V SEMESTER SYLLABUS

OPERATING SYSTEMS

Sub Code :	**21SCS51**	**IA Marks :**	**50**
Hrs/ Week :	**3**	**Exam Hours :**	**2**
Credits :	**3**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**	**Total Hours :**	**45**

Course Objectives:

- Introduce concepts and terminology used in OS.
- Explain threading and multithreaded systems.
- Illustrate process synchronization and concept of Deadlock.
- Introduce Memory and Virtual memory management, File system and storage techniques.

Course Outcomes:

On Completion of this course the students are able to,

CO1: Demonstrate need for OS and different types of OS.

CO2: Apply suitable techniques for management of different resources.

CO3: Use processor, memory, storage and file system commands.

CO4: Realize the different concepts of OS in platform of usage through case studies.

CO5: Realize the storage structure of the OS.

MODULE 1

Introduction to operating systems, System structures: What operating systems do; Computer System organization; Computer System architecture; Operating System structure; Operating System operations; Process management; Memory management; Storage management; Protection and Security; Distributed system; Special-purpose systems; Computing environments. Operating System Services; User - Operating System interface; System calls; Types of system calls; System programs; Operating system design and implementation; Operating System structure; Virtual machines; Operating System generation; System boot.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept*.

9 Hours

MODULE 2

Process Management: Process concept; Process scheduling; Operations on processes; Inter process communication.

Multi-threaded Programming: Overview; Multithreading models; Thread Libraries; Threading issues.

Process Scheduling: Basic concepts; Scheduling Criteria; Scheduling Algorithms; Multiple-processor scheduling; Thread scheduling.

Process Synchronization: Synchronization: The critical section problem; Peterson's solution; Synchronization hardware; Semaphores; Classical problems of synchronization; Monitors.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 3

Deadlocks : Deadlocks; System model; Deadlock characterization; Methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection and recovery from deadlock.

Memory Management: Memory management strategies: Background; Swapping; Contiguous memory allocation; Paging; Structure of page table; Segmentation.
Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 4

Virtual Memory Management: Background; Demand paging; Copy-on-write; Page replacement; Allocation of frames; Thrashing.
File System: Implementation of File System; File system: File concept; Access methods; Directory structure; File system mounting; File sharing; Protection: Implementing File system: File system structure; File system implementation; Directory implementation; Allocation methods; Free space management.
Teaching Methodology:*: Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 5

Secondary Storage Structures, Protection: Mass storage structures; Disk structure; Disk attachment; Disk scheduling; Disk management; Swap space management. Protection**:** Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights, Capability- Based systems. Case Study**:** The Linux Operating System: Linux history; Design principles; Kernel modules; Process management; Scheduling; Memory Management; File systems, Input and output; Inter-process communication.
Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

Continuous Internal Assessment

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini-Project/ solving Challenging Problems	Regular mode of Assessment	15
2	One Open Book written Exam at the end of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the regulations	5
		Total	50

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Principles 7th edition, Wiley-India, 2006.

Reference Books:

1. Ann McHoes Ida M Fylnn, Understanding Operating System, Cengage Learning, 6th Edition
2. D.M Dhamdhere, Operating Systems: A Concept Based Approach 3rd Ed, McGrawHill, 2013.
3. P.C.P. Bhatt, An Introduction to Operating Systems: Concepts and Practice 4th Edition, PHI(EEE), 2014.
4. William Stallings Operating Systems: Internals and Design Principles, 6th Edition, Pearson.

MICROPROCESSOR AND INTERFACING TECHNIQUES

Sub Code :	**21SCS52**	**IA Marks :**	**50**
Hrs/ Week :	**3**	**Exam Hours :**	**2**
Credits :	**3**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**	**Total Hours :**	**45**

Course Objectives:

- To introduce 8085 architecture and programming in assembly language.
- To introduce basic concepts of interfacing memory and peripheral devices to a microprocessor.
- To introduce serial and parallel bus standards.
- To introduce 8051 microcontroller.
- To introduce various advanced processor architectures such as 80X86, Pentium and Multicore processors.

Course Outcomes:

On Completion of this course the students are able to,

CO1: List and specify the various features of microprocessor, memory and I/O devices including concepts of system bus.

