DEPARTMENT OF
COMPUTER SCIENCE AND ENGINNERING

PROPOSED CURRICULUM STRUCTURE FROM
ACADEMIC YEAR 2022-23

Approved in XXIVth Academic
Council,Dated 23/07/2022

Government College of Engineering, Aurangabad
(An Autonomous Institute)
Teaching and Evaluation Scheme from year 2022-23
Second Year B. Tech. Program in Computer Science and Engineering
Semester III

Course				Teaching Scheme			Continuous Evaluation in terms of Marks					
Sr No	Category	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISEII	ISEIII	ESE	Total (100)
1	BSC	MABS2003	Mathematics III (Statistics, Differential Calculus)	2	1	-	3	15	15	10	60	100
2	PC	CSPC2001	Data Structures	3	-	-	3	15	15	10	60	100
3	PC	CSPC2002	Operating System	3	-	-	3	15	15	10	60	100
4	ESC	CSES2003	Microprocessors and Interfacing	3	-	-	3	15	15	10	60	100
5	PC	CSPC2004	Lab Data Structure	-	-	2	1	25	-	-	25	50
6	PC	CSPC2005	Lab Adv C & C++	-	-	4	2	50	-	-	50	100
7	PC	CSPC2006	Lab Web Technology	1	-	2	2	25	-	-	25	50
8	ESC	CSES2007	Lab Microprocessors and Interfacing			2	1	25			25	50
			Total	12	1	10	18	185	60	40	365	650

Government College of Engineering, Aurangabad
(An Autonomous Institute)
Teaching and Evaluation Scheme from year 2022-23
Second Year B. Tech. Program in Computer Science and Engineering
Semester IV

Sr No	Category	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISEII	ISEIII	ESE	Total (100)
		Course		Teaching Scheme			Continuous Evaluation in terms of Marks					
1	BSC	CSBS2008	Discrete Mathematic Structure	3	-	-	3	15	15	10	60	100
2	PC	CSPC2009	Database Management System	3	-	-	3	15	15	10	60	100
3	PC	CSPC2010	Computer Organization	3	-	-	3	15	15	10	60	100
4	PC	CSPC2011	Object Oriented Programming	3	-	-	3	15	15	10	60	100
5	OE	CSOE0010	Open Elective-I	3	-	-	3	15	15	10	60	100
6	ESC	CSES2012	Workshop II(CSE Specific)	-	-	2	1	25	-	-	25	50
7	PC	CSPC2013	Lab Database Management System	-	-	2	1	25	-	-	25	50
8	PC	CSPC2014	Lab Object Oriented Programming	-	-	2	1	25	-	-	25	50
9	PC	CSPC2015	Lab Java Programming			4	2	50			50	100
10	MC	INMG2010	Environmental Studies	3	-	-	-	15	15	10	60	100
			Total	15	-	10	20	200	75	50	425	750

Approved In XXIVth Academic Council, Dated 23/07/2022

3

Open Elective Offered by CSE Dept

	ODD Semester		EVEN Semester
1	Introduction to C & C++	1	Introduction to Cloud Computing
2	Introduction to Web Technology	2	Java Programming
3	Introduction to Python Programming		

Government College of Engineering, Aurangabad
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINNERING
Semester wise credit distribution

Semester	I	II	III	IV	V	VI	VII	VIII	Total	AICTE	Diff
BSC	8	9	3	3					23	25	-2
ESC	9	10	4	1					24	24	0
HSMC		3			3	3		3	12	12	0
PCC			11	13	11	4	7		46	48	-2
PEC						8	4	8	20	18	+2
OEC				3	3	6	6		18	18	0
LC											
MC											
PROJ					2	2	7	6	17	15	+2
Total	17	22	18	20	19	23	24	17	160	160	

MABS 2003 :Engineering Mathematics-III Semester-III			
Teaching Scheme		**Examination Scheme**	
Lectures	2 Hrs/Week	ISE- I	15 Marks
Tutorial	1 Hr/Week	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Perquisites: Nil

Course Description:

      MABS 2003 Engineering Mathematics-III is a compulsory course for second year E&TC and CSE students of the institute. The course aims to equip the students with statistical tools and concepts that help in decision-making. This course is intended to provide engineering students a coherent and balanced account of probability and statistics that form the basis of many engineering analysis tools.

Course objectives:

Create interest in students in statistical thinking.

1. To understand, analyze, and solve problems on random variables statistics, significance testing and goodness of fit tests for probability distributions

Course Outcomes expected:

      On completion of this course student should be able to:

Course Outcomes	
CO1	Define the basic concepts of probability distributions, random variable and sampling.
CO2	Explain the concepts of random variable, probability distributions and population parameters of large or small size sample.
CO3	Apply the regression techniques (least square method) and correlation techniques to the sample data, testing hypothesis for small and large samples.
CO4	Compute and interpret the results of bi-variate regression and correlation analysis, for forecasting.
CO5	to apply non-parametric tests for significance testing and goodness of fit of the probability distribution.

Detailed Syllabus:

Unit-I	**Basic Statistics:** Measures of central tendency, dispersion, moments, skewness and kurtosis, correlation coefficient, lines of regression, curve fitting, method of least square, straight lines, second degree parabola, exponential and power curves.	6L + 3T
Unit-II	**Random Variables:** Random variable, discrete random variables, Continuous random variables. definition of distribution and types of distribution: p.d.f, p.m.f, c.d.f. of random variables, characteristic function of random variables, univariate and bivariate distribution and its marginal distribution.	4L + 2T
Unit-III	**Mathematical Expectations:** Mathematical expectation: definition and	4L + 2T

		properties, mean, variance, standard deviation in terms of expectations, moment generating function, characteristics function.	
Unit-IV		**Probability distribution:** Binomial distribution, Poisson distribution, normal distribution, chi-square distribution and student's t distribution.	4L + 2T
Unit-V		**Sampling and Tests of Significance**: Basic concepts sampling and its type (simple random, stratified and cluster), its needs; types of hypothesis, types of error, critical region; level of significance. Procedure of testing hypothesis, test of significance: large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations. Test for single mean, difference of means and correlation coefficients, test for ratio of variances - chi-square test for goodness of fit and independence of attributes.	6L + 3T

Text and Reference Books :
1. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, 12th ed. New Delhi: S. Chand & Sons, 2014.
2. S.C. Gupta, *Fundamentals of Statistics*, 7th ed. Maharashtra: Himalaya Publishing House, 2021.
3. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th ed. John Wiley & Sons, New York, 2006.
4. B.S. Grewal, *Higher Engineering Mathematics*, 35th ed., Delhi : Khanna Publishers, 2000.
5. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Reprint, New Delhi: Laxmi Publications, 2010.
6. Ross, S.M., *Introduction to Probability and Statistics for Engineers and Scientists*, 5th ed. New Delhi: Elsevier, 2004.

Mapping of Course outcome with Program Outcomes

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		2								1
CO2	3	2		2								1
CO3	3	2		2	2							1
CO4	3	3		3								1
CO5	3	3		3								1

3 – High, 2 – Medium, 1 – Low

Teaching Strategies:

The teaching strategy planned through the lectures, and team based home works. Exercises assigned weekly to stimulate the students to actively use and revise the learned concepts, which also help the students

to express their way of solving the problems fluently in written form. Most critical concepts and mistakes emphasized

Teacher's Assessment: Teacher's assessment of 10 marks based on the following.
   1) Home assignments
   2) Surprise tests with multiple choice questions.

Assessment: ISE-I, ISE-II, ISE-III (Class Test-1, Class Test-2, TA) & ESE

TA: Students will perform one or more of the following activities

1. Surprise Test
2. Assignment using Mathematical tools like Mathematica / MatLab or similar.
3. Quiz
4. Any other activity suggested by course coordinator

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I (Class Test-1)	ISE II (Class Test-2)	ISE III (TA+Surprise Test)	End Semester Examination
K1	Remember	01	03		
K2	Understand	14	12	10	60
K3	Apply				
K4	Analyze				
K5	Evaluate				
K6	Create				
Total Marks 100		15	15	10	60

Designed by

Prof. S. D. Gadhire

Prof. S. P. Atipamulu

7

CSPC2001: Data Structures

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Perquisites: None

Course Description:

This course presents a conceptual and practical introduction to organizing data in a computer so that it can be used efficiently. The course is designed to develop skills to design and analyze simple linear and non linear data structures. It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem. It enables them to gain knowledge in practical applications of data structures. This course introduces concepts like ADT, stack, queue, linked lists, tree, graph, sorting technique and searching technique.

Course Outcomes:

After successful completion the course, students will be able to:

Course Outcomes	
CO1	Describe the concept of data abstraction and data structures like stack, queue.
CO2	Implement various linear data structures like stacks, queues, linked lists.
CO3	Implement and traverse various non linear data structures like trees and graphs.
CO4	Analyze & Compare various searching and sorting techniques.
CO5	Develop user defined data structures in a high level language.

Detailed Syllabus:

Unit 1	**Introduction to data structure , Stack & Queues –** Data structure- linear and non linear, abstract data type Algorithm, The stack as an ADT, stack applications - Basic Definition and examples: Infix, Postfix, and Prefix, Program to evaluate a Postfix expression, Limitations of the program ,The queue and its sequential representation, The queue as an ADT.
Unit 2	**Linear Data Structure & their representation** Definition, concept, operation on linked lists, Circular linked lists, Doubly linked lists, Operations like insertion, deletion, insertion in order, searching, updating , Applications of linked lists such as polynomial manipulation, Comparison of singly linked, circularly linked & doubly linked list

Unit 3	**Trees** Definition, Basic terminology, operation on binary trees, linked storage representation for binary search trees, Basic operation on binary search tree such as creating a binary search tree, searching, modifying an element, inserting & deleting the element, destroy a binary search tree, tree traversals ,in-order, pre-order, post-order , tree application for expression evaluation & for solving sparse matrices, height balanced trees2-3 tree, B trees, B+ trees	
Unit 4	**Graphs** Definition. Basic terminology, matrix representation & implementation of graphs, graph traversals, DFS, BFS, shortest Path , spanning tree	
Unit 5	**Sorting& searching and hashing techniques** Different sorting tech, classification on the basis of big-O notation, tech such as straight selection sort, bubble sort, merge sort, quick sort, heap sort, shell sort, radix sort, comparisons between different sorting techniques .Sequential searching, binary searching, Hashing Techniques.	

