Courses of Study

(Detailed Course Contents)

Bachelor of Technology

Computer Science & Engineering

(2023-2027 Batch)

Shri Mata Vaishno Devi University

Kakryal, Katra 182320 Jammu & Kashmir

VISION

Establishment of a Scientific & Technical University of Excellence to nurture young and talented human resources for the service of Indian Society & world at large and preserving the integrity and sanctity of human values.

MISSION

The mission of the University is the pursuit of Education, Scholarship and Research at the highest International level of excellence.

OBJECTIVES

- Provide education and training of excellent quality, both at undergraduate and postgraduate level.

- Ensure that the University achieves and maintains an international standing in both teaching and research

- Promote study and research in new and emerging areas and encourage academic interaction of the faculty and the students at national and international levels.

- Encourage close collaboration with industry and facilitate the application of research for commercial use and for the benefit of society.

University Campus Address	Shri Mata Vaishno Devi University Kakryal, Katra 182 320 J&K, INDIA Phone:01991-285634, 285524 Fax: 01991-285694
Public Relations Officer Address	Public Relations Office, Shri Mata Vaishno Devi University Saraswati Dham, Near Railway Station, Jammu-180004 J&K, INDIA Telefax: 0191-

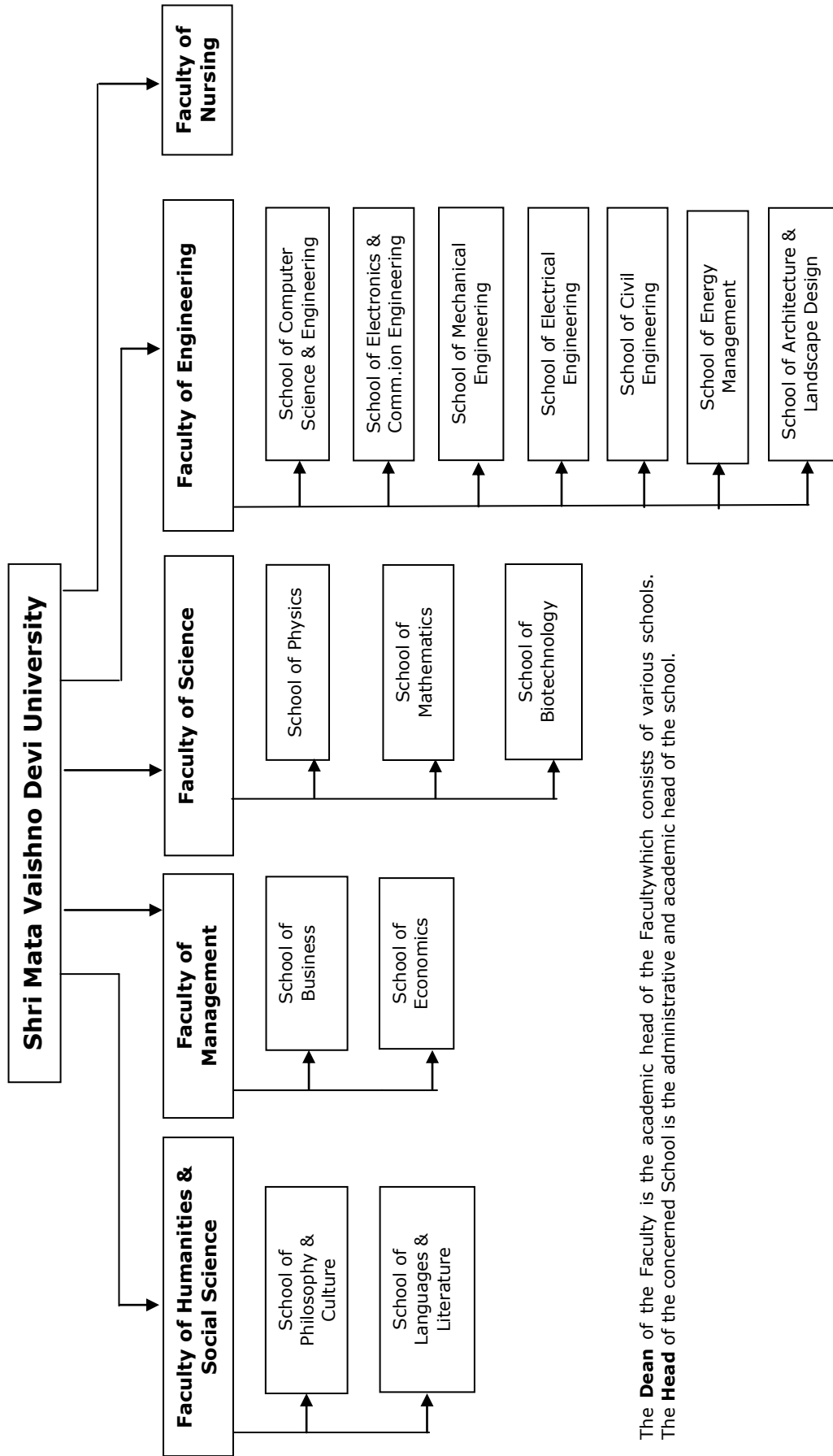Website: www.smvdu.ac.in
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Academic Structure of the University

Shri Mata Vaishno Devi University

- **Faculty of Humanities & Social Science**
  - School of Philosophy & Culture
  - School of Languages & Literature

- **Faculty of Management**
  - School of Business
  - School of Economics

- **Faculty of Science**
  - School of Physics
  - School of Mathematics
  - School of Biotechnology

- **Faculty of Engineering**
  - School of Computer Science & Engineering
  - School of Electronics & Comm.ion Engineering
  - School of Mechanical Engineering
  - School of Electrical Engineering
  - School of Civil Engineering
  - School of Energy Management
  - School of Architecture & Landscape Design

- **Faculty of Nursing**

The **Dean** of the Faculty is the academic head of the Facultywhich consists of various schools. The **Head** of the concerned School is the administrative and academic head of the school.

1.0 Introduction

Shri Mata Vaishno Devi University (SMVDU) has adopted the Indian Institutes of Technology (IIT) pattern of teaching and examination system in its endeavor to attain academic excellence. The University is offering graduate and postgraduate programs since 2004. The university also offers programs leading to award of PhD degree. The programs being offered from the academic session 2013-14are mentioned below.

2.0 Programs of study

The following programs of study are being offered by the university in the academic session 2023-24.

Undergraduate Programs
1. Bachelor of Technology in Computer Science & Engineering
2. Bachelor of Technology in Electronics &Communication Engineering
3. Bachelor of Technology in Mechanical Engineering
4. Bachelor of Technology in Industrial Biotechnology
5. Bachelor of Architecture

Post-graduate Programs
1. Master of Business Administration
2. Master of Technology (Manufacturing & Automation)
3. Master of Technology (Computer Science& Engineering)
4. Master of Technology (Electronics & Communication Engineering)
5. Master of Technology (Energy Management) (Part-Time Program)
6. Master of Arts (Philosophy)
7. Master of Arts (English)
8. Master of Sciences (Mathematics)
9. Master of Sciences (Physics)
10. Master of Sciences (Biotechnology)

PhD Programmes

3.0 Academic System, Rules & Regulations

Details of
Programme of Study
&
Syllabus of Courses

Offered by

School of Computer Science & Engineering

Vision of the School

To provide quality human resource equipped with technical expertise in Computer Science andEngineering to the world that are competent in solving the problems in industry and society andhave high moral and ethical values.

Mission of the School

- To have a program and value system appropriate to the pursuit of Computer Science and Engineering to meet the needs of the society.
- To nurture the students with proficiency in Computer Science and Engineering, and inculcate versatility of mind, motivation for learning and building self-reliance.

Details of Programs Offered

The school currently offers a 4 year (8 semesters) B.Techprogramme in Computer Science & Engineering, a 2year (4Semesters) M.TechProgramme in Computer Science & Engineering and Ph.D.

