Detailed Program

Bachelor of Technology (B.Tech.)

Computer Science Engineering (CSE)

&

CSE with Specialization in AI and ML

Semester-III

(2025-2029)

DOC202506200019

RNB GLOBAL UNIVERSITY

RNB Global City, Ganganagar Road, Bikaner,
Rajasthan 334601

OVERVIEW

RNB Global University follows Semester System. Accordingly, each academic year is divided into two semesters, **Odd (July-December) and Even (January-June).** Besides this, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The curriculum for B. Tech (CSE) Program **for (July-December) Odd Semester 2026** along with examination pattern is as follows:

Course Scheme

Semester – III

S. No.	Course Code	Course Category	Course Title	L	T	P	Credits
1	CSEC14200	DSC-6	Computer System Architecture	3	0	0	3
2	CSEC14201	DSC-7(a)	Data Structures	3	0	0	3
3	CSEC14202	DSC-7(b)	Data Structures Lab	0	0	2	1
4	CSEC14203	DSC-8(a)	Object Oriented Programming with C/C++	3	1	0	4
5	CSEC14204	DSC-8(b)	Object Oriented Programming with C/C++Lab	0	0	2	1
6	CSEC14205	DSC-9(a)	Operating Systems	3	0	0	3
7	CSEC14206	DSC-9(b)	Operating Functions Lab	0	0	2	1
8	CSEC14207	DSC-10(a)	Digital Electronic Circuits	3	0	0	3
9	CSEC14208	DSC-10(b)	Digital Electronic Circuits Lab	0	0	2	1
10	BSCC15200	BSC -6	Applied Mathematics-III	3	1	0	4
11	VAC088028	VAC-1	Human Values, Business & Managerial Ethics	2	0	0	2
12	SEC077003	SEC-3	Ability and Skill Enhancement -III	2	0	0	2
13	WHNN99000		Workshops/ Seminars/Human Values/ Social Service/NCC/NSS	-	-	-	1
		Total		**22**	**2**	**8**	**29**

EVALUATION SCHEME- THEORY

The evaluation of the theory paper of B.Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

Internal Assessment

The distribution of Internal Assessment Marks is as follows:

Type	Details	Marks
Mid Term	One Mid-term Sessional	25
Quiz	Quiz based on MCQs	5
Marks obtained in various Tests, Assignments, Presentations, Tutorials etc.	Average of Marks obtained	15
Academic Performance including Attendance	Eligibility >75% Attendance	5
TOTAL		**50**

External Assessment

Type	Marks
Theory	50

EVALUATION SCHEME -PRACTICAL

The evaluation of the practical paper of B.Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

Internal Assessment

Type	Details	Marks
Marks obtained in various manuals, practical file, participation, any model prepared, output of practical	Average of marks obtained	45
Academic Performance including Attendance	Eligibility >75% Attendance	5
TOTAL	**50**	

External Assessment

Type	Marks
Practical	50

EVALUATION SCHEME- WORKSHOPS & SEMINARS & NCC/NSS

1. NCC/NSS will be completed from Semester I – Semester IV. It will be evaluated internally by the institute. The credit for this will be given at the end of each Semester.

2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of each Semes

Bachelor of Technology – CSE (Four Years Course)

1. Vision

To deliver a high-quality education that will produce engineers of the highest caliber, equipped with the newest information and cutting-edge concepts in computer science engineering to fulfil the demands of industry and society.

2. Mission

To create an academic setting for the growth of professionals equipped with the knowledge, abilities, values, and self-assurance to assume leadership positions in the field of computer science and engineering.

To promote a culture of research that produces knowledge and cutting-edge technologies that aid in the society's sustainable development.

To improve academic collaborations for international exposure.

3 PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To produce students with strong foundation of knowledge and skills in the field of computer science and engineering.
PEO2: To produce students who are employable in private/public sector/research organizations or work as an entrepreneur.
PEO3: To produce students who can provide solutions to problems in their profession by applying computer engineering theory and practices.
PEO4: To produce graduates who can provide leadership and are effective in multidisciplinary environment.

4 PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitation.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

5. PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics and networking for efficient design of computer-based systems of varying complexity.

PSO2: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur and a zest for higher studies/employability in the field of Computer Science & Engineering.

PSO3: Cultivate the field of computing and its latest trends, to pursue teaching, research & development activities and to work effectively in a team.

6. Course Outcomes		
Course Code & Course Names	**After completion of these courses' students should be able to**	
BSCC15200 Applied Mathematics-III	**CO1:**	Demonstrate the statistical hypotheses tests.
	CO2:	Make use of probability theory on discrete and continuous random variables to obtain the solution of problems on different distributions and joint probability distribution.
	CO3:	Identify the problems on statistical parameter estimation.
	CO4:	Classify the regression and correlation analysis.
	CO5:	Create a solution of a problem by using probability theory.
CSEC14200- Computer System Architecture	**CO1:**	Define the basic functions of a digital computer.
	CO2:	Illustrate the basic arithmetic and logic operations in the computer.
	CO3:	Explain memory organization.
	CO4:	Identify the I/O interfacing.
	CO5:	Ability to analyze memory hierarchy and its impact on computer Cost/performance.
CSEC14201- Data Structures	**CO1:**	Find the time complexity of algorithms.
	CO2:	Demonstrate the stacks and queues for various applications.
	CO3:	Experiment with tree data structure for different applications.
	CO4:	Apply the concepts of graph for computing shortest path and construct MST.
	CO5:	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
CSEC14202- Data Structures Lab	**CO1:**	Find solutions for a range of problems using objects and classes.
	CO2:	Demonstrate the implementation of constructors, destructors and operator overloading.
	CO3:	Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism.
	CO4:	Solve the programs using generic programming, exception handling, templates, file Handling.
	CO5:	Able to identify and use a suitable data structure and algorithm to solve a real-world problem.
CSEC14203- Object Oriented Programming	**CO1:**	Explain the object-oriented programming features in C++.
	CO2:	Apply these features to program design and implementation.

with C/C++	**CO3:**	Develop applications using Object Oriented Programming Concepts.
	CO4:	Design features of object oriented programming to solve real world problems.
	CO5:	Handle exceptions in programming
CSEC14204-Object Oriented Programming with C/C++Lab	**CO1:**	Explain the language environment.
	CO2:	Apply object-oriented concepts to solve problems.
	CO3:	Develop applications using object-oriented concepts.
	CO4:	Design features of object-oriented programming to solve real world problems.
	CO5:	Solve different type of problems using object-oriented programming Techniques
CSEC14205-Operating Systems	**CO1:**	Explain the role and responsibilities of OS in the computer system.
	CO2:	Illustrate how the OS deals with process management, memory management and secondary storage management.
	CO3:	Analyze process synchronization and deadlocks.
	CO4:	Apply the knowledge about OS, for the Linux operating system case study.
	CO5:	Analyzing sharing of resources among multiple processes in order to detect, prevent and avoid a deadlock
CSEC14206-Operating Functions Lab	**CO1:**	Define the principles of resource management [Processor, Memory].
	CO2:	Explain using operating systems with an understanding of professional, ethical and social issues. [Windows, Linux etc.,].
	CO3:	Identify the lifelong need and engage in upgradation of operating system
	CO4:	Make use of shell commends and execute.
	CO5:	Create a program to analyze sharing of resources among multiple processes to detect, prevent and avoid a deadlock
CSEC14207-Digital Electronic Circuits	**CO1:**	Define the fundamental concepts and techniques used in digital electronics.
	CO2:	Show the ability to understand, analyze and design various combinational and sequential circuits.
	CO3:	Plan for basic requirements of a design application and propose a cost-effective solution.
	CO4:	Analyse and prevent various hazards and timing problems in a digital design.
	CO5:	Design the logic gates using different Logic families.
CSEC14208-	**CO1:**	Illustrate linear and digital electronic circuits.