Text and Reference Books:
1. Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, *"Data Structures using C and C++"* 2nd ed. New Delhi: PHI publication,2013.
2. Seymour Lipschutz , *Data Structures*, Revised 1st ed., Schaum's Outline Series , , McGraw Hill Education,2014.
3. E. Horowitz S. Sahani, D. Mehata, *"Fundamentals of data structures in C++",* New Delhi, Galgotia Book Source, 1995.

Web Resources:
NPTEL course : Data Structures https://nptel.ac.in/courses/106106127
Virtual Lab: Data structures http://cse01-iiith.vlabs.ac.in/

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2	PSO 3
CO1	3	2						3		3			2	2	
CO2	2	1						2		2			3	2	
CO3	2	2						2		2			3	2	
CO4	2	2			1			1	1	2			1	1	
CO5	1	2			1			3	1	1		2	1	3	

3 - High 2 – Medium   1 –Low

Assessment:
ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

9

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) Power Point presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	00	00	00	10
K2	Understand	10	05	02	15
K3	Apply	05	05	02	15
K4	Analyze	00	05	02	15
K5	Evaluate	00	00	02	05
K6	Create	00	00	02	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3
	CO1,CO2	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	00	15
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by:

1. V. A. Chakkarwar
2. Arjumand Khan
3. Khushboo Mehta

Approved in XXIVth Academic Council,Dated 23/07/2022

CSPC2002: Operating Systems			
Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: Nil

Course Description: Topics will include what an operating system does, management of the CPU, memory, processes and devices with exposure to android operating system.

Course Outcomes:

After successful completion the course, students will be able to:

Course Outcomes	
CO1	Differentiate between multiprocessing, multiprogramming, and multitasking.
CO2	Differentiate between programs, processes and threads.
CO3	Apply segmentation and paging techniques
CO4	Compare file naming in Linux and Windows.
CO5	Explain Android Operating System

Detailed Syllabus:

Unit 1	**Fundamentals of Operating System:**-OS services and Components, Multitasking , Multiprogramming, Multiprocessing Time Sharing, Buffering, Spooling, Distributed OS.
Unit 2	**Process Concept:** Process concept, process scheduling, operation on process, inter process communication, example of IPC systems and communication in client-server systems. Process Scheduling: Basic concepts, scheduling criteria, scheduling algorithm, algorithm evaluation. Process Coordination Synchronization : Background, the critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of Synchronization. Deadlock : System model, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection.
Unit 3	**Memory Management Memory** partitioning, Swapping, Paging, Segmentation, Virtual memory Overlays, Demand paging, Performance of Demand paging, Virtual memory concepts, Page replacement algorithms, Allocation algorithms, Example OS : Linux
Unit 4	**I/O Systems** Secondary-Storage Structure, Disk structure, Disk scheduling, Disk management, Swap-space management, Disk reliability, Stable storage implementation, Introduction to clock, Clock hardware, Clock software
Unit 5	**File systems**: File concept, File support, Access methods, Allocation methods ,Directory systems, File protection, Free space management Example OS : Linux , Case study : Android OS

Text and Reference Books:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*. 7th ed. New York Addison-Wesley , 2005.
2. Andrew Tanenbaum, *Modern Operating Systems*, 2nd ed. Prentice Hall,2008.

3. William Stallings, *Operating Systems Principles - Internals and Design,* 5th ed, Prentice Hall

Web Resources:

1. https://nptel.ac.in/courses/106/108/106108101/
2. https://www.javatpoint.com/os-tutorial

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1		2					1	1	2	2		1	1		
CO2		2					1	1	2	2		1	1		
CO3	2									2		2	2		
CO4		3										3		2	
CO5		3										3		2	

3 - High   2 – Medium1 –Low

Assessment:

ISE I and ISE II: In semester evaluations (ISEI and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	00	02	10
K2	Understand	10	00	02	20
K3	Apply	00	05	02	20
K4	Analyze	00	10	02	10
K5	Evaluate	00	00	02	00
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3, K4
	CO1	CO2,CO3, CO4,CO5
ISE I (15 Marks)	05	10
ISE II (15 Marks)	05	10
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by:
Vijayshri Injamuri

13

CSES2003: Microprocessor Fundamentals and Interfacing

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: Nil

Course Description:

This course presents a conceptual and practical introduction to imperative and assembly level language programming, exemplified by Microcontroller. As well as providing grounding in the use of microcontroller, the course will cover general principles of programming in assembly level frameworks. This course introduces concepts like Digital electronics, memory & peripherals interfacing which provides real time programming approach in assembly level languages.
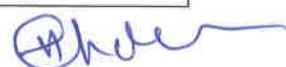
Course Outcomes:

After successful completion the course, students will be able to:

	Course Outcomes
CO1	Evaluate K-MAPs and number system conversion, A.C, D.C. Loading Characteristics, Registers & Counters functioning while designing with digital gates. Design several multiplexer and De- multiplexer.
CO2	Describe 8086 internal hardware architecture and Implement assembly language Programs using 16 bit registers.
CO3	Describe 8086 CPU Design.
CO4	Explain microprocessor architecture of memory organization of 8086 microprocessor and memory interfacing.
CO5	Demonstrate interface and program using legacy peripherals.

Detailed Syllabus:

Unit 1	**Basics of Digital Electronics** : Binary ,Octal & Hexadecimal number System, Parity Code,7-bit hamming code, Logic gates ,K-Map, Multiplexers &De multiplexers , Flip-flops, Registers, Counters, Introduction to D/A,A/D convertor
Unit 2	**8086 Microprocessor:** 8086 internal Architecture, memory Organization, Addressing modes, Accessing immediate & Register data ,memory accessing. Instruction set of 8086, Programming with 8086: 8086 data transfer instruction, Arithmetic instruction, Bit manipulation instruction, String instruction, Conditional & unconditional branch instruction, Process control instruction. Use of Assembler Debug, Development cycle, debugging software Modular Programming, Procedures Develop programs in assembly language
Unit 3	**Designing 8086 CPU Basic 8086** CPU hardware design, Generating CPU clock and reset signals, Bus types and buffering techniques, 8086 minimum mode CPU module, 8086 maximum mode CPU module Design minimum mode CPU module using

14

	appropriate tool such as ORCAD
Unit 4	**Main memory design**-SRAM, DRAM, ROM& interfacing Basic input-output-Parallel, serial programmed and interrupt driven I/O, DMA.
Unit 5	**Peripheral Controllers** 8255, 8259, 8251.

Text and Reference Books:
1. R. P Jain, "*Modern Digital Electronics*", 4th ed., New Delhi: Tata McGraw Hill, 2019.
2. K.M. Bhurchandi, A.K.Ray "*Advanced Microprocessors and Peripherals: Architecture, Programming & Interfacing*",3rd ed., New Delhi: Tata McGraw Hill, 2004
3. Douglas Hall, "*Microprocessors & Interfacing*",2nd ed. Revised, New Delhi: McGraw Hill, , 2006
4. John P. Uffenbeck ,"*8086 Family , Programming and interfacing*", Delhi PHI, 2001
5. Yu Chen Liu & Glenn A Gibson : "*Microcomputer Systems; The 8086/8088 Family*", Delhi PHI.

Web Resources:
NPTEL course : Digital Circuits https://nptel.ac.in/courses/108/105/108105113/
NPTEL course : Digital Circuits and Systems https://nptel.ac.in/courses/117/106/117106086/
NPTEL course : Microprocessors and Interfacing https://nptel.ac.in/courses/108/103/108103157/
Virtual Lab: Digital Electronics https://de-iitr.vlabs.ac.in/
Virtual Lab Digital Electronics Circuits http://vlabs.iitkgp.ernet.in/dec/

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3											1	3		
CO2	1														
CO3	2	2	1										2		
CO4	3	1	2		1				2	1			1	1	
CO5	3	1	1		1				1	1		1	1	1	1

3 - High 2 – Medium1 –Low

Assessment:
ISE I and ISE II: In semester evaluations (ISEI and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.
ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	00	00	00	10
K2	Understand	05	05	05	10
K3	Apply	05	05	05	20
K4	Analyze	00	05	00	10
K5	Evaluate	05	00	00	10
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3
	CO1	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	10	05
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by:

1. VijayshriA.Injamuri

CSPC2004 :Lab Data Structures			
Teaching Scheme		**Examination Scheme**	
Practical	2 Hrs/Week	ISE- I (Term Work)	25 Marks
Total Credits	01	End Semester Exam	25 Marks

Course Outcomes:

After completion of this course students will be able to:

Course Outcomes	
CO1	Implement linear data structures like stack, queue
CO2	Implement linear data structures like linked list(Singly, Circular and Doubly)
CO3	Implement and traverse non linear data structures like graphs and trees
CO4	Demonstrate and compare different searching and sorting algorithm

List of the Experiments:

The student shall perform minimum ten experiments of the following using c or c++

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
Level: Basic (all)				
1	Implement the stack and use it to solve postfix expression.	S1	CO1	02
2	Implement the circular queue.	S2	CO1	02
3	Implement singly linked list.	S2	CO2	03
4	Implement circular linked list.	S1	CO2	02
5	Implement doubly linked list.	S2	CO2	03
Level: Moderate (all)				
6	Write a program to implement merge sort and bubble sort.	S2	CO4	02
7	Write a program to implement quick sort.	S2	CO4	02
8	Write a program to implement binary search tree and apply tree traversal methods	S2	CO3	02
9	Write a program to implement insertion sort.	S2	CO4	01
Level: Complex (all)				
10	Write a program to implement graph. And traverse graph by DFS	S2	CO3	03
11	Write a program to implement graph. And traverse graph by BFS	S2	CO3	03

Assessment:

ISEI: In-Semester Evaluation of 25 marks based on performance of students in practical hours, practical assignments completed, and timely submission.