The purpose of programmesare:

- To have a perception and a value system appropriate to the pursuit of high science and high engineering science to meet the critically evaluated needs of the society in terms ifproducts and processes using indigenous resources
- To develop in each student mastery of fundamentals , versatility of mind , motivation for learning, intellectual discipline and self-reliance which provide the best foundation forcontinuing professional achievement;
- To provide a liberal; as well as a professional education so that each student acquires a respect for moral values, a sense of their duties as a citizen , a feeling for taste and style ,and a better human understanding. All these are required for leadership;
- To send forth men and women of the highest professional competence with a breath of learning and a character to deal constructively with issues, and problems anticipated inthe next decade relevant to the Programmes of development of our country.

Details of Minor & Interdisciplinary Specialization Offered (if any)

Pedagogy

The emphasis of the program is on practical, hands-on learning. Significant part of thecurriculum is dedicated to ensuring that the students get to work with latest equipment andexplore the implementation of the knowledge learnt through the class-work. The students arealso required to undergo summer training in an industrial environment to learn industrialstandards of project management, teamwork, quality considerations and documentation.

Infrastructure

The School of Computer Science & Engineering at Shri Mata Vaishno Devi University prides itself on its state-of-the-art laboratories, each equipped with the latest computer systems interconnected in a network. This advanced setup offers students a comprehensive platform to delve deep into the intricate concepts of computer science, fostering a seamless integration of theory learned in the classroom with practical applications.

The School currently has the following laboratories:
1. PROJECT LAB
2. DATABASE LAB
3. INTERNET LAB
4. PROGRAMMING LAB
5. OPERATING SYSTEM LAB
6. BASIC COMPUTING LABORATORY

Course Structure of
B. Tech (Computer Science & Engineering)programme, Batch 2023-2027

Semester I   **First Year**

S.No	Course Category	Course Code	CourseTitle	L	T	S/P	Credit
1	BSC1	MTL BS101	Engineering Mathematics-I	3	1	0	4
2	ESC1	ECL ES103	Digital Electronics	3	0	0	3
3	ESC1	ECP ES103	Digital Electronics Lab	0	0	2	1
4	BSC2	PHL BS101	Engineering Physics	3	0	0	3
5	BSC2	PHP BS101	Engineering Physics Lab	0	0	2	1
6	ESC2	CSL ES101	Introduction to 'C' Programming	3	0	0	3
7	ESC2	CSP ES101	'C' Programming Lab	0	0	2	1
8	SEC1	MEM SE103	Engineering Graphics with CAD	1	0	2	2
9			AEC1 /VAC1	2	0	0	2
			TotalCredits	**15**	**1**	**8**	**20**

Semester II   **First Year**

S. No	Course Category	Course Code	CourseTitle	L	T	S/P	Credit
1	BSC3	MTL BS102	Engineering Mathematics-II	3	1	0	4
2	BSC4	BTL BS102	Biology for Engineers	3	1	0	4
3	DCC1	CSL DC102	Programming using Python	3	0	0	3
4	DCC1	CSP DC102	Python Programming Lab	0	0	2	1
5	DCC2	CSL DC104	Data Structure	3	0	0	3
6	DCC2	CSP DC104	Data Structure Lab	0	0	2	1
7	SEC2	MEM SE101	Engineering Workshop	1	0	2	2
8	AEC2		AEC2	2	0	0	2
9	VAC2		VAC2	2	0	0	2
10	MAC1	PCL MA102	Universal Human Values-II				NC
			TotalCredits	**17**	**2**	**6**	**22**

List of Departmental/School Core Courses (DCC)

S. No	Course Code	Course Title	L	T	S/P	Credit
1	CSL DC102	Programming using Python	3	0	0	3
2	CSP DC102	Python Programming Lab	0	0	2	1
3	CSL DC104	Data Structure	3	0	0	3
4	CSP DC104	Data Structure Lab	0	0	2	1

List of Engineering Science Courses Offered by School (ESC)

S. No	Course Code	Course Title	L	T	S/P	Credit
1	CSLES101	Introduction to 'C 'Programming	3	0	0	3
2	CSPES101	'C' Programming Lab	0	0	2	1
3	CSL ES102	Programming using Python	3	0	0	3
4	CSP ES102	Python Programming Lab	0	0	2	1
5	CSL ES104	Data Structure	3	0	0	3
6	CSP ES104	Data Structure Lab	0	0	2	1

List of Ability Enhancement Courses Offered by School (AEC)

S. No	Course Code	Course Title	L	T	S/P	Credit
1	CSL AE101	Introduction to Computer Application	2	0	0	2
2	CSL AE102	Introduction to Cyber Security	2	0	0	2

List of Value Added Courses Offered by School (VAC)

S. No	Course Code	Course Title	L	T	S/P	Credit
1	CSL VA102	Introduction to Artificial Intelligence	2	0	0	2

List of Skill Enhancement Courses Offered by School (SEC)

S. No	Course Code	Course Title	L	T	S/P	Credit
1	CSL SE101	Introduction to Computer Application	2	0	0	2

Course Code : MTL BS101
Course Title : Engineering Mathematics-I
L-T-P/S=Credits : 3-1-0 =4
Course Category : Basic Science Course
Pre-requisite Courses (if any) :
Equal Course Code (if any) :
Equivalent Course Code (if any) :

Detailed Syllabus

Sr	Contents	Approx. ContactHours
1	**UNIT-I** **Differential Calculus**: Partial Differentiation, asymptotes, concavity, convexity, point of inflexion, curvature, radius of curvature, curve tracing, envelopes and evolutes, change of variables, Jacobian, expansion of functions of several variables, chain rule, mean value theorem, Taylor series with remainder term, maxima & minima, saddle point.	16
2	**UNIT-II** **Integral Calculus:** Fundamental theorem of Integral calculus, reduction formulae, properties of definite integral, applications to length, area, volume, surface of revolution. Moments, centre of gravity, improper integrals, β-γ functions	16
3	**UNIT-III** **Matrices:** Elementary row and column transformation, linear dependence, rank of a matrix, consistency of system of linear equations, solution of linear system of equations, characteristic equations, Cayley Hamilton theorem, eigen values and eigen vectors, diagonalization, complex matrices.	16

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	E. Kreysig , Advanced Engineering Mathematics , Wiley 10th Edition	2011
2	A . K. Gupta , Engineering Mathematics, Macmillan 7th Edition	2013
3	McQuarri Macmillan, Mathematical Methods by Scientists & Engineers, 1st Edition	2013
Reference Books		
1	Shanti Narayan, Differential Calculus, S. Chand; 30th Revised edition	2005
2		

Course Outcome

Sr	Course Outcome	CO
1	Introduce the basic concept of differential calculus to understand the different subjects of engineering as well as basic sciences.	CO1
2	Enable the students to develop the concept of partial differentiation to understand their applications in engineering	CO2
3	Understand the fundamentals of Integral calculus to understand their applications to length, area, volume, surface of revolution, moments and centre of gravity	CO3
4	Understand the improper integrals and Beta and Gamma functions and their applications	CO4
5	Understand the idea of Linear Algebra which are useful to all branches of engineering	CO5

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Course Code : ECL ES103
Course Title : Digital Electronics
L-T-P/S=Credits : 3-0-0 =3
Course Category : Engineering Science Course
Pre-requisite Courses (if any) :
Equal Course Code (if any) :
Equivalent Course Code (if any) :

Detailed Syllabus

Sr	Contents	Approx. Contact Hours
1	**Basic concepts of Boolean Algebra** Review of number systems - Binary, Hexadecimal, conversion from one to another, complement arithmatic, Signed and unsigned numbers and their arithmetic operations. BCD, Excess-3, Gray and Alphanumeric codes. Review of Boolean algebra, De-Morgan's Theorems, Standard Forms of Boolean Expressions, MinimizationTechniques: K-MAPS, VEM Technique, Q-M (Tabulation) method.	6
2	**Logic Gates & families** Logic Families: TTL, MOS, CMOS, Bi-CMOS; Performance parameters of IC families: input and output loading, fan-in, fan-out, tri-state, current drive, voltage levels, noise margins, power-speed tradeoff; Unused inputs; Interfacing between logic families.	6
3	**Combinational Logic Circuits** Problem formulation and design of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, ALU, Parity-Checkers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), De-multiplexers	6
4	**Sequential Circuits** Latches, Flip-flops (SR, JK, T, D, Master/Slave FF,) Edge-Triggered Flip-Flops, Flip-Flop Operating Characteristics, Basic Flip-Flop Applications, Asynchronous Counter Operation, Synchronous Counter Operation, Up/Down Synchronous Counters.	6
5	**Shift registers & Memories** Shift Register Functions, Serial In - Serial Out Shift Registers, Serial In - Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In - Parallel Out Shift Registers, Bidirectional Shift Registers,Basics of Semiconductor Memories, Random-Access Memories (ROM), Read Only Memories (ROMs), Programmable ROM's (PROMs and EPROM's), PAL, PLA.	6