Digital Electronic Circuits Lab	**CO2:**	Apply computing platform and software for engineering problems.
	CO3:	Design and implement interfacing.
	CO4:	Develop projects using microprocessor
	CO5:	Realize the logic gates using different Logic families and verify the functionality.
BSCC15200 - Applied Mathematics-III	**CO1:**	Demonstrate the statistical hypotheses tests.
	CO2:	Make use of probability theory on discrete and continuous random variables to obtain the solution of problems on different distributions and joint probability distribution.
	CO3:	Identify the problems on statistical parameter estimation.
	CO4:	Classify the regression and correlation analysis.
	CO5:	Create a solution of a problem by using probability theory.
VAC088028- Human Values, Business & Managerial Ethics	**CO1:**	Explain the sustained happiness through identifying the essentials of human values and skills.
	CO2:	Compare profession and happiness.
	CO3:	Understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO4:	Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life.
	CO5:	Support the employer organization with valuable inputs on corporate governance.
SEC077003- Ability and Skill Enhancement –III	**CO1:**	Classify the different types of reviews i.e. book review, movie review etc.
	CO2:	Express his/ her feeling at pressor situation or emotional situation
	CO3:	Explain his/her thoughts in group discussion and also build leadership quality
	CO4:	Enhance creativity in making documentary etc.
	CO5:	Manage negative emotions keeping balance of mental stability, stress and distress.

7 Co PO Mapping

BSCC15200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	2	3	2	2	2	-	-	2	3
CO2	3	2	2	-	3	3	-	-	-	-	-	3
CO3	-	-	2	-	2	2	-	-	2	-	-	3
CO4	2	2	2	2	-	3	-	-	2	-	-	3
CO5	3	3	3	3	-	2	2	2	3	3	3	2

CSEC14200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	3	3	3	3	3	2	3
CO2	2	3	3	2	-	2	2	3	3	2	-	3
CO3	2	2	2	2	3	-	-	-	2	3	3	3
CO4	2	3	3	2	3	-	-	-	3	3	3	3
CO5	-	-	-	3	3	3	2	2	-	-	2	-

CSEC14201	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	3	-	-	3	2	-	3
CO2	3	2	2	3	-	3	-	-	-	2	-	3
CO3	2	2	-	3	2	-	-	-	2	-	2	3
CO4	-	2	-	2	-	3	-	-	3	2	-	3
CO5	3	-	3	-	3	-	3	3	2	-	2	-

CSEC14202	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	2	-	-	2	2		3
CO2	2	3	3	-	2		-	2		2	3	3
CO3	2	-	-	-	-	2	-	-	3	3	-	3
CO4	2	2	-	2	-	3	-	-	3	2	-	3
CO5	3	3	2	-	3	-	3	3	-	-	3	-

CSEC14203	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	2	3	3	-	3	-	2	-	3
CO2	2	2	2	-	3	2	-	2	-	2	3	3
CO3	2	2	3	2	2	3	-	2	2	2	2	3
CO4	2	-	2	-	2	-	-	2	-	3	3	3
CO5	-	3	-	3	-	2	3	-	3	-	2	2

CSEC14204	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	2	-	2	2	-	2	3
CO2	3	2	3	3	2	3	2		2	3	3	3
CO3	2	-	2	2	-	3	2	2	3	2	2	3
CO4	-	2	2	2	2	2	-	-	2	-	2	3
CO5	2	-	3	-	3	-	3	3	-	2	2	-

CSEC14205	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	3	2	2	2	-	2	2	3
CO2	3	2	3	2	2	3	3	3	2	-	3	3
CO3	2	2	2	2	3	2	3	3	3	2	2	3
CO4	2		2	2		3	-	2	3	3	3	3
CO5	-	3	-	-	2	-	3	3	2	-	2	2

CSEC14206	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	3	2	2	2	-	2	2	3
CO2	3	-	3	2	2	3	3	3	2	-	3	3
CO3	3	2	3	3	3	2	3	3	3	2	2	3
CO4	2	-	2	2	-	3	2	2	3	3	3	3
CO5	-	3	-	-	2	-	-	-	3	3	2	2

CSEC14207	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	3	2	2	2	-	2	2	3
CO2	3	-	3	2	2	3	2	3	-	-	3	3
CO3	3	2	3	3	3	2	3	2	-	2	2	3
CO4	3	-	2	-	-	3	2	2	-	-	3	3
CO5	2	3	-	2	2	-	-	-	3	3	-	-

CSEC14208	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	3	2	-	3
CO2	3	3	2	3	3	3	3	2	3	-	2	3
CO3	3	3	3	2	3	3	3	2	3	3	3	3
CO4	2	2	3	2	3	3	3	3	3	3	3	3
CO5	-	2	-	2	2	3	2	3	2	-	3	3

VAC088028	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	3	2	-	-	3	3	3	3	3
CO2	-	3	-	-	3	3	3	-	3	-	-	3
CO3	3	-	2	3	-	2	-	3	-	-	3	3
CO4	3	2	3	-	3	3	3	-	3	3	-	3
CO5	-	3	3	2	2	3	-	3	3	2	3	3

SEC077003	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	3	-	3	-	2	2	3	3	2
CO2	2	2	3	3	-	2	-	2	-	3	2	2
CO3	2	-	-	-	3	2	-	3	2	3	2	2
CO4	2	-	2	-	2	-	-	2	-	3	-	2
CO5	3	3	2	2	2	2	3	3	2	2	3	2

8. Curriculum

Course Name: Computer System Architecture
Course Code: CSEC14200

Objectives

- To equip the students with the internal architecture, organization and design of computer systems
- To understand the basic structure and operation of digital computer
- To study the design of arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations
- To study the two types of control unit techniques and the concept of pipelining
- To study the hierarchical memory system including cache memories and virtual memory To study the different ways of communicating with I/O devices and standard I/O interfaces

Course Outline:

Unit I: Basics of Digital Electronics

Codes, Logic gates, Flip flops, Registers, Counters, Multiplexer, Demultiplexer, Decoder, Encoder. **Register Transfer and Micro operations:** Register transfer Language, Register transfer, Bus & memory transfer, Logic micro operations, Shift micro operation. **Basic Computer Organization:** Instruction codes, Computer instructions, Timing & control, Instruction Cycles, Memory reference instruction, Input/Output & Interrupts, Complete computer description & design of basic computer.

Unit II: : Control Unit

Hardwired vs. Micro programmed control unit. Central Processing Unit: General register

organization, Stack organization, Instruction format, Data transfer & manipulation, Program control, RISC, CISC.
Computer Arithmetic: Addition&subtraction,MultiplicationAlgorithms, Division algorithms

Unit III: Input-Output Organization
Peripheral devices, I/O interface, Data transfer schemes, Program control, Interrupt, DMA transfer, I/O processor.
Memory Unit: Memory hierarchy, Processor vs. memory speed, High-speed memories, Cache memory, Associative memory, Interleave, Virtual memory, Memory management.

Unit IV: Introduction To Parallel Processing
Pipelining, Characteristics of multiprocessors, Interconnection structures, Interprocessor arbitration, Interprocessor communication & synchronization.

Suggested Readings:

1. Mano, Morris M., Computer System Architecture, Prentice Hall (1992) 3rd ed.
2. Hayes, J.P., Computer Architecture and Organization, McGraw Hill (1998) 3rd ed.
3. Hennessy, J.L., Patterson, D.A, and Goldberg, D., Computer Architecture A Quantitative Approach, Pearson Education Asia (2006) 4th ed.
4. Leigh, W.E. and Ali, D.L., System Architecture: software and hardware concepts, South Wester Publishing Co. (2000).

Course Name: Data Structure

Course Code: CSEC14201

Objectives

- To give a complete overview about the various data structures used in computer science and to explain the implementation of these data structures in C programming.