Assessment Table:

Assessment Tool	S1	S2
	CO1	CO2,C03, CO4
ISE1/ Term work(**25** marks)	04	21
ESE (25 Marks)	04	21

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	04	04
S2	Manipulation	21	21
S3	Precision	00	00
S4	Articulation	00	00
S5	Naturalization	00	00
Total Marks		**25**	25

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PSO1	PSO2	PSO3
CO1	3		1												
CO2	3	2	2									2	1		
CO3	3	1	1									1		1	
CO4	2	1	1									1	1	1	

3 – High   2 – Medium   1- Low

Designed by:
1. V. A. Chakkarwar

CSPC2005 : Lab:Advanced C and C++			
Teaching Scheme		**Examination Scheme**	
Practical	4 Hrs/Week	ISE- I (Term Work)	50 Marks
Total Credits	02	End Semester Exam	50 Marks

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Understand the features of advance concept of C and C++ supporting object-oriented programming.
CO2	Incorporate Object Oriented Concepts like Classes, objects, inheritance, polymorphism resembling real time situation.
CO3	Familiarize with proper use of friend, inline and virtual functions in C++.
CO4	Understand the advanced features of C++ specifically stream i/o, templates and operator overloading.

List of the Experiments:

The student shall perform minimum ten experiments of the following:

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
Level: Basic (all)				
1	Construct and execute C program showing use of pointer to structure.	S1	CO1	04
2	Implement C program for self-referential structure.	S2	CO1	04
3	Study C++ Standard Library function.	S1	CO2	04
4	Demonstrate C++ program Illustrating Class declaration, Definition and accessing Class members.	S1	CO2	04
5	Illustrate default constructor, parameterized constructor and copy constructor and destructor.	S2	CO2	04
Level: Moderate (any Four)				
6	Execute Program to demonstrate Operator overloading.	S4	CO4	06
7	Develop Program for Function overloading.	S3	CO3	06
8	Implement Inheritance by applying various access controls to its data members and methods.	S2	CO2	06
9	Illustrate C++ program supporting following form of inheritance a. Single inheritance b. Multiple inheritance c. Multi level inheritance d. Hierarchical inheritance	S3	CO2	06

10	Implement Polymorphism by applying various access controls to its data members and methods.	S2	CO3	06
11	Execute Program to demonstrate Friend function and Friend class.	S2	CO4	06
12	Develop C++ program for inline function.	S2	CO4	06
Level: Complex (any one)				
13	Write a program to read the class object information from keyboard and store them on specified file using read () and write () function. Again, open the same file and display the same file content on screen.	S2	CO4	06
14	Write a program containing possible exception. Use a Try Block to Throw it and Catch Block to handle it properly.	S2	CO4	06

Assessment:

ISEI: In-Semester Evaluation of 50 marks based on performance of students in practical hours, practical assignments completed, and timely submission.

Assessment Table:

Assessment Tool	S1	S2
	CO1,CO2	CO2,C03, CO4
ISE1/ Term work(50 marks)	25	25
ESE (50 Marks)	25	25

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	10	10
S2	Manipulation	20	20
S3	Precision	00	00
S4	Articulation	00	00
S5	Naturalization	20	20
Total Marks		50	50

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2		1		2	2	1	3		1	3		
CO2		2	2		1		1	1	2	2			1		
CO3		1	1						1			1	2	1	
CO4		1	2						3			1	1	1	

3 – High   2 – Medium   1- Low

Designed by:
1. Khushbu Jain(Mehta)

21

CSPC2006: :LAB - WEB TECHNOLOGY		
Teaching Scheme	**Examination Scheme**	
Lectures: 01 hrs/ week	ISE I	25 Marks
Practicals: 02 hrs/week	ISE II	00 Marks
Credits:02	ISE III	00 Marks
	End Semester Examination	25 Marks

Prerequisites: None

<u>**Course Description:**</u>

This course aims at developing skill and awareness amongst students in area of Web Technology using HTML and CSS. After completion of this course student will be able to understand concepts of Front End Development and Create User Interfaces.

<u>**Course Outcomes:**</u>

After successful completion the course, students will be able to:

Course Outcomes	
CO1	Understand UI and UX Concepts, and crate Wireframes and Prototypes
CO2	Implement concepts of HTML 5 & CSS 3 in a Webpage
CO3	Create webpages using Bootstrap and Materialize Frameworks.
CO4	Create JavaScript programs to understand its
CO5	Host website using Domain Nam e+ Hosting Services.

Detailed Syllabus:

Unit 1	What is UI & UX, Various Job Roles, why it is important? Start the UX Design Process: Empathize, Define, and Ideate, Build Wireframes and Low-Fidelity Prototypes, Conduct UX Research and Test Early Concepts.
Unit 2	Introduction to HTML 5: History, Important Elements and Attributes. Creating Forms using HTML 5, Creating web page layout. Introduction to CSS 3 – Adding CSS Rules, CSS Properties, CSS Selectors, Design Issues, Minimizing CSS, Inheritance in CSS, Reset in CSS, Browser Compatibility using CSS
Unit 3	Bootstrap Framework: Getting Started, Introduction to Grid Basics, using components like navbar, carousel etc. Using Font Awesome, Goole Fonts for icons and typesetting Materialize Framework: Getting Started, Components, Forms, Other Components
Unit 4	Learning JavaScript – Adding Scripts to web pages, Document Object Model, Starting Program with JavaScript, Functions, Operators, Conditional Statements, and Looping structure in JavaScript. Events in JavaScript.
Unit 5	Deployment – Deploying website on IIS, Introduction to domain and Hosting, uploading website, Introduction to SEO, Using Google Analytics, AdWords and AdSense.

Text and Reference Books:
1. Thomas Powell,"*HTML & CSS: The Complete Reference*", 5th ed., New Delhi, McGraw Hill

Education India, 2010.
2. Jon Duckett ,*"Beginning HTML, XHTML, CSS, and JavaScript"*, UK: Wrox Publication,2009
3. *Head First HTML with CSS & XHTML*, US : O'Reilly Media, Inc 2005 .
4. Chris Minnick , *HTML, CSS, JavaScript for Dummies* , Wiley,
Web Resources:
Google UX Design Professional Certificate | Coursera
HTML Tutorial (w3schools.com)
CSS Tutorial (w3schools.com)
JavaScript Tutorial (w3schools.com)
Bootstrap 5 Tutorial (w3schools.com)

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
Level: Basic (All)				
1	Creating User Research and User Profiles	S1	CO1	04
2	Creating Wireframes and Prototypes	S2	CO1, CO2	04
3	Creating Webpages from Wireframes	S2	CO2	04
4	Creating Personal Resume using HTML5 and CSS3	S1	CO3	04
5	Adding Bootstrap Navigation and Carousel to Webpage	S2	CO3	04
Level: Moderate (All)				
6	Create a Webpage using Materialize.css	S2	CO1, CO2	06
7	Demonstrate JavaScript Functions and Events	S2	CO1, CO2	06
8	Creating Simple Calculator using JavaScript	S2	CO2	06
9	Deploying Webpages on IIS and Demonstrate FileZilla	S2	CO4	06
10	Using Font Awesome, Google Fonts and Other UI Libraries in Web Page	S2	CO4	06
Level: Complex (All)				
11	Create a Mini Project	S2	CO2	06

Assessment:
ISEI: In-Semester Evaluation of 25 marks based on performance of students in practical hours, practical assignments completed, and timely submission.

Assessment Table:

Assessment Tool	S1	S2
	CO1	CO2,C03, CO4
ISE1/ Term work(25 marks)	04	21

ESE (25 Marks)	04	21

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	04	04
S2	Manipulation	21	21
S3	Precision	00	00
S4	Articulation	00	00
S5	Naturalization	00	00
Total Marks		**25**	**25**

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2		1		2	2	1	3			3		
CO2		2	2		1		1	1	2	2			1		
CO3		1	1						1				2	1	
CO4		1	2						3				1	1	
CO5		1	2						2				1	1	

3 – High   2 – Medium   1- Low

Designed by:
1. P. D. PATHAK

CSES2007:LAB Microprocessor & Interfacing		
Teaching Scheme	**Examination Scheme**	
Practicals: 02 hrs/week	ISE I (Term Work)	25 Marks
Credits:01	End Semester Examination	25 Marks

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Describe the internal architecture of 8086
CO2	Execute ALP programs based on simple Addition, Subtraction etc.
CO3	Incorporate ALP concepts like 16-bit addition, subtraction, multiplication, division for resembling real time situation
CO4	Demonstrate the use of memory designing & Interfacing
CO5	Develop ALP programs for peripherals interfacing

List of the Experiments:

The student shall perform minimum ten experiments of the following using digital trainer kit, hardware components/digital logic simulator and MASM/8086 simulator.

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
Level: Basic (all)				
1	Introduction to 8086 Architecture	S1	CO1	05
2	16-bit addition, subtraction, multiplication and division in Debug.	S2	CO1,CO2	05
3	Assembly language program for 16-bit addition, subtraction, multiplication and division	S2	CO2	05
Level: Moderate (any three)				
4	Assembly language program for BCD multiplication	S2	CO1, CO2	05
5	Assembly language program for BCD division.	S2	CO1, CO2	05
6	Assembly language program for BCD string addition	S2	CO2	06
Level: Complex (any two)				
7	Assembly language program for finding largest and smallest number in an array	S2	CO2	05
8	Assembly language program for finding sum of series of 8-bit numbers in an array.	S2	CO2	05
9	Assembly language program for packed BCD to ASCI	S2	CO4	05
10	8255 interfacing with 8086.	S2	CO4	05

Assessment:

ISEI: In-Semester Evaluation of 50 marks based on performance of students in practical hours, practical assignments completed, and timely submission.

Assessment Table:

Assessment Tool	S1	S2
	CO1	CO2,C03, CO4
ISE1/ Term work(**25** marks)	10	15
ESE (25Marks)	10	15

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	10	10
S2	Manipulation	15	15
S3	Precision	00	00
S4	Articulation	00	00
S5	Naturalization	00	00
Total Marks		**25**	25

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	1						2						
CO2	3	2	2						1			1	3		
CO3	2	1	1						1			1			
CO4	2	1	3						3			2	2		
CO5		2	1						1			1			

3 – High   2 – Medium   1- Low

Designed by:

1. Vijayshri A.Injamuri

CSBS2008: Discrete Mathematical Structure

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: None

Course Description: This course is intended to introduce the students a coherent and balanced account of major discrete mathematical structures (Group, Rings, Integral Domain), Set theory
(Binary relations, partial order relations ,Equivalence relations, equivalence classes, partitions), Discrete functions and recurrence relations(Z-transform, generating functions),concepts that form the basis of programming Languages and organization of data structure.
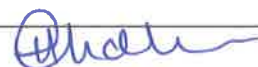
Course Outcomes:
After successful completion the course, students will be able to:

Course Outcomes	
CO1	Perform operations on discrete structures such as sets functions, relations construct proofs using mathematical induction and apply counting principal.
CO2	Evaluate problems involving recurrence relations and generating functions and combinatorial problems
CO3	Demonstrate the knowledge of algebraic structures such as Groups, Subgroups, Generators, Co-sets
CO4	Demonstrate the knowledge of algebraic structures such as Rings, Fields, Integral Domain, Polynomial ring, cyclic codes.
CO5	Analyse concepts and algorithms of graph theory and elementary combinatorial processes such as permutations and combinations.