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication / Reprint
Text Books		
1	"Digital Fundamentals" by Thomas L. Floyd, Prentice Hall, Inc	2015
2	SWITCHING THEORY AND LOGIC DESIGN By A. ANAND KUMAR, PHI	2014
3	Digital Logic Design By Brian Holdsworth, Clive Woods - Elsevier	2002
4	Digital Logic Circuit Analysis & Design, by Victor P. Nelson, H. Troy Nagle, Bill D. Carroll and J. David Irwin, Prentice Hall	1995
Reference Books		
1	Digital logic and computer design: M Morris Mano –PHI	2017
2	Modern digital electronics: R.P. Jain. TMH	2010

Course Outcome

Sr	Course Outcome	CO
1	To provide the skills to efficiently acquire knowledge on digital electronic circuit analysis and design	CO1
2	To acquire Knowledge of various number systems and codes from historic point of view.	CO2
3	To understand the logic families in digital circuits.	CO3
4	To obtain the ability to analyze various aspects of sequential circuit design.	CO4

Course Code : ECP ES103
Course Title : Digital Electronics Lab
L-T-P/S=Credits : 0-0-2 =1
Course Category : Engineering Science Course
Pre-requisite Courses (if any) :
Equal Course Code (if any) :
Equivalent Course Code (if any) :

List of Experiments

Sr	Contents
1	Introduction to Digital Electronics Lab- Nomenclature of Digital ICs, Specifications, Study of the Data Sheet, Concept of V_{CC} and Ground, Verification of the Truth Tables of Logic Gates using TTL ICs.
2	To Study and Verify NAND and NOR as a Universal Gate.
3	To Design &Verify Operation of Half Adder &Full Adder.
4	To Study &Verify Half Subtractor and Full Subtractor.
5	Implementation of 4x1 Multiplexer using IC 74153.
6	Implementation of 4-Bit Parallel Adder Using 7483 IC.
7	Implementation and Verification of Decoder/De-Multiplexer using IC 74139.
8	Verification of State Tables of Rs, J-k, T and D Flip-Flops using NAND & NOR Gates
9	To Design & Verify the Operation of Magnitude Comparator
10	Design, and Verify the 4-Bit Asynchronous Counter.
11	To design and implement a binary to gray and gray to binary converter.

Course Code : PHL BS101
Course Title : Engineering Physics
L-T-P/S=Credits : 3-0-0 =3
Course Category : Basic Science Course
Pre-requisite Courses (if any) :
Equal Course Code (if any) :
Equivalent Course Code (if any) :

Detailed Syllabus

Sr	Contents	Approx. ContactHours
1	**UNIT I:** Force and electric field due to continuous charge distribution, Field lines-Electric Flux, Gauss's Law (differential and integral forms), Applications of Gauss's law Electric potential, work done in assembling a charge distribution	8
2	**UNIT II:** Force Law - line current, surface current and volume current densities (Equation of continuity), Biot-savart law, Properties of B, Magnetic flux-Divergence B, Curl B, magnetic vector potential A Ampere's law (differential and integral forms), displacement current, modified Ampere's law Faraday's laws of electromagnetic induction, Four Maxwell's equations in differential and integral forms	10
3	**UNIT III:** Electromagnetic Spectrum, brief introduction to black body radiation, photo-electric Effect, Compton Effect, wave particle duality (de-Broglie waves), Davisson-Germer Experiment, concept of wave function and its physical significance, Phase and group velocities, Uncertainty principle.	10
4	**UNIT IV :**Bohr theory of atom (with finite and infinite nuclear mass) Derivarion of time dependent and time independent Schrödinger wave equations, Expectation values and operators (momentum, energy and angular momentum operators), Commutators, Particle in a box of infinite height (One dimensional)	10
5	**UNIT V:** Free electron theory-Free electron gas, Energy levels and density of states in one dimension Band theory of solids, Classification of metals, semiconductors and insulators on the basis of band theory	10

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	Introduction to Electrodynamics, D. J. Griffiths, Pearson.	2001
2	Electromagnetics, B. B. Laud, New Age International Publisher	2005
3	Electromagnetics, B. B. Laud, New Age International Publisher	2006
Reference Books		
1	Introduction to Solid State Physics, Charles Kittel, Wiley	2015
2	Solid State Physics, S.O. Pillai, Wiley	2008

Course Outcome

Sr	Course Outcome	CO
1	Know the vocabulary and concepts of Physics as it applies to: Electricity and Magnetism and Modern Physics	CO1
2	Develop the mathematical description of these concepts and principles to build up problem solving skills that will benefit their future career.	CO2
3	Apply an understanding of these concepts to develop various modern systems, structures, technology and devices.	CO3
4	Gain confidence to apply mathematical methods to understand Physics problems in real-life situations.	CO4

Course Code : PHP BS101
Course Title : Engineering Physics Lab
L-T-P/S=Credits : 0-0-2 =1
Course Category : Basic Science Course
Pre-requisite Courses (if any) :
Equal Course Code (if any) :
Equivalent Course Code (if any) :

List of Experiments

Sr	Contents
1	To study the Measuring Instruments (Vernier Calipers, Screw Gauge &Spherometer)
2	To find the angle of prism by rotating the telescope method.
3	To find the refractive index of the material of the given prism using a spectrometer
4	To determine the refractive index of the given liquid (water) using a hallow prism and spectrometer.
5	To study the Newton's Interference Rings and to determine the wavelength of Sodium light.
6	To determine the Wave Length of Sodium Light using a plane diffraction grating.
7	To determine the frequency of A.C. mains with a Sonometer using non magnetic wire.
8	To study the V-I characteristics of a Zener Diode.
9	To study the performance of a Half-wave, Full-wave & Bridge wave rectifier without filters
10	To verify Stefan's law by estimating the temperature of a torch bulb filament from resistance measurement.
11	To study the Hall Effect and to calculate the Hall Coefficient and Charge Carrier Concentration of a given sample
12	To study the dependence of Refractive Index(μ) of the material of the prism on the Wavelength(λ) of light; and hence(1) to determine the Dispersive Power of the material of prism;(2)to verify the Cauchy Relationship $\mu=a+b/\lambda^2$,and to estimate the values of a & b(3)to plot a graph of $d\mu/d\lambda$ versus λ.
13	To determine the band gap by measuring the resistance of a Thermistor at different temperatures
14	To determine the energy band gap of a semiconductor diode (Ge) using Four Probe Method.
15	To study the wavelength of He-Ne Laser

Course Code : CSL ES101
Course Title : Introduction to 'C' Programming
L-T-P/S=Credits : 3-0-0 =3
Course Category : Engineering Science Course
Pre-requisite Courses (if any) :No
Equal Course Code (if any) :
Equivalent Course Code (if any) :