CO2: Identify the various elements of 8085 microprocessor architecture, its bus organization including control signals

CO3: List the pin functions of the 8085 microprocessor

CO4: Describe the 8085 processor addressing modes, instruction classification and function of each instruction and write the assembly language programs using 8085 instructions.

CO5: Explain the concepts of memory and I/O interfacing with 8085 processor with Programmable devices.

MODULE 1

8085 Architecture: Introduction to microprocessors and microcontrollers, 8085 Processor Architecture, Internal operations, Instructions and timings, Programming the 8085 – Introduction to 8085 instructions, addressing modes and Programming techniques with Additional instruction.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept*.

9 Hours

MODULE 2

Stacks and subroutines, interfacing peripherals: Basic interfacing concepts, interfacing output displays, interfacing input keyboards. Interrupts - 8085 Interrupts, Programmable Interrupt Controller (8259A). Direct Memory Access (DMA) – DMA Controller (Intel 8257), Interfacing 8085 with Digital to Analog and Analog to Digital converters.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 3

Interface: Programmable peripheral interface (Intel 8255A), Programmable communication interface (Intel 8251), Programmable Interval timer (Intel 8253 and 8254), Programmable Keyboard

/ Display controller (Intel 8279). Serial and parallel bus standards RS 232 C, IEEE 488.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 4

Introduction to Microcontrollers: 8051 Architecture – Instruction set, Addressing modes and Programming Techniques. Comparison of various families of 8-bit micro controllers. System Design Techniques Interfacing of LCD, ADC, Sensors, Stepper motor, keyboard and DAC using microcontrollers Communication standards – serial RS232 and USB.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 5

Microprocessor Applications and trends in microprocessor Technology: 8-bit, 16-bit and 32-bit microprocessors. Advanced Processor Architecture – Register structure, Instruction set, Addressing modes of 8086.Features of advanced microprocessors.80386, 80486, Pentium and Multi-Core Processors.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

Continuous Internal Assessment

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini-Project/ solving Challenging Problems	Regular mode of Assessment	15
2	One Open Book written Exam at the end of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the regulations	5
		Total	50

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. R Gaonkar ,"Microprocessor Architecture, Programming, and Applications with the 8085".
2. Muhammad Ali Mazidi, "The 8051 Microcontroller and Embedded Systems : Using Assembly and C".

Reference Books:

1. Crisp John Crisp ,"Introduction to Microprocessors and Microcontrollers" .
2. A Nagoor Kani Barry B. Brey, "Microprocessors And Microcontrollers" ,The Intel Microprocessor, 8086/8088,8018/80188, 80286, 80386, 80486, Pentium and Pentium pro-processors – architecture, Programming and interfacing, 4 Edition, Prentice Hall 1993.

INTRODUCTION TO AI AND ML

Sub Code :	**21SCS53**	**IA Marks :**	**50**
Hrs/ Week :	**3**	**Exam Hours :**	**2**
Credits :	**3**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**	**Total Hours :**	**45**

Course Objectives:

- Present an overview of artificial intelligence (AI) principles and approaches.
- Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents: Search, Knowledge representation, inference, logic, and learning.
- Students will implement a small AI system in a team environment. The knowledge of artificial intelligence plays a considerable role in some applications students develop for courses in the program.
- Students have understanding of issues and challenges of Machine Learning.
- Should be able to select data, model selection, model complexity etc.

Course Outcomes:

On Completion of this course the students are able to,

CO1: To understand the basics of Artificial Intelligence , Intelligent Agents and its structure.
CO2: To understand the problem solving by various searching techniques.
CO3: To understand the concept of informed search and Exploration.
CO4: Identify the characteristics of datasets and compare the trivial data and big data for various applications.
CO5: Understand machine learning techniques and computing environment that are suitable for the applications under consideration.

MODULE 1

Introduction: AI History and applications. Overview of AI application areas: game playing, automated reasoning and theorem proving, expert systems, natural language understanding, planning and robotics, machine learning and Alan Turing Test.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept*.