Detailed Syllabus:

Unit 1	**Set, Relations and Functions** Combination of sets, finite and infinite sets, unaccountably infinite sets, mathematical induction, multisets, Properties of Binary Relations, Equivalence relation and partitions, Partial ordering Relations and Lattices. Chain and Antichains, A Job-Scheduling problem, Functions and Pigeonhole principles
Unit 2	**Discrete Numerical Functions and Recurrence Relations** Manipulation and Numerical Functions, Asymptotic behaviour, Generating functions and Combinatorial Problems, Recurrence relations, Linear 9 recurrence relations with constant coefficients, Homogeneous solutions, Particular Solutions, Total Solutions,Solutions by the method of generating functions.
Unit 3	**Groups,** Introduction to Algebraic structures, Groups, Sub groups, Generators and Evaluation of powers, Cosets and Lagrange's Theorem, Permutation Group, Isomorphism and Auto orphism, Homomorphism, Normal subgroup.
Unit 4	**Rings and Fields Rings,** integral domains and fields. Ring Homomorphism's, polynomial rings and cyclic codes.
Unit 5	**Graphs-** graphs types, graphs Properties, Connectivity, Trees.

Text and Reference Books:
1. C.L.Liu, *"Elements of Discrete Mathematics"*, 3rd ed., New Delhi, Tata McGraw-Hill, 2008
2. B.K.Kolman,R.C.Busby and S.Ross, *"Discrete Mathematical Structures"*, 6th ed., Delhi, PHI , 2015
3. Trembley, Manohar, *"Discrete mathematical Structures with Application to Computer Science"*, New Delhi, McGraw Hill Publication,1997.
4. B.S.Grewal, *Higher Engineering Mathematics*, 44th ed., New Delhi , KhannaPublication, 1965
5. Rm. Somasundaram, *"Discrete Mathematical Structures"*, Delhi, Prentice-Hall of India Pvt. Limited, 2004
6. Johnsonbaugh, *"Discrete Mathematics"*, 7th ed., Delhi,Pearson Education India, 2007.
7. K.D.Joshi, *Foundations of Discrete Mathematics*, New Delhi, Wiley eastern,2014.

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2						2				2	1		
CO2	3	1						1				1			
CO3	2	2						2				2	1		
CO4	3	1						1				1	1		
CO5	2	2						3				3	2		

3 - High 2 – Medium1 –Low

Assessment:
ISE I and ISE II: In semester evaluations (ISEI and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	00	05	02	10
K2	Understand	10	05	02	20
K3	Apply	05	00	02	20
K4	Analyze	00	05	02	10
K5	Evaluate	00	00	02	00

K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3
	CO1	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	10	05
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil   **Designed by:**

Vijayshri A. Injamuri

CSPC2009 :Database Management System		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs/ week	ISE I	15 Marks
Tutorial: 01 hrs/week	ISE II	15 Marks
Credits:04	ISE III	10 Marks
	End Semester Examination	60 Marks

Prerequisites: None

Course Description: Database management course involves studying different aspects of computerized data-keeping system. The fundamentals of relational database system which is the most widely used system is included in this course. Structured query language, transaction management system are the also included.

Course Outcomes:

After successful completion the course, students will be able to:

	Course Outcomes
CO1	Apply the basic concepts of relational data model, ER model, relational database design and database query language SQL
CO2	Design and convert E-R diagrams into database tables that satisfies relational theory and provides users with queries, forms, and reports.
CO3	Design a relational database, analyze it and improve the database design by normalization
CO4	Demonstrate knowledge of ACID properties of a transaction and several techniques of concurrency control
CO5	Develop database for any real time application considering various design constraints and compare SQL and NoSQL

Detailed Syllabus:

Unit 1	**Introduction to Database Management System**
	Basic terminologies: Data, Database, Database Management System (DBMS), History of Database Systems, Purpose of Database Systems, Characteristics of Database approach, Comparison of database system and file system, Data models, Schemas and instances, Three-schema
	architecture and data independence, Database users and administrators, Database applicationsEntity-Relationship Model, Mapping Constraints, Keys,Strong and Weak Entity types, Refining the ER Design,ER Design Issues,ER Diagrams, Reduction of ER diagram to tables, Generalization, Specialization and Aggregation , Extended Entity Relationship Model (EER)

Unit 2	**Relational Model and SQL**
	Structure of Relational Databases,Database schema, Relational Database Design Using ER-to-Relational Mapping, Mapping EER Model Constructs to Relations, Relational Query Language, Relational Algebra, Tuple Relational Calculus, Domain Relational Calculus SQL Overview, SQL Data Definition and Data Types, Types of SQL commands- DDL, DML, DCL, TCL,
	Integrity Constraints, SQL operators, Set operations, Null values, Aggregate functions, Nested and Complex queries, Views, Joins,PL/SQL Overview, Structure of PL/SQL program, Cursors, Stored procedures and functions, Triggers Concept of NoSQL Database, NoSQL using MongoDB, Comparative study of SQL and NoSQL
Unit 3	**Relational Database Design**
	Features of good Relational Database Design, purpose of Normalization for Relational Databases, Functional Dependencies, Decomposition: lossless join decomposition and dependency preservation, Normal Forms- First Normal Form, Second Normal Form, Third Normal Form, Boyce-
	Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form
Unit 4	**File Structures, Indexing and Hashing**
	File Organization, Organization of records in files, Basic File Structures, Operations on Files, Indexing Structures for Files, Ordered Indices, Single-Level Ordered Indexes, Multilevel Indexes, Hashing Techniques- Static and Dynamic Hashing, Comparison of Ordered indices and hashing, Bitmap indices, Index definition in SQL
Unit 5	**Transactions and Concurrency Control**
	Transaction concept, Transaction States, A simple Transaction Model, Desirable Properties of Transactions, Concept of schedule, serial & non serial schedules, Serializability: conflict & view serializable schedules, uses of Serializability, Recoverable and Non-recoverable schedules Concurrency Control Techniques: Lock based protocols, deadlock handling, Timestamp based
	protocols, Multiple granularity, Validation based protocols
	Recovery systems, log-based recovery, deferred and immediate database modification, object oriented database design

Text and Reference Books:

1. Silberschatz , Henry F. Korth , and S. Sudarshan, *Database System Concepts*, 6th ed. New York: McGrawHill,2010

2. Elmasri,Navathe, *Fundamentals of Database Systems*,6th ed.Boston: Addison-Wesley ,2011

3. Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, 3rd ed. New York: McGrawHill ,2007

4.Thomas M. Connolly, Carolyn E. Begg, *Database Systems: A Practical Approach to Design,*

Implementation and Management , 5th ed. Boston: Addison Wesley

5. Dr. P. S. Deshpande, *SQL and PL/SQL for Oracle 10g*, Black Book, Delhi: Dreamtech Press, 2007

6. C. J. Date, *Introduction to Database Systems*,7th ed. Boston: Addition Wesley, 2000

7. AtulKahate, *Introduction to Database Management System*, 3rd ed. New York: Pearson Education, 2004

8. Kristina Chodorow, *MongoDB: The Definitive Guide*, 3rd ed. China: Oreilly, 2019

Web Resources:

NPTEL course : Database management system(IITK): https://onlinecourses.nptel.ac.in/noc21_cs04/

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO 1	PSO 2	PSO 3
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12			
CO1			3	3				1							
CO2	1		1					1							
CO3			3	2				2		1				2	
CO4			2					1		1					
CO5			1	1				3	3			3	3		

3 - High 2 – Medium 1 –Low

Assessment:
ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	00	00	10
K2	Understand	05	05	00	10
K3	Apply	05	05	00	10
K4	Analyze	00	05	05	10
K5	Evaluate	00	00	00	20
K6	Create	00	00	05	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3
	CO1,CO2	CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	05	10
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	20	40
Total Marks 100		

Special Instructions if any: Nil   **Designed by:**

1. Tanaya Jadhav

CSPC2010 : Computer Organization and Architecture

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: None

Course Description:

It includes basic machine architecture and design, digital logic circuits, digital components, central processing unit, machine representation of instructions and data, addressing techniques, memory organization, and execution of instructions at machine level.

Course Outcomes:

After successful completion the course, students will be able to:

Course Outcomes	
CO1	Understand structure and functional components of computer system.
CO2	Discuss different basic algorithms used by ALU.
CO3	Demonstrate the elements of modern instructions sets and explain their impact on processor design.
CO4	Describe various memory types according to their properties and the principles of memory management.
CO5	Explain how interrupts are used to implement I/O control and data transfers.

Detailed Syllabus:

Unit 1	**Computer Evolution and performance** Computer Organization and Architecture, Structure and function of computer, Functional Components of a computer and functions of each component, Interconnection structure, Bus Interconnection, Designing for performance, Performance assessment
Unit 2	**Computer Arithmetic** The Arithmetic and Logic Unit, addition and subtraction of signed numbers, design of adder and fast adder, carry look ahead addition, multiplication of positive numbers, signed operand multiplication, booths algorithm, fast multiplication, integer division. Floating point representation and operations – IEEE standard, arithmetic operations, guard bits and truncation.
Unit 3	**Instruction Set and Processor Organization** Instruction characteristics, types of operands, Types of operations- data transfer, arithmetic, logical, conversion, input-output, system control, and transfer of control, Addressing modes- immediate, direct, indirect, register, register indirect, displacement and stack, Instruction Formats- instruction length, allocation of bits, variable length instructions. RISC Vs CISC Processor organization, Register Organization: user visible registers, control and status registers, Instruction Pipelining- Pipelining Strategy, pipeline performance, pipeline hazards.
Unit 4	**Computer Memory System** Characteristics of memory system, The memory hierarchy. Cache Memory- Cache memory principles, Elements of cache design- cache address, size, mapping functions, replacement algorithms, write policy, line size, number of caches, one level and two-level cache, Internal Memory- RAM: SRAM, DRAM, SDRAM, advanced DRAM organization. ROM: PROM, EPROM, EEPROM, External

	Memory- Hard Disk organization, RAID- level 1 to level 6.
Unit 5	**Input and Output System** External devices, I/O modules: Module function and I/O module structure, Programmed I/O: overview, I/O commands, I/O instructions, Interrupt driven I/O: interrupt processing, design issues. Direct Memory Access- drawbacks of programmed and interrupt driven I/O, DMA functions, I/O channels and processors- evolution and characteristics, The external Interface.