Detailed Syllabus

Sr	Contents	Approx. ContactHours
1.	History of Programming Languages and their constructs , approach , Basics of computer systems , programs, flowchart , algorithms.	03 Hrs
2.	Different Number systems , Algorithms and flow charts , types of algorithm , properties of good algorithm , examples , use of flow chart. C- fundamentals , constants, variables ,data types and ranges , Different , expressions operators Methods of writing C program	03 Hrs
3.	C- fundamentals , constants, variables ,data types and ranges , Different , expressions operators. Methods of writing C program. Input output statements , format conversions.	03 Hrs
4.	Character operation, control statements simple , if- , if else , ternary , compound , nested .	03 Hrs
5.	Switch case statements, different programs on the topic Looping statements FOR , WHILE, Do- WHILE, Nested FOR, Parallel FOR, Goto , continue , break statement, programs on the topic.	03 Hrs
6.	Looping statements FOR , WHILE, Do- WHILE, Nested FOR, Parallel FOR.. Programs on the covered topics	03 Hrs
7.	Introduction to functions , different types of functions in C, Recursion , function as argument, Nesting of functions. Call by reference and call by value=s, Various programs with usage of different function in C	03 Hrs
8.	**MINOR-I Exam**	
9.	Arrays in C , Numeric array, single dimensional, multi dimensional arrays printing of arrayssupply of values to array , character array , matrix , input output formats for String	03 Hrs
10.	String operation , Types of operations , string functions , length of string , comparing of string	03 Hrs
11.	Auxiliary statements and operations , types of variables automatic static , global , register variables	03 Hrs
12.	User defined data types, Enumerated , Typedef Unions	03 Hrs
13.	Pointers in C ,Decalration of pointer , concept of pointer , types of pointers pointer as argument of function program.	03 Hrs
14.	**Minor-II Exam**	
15.	Use of pointer in an array, character operation using pointer , function pointer Use of pointer in multi dimensional array,	03 Hrs
16.	Pointers as a main variable of structure , Structure of pointers . Structure of normal variables and pointers Nested structure programs on structure and pointers.	03 Hrs
17.	File operations , Creation of files , file organization Sequential, direct, indexed , Random access file organization, file pointers, file input output functions	03 Hrs
18.	Error in opening file end of file Fgets ,Exit, Fread , Fputs , Eof, Fprintf, StdinStdout, Stdeer file pointer	03 Hrs
	Revision WEEK	
1.	**Major Exams**	

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	Gottfried, Byron S., —Programming with C, Tata McGraw Hill	2016
2	Balagurusamy, E., —ANSI C, Tata McGraw-Hill	2011
3	YashwantKanetker, —Let us C, BPB	2022
Reference Books		
1	C, The Complete Reference, Scholdt, TMH	2001
2	Programming with C, S. Kaicher, Macmillan	2003

Course Outcome

Sr	Course Outcome	CO
1	Have knowledge and understanding of programming.	CO1
2	Attain the logical ability to write programs in C language by using basic control structures (conditional statements, loops, switches, branching, etc.).	CO2
3	Understand the usage of advanced programming concepts using functions, arrays, strings, pointers and structures, and implement the various data structures	CO3
4	Attain the ability to create a programmable model for a problem given	CO4

Course Code : CSP ES101
Course Title : 'C' Programming Lab
L-T-P/S=Credits : 0-0-2 =1
Course Category : Engineering Science Course
Pre-requisite Courses (if any) :
Equal Course Code (if any) :
Equivalent Course Code (if any) :

List of Experiments

S.No.	List of Programs
1.	Write a program to print "Hello World" on the screen
2.	Write a program to find sum of the two numbers
3.	Write a program to find average of two numbers
4.	Write a program to know the number of bytes of data type contains
5.	Write a program to display the ASCII code of a variable on the screen
6.	Writ a program to determine the area of a circle
7.	Write a program to find the area of a square
8.	Write a program to find the sum of digits of a 4 digit number
9.	Write a program to reverse a 4 digit number
10.	Write a program to swap the values of two variables with/without using third variable
11.	Write a program to display if a number is even or odd
12.	Write a program to display if a number is positive or negative
13.	Write a program to display that a person is eligible for voting
14.	Write a program to display greatest among two numbers
15.	Write a program to display subject of 5 marks & compute percentage and display pass or fail
16.	Write a program to read number between 1-7 & display corresponding day of week
17.	Write a program to read marks of five subjects and compute percentage and display grade of students based on percentage
18.	Write a program to check whether the year entered is leap year or not
19.	Write a program to print the relation between 2 numbers as equal to, less than or greater than
20.	Write a program to read lower case character and display it in upper case
21.	Write a program to convert dollar into rupees
22.	Write a program to convert Celsius into Fahrenheit
23.	Write a program to swap the values to two variables with the help of temporary variable
24.	Write a program to make a calculator

25.	Write a program to print "Hello world" 10 times using while loop
26.	Write a program to print "Hello world" n times using while loop
27.	Write a program to print 1 to 10 on screen
28.	Write a program to print 10 to 1 on screen
29.	Write a program to print sum of all even numbers between 1 to 100
30.	Write a program to print sum of all odd numbers between 1 to n
31.	Write a program to print multiplication table of n
32.	Write a program to find factorial of a number
33.	Write a program to find sum of all numbers between m to n
34.	Write a program to read a number and print each digit on separate line
35.	Write a program to find the sum of digits of a number
36.	Write a program to reverse a number
37.	Write a program to find if the number is Palindrome or not
38.	Write a program to read +ve numbers from user till user enters 0 & display for each number whether it is even or odd
39.	Write a program to find the reverse of a number
40.	Write a program to read +ve number from user till user enters 0 and display count of even numbers and odd numbers.
41.	Write a program to read character from user till user enters special character and display count of vowels and digits
42.	Write a program to read a number from user and display whether it is prime or not
43.	Write a program to print all leap years between year m to n
44.	Write a program to read a number and find if it is an Armstrong number or not
45.	Write a program to print all prime number between n to m
46.	Write a program to print 1st n prime numbers.
47.	Write a program using switch case to read one number and perform 1. Sum of digit 2. Reverse of number 3. Number is palindrome or not
48.	Write a program using switch case to read operator and perform (+, -, /, *) operators of operands
49.	Write a program using switch case to read a number and perform 1. Factorial of a number 2. Number is prime 3. Number is Armstrong 4. Even or odd
50.	Write a program to sort an array of type integer
51.	Write a program to reverse an array element in the array
52.	Write a program to check if the array is palindrome or not
53.	Write a program to reverse an array element in the array
54.	Write a program to check of the array is palindrome or not
55.	Write a program to insert an element in sorted array at its right place
56.	Write a program to delete all the duplicate numbers from the array
57.	Write a program to read temperature recorded for the month of September. Display the highest and lowest temperature recorded
58.	Write a program to read total marks of 90 students. Find the average marks scored by the class. Display the number of students having marks below average and total number of students marks equal to or above average.
59.	Write a program to read n numbers in an array. Display the count of total –ve numbers, +ve numbers and total zero. Your program must derive m which should be added to all –ve numbers so as they are converted to either zero or +ve number.
60.	Write a program to sum the two arrays into another array.
61.	Write a program to add two matrix using multi-dimensional arrays
62.	Write a program to multiply to matrix using multi-dimensional arrays
63.	Write a program to find transpose of a matrix
64.	Write a program to print the characters of a string in vertical order
65.	Write a program to find the length of a string
66.	Write a program to find the frequency of characters in string
67.	Write a program to find the total number of vowels in the string
68.	Write a program to find the number of vowels, consonants, digits and white space in string using Switch - case
69.	Write a program to concatenate two strings
70.	Write a program to find the total number of words in a sentence
71.	Write a program to reverse a sentence
72.	Write a program to remove all characters in a string except alphabet
73.	Write a program to sort elements in different orders in string
74.	Write a program to insert a character in a string
75.	Write a program to search a character in a string
76.	Write a program to delete a character in a string
77.	Write a program to insert a word in a string
78.	Write a program to search a word in a sentence
79.	Write a program to delete a word in a sentence
80.	Write a program to find the length of each string in a 2-dimensional array
81.	Write a program to find sort each string in a 2-dimensional array

82.	Write a program to change the case of each string in a 2-dimensional array
83.	Write a program to change the reverse each string in a 2-dimensional array
84.	Write a program to display prime numbers between m and n using function
85.	Write a program to check Armstrong number using user-defined function
86.	Write a program to check whether a number can be expressed as sum of two prime numbers using function
87.	Write a program to find the sum of n natural numbers using function
88.	Write a program to calculate factorial of a number using function
89.	Write a program to reverse a sentence using function
90.	Write a program to calculate power of a number using function
91.	Write a program to convert binary number to decimal and vice-versa using function
92.	Write a program to store information (name, roll and marks) of student using structure
93.	Write a program to add two distances (in inch-feet) system using structure
94.	Write a program to add two complex numbers by passing structure to a function
95.	Write a program to calculate between two time period
96.	Write a program to store information of 10 students using structure and display the roll no, name and total marks of each student
97.	Write a program to access elements of an array using pointer
98.	Write a program to swap numbers of an array using call by reference
99.	Write a program to find largest number in an array using function
100.	Write a program to multiply two matrices by passing matrix to function