Course Outline:

Unit I: Introduction
Algorithm complexity and Big O notation, Recursion and its importance, Tower of Hanoi problem. **Stacks:** Concept, Operations and representation, Application to evaluation of postfix expressions, Conversion from infix to postfix representation.

Unit II: Queues
Sequential representation, Operations, Priority queues, and Array implementation. **Linked Lists:** Concept, Operations, Stacks and queues as lists, Array and dynamic representation Circular lists, Doubly linked lists, Josephus problem.

Unit III: Trees
Definition, Array and dynamic representations, Operations, Lists as trees, Almost Complete binary trees, threaded binary trees, AVL trees, heaps;
Graphs: Applications of graphs.
Sorting: Efficiency considerations, O notation, Bubble sort, Quicksort, Selection sort, Binary Tree sort heap, Heapsort, Heap as a priority queue, Insertion sort, Shell sort, Merge sort, Radix sort.

Unit IV: Searching
Sequential searching, Indexed sequential searching, Binary search, Interpolation search, Binary tree searching, Insertion and deletion, Optimum search trees, Height balanced trees, Single and double rotations, Multi way, Search trees, B-trees, B+-trees, Hashing methods of resolving clashes, Methods of choosing Hash functions.

Suggested Readings

1. Kruse, R.L., Leung, B.P. and Tondo, C.L., Data Structures and Program Design in C, Dorling Kindersley (2008).
2. Langsam, Y. and Augenstein, M.J., Data Structures Using C and C++, Dorling Kindersley (2008) 2nd ed.
3. Trembley, J.P., Sorenson, P.G., An introduction to data structures with applications, Tata McGraw Hill (2008) 2nd ed.
4. Sahni, Sartaj, Data Structures, Algorithms and Applications in C++, Universities Press (2005) 2nd ed.

Course Name: Data Structure Lab

Course Code: CSEC14202

Course Outline

Laboratory work: Implementation of Arrays, Recursion, Stacks, Queues, Lists, Binary trees, sorting techniques, Searching techniques in C/C++.

Course Name: Object Oriented Programming with C/C++

Course Code: 19008600

Objectives

- To provide an overview of the various business process, analyze operations, production planning.

Course Outline:

Unit I: Review
Review of basic concepts of object-oriented programming, Comparison between procedural programming paradigm and object-oriented programming paradigm. Classes and Objects: Specifying a class, Creating class objects, Accessing class members, Access specifiers – public, private, and protected, Classes, Objects and memory, Static members, Theconst keyword and classes, Static objects, Friends of a class, Empty classes, Nested classes, Local classes, Abstract classes, Container classes, Bit fields and classes.

Unit II: Console Based I/O
Concept of streams, Hierarchy of console stream classes, Input/output using Overloaded operators >> and << and Member functions of I/O stream classes, Formatting Output, Formatting using ios class functions and flags, Formatting using manipulators. Constructors and Destructors: Need for constructors and destructors, Copy constructor, Dynamic constructors, Destructors.

Unit III: "for", "while" and "do – while" loops
Break and continue statement, nested control statement, value returning functions, void functions, value versus reference Parameters, local and global variables, static and automatic variables, enumeration type, one dimensional array, two dimensional array, character array, pointer data and pointer variables.

Unit IV*:* Object Oriented Concepts

Abstraction, encapsulation, inheritance and its types, static and dynamic binding, overloading. Program Development: Object oriented analysis, design, unit testing & debugging, system testing & integration, maintenance.

Virtual Functions and Polymorphism: Concept of Binding - Early binding andlate binding, Virtual functions, Pure virtual functions, Abstract classes, Virtual destructors & polymorphism.

Suggested Readings:

1. Lippman, S.B. and Lajoie, J., C++Primer, Pearson Education (2005) 4th ed.
2. Stroustrup, Bjarne, The C++ Programming Language, Pearson Education (2000)3rd ed.
3. Eills, Margaret A. and Stroustrup ,Bjarne, The Annonated C++ Reference Manual, Pearson Education (2002).
4. Rumbaugh, J.R., Premerlani, W. and Blaha, M., Object Oriented Modeling and Design with UML, Pearson Education (2005) 2nd ed.
5. Kanetkar, Yashvant, Let us C++, Jones and Bartlett Publications (2008) 8th ed

Course Name: Object Oriented Programming with C/C++ Lab

Course Code: CSEC14204

Outline:

Programs:

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series S = 1+1/2+1/3+1/4
4. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
5. WAP to compute the factors of a given number.
6. Write a program that swaps two numbers.
7. WAP to print a triangle of stars as follows (take number of lines from user):

```
    *
   ***
  *****
 *******
********
```

8. WAP to perform following actions on an array entered by the user: i) Print theeven-valued elements ii) Print the odd-valued elements.
9. Calculate and print the sum and average of the elements of array
10. Print the maximum and minimum element of array
11. Write a program that swaps two numbers using pointers.
12. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
13. WAP to display Fibonacci series using recursion.
14. WAP to display Fibonacci series using iteration.
15. WAP to calculate Factorial of a number using iteration
16. WAP to calculate Factorial of a number using recursion
17. Create Matrix class using templates. Write a menu-driven program to perform following Matrix operations (2-D array implementation): a) Sum b) Difference
    a) Create a class Box containing length, breath and height. Include following methods init:Calculate surface Area
    b) Calculate Volume
18. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
19. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

Course Name: Operating Systems

Course Code: CSEC14205

Objectives

- The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests.

Course Outline:

Unit I: Introduction

Definition and types of operating systems, Batch Systems, multi programming, time–sharing parallel, distributed and real-time systems, Operating system structure, Operating system components and services, System calls, system programs, Virtual machines.

Unit II: Process Management

Process concept, Process scheduling, Cooperating processes, Threads, Inter-process communication, CPU scheduling criteria, Scheduling algorithms, multiple processor

scheduling, Real-time scheduling and Algorithm evaluation. Process Synchronization and Deadlocks: The Critical-Section problem, synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, Monitors, Deadlocks-System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock, Combined approach to deadlock handling.

Unit III: Storage management

Memory Management-Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with paging, Virtual Memory, Demand paging and its performance, Page replacement algorithms, Allocation of frames, Thrashing, Page Size and other considerations, Demand segmentation, File systems, secondary Storage Structure

Unit IV: File concept

Access methods, directory implementation, Efficiency and performance, recovery, Disk structure, Disk scheduling methods, Disk management, Recovery, Swap-Space management, Disk reliability.

Unit V: Protection

Security-Goals of protection, Domain of protection, Access matrix, Implementation of access Matrix, Revocation of Access Rights, language based protection, The Security problem, Authentication, One Time passwords, Program threats, System threats, Threat Monitoring, Encryption.

Suggested Readings

1. W. Stalling, Data & Computer Communication, 8th edition, Prentice Hall of India, 2006.
2. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
3. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
4. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.

Course Name: Operating Functions Lab

Course Code: CSEC14206

Course Outline:

List of Experiments

1. Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify "cal" command to display calendars of the specified months.
6. Write a shell script to modify "cal" command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message – "Entered login name is invalid".
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of "who" command along with the total number of users
10. Write a shell script to display the multiplication table any number,
11. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file. 12. Write a shell script to find the sum of digits of a given number.
12. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
13. Write a shell script to find the LCD(least common divisor) of two numbers.
14. Write a shell script to perform the tasks of basic calculator.
15. Write a shell script to find the power of a given number.
16. Write a shell script to find the factorial of a given number.
17. Write a shell script to check whether the number is Armstrong or not.
18. Write a shell script to check whether the file have all the permissions or not.