Text and Reference Books:
1. W. Stallings, *"Computer Organization and Architecture: Designing for performance"*, 7t[h] ed. ,New Delhi , Prentice Hall of India, 2003
2. C. Hamacher, V. Zvonko, S. Zaky, *"Computer Organization"*, 5th ed. New Delhi, McGraw Hill, 2002
3. D. Paterson, J. Hennesy, *"Computer Organization and Design: The Hardware Software Interface"*, 2nd Ed, Morgan Kauffman, 2000
4. John P. Hayes, *Computer Architecture and Organization*, New Delhi, McGraw Hill

Web Resources:
NPTEL course : https://onlinecourses.nptel.ac.in/noc21_cs61/preview

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3											1	3		
CO2	1														
CO3	2	2	1										2		
CO4	3	1	2		1				2	1			1	1	
CO5	3	1	1		1				1	1		1	1	1	1

3 - High 2 – Medium 1 –Low

Assessment:

ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	00	00	05
K2	Understand	05	10	03	20
K3	Apply	05	05	05	20
K4	Analyze	00	00	00	05
K5	Evaluate	00	05	02	10
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3,K4
	CO1, CO2	CO2, CO3, CO4, CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	05	10
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by:
Khushbu Jain

CSPC2011: Object Oriented Programming

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: Nil

Course Description:

This course presents a conceptual and practical introduction to imperative and object-oriented programming, exemplified by Java. As well as providing grounding in the use of Java, the course will cover general principles of programming in object-oriented frameworks. This course introduces concepts like Exception handling, interfaces & multithreading which provides real time programming approach in object-oriented programming.

Course Outcomes:

After successful completion the course, students will be able to:

Course Outcomes	
CO1	Define the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation, and method overloading.
CO2	Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
CO3	Use OOP concepts like inheritance, Interface & package in real time situations.
CO4	Identify situations for exceptions and multithreading &incorporate in program.
CO5	Develop Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifies, multithreading, error exception handling)

Detailed Syllabus:

Unit 1	**Introduction :** Difference between OOP and other conventional programming – advantages and disadvantages. An overview of OOP concepts: Class, object, message passing, inheritance, encapsulation, polymorphism. Importance of Java in the internet, Java applets and applications, security, portability, the byte code. An overview of Java, OOP, Two paradigms, abstraction, the three OOP Principles. **Data Types, Variable and arrays :** Simple types, integers, floating point types, characters, Booleans, variables – declaring variable, dynamic initialization, the scope and life time of variables, type conversion and casting, arrays-one dimensional arrays and multi dimensional arrays. **Operators and control statements :** Arithmetic operators, bitwise operators, relational operators, logical operators, assignment operators, ternary operators, operator precedence. Control statements – if, switch, while, do-while, for nested loops, break, continue. All with examples.
Unit 2	**Classes and Object:** Class fundamentals, declaring objects, assigning object references variables,anonymous object, introducing methods, constructors with types , overloading of constructors , recursion in JAVA, use of static final key ,word,this keyword, new keyword, instance of operator

	,instance variable, Operator Overloading.
Unit 3	**Inheritance & reusability** Inheritance – basics, using super, creating a multi-level hierarchy, Java polymorphism(Method overloading, Method overriding ,Runtime polymorphism ,Dynamic Binding ,Aggregation, abstract classes, using final with inheritance, Wrapper classes. packages, defining a package, package example, access Protection,, Interfaces – defining an interface, implementing interfaces, applying interfaces, variables in interfaces, extending interfaces
Unit 4	**Exception Handling & Multithreading :** Fundamentals, exception types, uncaught exception, using try and catch, multiple catch clauses, nested try statements, throw, throw, finally, exception. Basics of multithreading, main thread, thread life cycle, creation of multiple threads, naming a thread, sleeping a thread, Encapsulation in Java
Unit 5	**Input/output AWT & SWING:** Java I/O classes and Interfaces, File – directories, using filename filter, the stream classes, - input stream, output stream, File I/P stream, file output stream, Java Applets, Java AWT, AWT platform independent ,Java swing, Hierarchy of Swing classes.

Text and Reference Books:
TEXT BOOKS / REFERENCE BOOKS:
1. Patrick Naughton, Herbert Schildt – "*The complete reference-Java2*" 8th ed, New Delhi, TMH,2017
2. E. Balagurusamy – " *Programming With Java: A Primer*" – 3rd Ed., New Delhi, TMH, 2000
3. Deitel and Deitel – "*Java How to Program*" – 6th Ed. – Pearson
4. Aaron Walsh and John Fronckowiak, " *Java Programming Bible*" 1st ed.,New Delhi, IDG Books, 2000 .
5. Patrick Niemeyer, Daniel Leuck, *Learning Java*, 4th Ed. A Bestselling
   Hands-On Java Tutorial, O'Reilly Media , 2013

Web Resources:
NPTEL course : Programming in Java IIT Kharagpur https://nptel.ac.in/courses/108/105/108105113/
URl:- https://www.javatpoint.com/

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3			2			3		2				1	
CO2		2						2		1				1	
CO3		3						1		2					
CO4		2						1		2			2		
CO5		3	3		1			3		3		3	1	2	1

3 - High 2 – Medium 1 –Low
Assessment:
ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Class room Question & answer
4) Power point presentation of Topic which is related but out of syllabus
5) Overall approach towards learning, creativity.
6)

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	05	02	10
K2	Understand	05	05	02	20
K3	Apply	05	05	03	20
K4	Analyze	00	00	03	10
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3,K4
	CO1	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	10	05
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by:
1. Arjumand M.Khan

CSPC2012 : Workshop II

Teaching Scheme		Examination Scheme	
Practicals	2 Hrs/Week	ISE- I	25 Marks
Tutorial	0	ISE-II	00 Marks
Total Credits	01	ISE- III	00 Marks
		End Semester Exam	25 Marks

Prerequisites: Nil

Course Description:
Python is a language with a simple syntax, and a powerful set of libraries. It is an interpreted language, with a rich programming environment, including a robust debugger and profiler. While it is easy for beginners to learn, it is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience.

Course Outcomes:
After successful completion the course, students will be able to:

	Course Outcomes
CO1	Understand installation procedure and system requirement for Python
CO2	Apply Data Types, Variables, Operators and other Conditional blocks in programs
CO3	Apply in build functions of Python and Create User Defined Functions
CO4	Create program using Strings, Tuples, List etc
CO5	Create and Edit Files using File Handling, Using Exception Handling, Implement OOP Concepts

Detailed Syllabus:

Unit 1	Introduction: History, Features, Setting up and Installation, Working with Python, Understanding Python Variables and Operators, Understanding python blocks, Understanding Python Data Types, Working with Operators
Unit 2	Conditional blocks using if, else and elif, Simple for loops in python, For loop using ranges, string, list and dictionaries, Use of while loops in python, Loop manipulation using pass, continue, break and else, Programming using Python conditional and loops block
Unit 3	Functions: Built in Functions, Invoking built-in function, Modules – Importing entire module or selected object using from statement. Functions from Math, random, Time & date. Composition, User defined functions – Defining, Invoking, Passing Parameters
Unit 4	Strings – Creating initializing & accessing the elements, String operators, String built in functions like find, capitalize, isdigit, lower etc., Regular Expression and Pattern Matching. Concepts of List, Tuples, Sets, Dictionaries
Unit 5	I/O and File Handling – using function like read, write, writelines etc., Errors & Exception – Syntax Errors, Exceptions, Handling Exceptions, User Defined Exceptions, Clean-up actions. Object Oriented Concepts in Python – Introduction, Creating Classes and Objects, Instance Objects, Inheritance

Text and Reference Books:
1. Mark Lutz ,*Learning Python* ,5th ed., O'Reilly Publication, 2013
2. Michael Dawson, *Programming with Python, A User Book*, , Cengage learning,2007
Web Resources:
The Joy of Computing using Python - Course (nptel.ac.in)

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	2		1		2	2	1	3		2	3		
CO2		2	2		1		1	1	2	2		1	1		
CO3		1	1						1				2	1	
CO4		1	2						3				1	1	
CO5		1	2						2			2	1	1	

3 - High 2 – Medium 1 –Low

Assessment:
ISE I: In semester evaluations of 25 marks, & **ESE** evaluation of 25 marks

List of the Experiments:
Students will perform:-

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
	Level: Basic			
1	Introduction to Python and its Installation	S1	CO1	05
2	Create a simple hello world program using Python	S2	CO1, CO2	05
3	Working with variables and data types in Python	S2	CO2	05
	Level: Moderate			
4	Working with conditional and looping operators	S2	CO1, CO2	05
5	Working with Built in Functions	S2	CO1, CO2	05
6	Creating User Defined Functions	S2	CO2	05
	Level: Complex			
7	Working with Strings, List, Tuples & sets	S2	CO2	05
8	Using File Handling in Python	S2	CO2	05
9	Implementing Exception Handling in Python	S2	CO4	05
10	Creating Classes, Objects with Python	S2	CO4	05

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	00	00	00	00
K2	Understand	05	00	00	05
K3	Apply	05	00	00	05
K4	Analyze	05	00	00	05
K5	Evaluate	05	00	00	05
K6	Create	05	00	00	05
Total Marks 100		25	00	00	25

Assessment table:

Assessment Tool	S1	S2
	CO1	CO2,C03, CO4
ISE1/ Term work(25 marks)	10	15
ESE (25 Marks)	10	15

Special Instructions if any: Nil

Designed by:

1 P.D .PATHAK

CS2013: Lab Database Management System		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	ISE I (Term Work)	25 Marks
Credits:01	Practical/ viva-voce	25 Marks

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Know the scope of SQL and use it to query, update and manage a database
CO2	Use PL/SQL
CO3	Identify functions of database administrator
CO4	Demonstrate advance SQL functions
CO5	Design and build a simple database management system.