Course Code   : **MEM SE103**
Course Title   : **Engineering Graphics with CAD**
L-T-P/S=Credits   : **1-0-2 =2**
Course Category   : **Skill Enhancement Course**
Pre-requisite Courses (if any)   :
Equal Course Code (if any)   :
Equivalent Course Code (if any)   :

Detailed Syllabus

Sr	Contents	Approx. ContactHours
1	Introduction of Engineering Graphics: Drawing instruments and their uses, Orthographic Projections: Planes of projection – Projection of points in different quadrants. Orthographic Projection of Straight Line parallel to one plane and inclined to the other plane – Straight Line inclined to both the planes – True Length and inclination of lines with reference planes – Traces of line – Projection of Planes, Projection of Solids. Section of Solids: Classification of Solids, Section plane perpendicular to one plane and parallel to other, Section plane inclined to one plane and perpendicular to other plane. Development of Surfaces: Principle, Engineering applications and Methods of development	10
2	**Introduction to AutoCAD:** Starting AutoCAD, AutoCAD screen components, creating a drawing on AutoCAD, invoking different commands, Dialog boxes, Coordinate Systems, Exercises on Drawing of Line, Circle, Arc, Ellipse, Polygon, etc.	10
3	**Drawing Aids and Editing Commands:** Layers, Drafting Settings, Object Snaps, Function and Control keys, various Editing Commands, Editing the Objects with Grips, Grip Types.	10
4	**Creating Text, Dimensions and Tolerances in AutoCAD**: Creating Text, Editing Text, Styles of Dimensioning, Dimensioning System Variables, Editing/Updating Dimensions, Adding Tolerances.	8

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	Bhat, N.D. and Panchal, V. M. - Engineering Drawing, Charotar Publishers, Anand	
2	Narayana, K.L. and Kannaiah, P.- Engineering Graphics, Tata Mc Graw Hill, New Delhi.	
3	Gill, P.S- Engineering Drawing, S.K Kataria& Sons, New Delhi	

Reference Books

1	Ellen Filkensten - AutoCAD & AutoCAD LT Bible,Wiley, New York	
2	Sham Tickoo - AutoCAD ,Tata McGraw Hill, New Delhi.	

Course Outcome

Sr	Course Outcome	CO
1	To learn basics of drawing including dimensioning	CO1
2	To draw orthographic projections of points and lines and traces of line	CO2
3	To draw orthographic projections of planes.	CO3
4	To draw orthographic projections and section of solids.	CO4

Course Code   **: MTL BS102**
Course Title   **: Engineering Mathematics-II**
L-T-P/S=Credits   **: 3-1-0 =4**
Course Category   **: Basic Science Course**
Pre-requisite Courses (if any)   **:**
Equal Course Code (if any)   **:**
Equivalent Course Code (if any)   **:**

Detailed Syllabus

Sr	Contents	Approx. ContactHours
1	**Vector Calculus:** Beta & Gamma functions. Differentiation of vector functions of scalar variables. Gradient of a scalar field, Divergence & Curl of a vector field and their properties.Line& surface integrals, Greens theorem, Stokes Theorem and Gauss Theorem both in vector & Cartesian forms (statement only) with simple applications	18
2	**Ordinary Differential Equation(ODE):**Formation of ODE, definition of order and degree of ODE and solution, ODE's of first order, method of separation of variables, homogeneous and non-homogenous differential equations and their solution, exactness and integrating factor, Bernoulli equation, linear ODE's of order, operator method, method of undetermined coefficients, method variation of parameters, solution of simple simultaneous ODE's.	15
3	**Partial Differential Equation(PDE):** Formation of (PDE), Solution of PDE by direct integration, Lagrange's linear equation, Non-linear PDE of first order, Method of separation of variables, Wave & Laplace equations (Two dimensional Polar & Cartesian Co-ordinates).	18

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	E. Kreysig, Advanced Engineering Mathematics, Wiley 10thedition	2011
2	Frank Ayres , Vector Analysis, Mc Graw Hills, 6thedition	2011
3	T. Marsden and W.H. Freeman,VectorCalclus, Freeman, 6 edition	2011
Reference Books		
1	G.Simons,DifferentialEquationswithApplications,TMH**,**McGraw-HillHigher Education; 2 edition	1991
2	S.L. Ross, Differential Equations, Wiley 3rdedition	1984
3	R. Zalman, A Course in Ordinary and PDEs, Academic Press, 1stedition	2014

Course Outcome

Sr	Course Outcome	CO
1	Understand the concepts of vector calculus like directional derivative, gradient, divergence and curl, and their applications.	CO1
2	Learn and apply the concepts of vector integral calculus for the computation of work done, circulation, and flux.	CO2
3	Formulate the differential equations concerning physical phenomena like electric circuits, wave motion, heat equation etc.	CO3
4	Learn various methods of solution of ordinary and partial differential equations	CO4
5	Solve various partial differential equations arising in heat conduction problems and wave propagation problems	CO5

Course Code	: BTL BS102
Course Code	**: BTL BS102**
Course Title	**: Biology for Engineers**
L-T-P/S=Credits	**: 3-1-0 =4**
Course Category	**: Basic Science Course**
Pre-requisite Courses (if any)	**: Nil**
Equal Course Code (if any)	**: Nil**
Equivalent Course Code (if any)	**: Nil**

Detailed Syllabus

Sr	Contents	Approx. Contact Hours
1	**Introduction to Basic Biology** Cell, Cell theory, Cell shapes, structure of a Cell, prokaryotic and eukaryotic Cell, Plant Cell and animal Cell, protoplasm, Plant Tissue and Animal Tissue. Cell cycle	16
2	**Introduction to Bio-molecules** Carbohydrates, proteins, Amino acid, nucleic acid (DNA and RNA) and their types. Enzymes and their application in Industry. Large scale production of enzymes by Fermentation	18
3	**Gene structure and recombinant DNA technology** Prokaryotic gene and Eukaryotic gene structure, gene replication, Transcription and Translation in Prokaryotes and Eukaryotes. Recombinant DNA technology and introduction to cloning.	18
4	**Applications of Biology** Brief introduction to Production of vaccines, Enzymes, antibodies, Cloning in microbes, plants and animals, Basics of biosensors, biochips, Bio fuels. Tissue engineering and its application, transgenic plants and animals, Stem cell and applications. Bio engineering (production of artificial limbs, joints and other parts of body).	20

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication / Reprint
Text Books		
1	Essential Cell Biology Fifth edition by Bruce Alberts, Karen Hopkin, Alexander Johnson, David Morgan, Martin Raff, Keith Roberts, Peter Walter, WW Norton & Co	2019
2	Karp's Cell Biology Eighth edition by Gerald Karp, Janet Iwasa, Wallace Marshall; Wiley	2018
3	Biology for Engineers by T Johnson press	2011
Reference Books		
1	The Cell: A Molecular Approach Fifth edition by Cooper, G.M. and Hausman, R.E. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, M.A.	2009
2	Lehninger: Principles of Biochemistry, 8th edition by David L. Nelson and Michael. M. Cox; W. H. Freeman and Company.	2021

Course Outcome

Sr	Course Outcome	CO
	After successful completion of this course, students will be able to:	
1	Understand the detailed structure of the cell and cell cycle.	CO1
2	Understand the structure and function of biomolecules and their importance.	CO2
3	Illustrate about genes and genetic materials (DNA & RNA) present in living organisms and how they replicate, transfer & preserve vital information in living organisms	CO3
4	Demonstrate the concept of biology and its uses in combination with different technologies for the production of medicines and production of transgenic plants and animals.	CO4

Course Code : CSL DC102
Course Title : Programming using Python
L-T-P/S=Credits : 3-0-0 =3
Course Category : Departmental Core course
Pre-requisite Courses (if any) :No
Equal Course Code (if any) :
Equivalent Course Code (if any) :