Course Name: Digital Electronic Circuits

Course Code: CSEC14207

Objectives

- The main objective of this course to make student familiar about basic component of any electronics devices. The basic of digital electronics circuit can be studied in this subject. The main component of computer covered in this subject. By the theoretical and practical knowledge we can verify the various aspects of digital electronic circuits. This file covered the all information regarding lecture, tutorials, webinar, seminar and many more things to cover.

Course Outline:

Unit I: Number Systems
Number systems, Conversions, Number Representations, Demorgans Theorem, Boolean Algebra and Arithmetic operations. Binary codes, Error detection and correction codes.Unit II: Combinational circuits
Simplification of Boolean functions by K-map method and Q. M. method, Half adder, Full adder, BCD adder, High speed adder, subtractor, multiplier, dividers, ALU, Code conversion, Magnitude comparators, Encoders, Decoders, Multiplexers, Demultiplexer, Application of Encoders, Decoders, MUX, DEMUX. Implementation using ROM, PLA, PAL, FPGAs & TTL ICs for their applications.

Unit III: Sequential circuits
Various types of flip-flops and their conversions. Registers, Timing issues, Counters-Synchronous, Asynchronous. Finite state machines. Design of Synchronous sequential circuits. Design of Asynchronous circuits, cycles, races and hazards.

Unit IV: Memories Types of ROM
RAM- Static and Dynamic, Representative circuits for cells using BJT and FETs, Timing diagrams of memories; Memory expansion using ICs, Flash memory, CCD, latest trends in memories;
Logic circuits: ECL, TTL, MOS, CMOS logic families their comparison. Detailed study of TTL, CMOS and their characteristics, fanout, unit load, current & voltage parameters. Tristate Logic. Interfacing of TTL & CMOS logic families
Suggested Readings:

1. Modern Digital Electronics- R. P. Jain, Tata McGraw Hill Pub. Company

2. Digital Fundamentals-Thomas L. Floyd, Universal Publishing House
3. Digital Electronics: An Introduction to Theory and Practice-William H. Gothmann, Prentice Hall of India
4. Digital Principles and Applications, A.P. Malvino, McGraw Hill International Editions

Course Name: Digital Electronics Circuits Lab

Course Code: CSEC14208

Course Outline:

List of Experiments

1. Introduction to Digital Laboratory Equipments& IC‟s
2. To study basic gates and verify their truth tables.
3. To design and construct basic flip-flops
4. To design and implement Binary to Gray
5. To design and implement Gray to Binary
6. To Design adder circuit.
7. To Design subtractor circuit.
8. To Design Bit Comparator circuit.
9. To design and construct of Synchronous Counter
10. To design and construct Asynchronous counter
11. To realize Basic gates (AND,OR,NOT) From Universal Gates(NAND & NOR).
12. To study about full adder & verify its truth table.

Course Code: Applied Mathematics-III

Code: BSCC15200

Course Outline

Unit I: Fourier series and Fourier Transforms

Euler's formulas, conditions for a Fourier expansion, change of interval, Fourier expansion ofodd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series. Fourier integrals, Fouriertransforms, Shifting theorem, Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

Unit II: Functions of Complex Variable

Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions, Limit and Continuity of a function, Differentiability and Analyticity of function. Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic,polar form of the Cauchy-Riemann equations, Harmonic functions, application to flow problems, Integration of complex functions, Cauchy-Integral theorem and formula.

Unit III: Power series

Radius and circle of convergence, Taylor's, Maclaurin's and Laurent's series. Zeroes and singularities of complex functions, Residues Evaluation of real integrals using residues (around unit and semi-circle only); Linear Programming: Linear programming problems formulation, solving linear Programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

Unit IV: Probability Distributions and Hypothesis Testing

Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions, Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (Applications only), Chi-square test of goodness of fit.

Suggested Readings

1. Advanced Engg. Mathematics: F Kreyszig.
2. Higher Engg. Mathematics: B.S. Grewal.
3. Engineering Mathematics by Babu Ram Pearson media Publication
4. Advance Engg. Mathematics: R.K. Jain, S.R.K.Iyenger.
5. Advanced Engg. Mathematics: Michael D. Greenberg.

Course Name: Human Values, Business and Managerial Ethics

Course Code: VAC088028

Objectives:

- To Know about the importance of ethics, Moral values in Human life, Business.-
- To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on the correct understanding of the Human reality and the rest of the Existence. Such a Holistic perspective forms the basis of value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

Course Outline

Unit I: Values & Ethics
Concept of Values and its formation; Values and Behavior. What is Ethics? Nature and scope of Ethics; Morality vs. Legality dilemma. Facts and value; Ethical subjectivism and Relativism, Moral Development (Kohlberg's 6 stages of Moral Development), Ethics and Business, Myth of a moral business.

Unit II: Decision making (Normal Dilemmas and Problems)
Application of Ethical theories in Business (i) **Utilitarianism** (J.Bentham and J.S. Mill), (ii) **Deontology** (I. Kant) (iii) **Virtue Ethics** (Aristotle).**Economic Justice: Distributive Justice**, John Rawls **Libertarian Justice** (Robest Nozick).

Unit III: Corporate Social Responsibility of Business
Concept of CSR; Changing expectation of society; Models of CSR: - Carroll's Model; Ackerman's Model. Why Social Responsibility of Business? Arguments in Favor and in against of Social Responsibility. **Consumerism and Consumer Rights.**

Unit IV: Ethical Issues in Business: Marketing
Characteristics of Free and Perfect competitive market, Monopoly oligopoly, Corruption and Bribery; Ethics in Advertising (Truth in Advertising).**Finance:** Fairness and Efficiency in Financial Market, Insider Trading, Greenmail, Golden parachute. **HR:** Workers Right and

Duties: Work place safety, sexual harassment, whistles blowing.

Unit V: Managerial Ethics Ethical Decision Making. Role of Moral philosophy in decision making; Argument for and against of Ethics in Business. Challenge of ethical issues due to Globalization. Power and Politics in organization. Hierarchism as organizational values. Indian ethos in Management.

Suggested Readings

1. Business Ethics Text and Cases , C.S.V.Murthy, Himalaya Publishing House
2. Business Ethics, Francis & Mishra, TMH
3. Business Ethics, Fernando A. C. , Pearson
4. Values & Ethics, Kaur Tripat, Galgotia Publishers
5. Ethics in Management: A Vedantic Perspective; Chakraborty, S. K. Oxford University Press

Course Name: Ability & Skill Enhancement III

Course Code: SEC077003

Objectives:

- Besides making English Learning an interesting activity, the curriculum aims to develop and enhance creativity of the students

Course Outline - Final Assessment – Preparing a documentary

Unit I: Book & Movie Reviews
What is Book Review, Purpose & Importance of Book Review, Types of Book Review,and Elements& Steps of Writing Book Review, What is Movie Review, Purpose & Importance of Movie Review, Types of Movie Review, and Elements& Steps of Writing Movie Review.

Unit II: LSWR Skills
Reading Comprehension, Rewriting Mythology/Folklore, Debate, News Analysis, Role Plays.

Unit III: Emotional Intelligence& Handling Emotions
What is emotional intelligence, E.Q. Tests, performing under pressure, how to take right decisions under pressure keeping balance in difficult emotional situations. The science of emotional intelligence, characteristics of emotional intelligence, Emotions handling-identifying good and bad emotions, how to control emotions, how to manage negative emotions keeping balance of mental stability, stress and distress.

Unit IV: Group Discussion Skills
What is GD, Types of Group Discussions, Do's & Dont's, Participation, Thinking, Structuring, Group Behavior, Leadership Skills, Interpersonal Skills, Persuasive Skills, Conceptualization Skills.

