr> <td>2</td><td>Overall performance</td><td>05 Marks</td></tr> <tr> <td>3</td><td>Viva-Voce</td><td>05 Marks</td></tr> </tbody> </table>		Sr. No.	Activity	Total 20 Marks	1	Skill testing related any One Experiments	10 Marks	2	Overall performance	05 Marks	3	Viva-Voce	05 Marks
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