Sr	Contents	Approx. ContactHours
1	Introduction to importance of IDEs like Spyder(Anaconda)/PyCharm for professional programming, explorePython shell as a calculator and for inputting Python expressions directly, Data Types in. Operators in Python:comparison, arithmetic, logical, Boolean, bitwise,assignment. Python: numbers, list, tuple, strings, set, dictionary, conversion between various data types	03
2	HelloWorld program in Python script, Python keyword andIdentifiers, Indentation, Comments,	03
3	Data Types. Operators in Python: comparison, arithmetic,logical, Boolean, bitwise, assignment.	03
4	Python: numbers, list, tuple, strings, set, dictionary,conversion between various data types	03
5	Input and Output in Python, if-else , for loop, while loop,break, pass, continue, global and local variables, Importingother modules/packages and using their functions, creatingrandom numbers/random-choice to create programs for simple guessing games like Rock –Paper-Scissors. Problemson 1D/2D/3D arrays using list. Problem solving usingdictionary as look-up table.	03
6	creating Functions, functions with arguments, returningvalues form functions, lambda expressions, recursion,	03
7	Global and local variables, Importing othermodules/packages and using their functions, creating randomnumbers/random-choice to	03
	MinorI	
8	create programs for simple guessing games like Rock –Paper-Scissors. Problems on 1D/2D/3D arrays using list. Problemsolving using dictionary as look-up table.	03
9	Object oriented programming: Class and Object. Definingvariables and functions inside class. Creating objects,	03
10	Inheritance, Multiple and Multi Level Inheritance, Functionover-riding.	03
11	Concept of composing objects of a different class in anobject, problems on object composition	03
12	Python's de-facto GUI package like tkinter or alternativepackages like: wxPython, PyQt (PySide), Pygame, Pyglet,and PyGTK.	03
	MinorII	
13	Creating labels, buttons, entry (textbox), combobox,checkbutton, radiobutton, scrolledText (textarea), spinbox,progressbar, menubar, filedialog, tabs etc.	03
14	Creating GUI simple games like Tic-Tac-Toe	03
15	Dicussion about implementation of python in Machine learning Algorithms	03
16	Python with Data Sets	03
	Recent trends	03
	Major Exam	

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	Think Python 2nd Edition - How to Think Like a Computer Scientist, Allen B Downey, O'Reillypublication	2015
2	Learn Python 3 the Hard Way, Zed A. Shaw, Pearson publication	2022
3	Head First Programming: A Learner's Guide to Programming using the Python Language, Paul BarryDavid Griffiths Barry Griffiths, O'Reilly publication	2018
Reference Books		
1	Dive into Python 3, Mark Pilgrim, Apress publication	2017

Course Outcome

Sr	Course Outcome	CO
1	Know the basic syntax and Data Structures in Python.	CO1
2	Think and Design solution in Object Oriented way as well as Procedural way.	CO2
3	Enjoy coding and compete at online programming sites like CodeChef, HackerEarth etc.	CO3

Course Code : **CSP DC102**
Course Title : **Python Programming Lab**
L-T-P/S=Credits : **0-0-2 =1**
Course Category : **Departmental Core course**
Pre-requisite Courses (if any) :
Equal Course Code (if any) :
Equivalent Course Code (if any) :

List of Experiments

Sr	Contents
1	Write a program to add two numbers.
2	Write a program to calculate grade of a student.
3	Write a program to print following pattern. * ** ***
4	Write a program to print table of a number.
5	Write a program to print following pattern: 0 01 012
6	Write a program to add and multiply numbers using user define functions.
7	Write a program to concatenate strings in Python.
8	Give at least five examples of inbuilt functions of Python.
9	Give at least five examples of inbuilt Math functions of Python.
10	Write a program to calculate factorial of a number using recursion.
11	Write a program to make a List in Python and perform following operations on List: a) Length using len() function b) Print element at index 0 c) Adding an element to the list using + operator d) Appending an element to the list e) Negative indexing in list f) Remove the first occurrence of element a from list g) Reverse the list h) Sort list
12	Write a program to demonstrate use of Dictionary in Python with their inbuilt functions.
13	Write a program to demonstrate use of Set in Python with their inbuilt functions.
14	Write a program to demonstrate use of Tuple in Python with their inbuilt functions.
15	Write a program to calculate Median using List.
16	Write a program to calculate Mode using List.
17	Write a program to calculate Mean using List.
18	Write a program to inherit properties of a person to a student using inheritance in Python.
19	Write a program to calculate Coefficients of given numbers.
20	Write a program to calculate Covariance of given numbers.
21	Write a program to plot a graph using python library.
22	Write a program to make a class Vehicle and their properties.
23	Write a program to make a game Rock-Paper-Scissor.
24	Write a program to make classes for bird and animal with their properties and simulate a zoo like environment.
25	Write a program to make a GUI to take input from user and display.

Course Code	: CSL DC104
Course Title	: Data Structure
L-T-P/S=Credits	: 3-0-0 =3
Course Category	: Departmental Core course
Pre-requisite Courses (if any)	:No
Equal Course Code (if any)	:
Equivalent Course Code (if any)	:

Sr	Contents	Approx. ContactHours
1	Unit-1: INTRODUCTION Introduction to programming methodologies and design of algorithms, Structured programming concepts, Study and implementation of basic data structures like: Arrays, multidimensional arrays and their organization, introduction to sparse arrays	5
2	Unit-2: LINKED LIST Linked list (singly, doubly and circular),Concept of linked list, Difference of link list & array, Single linked list, Representation, Operations, Traversing, Insertion(first node, last node, at a position, after a node value), Deletion(first node, last node, at a position, after a node value), Double linked list, Representation, Operations, traversing, Insertion (first node, last node, at a position, after a node value), Deletion (first node, last node, at a position, after a node value), Circular link list & header link list example	6
3	Unit-3: STACKS & QUEUES Stacks, Queues, Operations on Stack, Array & Linked Representation, Programs on stack, Push & Pop operations, traversing. Operations on Queue, Array & Linked Representation, Programs on stack, Insert & Delete operations, Circular queue, representation, Deque, Priority Queue, Application of queue	8
4	Unit-4: SORTING AND SEARCHING Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort	8
5	Unit-5 : TREES AND GRAPHS Tree terminology, Binary tree, Complete Binary Tree, Binary search tree, Tree Traversals, Creation of Binary Tree from traversal methods, Expression Tree & expression, Manipulation, Binary Search Tree, Insertion & deletion in BST(Program), AVL Tree, M-way Search Tree, B+ tree, Insertion & deletion, Graph:, Graph terminology, Representation of graphs, Path matrix, Graph Traversal, BFS (breadth first search), DFS (depth first search), Minimum spanning Tree, Kruskal's Algorithm & Prim's Algorithm, Warshall's algorithm (shortest path, algorithm)., Introduction to trees and graphs and traversal methods.	9

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	Data structures, Lipshutiz, Shaum series	2012
2	Data structures & program design, R Kurse, PHI	2003
3	Data structures: A pseudo code approach with C, R F Gilbarg, Thomson	2005
Reference Books		
1	An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. SorensonPublisher-Tata McGraw Hill.	2018
2	Data Structures using C & C++ -By Ten Baum Publisher – Prenctice-Hall International.	2014
3	Fundamentals of Computer Algorithms by Horowitz, Sahni,Galgotia Pub. 2001 ed. Fundamentalsof Data Structures in C++-By SartajSahani.	2001
4	Data Structures: A Pseudo-code approach with C -By Gilberg&Forouzan Publisher ThomsonLearning.	2008

Course Outcome

Sr	Course Outcome	CO
1	Select appropriate data structure as applied to specified problem definition.	CO1
2	Understand basic data structures such as arrays, linked lists, stacks and queues.	CO2
3	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	CO3

4	Demonstrate a thorough understanding of how data structures impact the performance of algorithms.	CO4

Course Code   **: CSP DC104**
Course Title   **: Data Structure Lab**
L-T-P/S=Credits   **: 0-0-2 =1**
Course Category   **: Departmental Core course**
Pre-requisite Courses (if any)   **:**
Equal Course Code (if any)   **:**
Equivalent Course Code (if any)   **:**

List of Experiments

Sr	Contents

1	Design, Develop and Implement a menu driven Program in C for the following Array operations
	   a. Creating an Array of N Integer Elements
	   b. Display of Array Elements with Suitable Headings
	   c. Inserting an Element (ELEM) at a given valid Position (POS)
	   d. Deleting an Element at a given valid Position(POS)
	   e. Exit.
	Support the program with functions for each of the above operations.