Unit V: Documentary Making
What is documentary, aims & objectives, documentary for social cause, Documentary/Movie Screening & Reviews, preparing a documentary, Narration

9.Lesson Plans

CSEC14200–Computer Architecture

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Basics of Digital Electronics		
Unit-I	Introduction to Codes, Logic gates, Flip flops, Registers, Counters	C-1	Lecture
Unit-I	Multiplexer, Demultiplexer, Decoder, Encoder	C-2	Lecture
Unit-I	Register Transfer and Micro operations: Register transfer Language	C-3	Lecture
Unit-I	Register transfer, Bus & memory transfer	C-4	Lecture
Unit-I	Logic micro-operations, Shift micro operation	C-5	Lecture
	Activity	C-6	Activity
	Take Home Assignments		Home Assignments
	Basic Computer Organization: Instruction codes, Computer instructions	C-7	Lecture
Unit-II	Timing & control, Instruction Cycles	C-8	Lecture
Unit-II	Memory reference instruction, Input/output & Interrupts	C-9	Lecture
Unit-II	Complete computer description & design of basic computer	C-10	Lecture
Unit-II	Clarification Class	C-11	Clarification Class
Unit-II	Control Unit		
Unit-II	Hardwired vs. Micro programmed control unit.	C-12	Lecture
Unit-II	Hardwired vs. Micro programmed control unit.	C-13	Lecture
Unit-II	Central Processing Unit: General register organization	C-14	Lecture
Unit-II	Stack organization	C-15	Lecture
Unit-II	Instruction format	C-16	Lecture
Unit-II	Data transfer & manipulation	C-17	Lecture
Unit-II	Program control, RISC, CISC	C-18	Lecture
Unit-II	Addition & subtraction, Multiplication Algorithms, Division algorithms	C-19	Lecture
Unit-II	Webinar	C-20	Webinar
Unit-II	Quiz	C-21	Quiz
Unit-II	Class Room Assignment	C-22	Class Assignment
Unit-II	Presentation	C-23	Presentation
Unit-II	Take Home Assignments		Home Assignments
Unit-II	Seminar	C-24	Seminar
Unit-II	Clarification Class	C-25	Clarification Class
Unit-II	Guest Lecture	C-26	Guest lecture
	Input-Output Organization		
	Peripheral devices, I/O interface	C-27	Lecture
Unit-III	Data transfer schemes	C-28	Lecture
Unit-III	Program control, Interrupt	C-29	Lecture
Unit-III	DMA transfer, I/O processor	C-30	Lecture
Unit-III	Memory hierarchy, Processor vs. memory speed	C-31	Lecture

Unit-III	High-speed memories, Cache memory, Associative memory	C-32	Lecture
Unit-III	Interleave, Virtual memory, Memory management	C-33	Lecture

Unit-III	Webinar	C-34	Webinar
	Presentation	C-35	Presentation
	Clarification Class	C-36	Clarification Class
	Class Room Assignment	C-37	Class Assignment
Unit-IV	Take Home Assignments		Home Assignments
Unit-IV	Introduction To Parallel Processing	C-38	
Unit-IV	Pipelining	C-39	Lecture
Unit-IV	Characteristics of multiprocessors	C-40	Lecture
Unit-IV	Interconnection structures	C-41	Lecture
Unit-IV	Interprocessor arbitration	C-42	Lecture
Unit-IV	Interprocessor communication & synchronization	C-43	Lecture
Unit-IV	Class Room Assignment	C-44	Class Assignment
	Guest Lecture	C-45	Guest lecture

CSEC14201– Data Structures

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Data Structures		
Unit-I	Algorithm complexity and Big O notation	C-1	Lecture
Unit-I	Recursion and its importance	C-2	Lecture
Unit-I	Tower of Hanoi problem	C-3	Lecture
Unit-I	Stacks: Concept, Operations and representation	C-4	Lecture
Unit-I	Application to evaluation of postfix expressions	C-5	Lecture
Unit-I	Conversion from infix to postfix representation	C-6	Lecture
	Clarification Class	C-7	Clarification Class
	Take Home Assignment 1		Home Assignments
Unit-II	Queues & Linked Lists		
Unit-II	Queues: Sequential representation, Queue Operations	C-8	Lecture
Unit-II	Priority queues, and Array implementation	C-9	Lecture
Unit-II	Linked Lists: Concept, Operations	C-10	Lecture
Unit-II	Stacks and queues as lists	C-11	Lecture
Unit-II	Circular linked lists	C-12	Lecture
Unit-II	Doubly linked lists, Josephus problem	C-13	Lecture
	Webinar	C-14	Webinar
Unit-II	Array and dynamic representation Circular lists	C-15	Lecture
	Clarification Class	C-16	Clarification Class
	Class Room Assignment 1	C-17	Class Assignment
	Activity	C-18	Activity
Unit-III	Trees, Graphs & Sorting		
Unit-III	Trees: Definition, Array and dynamic representations,	C-19	Lecture
Unit-III	Operations, Lists as trees, Almost Complete binary trees, Threaded binary trees	C-20	Lecture
Unit-III	Seminar	C-21	Seminar
Unit-III	AVL trees	C-22	Lecture
Unit-III	AVL trees, Heaps	C-23	Lecture
Unit-III	Graphs: Applications of graphs	C-24	Lecture
Unit-III	Sorting: Efficiency considerations, O notation, Bubble sort, Quicksort	C-25	Lecture
	Class Room Assignment 2	C-26	Class Room Assignment
Unit-III	Selection sort, Binary Tree sort heap	C-27	Lecture
Unit-III	Heapsort, Heap as a priority queue	C-28	Lecture
	Guest Lecture	C-29	Guest lecture
Unit-III	Insertion sort, Merge sort	C-30	Lecture
Unit-III	Shell sort, Radix sort	C-31	Lecture
	Presentation	C-32	Presentation
	Quiz	C-33	Quiz
Unit-III	Clarification Class	C-34	Clarification Class
Unit-III	Take Home Assignment		Home Assignments

Unit-IV	Searching: Sequential searching, Indexed sequential searching	C-35	Lecture
	Webinar	C-36	Webinar
Unit-IV	Binary search, Interpolation search	C-37	Lecture
Unit-IV	Binary tree searching, Insertion and deletion, Optimum search trees	C-38	Lecture
Unit-IV	Height balanced trees, Single and double rotations, Multi way, Search trees	C-39	Lecture
Unit-IV	Guest Lecture	C-40	Guest lecture
Unit-IV	Class Room Assignment	C-41	Class Assignment
Unit-IV	B-trees, B+-trees	C-42	Lecture
Unit-IV	Hashing methods of resolving clashes,	C-43	Lecture
Unit-IV	Methods of choosing Hash functions	C-44	Lecture
	Clarification Class	C-45	Clarification Class
	Take Home Assignment		Home Assignments

CSEC14202– Data Structures Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Implementation of Single Dimension Array, Implementation of Multi Dimension Array	P-1,2	Practical
2	Recursion, Stack Operations	P-3,4	Practical
3	Stack Operations	P-5,6	Practical
4	Queue Operations	P-7,8	Practical
5	Linked List Implementation	P-9,10	Practical
6	Linked List Implementation, Binary Trees	P-11,12	Practical
7	Binary Trees, Quick Sort	P-13,14	Practical
8	Quick Sort	P-15,16	Practical
9	Insertion Sort	P-17,18	Practical
10	Merge Sort	P-19,20	Practical
11	Merge Sort	P-21,22	Practical
12	Linear Search	P-23,24	Practical
13	Binary Search	P-25,26	Practical
14	Clarification Class	P-27,28	Clarification Class
15	Quiz	P-29,30	Quiz

