Vidyasagar University

Curriculum for B.Sc (General) in Computer Science

[Choice Based Credit System]

Semester-I

Course	Course Code	Name of the Subjects	Course Type/ Nature	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
CC1 [DSC-1A]		**C1T:**Problem Solving using Computers	Core Course-1	4	0	0	6	75
		C1P: Software Lab using Python (Practical)		0	0	4		
CC2 [DSC-2A]	TBD	**DSC-2A (other Discipline)**	Core Course-2				6	75
CC3 [DSC-3A]	TBD	**DSC-3A (other Discipline)**	Core Course-3				6	75
AECC		English	AECC (Elective)	1	1	0	2	50
Semester Total							**20**	**275**

L=Lecture, **T**=Tutorial, **P**=Practical, **CC =** Core Course, **TBD =** To be decided, **AECC=** Ability Enhancement Compulsory Course
DSC-1 = Discipline Specific Core of Subject-1, **DSC-2** = Discipline Specific Core of Subject-2,
DSC-3 = Discipline Specific Core of Subject-3.

Semester-I
Core Course (CC)

CC-1: Problem Solving using Computers **Credits 06**

C1T: Problem Solving using Computers **Credits 04**

Computer Fundamentals: Introduction to Computers: Characteristics of Computers, Uses of computers, Types and generations of Computers.
Basic Computer Organization - Units of a computer, CPU, ALU, memory hierarchy, registers, I/O devices.

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

Overview of Programming: Structure of a Python Program, Elements of Python

Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

Creating Python Programs: Input and Output Statements, Control statements (Looping-while Loop, for Loop , Loop Control, Conditional Statement- if...else, Difference between break, continue and pass).

Structures: Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.

Introduction to Advanced Python: Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming.

Suggested Readings:

1. P. K. Sinha & Priti Sinha , “Computer Fundamentals”, BPB Publications, 2007.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. T. Budd, Exploring Python, TMH, 1st Ed, 2011
4. Python Tutorial/Documentation www.python.or 2010
5. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
6. http://docs.python.org/3/tutorial/index.html
7. http://interactivepython.org/courselib/static/pythonds
8. http://www.ibiblio.org/g2swap/byteofpython/read/

C1P: Software Lab using Python **(Practical):** **Credits 02**

Section: A (Simple programs)

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :
   Grade A: Percentage >=80
   Grade B: Percentage>=70 and <80
   Grade C: Percentage>=60 and <70
   Grade D: Percentage>=40 and <60
   Grade E: Percentage<40
3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. WAP to display the first n terms of Fibonacci series.
5. WAP to find factorial of the given number.
6. WAP to find sum of the following series for n terms: 1 – 2/2! + 3/3! - - - - - n/n!
7. WAP to calculate the sum and product of two compatible matrices.

Section: B (Visual Python):

All the programs should be written using user defined functions, wherever possible.

1. Write a menu-driven program to create mathematical 3D objects
   I. curve
   II. sphere
   III. cone
   IV. arrow
   V. ring
   VI. Cylinder.

2. WAP to read n integers and display them as a histogram.
3. WAP to display sine, cosine, polynomial and exponential curves.
4. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.
5. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula m=60/(t+2), where t is the time in hours. Sketch a graph for t vs. m, where t>=0.
6. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:

$$P(t) = (15000(1+t))/(15+ e)$$

where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.

7. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
   I. velocity wrt time (v=u+at)
   II. distance wrt time (s=u*t+0.5*a*t*t)
   III. distance wrt velocity (s=(v*v-u*u)/2*a)