2	Design, Develop and Implement a Program in C for the following operations on Strings
	   a. Read a main String (STR), a Pattern String (PAT) and a Replace String (REP)
	   b. Perform Pattern Matching Operation: Find and Replace all occurrences of PAT in STR
	   with REP if PAT exists in STR. Report suitable messages in case PAT does not exist in
	   STR.
	Support the program with functions for each of the above operations. Don't use
	Built-in functions.

3	Design, Develop and Implement a menu driven Program in C for the following operations on STACK of Integers (Array Implementation of Stack with maximum size MAX)
	   a. Push an Element on to Stack
	   b. Pop an Element from Stack
	   c. Demonstrate how Stack can be used to check Palindrome
	   d. Demonstrate Overflow and Underflow situations on Stack
	   e. Display the status of Stack
	   f. Exit
	Support the program with appropriate functions for each of the above operations

4	Design, Develop and Implement a Program in C for converting an Infix Expression to Postfix Expression. Program should support for both parenthesized and free parenthesized expressions with the operators: +, -, *, /, %(Remainder), ^ (Power) and alphanumeric operands.
5	Design, Develop and Implement a Program in C for the following Stack Applications a. Evaluation of Suffix expression with single digit operands and operators: +, -, *, /, %, ^ b. Solving Tower of Hanoi problem with n disks.

6	Design, Develop and Implement a menu driven Program in C for the following operations on Circular QUEUE of Characters (Array Implementation of Queue with maximum size MAX)
	   a. Insert an Element on to Circular QUEUE
	   b. Delete an Element from Circular QUEUE
	   c. Demonstrate Overflow and Underflow situations on Circular QUEUE
	   d. Display the status of Circular QUEUE
	   e. Exit
	Support the program with appropriate functions for each of the above operations.

7	Design, Develop and Implement a menu driven Program in C for the following operations on Singly Linked List (SLL) of Student Data with the fields: USN, Name, Branch, Sem, PhNo
	   a. Create a SLL of N Students Data by using front insertion.
	   b. Display the status of SLL and count the number of nodes in it
	   c. Perform Insertion and Deletion at End of SLL
	   d. Perform Insertion and Deletion at Front of SLL
	   e. Demonstrate how this SLL can be used as STACK and QUEUE
	   f. Exit

8	Design, Develop and Implement a menu driven Program in C for the following operations on Doubly Linked List (DLL) of Employee Data with the fields: SSN, Name, Dept, Designation, Sal, PhNo a. Create a DLL of N Employees Data by using end insertion. b. Display the status of DLL and count the number of nodes in it c. Perform Insertion and Deletion at End of DLL d. Perform Insertion and Deletion at Front of DLL

	e. Demonstrate how this DLL can be used as Double Ended Queue
	f. Exit

9	Design, Develop and Implement a Program in C for the following operations on Singly Circular Linked List (SCLL) with header nodes
	  a. Represent and Evaluate a Polynomial $P(x,y,z) = 6x^2y^2z-4yz^5+3x^3yz+2xy^5z-2xyz^3$
	  b. Find the sum of two polynomials POLY1(x,y,z) and POLY2(x,y,z) and store the result in POLYSUM(x,y,z)
	
	Support the program with appropriate functions for each of the above operations

10	Binary Search Tree (BST) of Integers
	    a. Create a BST of N Integers: 6, 9, 5, 2, 8, 15, 24, 14, 7, 8, 5, 2
	    b. Traverse the BST in In order, Preorder and Post Order
	    c. Search the BST for a given element (KEY) and report the appropriate message
	    d. Delete an element(ELEM) from BST
	    Exit

11	Design, Develop and Implement a Program in C for the following operations on Graph(G) of Cities
	    a. Create a Graph of N cities using Adjacency Matrix.
	    b. Print all the nodes reachable from a given starting node in a digraph using BFS method
	    c. Check whether a given graph is connected or not using DFS method.

12	Given a File of N employee records with a set K of Keys(4-digit) which uniquely determine the records in file F. Assume that file F is maintained in memory by a Hash Table(HT) of m memory locations with L as the set of memory addresses (2-digit) of locations in HT. Let the keys in K and addresses in L are Integers. Design and develop a Program in C that uses Hash function H: K ®L as H(K)=K mod m (remainder method), and implement hashing technique to map a given key K to the address space L. Resolve the collision (if any) using linear probing.

Course Code   **: MEM SE101**
Course Title   **: Engineering Workshop**
L-T-P/S=Credits   **: 1-0-2 =2**
Course Category   **: Skill Enhancement Course**
Pre-requisite Courses (if any)   **:**
Equal Course Code (if any)   **:**
Equivalent Course Code (if any)   **:**

Detailed Syllabus

Sr	Contents	Approx. ContactHours
1	**Carpentry shop**:Tools and Equipment, Making of Various Joints, Pattern Making. **Foundry Shop**: Tools and Equipments, Preparation of Moulds of Simple Objects Using Single Piece, Two Piece and Match Plate Patterns.	10
2	**Fitting Shop**:Tools And Equipments, Practice in Chipping, Filing and Drilling, Making of V, Dovetail and Square Joints of M.S Flat. **Welding Shop**:Tools and Equipments, Making of Various Joints Using Gas Welding and Arc Welding (MIG Welding) ,Bead Formation in Horizontal, Vertical and Overhead Positions, Brazing and Soldering Operations.	10
3	**Sheet Metal Shop**:Tools and Equipments, Making Tray, Cone, etc. with GI Sheet Metal **Machine Shop**:Introduction to Various Lathe Operations and Practice on Milling, Drilling Machines, etc.	10

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	Raghuvanshi, B. S. - Workshop Technology–Vol 1, Dhanpat Rai & Sons, New Delhi.	2010
2	Gupta, R. B. - Production Technology, Satyaprakashan, New Delhi	2006
3	Swarn Singh - Workshop Practice, Kataria& Sons, New Delhi	2005
Reference Books		
1	Upadhyay, R. – Manufacturing Practice, Kataria& Sons, New Delhi	2004
2	Narayana, K L Kannaiah P. - Manual on Workshop Practice, Scitech Publishers, Chennai	2006

Course Outcome

Sr	Course Outcome	CO
1	Study and practice on machine tools and their applications so that students should know and operate the machine tools and perform various processes in welding, sheet metal, smithy and machines shop.	CO1
2	Students should understand the functioning and applications ofcutting tools, machines, processes ; like fabrication of joints using arc welding, seam joints, forging and taper turning	CO2
3	Students should document the job performed, safety precautions observed while performing experiment on different machine tools	CO3
4	Students should perform the jobs, safety precautions taken while performing the experiments using various tools/ machine tools.	CO4

Course Code : PCAL MA102
Course Title : Universal Human Values-II
L-T-P/S=Credits : 2-0-0 =2
Course Category : Mandatory Course
Pre-requisite Courses (if any) : No
Equal Course Code (if any) :
Equivalent Course Code (if any) :

Detailed Syllabus

Sr	Contents	Approx. ContactHours
1	**Unit I** 1. What is Value Education? 2. Knowledge and Skill 3. Value and Virtue 4. Moral Agency and the Notion of Dharma 5. Freedom of Will and Determinism	14
2	Unit II 6. Understanding Human Existence: Human Being and Human Person 7. The Basic Human Aspirations: Continuous Happiness and Prosperity 8. Understanding harmony at the level of Individual, Family and Society	13
3	Unit III 9. Understanding harmony at the level of Nature 10. Cardinal Human Virtues such as Compassion, Wisdom, Justice, Tolerance, Non-violence, Service to Humanity with the help of suitable illustrations	13

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	Das, Gurucharan (1990), The Difficulty of Being Good (Chapter 3), New Delhi: Penguin Books.	1990
2	Frankfurt, Herry G. (1971). Freedom of the Will and the Concept of a Person. The Journal of Philosophy, 68 (1): 5 – 20.	1971
3	Gaur, R.R. et. al. (2006), A Foundation Course in Human Values and Professional Ethics. New Delhi: Excel Books.	2006