CSEC14203– Object Oriented Programming with C/C++

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Basic concept of OOPS	C-1	Lecture
Unit-I	Review of basic concepts of object-oriented programming	C-2	Lecture
Unit-I	Comparison between procedural programming paradigm and object-oriented programming paradigm	C-3	Lecture
Unit-I	Classes and Objects: Specifying a class	C-4	Lecture
Unit-I	Creating class objects, Accessing class members	C-5	Lecture
Unit-I	Access specifiers – public, private, and protected	C-6	Lecture
Unit-I	Classes, Objects and memory	C-7	Lecture
Unit-I	Static members, The const keyword and classes	C-8	Lecture
Unit-I	Static objects, Friends of a class	C-9	Lecture
Unit-I	Empty classes	C-10	Lecture
Unit-I	Nested classes, Local classes	C-11	Lecture
Unit-I	Abstract classes, Container classes, Bit fields	C-12	Lecture
Unit-I	Presentation	C-13	Presentation
	Home Assignment		Home Assignment
	Clarification Class	C-14	Clarification Class
	Class Room Assignment	C-15	Class Assignment
Unit-II	Console Based I/O		
Unit-II	Concept of streams, Console Based I/O	C-16	Lecture
Unit-II	Hierarchy of console stream classes,	C-17	Lecture
Unit-II	Input/output using Overloaded operators >> and << and Member functions of I/O stream classes	C-18	Lecture
Unit-II	Formatting Output	C-19	Lecture
Unit-II	Formatting using ios class functions and flags	C-20	Lecture
Unit-II	Formatting using manipulators	C-21	Lecture
Unit-II	Constructors and Destructors: Need for constructors and destructors	C-22	Lecture
Unit-II	Class Room Assignment	C-23	Class Assignment
Unit-II	Copy constructor	C-24	Lecture
Unit-II	Dynamic constructors	C-25	Lecture
Unit-II	Destructors	C-26	Lecture
	Clarification Class 2	C-27	Clarification Class
	Guest Lecture 1	C-28	Guest lecture
	Home Assignment	C-29	Home Assignment
Unit-III	Loops, Arrays & Pointers	C-30	Lecture
Unit-III	"for", "while" and "do – while" loops, break and continue statement	C-31	Lecture
	Home Assignment		Home Assignments
	Seminar		Seminar
Unit-IV	nested control statement, value returning functions	C-32	Lecture
Unit-IV	void functions, value versus reference Parameters	C-33	Lecture
Unit-IV	local and global variables, static and automatic variables	C-34	Lecture
	Seminar	C-35	Seminar

Unit-IV	enumeration type	C-36	Lecture

Unit-IV	one dimensional array, two dimensional array	C-37	Lecture
	Class Room Assignment	C-38	Class Assignment
Unit-IV	character array	C-39	Lecture
Unit-IV	pointer data and pointer variables	C-40	Lecture
	Clarification Class	C-40	Clarification Class
	Webinar	C-41	Webinar
Unit-IV	Object Oriented Concepts, Virtual Function & Polymorphism	C-42	Lecture
Unit-IV	Abstraction, encapsulation	C-43	Lecture
Unit-IV	Inheritance and Its types	C-44	Lecture
Unit-IV	Inheritance and Its types	C-45	Lecture
Unit-IV	Home Assignment		Home Assignments
Unit-IV	Static and Dynamic binding	C-46	Lecture
Unit-IV	Guest Lecture	C-47	Guest lecture
Unit-IV	Overloading	C-48	Lecture
Unit-IV	Program Development: Object oriented analysis	C-49	Lecture
Unit-IV	Design, unit testing & debugging	C-50	Lecture
Unit-IV	system testing & integration	C-51	Lecture
Unit-IV	Webinar	C-52	Webinar
	Class Room Assignment	C-53	Class Assignment
	Quiz	C-54	Quiz
Unit-IV	Virtual Functions and Polymorphism: Concept of Binding	C-55	Lecture
Unit-IV	Early binding and late binding	C-56	Lecture
Unit-IV	Virtual functions, Pure virtual functions	C-57	Lecture
Unit-IV	Abstract classes,	C-58	Lecture
Unit-IV	Virtual destructors & polymorphism	C-59	Lecture
Unit-IV	Clarification Class	C-60	Clarification Class

CSEC14204– Object Oriented Programming with C/C++ Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	sum and product of digits of an integer, reverse a number	P1-P2	Practical
2	sum of the first n terms, Prime No.	P3-P4	Practical
3	Factors, Swapping	P5-P6	Practical
4	Triangle of stars, Array: Print even-valued elements, odd-valued elements	P7-P8	Practical
5	sum and average of the elements of array, maximum and minimum element of array	P9-P10	Practical
6	Concatenation of strings-Streams input output, half triangle of stars using streams	P11-P12	Practical
7	Using operator overloading, implementation of matrix operations	P13-P14	Practical
8	Using operator overloading and function overloading for string operations	P15-P16	Practical
9	Calculate and print the sum and average of the elements of array, Print the maximum and minimum element of array, Write a program that swaps two numbers using pointers, Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main function.	P17-P20	Practical
10	WAP to display Fibonacci series using iteration, WAP to calculate Factorial of a number using iteration, WAP to calculate Factorial of a number using recursion, Create Matrix class using templates	P19-P20	Practical
11	Create Matrix class using templates	P21-P22	Practical
12	Create a class Box containing length, breath and height and calculate surface area and volume.	P23-P24	Practical
13	WAP for matrix addition, Using concept of constructor and destructors, create database for students database.	P24-P25	Practical

CSEC14205– Operating Systems

Unit	Particulars	Class No.	Pedagogy of Class
Unit I	Introduction to operating system	C-1	Lecture
Unit I	need and operating system services	C-2	Lecture
Unit I	operating system classification	C-3	Lecture
Unit I	batch processing, Multiprogramming, Multitasking, parallel Systems,	C-4	Lecture
Unit I	Distributed system, Real time system, SYSTEM CALL	C-5	Lecture
Unit I	Process concept, Process scheduling,	C-6	Lecture
Unit I	threads, overview of Inter process communication,	C-7	Lecture
Unit I	CPU scheduling, Dead Lock, Deadlock characteristic, Prevention	C-8	Lecture
	Clarification Class1	C-9	Clarification Class
	Home ASSIGNMENT-1		Home Assignments
	Class Assignment-1	C-10	Class Assignment
Unit II	Memory management		
Unit II	Memory management	C-11	Lecture
Unit II	Logical versus Physical address space	C-12	Lecture
Unit II	Swapping, Partition, Paging and segmentation	C-13	Lecture
Unit II	Virtual memory: Demand paging	C-14	Lecture
Unit II	Page replacement algorithms, Allocation algorithms	C-15	Lecture
Unit II	Thrashing	C-16	Lecture
	Clarification Class 2	C-17	Clarification Class
	Home ASSIGNMENT-2		Home Assignments
Unit III	File Management		
Unit III	File Management	C-18	Lecture
Unit III	Seminar	C-19	Seminar
Unit III	File concept, access methods, and Directory structure	C-20	Lecture
Unit III	single level, two lever, tree structures	C-21	Lecture
Unit III	acrylic graph and general graph directory	C-22	Lecture
Unit III	file protection, free space management	C-23	Lecture
Unit III	Guest lecture	C-24	Guest lecture
Unit III	Clarification Class 3	C-25	Clarification Class
Unit III	MCQ Quiz Based on job oriented	C-26	Quiz
	Home ASSIGNMENT-3		Home Assignments
Unit IV	Device Management: SEMAPHORE		
Unit IV	Device Management: SEMAPHORE	C-27	Lecture
Unit IV	Disk Structure, Disk Scheduling	C-28	Lecture
Unit IV	Webinar	C-29	Webinar
Unit IV	FCFS Scheduling, SSTF Scheduling,	C-30	Lecture
Unit IV	SCAN Scheduling, C-SCAN Scheduling	C-31	Lecture
Unit IV	Disk Scheduling algorithm	C-32	Lecture
Unit IV	Presentation	C-33	Presentation
Unit IV	Presentation	C-34	Presentation
Unit IV	Avoidance, Detection and Recovery, Critical Section	C-35	Lecture
Unit IV	Synchronization, Hardware, Semaphore	C-36	Lecture
Unit IV	Combined Approach to dead lock Handling	C-37	Lecture