List of the Experiments:

The student shall perform minimum ten experiments of the following using Oracle databases.

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
Level: Basic (all)				
1	To execute all the Basic DDL (Data Definition language) commands (i.e. Create, Alter, Drop, and Truncate) with example	S1	CO1	04
2	To execute all the Basic DML (Data Manipulation language) commands (i.e. Insert, Select, Update, and Delete) with example	S2	CO1,CO3	04
3	To Execute the Database Functions (i.e. Numeric, Date, Group, Character, and count function) with example.	S2	CO4	04
4	To Execute the join Commands (i.e. Cartesian product, natural join, Inner join, left outer join, right outer join, equi join, non- equi join, and full join).	S1	CO4	04
5	Implement the Program for Arithmetic operations (like addition, Subtraction, Multiplication and Division)' using PL/SQL (programming language in SQL).	S2	CO4	04
Level: Moderate				
6	Implement the concept for cursors in PL/SQL and demonstrate competence for loop constructs	S2	CO1, CO2	06
7	To implement the program for updating the values using cursor.	S2	CO1, CO2	06
Level: Complex				
8	To implement the Concept of Views and Sql Sub-Queries.	S2	CO4	06
9	Mini-project	S2	CO5	06

Assessment:

ISEI: In-Semester Evaluation of 50 marks based on performance of students in practical hours, practical assignments completed, and timely submission.

Assessment Table:

Assessment Tool	S1	S2
	CO1	CO2,C03, CO4
ISE1/ Term work(25 marks)	10	15
ESE (25 Marks)	10	15

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	5	5
S2	Manipulation	10	10
S3	Precision	10	10
S4	Articulation	00	00
S5	Naturalization	00	00
Total Marks		**25**	25

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1			3	3				1							
CO2	1		1					1							
CO3			3	2				2		1				2	
CO4			2					1		1					
CO5			1	1				3	3			3	3		

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:
3 – High   2 – Medium   1- Low

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Designed by:

Tanaya Jadhav

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	CSPC2014 :Lab Object Oriented Programming		

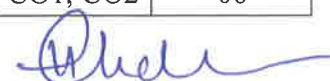| Teaching Scheme		Examination Scheme	
Practical	2 Hrs/Week	ISE- I	25 Marks
Total Credits	01	End Semester Exam	25 Marks

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Execute JAVA programs based on simple constructs like arrays, loops , decision statements, functions etc
CO2	Incorporate object oriented concepts like classes , objects , inheritance , polymorphism resembling real time situation.
CO3	Demonstrate the use of packages and interfaces.
CO4	Develop OOP programs containing User created Exception handling & Threading.
CO5	Connect with Java development Environment such as Eclipse, NetBeans , IntelliJ etc.

List of the Experiments:

The student shall perform minimum ten experiments of the following using Notepad / Eclipse / Netbeans / Intellij environment

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
	Level: Basic (all)			
1	Demonstrate the installation of JAVA with necessary path settings & Execute " Hello World " Program.	S1	CO1	04
2	Execute simple program based on basic syntactical constructs of java like : a. Operators and Expression. b. Looping Statements. c. Decision making statements	S1	CO1	04
3	Construct & Execute a Java Program to define a class, describe its constructors, overload the constructors and instantiate its object.	S1	CO2	04
4	Execute A simple program using Scanner class	S1	CO1	04
	Level: Moderate (all)			
5	Implement inheritance & its types by applying various access controls to its data members and methods.	S2	CO1, CO2	06
6	Demonstrate use of method overriding.	S2	CO1, CO2	06

7	Demonstrate use of implementing interfaces.	S2	CO2	06
8	Implement program using Object & Classes	S2	CO2	06
Level: Complex (any three)				
11	Implement Package and Sub-Packages.	S2	CO3	06
12	Implement an Applet	S2	CO3	06
13	Write a program for Exceptional handling	S2	CO4	06
14	Implement a Program using Multithreading	S2	CO4	06

Assessment:

ISEI: In Term work of 25 marks based on performance of students in practical hours, attendance ,practical assignments completion , and timely submission.

End Semester Evaluation: In ESE of 25 marks Practical conduction and Oral Examination

Assessment Table:

Assessment Tool	S1	S2	S3	S3	S2
	CO1	CO2	CO3	CO4	CO5
Term Work (25 Marks)	07	07	05	03	03
Practical Examination & Viva Voce (25 Marks)	05	05	05	05	05

Assessment Pattern:

Assessment Pattern Level No.	Skill Level	Term Work	Practical Examination & viva voce
S1	Imitation	05	05
S2	Manipulation	08	10
S3	Precision	12	10
S4	Articulation	00	00
S5	Naturalization	00	00
Total		25	25

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2		1		2	2	1	3		1	3		
CO2		2	2		1		1	1	2	2			1		
CO3		1	1						1			1	2	1	
CO4		1	2						3			1	1	1	
CO5		3	2		1		2	2	1	3		1	3		

3 – High   2 – Medium   1- Low

Designed
1. Arjumand .M.Khan

CSPC2015 : Lab- Java Programming

Teaching Scheme		Examination Scheme	
Practicals	04 Hrs/Week	ISE- I	50 Marks
Tutorial	0	ISE-II	00 Marks
Total Credits	02	ISE- III	00 Marks
		End Semester Exam	50 Marks

Prerequisites: OOP Concepts

Course Description:
This course covers advance java concepts used to build Web Apps using JDBC, AJAX, MVC and Hibernate.

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Understand the features of advance concept of Java
CO2	Incorporate JDBC Driver to perform CRUD operations
CO3	Creating basic JSP, Servlet pages and add AJAX to it
CO4	Create the application using Spring and Spring boot

List of the Experiments:
The student shall perform minimum ten experiments of the following:

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
		Level: Basic (all)		
1	Implement Collection framework using Stack, ArrayList and Vector	S1	CO1	04
2	Implement Collection framework using Queue, De-Queue and Tree Map	S2	CO1	04
3	Configure JDBC Driver and Execute Program for Insert, Update and Delete	S1	CO2	04
4	Configure JDBC Driver and Execute Program for Select data from Database	S1	CO2	04
5	Configure Apache Tomcat and Create JSP Pages and Servlets	S2	CO2	04
		Level: Moderate (any Four)		
6	Configure Servlets to Use HTTP Methods like GET and POST	S4	CO4	06
7	Implement AJAX in JSP Pages	S3	CO3	06
8	Configure Spring and its dependencies	S2	CO2	06

	Level: Complex (any one)			
9	Create Spring Boot Application	S2	CO4	06
10	Create an application using Hibernate and ORM	S2	CO4	06

Text and Reference Books:
1. Herbert Schildt , *Java: The Complete Reference*, 7th ed. ,New Delhi, Tata McGraw-Hill, 2017
Web Resources:
Programming in Java - Course (nptel.ac.in)

Assessment:
ISEI: In-Semester Evaluation of 50 marks based on performance of students in practical hours, practical assignments completed, and timely submission.

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	00	00	00	00
K2	Understand	10	00	00	10
K3	Apply	10	00	00	10
K4	Analyze	10	00	00	10
K5	Evaluate	10	00	00	10
K6	Create	10	00	00	10
Total Marks 100		50	00	00	50

Assessment Table:

Assessment Tool	S1	S2
	CO1,CO2	CO2,C03, CO4
ISE1/ Term work(**50 marks**)	25	25
ESE (00 Marks)	00	00

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	10	00
S2	Manipulation	20	00
S3	Precision	00	00
S4	Articulation	00	00
S5	Naturalization	20	00
Total Marks		**50**	00

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1		3	2		1		2	2	1	3		1	3		
CO2		2	2		1		1	1	2	2			1		
CO3		1	1						1			1	2	1	
CO4		1	2						3			1	1	1	

3 – High   2 – Medium   1- Low

Designed by
Prashant pathak

Prof. A. M. Khan   V. A. Chakkarwar
BoS Co-ordinator ,   BoS Chairman and Head
Computer Science and Engineering Department   Computer Science and Engineering Department

Government Engineering College, Aurangabad.

Approved in XXIVth Academic
Council, Dated 23/07/2022

Open Elective Offered by CSE Dept

ODD Semester		EVEN Semester	
1	Introduction to C & C++	1	Introduction to Cloud Computing
2	Introduction to Web Technology	2	Java Programming
3	Introduction to Python Programming	3	

CSOE0010: Introduction to C & C++

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: None

Course Description:
One important practical objective for this course is to help to learn basics of C Programming and the Object Oriented programming language concepts. This course introduces basic skills in C & C++. C++ is a superset of the C language. It was designed with a bias toward system programming and embedded, resource-constrained and large systems, with performance, efficiency and flexibility of use as its design highlights.

Course Outcomes:
After successful completion the course, students will be able to:

Course Outcomes	
CO1	Implement the C Programs using basic C constructs.
CO2	Solve real time problems using C++ functions ,looping & Decision statements
CO3	Illustrate the concept of Array and Structure in C++
CO4	Describe Principles of Object Oriented Paradigm like Abstraction, Encapsulation, Inheritance, Polymorphism
CO5	Apply the concept of Constructor, Destructor, Friend Function, and Dynamic Memory Allocation.

Detailed Syllabus:

Unit 1	**Introduction to C Language fundamentals**, The C character set, variables and constants, data types, keywords, expressions, statements, operators- arithmetic operators , unary operators, relational & logical operators, conditional operators, type conversions , type casting, conditional execution, loops, functions, arrays, pointers, structure, Union
Unit 2	**Introduction to object oriented programming**, Classes & objects ,user defined types, structures, unions, polymorphism, encapsulation. Getting started with C++ syntax, data-type, variables, strings, functions, default values in functions, recursion, namespaces, operators, flow control, arrays and pointers.

Unit 3	**Abstraction mechanism:** Classes &, private, public, constructors, destructors, member data, member functions, inline function, friend functions, static members, and references. **Inheritance**: Class hierarchy, derived classes, single inheritance, multiple, multilevel, hybrid inheritance, role of virtual base class, constructor and destructor execution, base initialization using derived class constructors
Unit 4	**Polymorphism**: Binding, Static binding, Dynamic binding, Static polymorphism: Function Overloading, Ambiguity in function overloading, Dynamic polymorphism: Base class pointer, object slicing, late binding, method overriding with virtual functions, pure virtual functions, abstract classes. Operator Overloading: This pointer, applications of this pointer, Operator function, member and non member operator function, operator overloading, I/O operators.
Unit 5	**Exception handling**: Try, throw, and catch, exceptions and derived classes, function exception declaration, unexpected exceptions, exception when handling exceptions, resource capture and release.