Course Outcome

Sr	Course Outcome	CO
1	Understand the relevance of human values and peaceful co-existence	CO1
2	Widen their perspectives in moral decision making	CO2
3	Develop right understanding with respect to the basic aspirations of human life	CO3

4	Gain holistic understanding of the interrelatedness of individual, family, society and nature	CO4
5	Enhance clarity, assurance & purposefulness of life	CO5

Course Code   **: CSL AE101**
Course Title   **: Introduction to Computer Application**
L-T-P/S=Credits   **: 2-0-0 =2**
Course Category   **: Ability Enhancement Courses**
Pre-requisite Courses (if any)   **:No**
Equal Course Code (if any)   **:CSL SE101**
Equivalent Course Code (if any)   **:**

Detailed Syllabus

Sr	Contents	Approx. ContactHours
1	**Unit 1: Basics of Information Technology** • Computer Systems: characteristics of a computer, components of a computer system – CPU, memory, storage devices, File system and I/O devices • Memory: primary (RAM and ROM) and secondary memory • Storage devices: hard disk, CD ROM, DVD, pen/flash drive, memory stick • I/O devices: keyboard, mouse, monitor, printer, scanner, web camera • Types of software: system software (operating system, device drivers), application software including mobile applications • Computer networking: Type of networks: PAN, LAN, MAN, WAN, wired/wireless communication, Wi-Fi, Bluetooth, cloud computers (Private/public) • Multimedia: images, audio, video, animation; formats, size, compression	8
2	**Unit 2: Cyber-safety** • Safely browsing the web and using social networks: identity web protection, proper usage of passwords, privacy, confidentiality of information, cyber stalking, reporting cybercrimes • Safely accessing websites: viruses and malware, adware	6
3	**Unit 3: Introduction to a word processor** • create and save a document • Edit and format text: text style (B, I, U), font type, font size, text colour, alignment of text. Format paragraphs with line and/or paragraph spacing. Add headers and footers, numbering pages, grammar and spell check utilities, subscript and superscript, insert symbols, use print preview, and print a document. • Insert pictures, change the page setting, add bullets and numbering, borders and shading, and insert tables – insert/delete rows and columns, merge and split cells. • Use auto-format, track changes, review comments, use of drawing tools, shapes and mathematical symbols.	8
4	• Presentation tool: understand the concept of slide shows, basic elements of a slide, different types of slide layouts, create and save a presentation, and learn about the different views of a slide set – normal view, slide sorter view and hand-outs. • Edit and format a slide: add titles, subtitles, text, background, and watermark, headers and footers, and slide numbers. • Insert pictures from files, create animations, add sound effects, and rehearse timings.	5

	Unit 4- Spreadsheets	5
	• concept of a worksheet and a workbook, create and save a worksheet.	
	• Working with a spreadsheet: enter numbers, text, date/time, series using auto fill; edit and format a worksheet including changing the colour, size, font, alignment of text; insert and delete cells, rows and columns. Enter a formula using the operators (+,-,*, /), refer to cells, and print a worksheet.	
	• Use simple statistical functions: SUM (), AVERAGE (), MAX (), MIN (), IF () (without compound statements); embed charts of various types: line, pie, scatter, bar and area in a worksheet.	

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	• Alexis Leon, Mathews Leon, "Fundamentals of Information Technology, 2/e', Vikas Publishing House Pvt Limited, 2009,	2009
2	• E Balagurusamy, " Fundamentals of Computers" Tata McGraw-Hill Education PVT.Ltd., 2009	2009
3	• Peter Norton's "Introduction to Computers" 7th Edition, Tata McGraw-Hill, 2010	2010

Course Outcome

Sr	Course Outcome	CO
1	Ability to familiarise with basics of computers	CO1
2	Ability to navigate the file system.	CO2
3	Ability to create and edit documentsand use Indian languages in documents	CO3
4	Ability to perform basic data manipulation and data presentation using spread sheets.	CO4
5	Ability to create and present formal presentations using Presentation Tool.	CO5
6	Ability to send and receive emails, follow email etiquette, and communicate over the internet.	CO6
7	Ability to safely and correctly use websites, and email	CO7

Course Code	**: CSL AE102**
Course Title	**: Introduction to Cyber Security**
L-T-P/S=Credits	**: 2-0-0 =2**
Course Category	**: Ability Enhancement Courses**
Pre-requisite Courses (if any)	**: No**
Equal Course Code (if any)	**:**
Equivalent Course Code (if any)	**:**

Detailed Syllabus

Sr	Contents	Approx. ContactHours
1	**Unit-1-Introduction to Cyber Security** Cyber security increasing threat landscape, Cyber security terminologies- Cyberspace, attack, attack vector, attack surface, threat, risk, vulnerability, exploit, exploitation, hacker., Non-state actors, Cyber terrorism, Protection of end user machine, Critical IT and National Critical Infrastructure, Cyberwarfare, Case Studies	8
2	**Unit-2 Cyber crimes** Cyber crimes targeting Computer systems and Mobiles- data diddling attacks, spyware, logic bombs, DoS, DDoS, APTs, virus, Trojans, ransomware, data breach., Online scams and frauds- email scams, Phishing, Vishing, Smishing, Online job fraud, Online sextortion, Debit/ credit card fraud, Online payment fraud, Cyberbullying, website defacement, Cybersquatting, Pharming, Cyber espionage, Cryptojacking, Darknet- illegal trades, drug trafficking, human trafficking., Social Media Scams & Frauds- impersonation, identity theft,job scams, misinformation, fake newscyber crime against persons - cyber grooming, child pornography, cyberstalking., Social	8

	Engineering attacks, Cyber Police stations, Crime reporting procedure, Case studies.	
3	**Unit-3 Cyber Law** Cyber crime and legal landscape around the world, IT Act,2000 and its amendments. Limitations of IT Act,2000. Cyber crime and punishments, Cyber Laws and Legal and ethical aspects related to new technologies-AI/ML, IoT, Blockchain, Darknet and Social media, Cyber Laws of other countries, Case Studies	8
4	**Unit-4 Data Privacy and Data Security** Defining data, meta-data, big data, nonpersonal data. Data protection, Data privacy and data security,Personal Data Protection Bill and its compliance, Data protection principles, Big data security issues andchallenges, Data protection regulations of other countries- General Data Protection Regulations(GDPR),2016 Personal Information Protection and Electronic Documents Act (PIPEDA)., Social media- data privacy andsecurity issues	8
	Unit -5 Cyber security M a n a g e m e n t , Compliance and Governance Cyber security Plan- cyber security policy, cyber crises management plan., Business continuity, Riskassessment, Types of security controls and their goals, Cyber security audit and compliance, National cybersecurity policy and strategy	8

Suggested Books:

Sr.	Name of Book, Author, Publisher	Year of Publication/Reprint
Text Books		
1	Marjie T. Britz Computer Forensics and Cyber Crime: An Introduction, Pearson	2012
2	AlfaredBasta and Wolf Holten, Computer Security Concepts, Issues and Implementation, CENGAGE learning	2015
3	Raghu Santanam, M. Sethumadhavan, MohitVirendraCyber Security, Cyber Crime and Cyber Forensics, IGIGlobal	2022
Reference Books		
1	George M. Mohay,AlisonAndersonComputer and intrusion forensics, Artech House	2006
2		

Course Outcome

Sr	Course Outcome	CO
1	Understand the cyber security threat landscape.	CO1
2	Develop a deeper understanding and familiarity with various types ofcyberattacks, cyber crimes, vulnerabilities and remedies thereto.	CO2
3	Analyse and evaluate existing legal framework and laws on cyber security.	CO3
4	Analyse and evaluate the digital payment system security and remedial measures against digital payment frauds.	CO4
5	Analyse and evaluate the importance of personal data its privacy and security.	CO5
6	Analyse and evaluate the security aspects of social media platforms andethical aspects associated with use of social media.	CO6
7	Analyse and evaluate the cyber security risks.	CO7
8	Based on the Risk assessment, plan suitable security controls , audit andcompliance	CO8
9	Evaluate and communicate the human role in security systems with anemphasis o n ethics, social engineering vulnerabilities and training.	CO9
10	Increase awareness about cyber-attack vectors and safety against cyber-frauds.	CO10
11	Take measures for self-cyber-protection as well as societal cyber-protection	CO11

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