	Clarification Class 4	C-38	Clarification Class
	Class Room Assignment 3	C-39	Class Assignment
Unit V	Goals of Protection, Domain of Protection, Access Matrix	C-40	Lecture
Unit V	Security and Authentication, Revocation of access Rights	C-41	Lecture
Unit V	Program Threats and System Threads	C-42	Lecture
Unit V	Clarification Class 5	C-43	Clarification Class
	Guest lecture	C-44	Guest lecture
	Webinar	C-45	Webinar

CSEC14206– Operating Functions Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Basic Commands in unix	P-1,2	Practical
2	VI editor	P-3,4	Practical
3	Shell Programming	P-5,6	Practical
4	File Permission	P-7,8	Practical
5	Factorial of any number	P-9,10	Practical
6	Write a program to check whether a given string is palindrome or not.	P-11,12	Practical
7	Simple Interest	P-13,14	Practical
8	Activity1	P-15,16	Activity
9	Global and Internal Variables, Extern Variables	P-17,18	Practical
10	Bitwise operators , Size of data Types , Switch Statement	P-19,20	Practical
11	Area of Circle	P-23,24	Practical
12	Nested If-else, Do while	P-25,26	Practical
13	For Loop, other scrpitng Programmes	P-27,28	Practical
14	Nano and emacs editor in linux	P-29,30	Practical

CSEC14207– Digital Electronic Circuits

Unit	Particulars	Class No.	Pedagogy of Class
Unit- I	NUMBER SYSTEMS: Introduction of Syllabus, Introduction of digital Electronics, Advantages of digital electronics, application of digital electronics, Modern day usage of Digital electronics	C-1	Lecture
Unit- I	Introduction of Number System, Decimal, Hexadecimal number system, Octal Number system and Binary Number System	C-2	Lecture
Unit- I	Conversion of Number System with Example	C-3	Lecture
Unit- I	Conversion of Number System with Example-II	C-4	Lecture
Unit- I	Home Assignment No. 1 - Based on Conversions		Home Assignments
Unit- I	Arithmetic Operation, Boolean Algebra, De Morgons, Theorem	C-5	Lecture
Unit- I	Example based on Boolean Algebra	C-6	Lecture
Unit- I	Example based on Boolean Algebra	C-7	Lecture
Unit- I	Class Room Assignment No. 1	C-8	Class Assignment
Unit- I	Error detection and Corrections Codes	C-9	Lecture
Unit- I	Clarification Class-1	C-10	Clarification Class
Unit-II	COMBINATIONAL CIRCUITS		
Unit-II	Simplification of Boolean Algebra, Introduction of K-Map	C-11	Lecture
Unit-II	Simplification of Boolean using K-Map with Example	C-12	Lecture
Unit-II	Home Assignment No- 2 based on Karnaugh Map		Home Assignments
Unit-II	Simplification of Boolean function using Q M Method	C-13	Lecture
Unit-II	Half Adder, Full Adder, Subtractor, BCD Adder, Full Speed Adder, Multiplier, Divider, Decoder and Encoder	C-14	Lecture
Unit-II	ALU, Code Conversions, Magnitude Comparators	C-15	Lecture
Unit-II	Multiplexer, De-Multiplexer and Application of Multiplexer and De-Mux	C-16	Lecture
Unit-II	Implementation using ROM, PLA, PAL, FPGA and TTL Ics for their Application	C-17	Lecture
Unit-II	Implementation using ROM, PLA, PAL, FPGA and TTL Ics for their Application-II	C-18	Lecture
Unit-II	Class Room Assignment No. 2	C-19	Class Assignment
Unit-II	Clarification Class - 2	C-20	Clarification Class
Unit- III	SEQUENTIAL CIRCUITS		
Unit- III	Various Types of Flip-Flops and their Conversions	C-21	Lecture
Unit- III	Various Types of Flip-Flops and their Conversions-II	C-22	Lecture
Unit- III	Seminar	C-23	Seminar
Unit- III	Counter and Its Type	C-24	Lecture
Unit- III	Presentation-I	C-25	Presentation
Unit- III	Guest Lecture -1	C-26	Guest lecture
Unit- III	Design of Synchronous and Asynvhronous Sequential Circuits-II	C-27	Lecture
Unit- III	Clarification Class -3	C-28	Clarification Class

Unit- III	Guest Lecture -2	C-29	Guest lecture

Unit- III	Class Room Assignment 3	C-30	Class Assignment
Unit-IV	MEMORIES - TYPES OF ROM		
Unit-IV	Memory and Its Type	C-31	Lecture
Unit-IV	Static and Dynamic Memory	C-32	Lecture
Unit-IV	Representative Circuits for BJT	C-33	Lecture
Unit-IV	Presentation-II	C-34	Presentation
Unit-IV	Representative Circuits for BJT-II	C-35	Lecture
Unit-IV	FET Transistor	C-36	Lecture
Unit-IV	Webinar -2	C-37	Webinar
Unit-IV	Memory Expansion using IC	C-38	Lecture
Unit-IV	Flash Memory, CCD, Latest Trends in memories	C-39	Lecture
Unit-IV	ECI, TTL, MOS, CMOS logic families and their comparison	C-40	Lecture
Unit-IV	Home Assignment No.3		Home Assignments
Unit-IV	Activity	C-41	Activity
Unit-IV	Fanout, unit load, current and voltage parameters	C-42	Lecture
Unit-IV	Webinar	C-43	Webinar
Unit-IV	Interfacing of TTL & CMOS Logic families	C-44	Lecture
Unit-IV	Clarification Class -4	C-45	Clarification Class

CSEC14208– Digital Electronic Circuits Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Introduction of digital laboratory equipment. Digital IC Trainer	P-1,2	Practical
2	To study of basic gates and verify the truth - table	P-3,4	Practical
3	Verification of Universal loic gates with truth-table	P-5,6	Practical
4	Activity	P-7,8	Activity
5	Design and Verification of Full adder and full subtractor	P-9,10	Practical
6	Design and Verification of Full adder and full subtractor	P-11,12	Practical
7	To design and Implement Binary to Gray Conversion	P-13,14	Practical
8	To design and Implement Gray to Binary Conversion	P-15,16	Practical
9	To design 1-bit comparator	P-17,18	Practical
10	To design two bit comparator	P-19,20	Practical
11	To design and construct basic flip flop	P-21,22	Practical
12	Test	P-23,24	Test
13	To design asynchronous counter	P-25,26	Practical
14	To design synchronous counter	P-27,28	Practical
15	Presentation-I	P-29,30	Presentation