Text and Reference Books:
1. **E. Balagurusamy** *Programming in C*, 3rd ed., New Delhi , Tata McGraw Hill, 2018
2. E Balagurusamy *Object Oriented Programming (OOP) with C++* , 7th ed., New Delhi,Tata McGraw-Hill Education, 2011

3.K. R.Venugopal, Rajkumar B., T.Ravishankar; *Mastering C*, New Delhi ,Tata McGraw Hill.
4 A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", 25th Reprint, New Delhi ,TMH, 1997.
5. R. Lafore, "Object Oriented Programming using C++", New Delhi, BPB Publications, 2004.
6. Schildt Herbert, "*C++ Programming*", 2nd Ed., New Delhi, Wiley DreamTech.
Web Resources:
NPTEL course : https://onlinecourses.nptel.ac.in/noc21_cs02
Virtual Lab: http://cse01-iiith.vlabs.ac.in/

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2		1		2	2	1	3		1	3		
CO2		2	2		1		1	1	2	2			1		
CO3		1	1						1			1	2	1	
CO4		1	2						3			1	1	1	
CO5		3	2		1		2	2	1	3		1	3		

3 - High 2 – Medium 1 –Low

Assessment:

ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	00	00	00	10
K2	Understand	10	05	02	15
K3	Apply	05	05	02	15
K4	Analyze	00	05	02	15
K5	Evaluate	00	00	02	05
K6	Create	00	00	02	05
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3,K4,K5
	CO1,CO2	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	00	15
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by:

1. V. A. Chakkarwar
2. Arjumand Khan
3. Ashwini Sugave

CSOE1011: Introduction to Cloud Computing

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: None

Course Description:

This course provides a hands-on comprehensive study of Cloud concepts and capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Business Process as a Service (BPaaS). This course also gives foundational knowledge required for understanding cloud computing from a business perspective as also for becoming a cloud practitioner

Course Outcomes:

After successful completion the course, students will be able to:

	Course Outcomes
CO1	Understand the concept of cloud computing
CO2	Discuss the evolution of cloud from the existing technologies
CO3	Interpret knowledge on the various issues in cloud computing
CO4	Familiarize with the lead players in cloud
CO5	Demonstrate the emergence of cloud as the next generation computing paradigm.

Detailed Syllabus:

Unit 1	**Introduction To Cloud Computing :-** History, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Importance of Virtualization in Cloud, Anatomy of Cloud, Cloud deployment models, Cloud delivery models, Stepping stones for the development of cloud.
Unit 2	**Cloud Implementation:-** Exploring the Cloud Computing Stack, Connecting to the Cloud - Decision Factors for Cloud Implementations, Public, Private and Hybrid Cloud, Overview, Infrastructure as a Service (IaaS) Cloud Delivery Model, Platform as a Service (PaaS) Cloud Delivery Model, Software as a Service (SaaS) Cloud Delivery Model.

Unit 3	**Cloud_Architecture,Services_And_Storage:-** Layered Cloud Architecture Design, Nist Cloud Computing Reference Architecture – Public, Private And Hybrid Clouds, Laas, Paas , Saas ,Architectural Design Challenges , Cloud Storage , StorageAs A-Service , Advantages Of Cloud Storage – Cloud Storage Providers – S3..
Unit 4	**Resource_Management_And_Security_In_Cloud:-** Inter Cloud Resource Management , Resource Provisioning and Resource Provisioning Methods, Global Exchange of Cloud Resources, Security Overview, Cloud Security Challenges, Software-as-a-Service Security, Security Governance, Virtual Machine Security, IAM, Security Standards..
Unit 5	**Case Study :-**Secure Data Analysis in GIS Database, Distributed Database, Secure Multi-Party Computation, Association Rule Mining Problem, Distributed Association Ruling Data Analysis in GIS System, Emergence of Green Computing in Modern Computing Environment.

Text Books/ Reference Books:

1. Buyya R., Broberg J., Goscinski A., *"Cloud Computing: Principles and Paradigm"*, 1st Ed. US, John Wiley & Sons,2011.
2. Sosinsky B., *"Cloud Computing Bible"*, 1st Ed., US, John Wiley & Sons,2011
3. IBM, *Introduction to Virtualization and Cloud Computing*, US, ICE Publications.
4. GautamShroff, *"Enterprise Cloud Computing Technology Architecture Applications"*, 1st ed., Cambridge University Press; 2010.
5. Greg Schulz, *"Cloud and Virtual Data Storage Networking"*,1st ed., New York, Auerbach Publications 2011.
6. Dac-Nhuong Le, Raghvendra Kumar, Gia Nhu Nguyen, Jyotir Moy Chatterjee *"Cloud Computing and Virtualization"* 1st ed., 2015 US., O Wiley.

Web Source:-
NPTEL course :- https://nptel.ac.in/courses/106105167

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2								2					
CO2		2	2							1		1		1	
CO3		1	3					2		1					
CO4		1	3	3				2		2					
CO5		2	3					1		1		1	1	1	

3 - High 2 – Medium 1 –Low

Assessment:

ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	00	02	10
K2	Understand	10	10	03	20
K3	Apply	0	05	03	20
K4	Analyze	00	00	02	10
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3,K4
	CO1, CO2	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	05	10
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil   **Designed by: Kailash.D. Kharat**

CSOE0012: Introduction to Web Technology			
Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: None

Course Description:
On completion of this course, a student will be familiar with client server architecture and able to develop a web application using web technologies. Students will gain the skills and project-based experience needed for entry into web application and development careers.
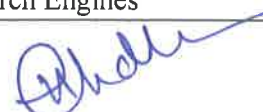
Course Outcomes:
After successful completion the course, students will be able to:

Course Outcomes	
CO1	Differentiate Network Hardware, Internet and how it works
CO2	Create a simple web pages using HTML & CSS
CO3	Summarize Internet using Internet Marketing
CO4	Apply Security to their online presence
CO5	Monetize their skills using E-Commerce solution

Detailed Syllabus:

Unit 1	**World Wide Web:** Introduction, History, Internet v/s WWW, Internet v/s Intranet, Introduction to Networking, LAN, MAN, WAN, PAN **Introduction to Network Hardware:** Switches, Routers, Hubs, Gateways, Other Hardware
Unit 2	**Introduction to HTML:** Introduction, HTML Editors, Creating a Simple Web Page, HTML Tags/Elements, Formatting Tags, Presentation Tags and HTML Attributes **Cascaded Style Sheets:** Introduction to Style Sheets, Properties, Style by ID/Class & Tag Name
Unit 3	**Online Marketing:** Tracking Website performance with Google Analytics, Using Google AdWords and AdSense, Social Media Marketing, Email Marketing **Search Engine Optimization:** Introduction, SEO best practices, Online Reputation Management, Web Master Tools, Registering to Major Search Engines

Unit 4	**Web Security:** Introduction, Network Security Model, Symmetric Cipher Models, Digital Signature, PGP, S-MIME, Web Security Considerations, Secure Electronic Transactions **Safety precautions:** Firewall, Virus and its related threats and countermeasures
Unit 5	**Domain & Hosting:** Introduction, **E-Commerce:** Payment Gateways **Mobile Compatible website:** Introduction, Introduction to HTML5 & CSS3

Text and Reference Books:

1. Thomas Powell,"*HTML & CSS: The Complete Reference*", 5th ed., New Delhi, McGraw Hill Education India, 2010

2. Jon Duckett ,"*Beginning HTML, XHTML, CSS, and JavaScript*".,Wrox Publication.,2010
3. *Head First HTML with CSS & XHTML,* 2005, O'Reilly Publication. HTML, CSS, JavaScript for Dummies

Web Resources:
1. https://nptel.ac.in/courses/106105084

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2		1		2	2	1	3			3		
CO2		2	2		1		1	1	2	2			1		
CO3		1	1						1				2	1	
CO4		1	2						3				1	1	
CO5		1	2						2				1	1	

3 - High   2 – Medium   1 –Low

Assessment:
ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	00	00	10
K2	Understand	10	10	02	15
K3	Apply	0	05	02	15
K4	Analyze	00	00	02	10
K5	Evaluate	00	00	02	05
K6	Create	00	00	02	05
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3,K4,K5
	CO1, CO2	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	05	10
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by: V.A.Chakkarwar
Arjumand M Khan

CSOE0013: Introduction to Python Programming			
Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: None

Course Description:

Python is a language with a simple syntax, and a powerful set of libraries. It is an interpreted language, with a rich programming environment, including a robust debugger and profiler. While it is easy for beginners to learn, it is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience.