BSCC15200– Applied Mathematics-III

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Fourier Series and Fourier Transforms: Periodic Functions, Euler's formulas	C-1,2	Lecture
Unit-I	Application of Fourier Series, Conditions for a Fourier expansion; Questions for obtaining the Fourier Series	C-3,4	Lecture
Unit-I	Fourier expansion of odd and even functions, Change of interval	C-5,6	Lecture
Unit-I	Fourier expansion of square wave, rectangular wave, saw-toothed wave	C-7,8	Lecture
Unit-I	Half and full rectified wave, half range sine and cosine series	C-9,10	Lecture
Unit-I	Fourier integrals	C-9,10,11	Lecture
Unit-I	Fourier transforms, Shifting theorem	C-12,13	Lecture
Unit-I	Fourier transforms of derivatives, Fourier transforms of integrals	C-14,15	Lecture
Unit-I	Convolution theorem, Fourier transform of Dirac-delta function.	C-16,17	Lecture
Unit-I	Clarification Class -I	C-18	Clarification Class
	Classroom Assignment - I	C-19	Class Assignment
	Home Assignment - I		Home Assignments
Unit-II	Functions of Complex Variable: Definition, Exponential function	C-20,21	Lecture
Unit-II	Trigonometric and Hyperbolic functions, Logarithmic functions	C-22,23	Lecture
Unit-II	Limit and Continuity of a function	C-24,25	Lecture
Unit-II	Differentiability and Analyticity of function.	C-26,27	Lecture
Unit-II	Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic	C-28,29,30	Lecture
Unit-II	Polar form of the Cauchy-Riemann equations	C-31	Lecture
Unit-II	Harmonic functions, application to flow problems	C-32,33	Lecture
Unit-II	Integration of complex functions. Cauchy-Integral theorem and formula	C-34,35	Lecture
	Clarification Class -II	C-36	Clarification Class
	Classroom Assignment - II	C-37	Class Assignment
	Home Assignment - II		Home Assignments
Unit-III	Power series, radius and circle of convergence	C-38,39	Lecture
Unit-III	Taylor's, Maclaurin's and Laurent's series	C-40,41	Lecture
Unit-III	Zeroes and singularities of complex functions	C-42,43	Lecture
Unit-III	Residues Evaluation of real integrals using residues (around unit and semi-circle only)	C-44,45	Lecture
Unit-III	Linear Programming: Linear programming problems formulation	C-46,47	Lecture

Unit-III	Solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.	C-48,49,50,51,52	Lecture
	Clarification Class -III	C-53	Clarification Class
	Classroom Assignment - III	C-54	Class Assignment
	Home Assignment - III		Home Assignments
Unit-IV	Probability Distributions and Hypothesis Testing: Conditional probability	C-55	Lecture
Unit-IV	Bayes theorem and its applications	C-56	Lecture
Unit-IV	Expected value of a random variable	C-57	Lecture
Unit-IV	Properties and application of Binomial, Poisson and Normal distributions	C-58	Lecture
Unit-IV	Testing of a hypothesis	C-59	Lecture
Unit-IV	Tests of significance for large samples, Student's t-distribution (Applications only), Chi-square test of goodness of fit	C-60	Lecture
	Clarification Class -IV		Clarification Class
	Classroom Assignment - IV		Class Assignment
	Home Assignment - IV		Home Assignments
	PPT Presentation		Presentation
	Webinar		Webinar
	Revision		Tutorial

VAC088028– Human Values, Business & Managerial Ethics

Unit	Particulars	Class No.	Pedagogy of Class
Unit- I	Concept of values & its formation, Values & Behaviour	C-1	Lecture
Unit- I	Ethics Meaning, nature Scope	C-2	Lecture
Unit- I	Morality vs legality dilemma & Facts & Values & Subjectivism & Relativism	C-3	Lecture
Unit- I	Moral Development Kohalsberg 6 stage of moral development	C-4	Lecture
Unit- I	Myth of Moral Business	C-5	Presentation
Unit- I	Ethics & Business	C-6	Clarification Class
Unit-II	Decision Making (Normal Dilemma & Problems)	C-7	Lecture
Unit-II	Application of ethical theories in business Practice ie	C-8	Class Assignment
Unit-II	Utilitarianism (Bentham & J.S Mill)	C-9	Lecture
Unit-II	Take Home Assignment - I		Home Assignment
Unit-II	Deontology (I. Kant)	C-10	Lecture
Unit-II	Economic Justice: Distributive justice (John Rawls) & Libertarian justice (Robest Nozick)	C-11	Presentation
Unit-II	Virtue Ethics Theory (Aristotle)	C-12	Clarification Class
Unit-III	Concept of CSR , Changing expectation of society	C-13	Lecture
Unit-III	Model's Of CSR Carolls Model, Ackerman's CSR Model	C-14	Webinar
Unit-III	Why social Responsibility of Business, Arguments in favor of social responsibility	C-15	Lecture
Unit-III	Arguments against of social responsibility	C-16	Lecture
Unit-III	Take Home Assignment - II		Home Assignment
Unit-III	Consumerism & Consumer rights	C-17	Class Assignment
Unit-III	Ethical Issues in Business	C-18	Clarification Class
Unit-IV	Features of free and perfect competitive market, Monopoly & Oligopoly, Corruption & Bribery & Ethics in advertising	C-19	Lecture
Unit-IV	Corruption & Bribery & Ethics in advertising	C-20	Lecture
Unit-IV	Finance: Fairness and efficiency in financial market	C-21	Guest Lecture
Unit-IV	Insider trading & Green Mail & Golden parachute	C-22	Lecture
Unit-IV	HR: Worker Rights & duties & Work place Safety	C-23	Lecture
Unit-IV	Take Home Assignment - III		Home Assignment
Unit-IV	Sexual Harassment & Whistle Blowing policy	C-24	Clarification Class
Unit-V	Ethical Decision making	C-25	Lecture
Unit-V	Role of Moral philosophy in decision	C-26	Lecture
Unit-V	Argument for and against in decision making	C-27	Class Assignment
Unit-V	Challenges of ethical issues due to globalization	C-28	Lecture
Unit-V	Power & Politics in organization	C-29	Quiz
Unit-V	Hierarchism as organisation value & Indian ethos in Management	C-30	Clarification Class

SEC077003– Ability and Skill Enhancement -III

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	What is Book Review, Purpose & Importance of Book Review Types of Book Review, Elements & Steps of Writing Book Review	C-1	Lecture
Unit-I	Book Review Writing	C-2	Class Assignment
Unit-I	What is Movie Review, Purpose & Importance of Movie Review Types of Movie Review, Elements & Steps of Writing Movie Review	C-3	Lecture
Unit-I	Watch a movie	C-4	Activity
Unit-I	Write the review of the movie shown in the class		Home Assignments
Unit-I	Clarification Class Unit 1	C-5	Clarification Class
Unit-II	Reading Comprehension	C-6	Lecture
Unit-II	Debate	C-7	Class Assignment
Unit-II	Rewriting Mythology/Folklore	C-8	Lecture
Unit-II	Watch an international greek myth or indian folklore	C-9	Activity
Unit-II	Rewriting Mythology/Folklore watched in the class		Home Assignments
Unit-II	News Analysis	C-10	Activity
Unit-II	Role Plays	C-11	Lecture
Unit-II	Role Plays	C-12	Class Assignment
Unit-III	What is emotional intelligence, E.Q. Tests, performing under pressure, how to take right decisions under pressure keeping balance in difficult emotional situations. The science of emotional intelligence, characteristics of emotional intelligence,	C-13	Lecture
Unit-III	Emotions handling- identifying good and bad emotions	C-14	Lecture
Unit-III	how to control emotions, how to manage negative emotions keeping balance of mental stability	C-15	Lecture
Unit-III	stress and distress	C-16	Lecture
Unit-III	Activity/Case Study	C-17	Activity
Unit-III	Unit 3	C-18	Clarification Class
Unit-IV	What is GD, Types of Group Discussions	C-19	Lecture
Unit-IV	GD: Do's & Dont's, Participation,	C-20	Lecture
Unit-IV	GD: Thinking, Structuring, Group Behaviour	C-21	Lecture
Unit-IV	Leadership Skills, Interpersonal Skills, Persuasive Skills, Conceptualization Skills	C-22	Lecture
Unit-V	What is documentary, aims & objectives	C-23	Lecture
Unit-V	Documentary/Movie Screening & Reviews	C-24	Activity
Unit-V	documentary for social cause	C-25	Presentation
Unit-V	documentary for social cause: Screening and Narration	C-26	Presentation
Unit-V	Preparing a documentary		Home Assignments
Unit-V	Unit 5	C-27	Clarification Class
	Webinar	C-28	Webinar
	Seminar	C-29	Seminar
	Guest Lecture	C-30	Guest lecture

Note: The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing.

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