Course Outcomes:

After successful completion the course, students will be able to:

Course Outcomes	
CO1	Understand installation procedure and system requirement for Python
CO2	Describe Data Types, Variables, Operators and other Conditional blocks
CO3	Apply in build functions of Python and Create User Defined Functions
CO4	Use Strings, Tuples, List etc., in programming
CO5	Illustrate File Handling, Using Exception Handling, Implement OOP Concepts

Detailed Syllabus:

Unit 1	Introduction, History, Features, Setting up and Installation, Working with Python, Understanding Python Variables and Operators, Understanding python blocks, Understanding Python Data Types, Working with Operators
Unit 2	Python Numbers- integer, float and complex. Conditional blocks using if-else and elif, Simple for loops in python, for loop using ranges, Use of while loops in python, Loop manipulation using pass, continue, break and else, Programming using Python conditional and loops block Functions: Built in Functions, Invoking built-in function, Modules – Importing entire module or selected object using from statement. Functions from Math, random, Time & date. Composition, User defined functions – Defining, Invoking, Passing Parameters
Unit 3	Python Strings – slicing strings, modify strings, concatenate strings, format strings, escape characters, sting methods. Python Booleans. Python List – Access list items, change list items, add list items, remove list items, loop lists, list comprehension, sort

	lists, copy list, join list, list methods.
Unit 4	Python Tuples–Access, Update and unpack tuple, Loop tuple, Join tuple, Tuple methods. Python Sets – Access, add and remove set items, loop sets, join sets, se methods. Python Dictionaries- Access, change, add, remove items, loop dictionaries, copy dictionaries, nested dictionaries. Dictionary methods.
Unit 5	I/O and File Handling – using function like read, write, writelines etc., Errors & Exception – Syntax Errors, Exceptions, Handling Exceptions, User Defined Exceptions, Clean-up actions Object Oriented Concepts in Python – Introduction, Creating Classes and Objects, Instance Objects, Inheritance

Text and Reference Books:
1. Mark Lutz, *Learning Python, 5th ed,* O'Reilly Publication, 2013
2. Michael Dawson , *Programming with Python, A User Book,* , 3rd ed, Boston, Cengage learning,2010
3. David Beazley , *Python Essentials Reference,* ,3rd ed , New York .,2006

Web Resources:
1. https://nptel.ac.in/courses/106106182
2. https://docs.python.org

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	2		1		2	2	1	3		2	3		
CO2		2	2		1		1	1	2	2		1	1		
CO3		1	1						1				2	1	
CO4		1	2						3				1	1	
CO5		1	2						2			2	1	1	

3 - High   2 – Medium   1 –Low

Assessment:
ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	00	00	10
K2	Understand	10	10	03	15
K3	Apply	0	05	05	15
K4	Analyze	00	00	00	10
K5	Evaluate	00	00	02	05
K6	Create	00	00	00	05
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3,K4,K5
	CO1, CO2	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	05	10
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by:
Khushbu Jain

CSOE1014: Java Programming

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	ISE- I	15 Marks
Tutorial	0	ISE-II	15 Marks
Total Credits	03	ISE- III	10 Marks
		End Semester Exam	60 Marks

Prerequisites: Adv C & C++

Course Description:
This course presents a conceptual and practical introduction to imperative and object-oriented programming, exemplified by Java. As well as providing grounding in the use of Java, the course will cover general principles of programming in object-oriented frameworks. This course introduces concepts like Exception handling, interfaces & multithreading which provides real time programming approach in object-oriented programming.

Course Outcomes:

After successful completion the course, students will be able to:

Course Outcomes	
CO1	Write and resolve programming problems using Java Language
CO2	Build Java Application and Java Applet, Java Servlet
CO3	Identify Java standard libraries and classes
CO4	Understand and utilize Java Graphical User Interface in the program writing
CO5	Develop and write Advanced Object Oriented Java Programs.

Detailed Syllabus:

Unit 1	**Introduction to Java:** History and evolution of Java,Java features, Java vs other popular languages, Java programming environment, Installing Java, Exploring the IDE, JVM, command line arguments, Bytecodes And The Java Virtual Machine, Application And Applets, Classes And Objects, The Java Class Libraries, The Java Development Kit (Jdk), Identifiers, Keywords &Types–Variables And Assignments, Strings And Characters, Arithmetic Operators And Expressions, Type Conversion and Casting, Comments, Arrays–One-Dimensional Arrays, Multidimensional Arrays;arithmetic operators, bit wise operators, relational, Boolean expressions, statements and blocks, control flow statements selection, iteration and jump statements
Unit 2	**Java Fundamentals and Classes**: Objects and classes, declaring objects, constructors, The General Form Of A Class, Creating Simple Classes, Method Overloading, Adding Constructors, The This Keyword, Instance Variables And Methods, StaticVariables And Methods, Local Variables And Variable Scope, Argument Passing, Introduction to Inner Classes Inheritance–Subclasses, Inheritance And Variables, Method Overriding,

	Inheritance And Methods, inheritance And Constructors, Class Modifiers, Variable Modifiers, Constructor Modifiers, Method Modifiers, Interface And Packages, Interfaces, Interface References, Interface Inheritance, The Instance Of Operator, Packages, Classpath, The Import Statement, Access Control And Packages, Exception Handling, Binary I/O, file handling
Unit 3	**The Collection Framework in Java**: Collection Class, Array List & linked list Classes, Inserting elements, HashSet and TreeSet Classes. Algorithm Support to Collection Classes. **J2EE:** Introduction to Java Enterprise Edition 6, Need for JEE 6, Advantages of JEE 6, Types of Enterprise Architecture, JEE6 Best Practices, Introduction to Eclipse and its Integrated Development Environment
Unit 4	**Networking in Java**: Java.Net Package, Socket Fundamentals and Sockets in Java, **Java Database Connectivity (JDBC):** Understanding JDBC Classes, Performing CRUD (create, read, update and delete) Operations, Joining, Manipulating Databases with JDBC, Transaction Processing, Stored Procedures **Remote Method Invocation [RMI] :** Introduction To Distributed Computing, RPC, Client Side And Server Side Proxies, Introduction To RMI, Stubs And Skeletons, The Process Of Creating A Simple RMI Application, Callbacks, Bootstrap Server, RMI With JDBC, RMI Packages
Unit 5	**Servlets**: Servlet Overview and Architecture, Introduction to Tomcat 7 Servlet container, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources **Java Server Pages (JSP):** Introduction, Java Server Pages Overview, A First Java Server Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries **AJAX:** Introduction, Understanding Synchronous vs Asynchronous, Technologies, Examples, Operations, How AJAX works?

Text and Reference Books:
1. Patrick Naughton, Herbert Schildt ,"*The complete reference-Java2*" 8th ed., New Delhi, TMH
2. Deitel and Deitel – "*Java How to Program*", 6th Ed., US, Pearson, 2005
3. Aaron Walsh and John Fronckowiak, " *Java Programming Bible*",1st ed., IDG Books, India, 2000,
4. Patrick Niemeyer, Daniel Leuck, *Learning Java*, 4th Ed., O'Reilly Media, Inc., 2013
5. Patrick Niemeyer, Daniel Leuck ,*A Bestselling Hands-On Java Tutorial*, O' 4th ed., Reilly Media, 2013

Web Resources:
NPTEL :- https://onlinecourses.nptel.ac.in/noc22_cs47/preview
URl:- https://www.javatpoint.com/

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2		1		2	2	1	3		1	3		
CO2		2	2		1		1	1	2	2			1		
CO3		1	1						1			1	2	1	
CO4		1	2						3			1	1	1	
CO5		3	2		1		2	2	1	3		1	3		

3 - High   2 – Medium   1 –Low

Assessment:

ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Class room Question & answer
4) Power point presentation of Topic which is related but out of syllabus
5) Overall approach towards learning, creativity.

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	05	02	10
K2	Understand	05	05	02	20
K3	Apply	05	05	03	20
K4	Analyze	00	00	03	10
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3,K4
	CO1	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	10	05
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by:
1. Arjumand M. Khan
2. Prashant Pathak

CSHS0011: Psychology		
Teaching Scheme	Examination Scheme	
Lectures: 03 hrs/ week	ISE I	15 Marks
Tutorial: 0	ISE II	15 Marks
Credits:03	ISE III	10 Marks
	End Semester Examination	60 Marks

Prerequisites: None

Course Description: The course is designed to provide the student a basic understanding of the psychology of human behavior. The students will be given exposure to concepts, terminology, principles, and theories that comprise an introductory course in psychology.

Course Outcomes:

After successful completion the course, students will be able to:

	Course Outcomes
CO1	Define the term psychology and demonstrate command of the basic terminology
CO2	Managing stress and disorders of Health.
CO3	Identify and compare the major perspectives in psychology: Recognize how each approach views human thought and behavior.
CO4	Understand the social and community physiological human behavior.
CO5	Discover knowledge of scientific methodology–the variety of ways in which psychological data are gathered and evaluated / interpreted in workflow.

Detailed Syllabus:

Unit 1	**Introducing Psychology** Johari Window, Maslow's hierarchy of needs, Concept and definition of psychology, Roots of psychology, Psychology as a scientific discipline. Key Perspectives in Psychology- Behavioral, Cognitive, Humanistic, Psychodynamic, and Socio-cultural..
Unit 2	**Methods in Psychology** Natural Observation, Survey and Case Study - Nature, advantages and limitations. Experimental and Correlational methods -Nature, advantages and limitations.
Unit 3	**Psychology of Health** Understanding stress and its various causes. Stress and psychologically-oriented and physically-manifested disorders [Psychosomatic disorders] Manic depressive tendencies, socialization problems, eating disorders. Depression and other related psychological states that are also manifest in the technological/industrial environment. Stress adjustment: Occupational, social, marital, sexual and environmental aspects. Technology and subjective well-being (SWB)
Unit 4	**Social Psychology**: Group and Leadership (i) Group - Group structure and function, Task performance: Social facilitation, Social loafing; Conformity, Obedience and social modeling; Group cohesiveness. (ii) Leadership- Definitions and functions, Trait, situational, interactional and contingency approaches to leadership; Leadership effectiveness, The charismatic leadership. The study of community life, interaction strategies;

	implications for manpower and training; family therapy and the community; crisis intervention; advocacy and community psychology
Unit 5	**Psychological Factors in Work Design** Approaches to work design. Historical perspective. Human information processing, Natural and man-made environment effect, psychology of work. The living environments, physical features, psychological dimensions of work. Job enrichment, quality of working life. Future of work designs.

Text and Reference Books:

1. Atkinson & Hilgard's, *Introduction to Psychology*, 16th Edition

2. Pearson, *Social Psychology*, Elliot Aronson, Timothy D Wilson

3. Myers, D.G., *Psychology* , 4th ed., New York: Worth, 1995.

4. Asch, S.E., *Social Psychology*, OUP Oxford, 1987.

5. Baron R. A & Byrne. D, *Social Psychology*. 10th Ed.,New Delhi, Prentice Hall , 2003

Web Resources:
NPTEL course : Introduction to Psychology - Course (nptel.ac.in)

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes:

Course outcome	Program Outcomes												PSO's		
	PO1	PO 2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PS O 2	PS O 3
CO1							2				2				3
CO2							2				2				2
CO3						2	2				3				3
CO4						2	3				2				1
CO5						3	3				3				1

3 - High   2 – Medium   1 –Low

Assessment:
ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the / or combination of few of the following:
1) Quiz
2) Assignments
3) Question and answer
4) Power Point presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	00	02	15
K2	Understand	05	05	04	15
K3	Apply	05	05	02	15
K4	Analyze	00	05	02	15
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3
	CO1,CO2	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	00	15
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

Designed by:

1. V. A. Chakkarwar
2. Arjumand Khan