9 Hours

MODULE 2

The Propositional and Predicate Logic: Symbol and sentences, the semantics of the Propositional Calculus & Predicate Calculus. Inference Rules and Theorem Proving. Axioms, Literals, Horn clause & Clausal forms.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 3

Reasoning: Inductive, Deductive, Abductive and Default reasoning. More examples on Resolution proof.

Problem Solving as Search: Structures and strategies for state space search. Algorithms for Heuristic search, Heuristic evaluation functions.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 4

Brief Introduction to Machine Learning: Supervised Learning, Unsupervised Learning, Reinforcement Learning.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 5

Probability Basics, Linear Algebra, Statistical Decision Theory – Regression & Classification, Bias – Variance, Linear Regression ,Multivariate Regression

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

Continuous Internal Assessment

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini-Project/ solving Challenging Problems	Regular mode of Assessment	15
2	One Open Book written Exam at the end of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the regulations	5
		Total	50

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1.Nils J. Nilsson ,"Artificial Intelligence- A New Synthesis", Morgan Kaufmann Publishers.

2.T. Hastie, R. Tibshirani, J. Friedman,"The Elements of Statistical Learning" , 2nd Ed., 2008.

Reference Books:

1. E Rich, K Knight, and S B Nair ," Artificial Intelligence", 3rd Ed., Tata Mc-Graw Hill, 2009.
2. Stuart Russell and Peter Norvig," Artificial Intelligence: A Modern Approach", 3rd Ed., Prentice Hall,2009.
3. Christopher Bishop,"Pattern Recognition and Machine Learning", 2nd Ed..

THEORY OF COMPUTATIONS AND COMPILER DESGN

Sub Code :	**21SCS54**	**IA Marks :**	**50**
Hrs/ Week :	**3**	**Exam Hours :**	**2**
Credits :	**3**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**	**Total Hours :**	**45**

Course Objectives:

- Introduce core concepts in Automata and Theory of Computation.
- Identify different Formal language Classes and their Relationships.
- Design Grammars and Recognizers for different formal languages.
- To understand the theory and practice of compiler implementation.
- To learn finite state machines and lexical scanning.

Course Outcomes:

On Completion of this course the students are able to,

CO1: Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation.

CO2: Learn how to translate between different models of Computation (e.g., Deterministic and Non- deterministic and Software models).

CO3: Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.

CO4: To apply the knowledge of Lex tool & Yacc tool to develop a scanner & parser.

CO5: To design & implement a software system for backend of the compiler.

MODULE 1

Why study the Theory of Computation, Languages and Strings: Strings, Languages. A Language Hierarchy, Computation, Finite State Machines (FSM): Deterministic FSM, Regular languages, Designing FSM, Nondeterministic FSMs, From FSMs to Operational Systems, Simulators for FSMs, Minimizing FSMs, Canonical form of Regular languages, Finite State Transducers, Bidirectional Transducers.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept*.

9 Hours

MODULE 2

Regular Expressions (RE): what is a RE?,Kleene's theorem, Applications of REs, Manipulating and Simplifying REs. Regular Grammars: Definition, Regular Grammars and Regular languages. Regular Languages (RL) and Non regular Languages: How many RLs, To show that a language is regular, Closure properties of RLs, to show some languages are not RLs.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 3

Context-Free Grammars(CFG): Introduction to Rewrite Systems and Grammars, CFGs and languages, designing CFGs, simplifying CFGs, proving that a Grammar is correct, Derivation and

Parse trees, Ambiguity, Normal Forms.

Pushdown Automata (PDA): Definition of non-deterministic PDA, Deterministic and Non-deterministic PDAs, Non-determinism and Halting, alternative equivalent definitions of a PDA, alternatives that are not equivalent to PDA.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 4

Introduction: Issues related to programming Language Design, Issues related to Finite-State Machines, Phases of Compiler Design, Lexical Analysis, Error Detection and Recovery.

Teaching Methodology:*: Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 5

Top-Down Parsing, Bottom-up Parsing: LL(1) Grammars, Recursive Descent Parsers, LR Grammars – Concepts and Terminology, LR(O) Parsers, SLR(1) Parsers, Canonical LR(1) Parsers, LALR(1) Parsers, using ambiguous grammar. Attributed Translation Grammar, L-Attributed Translation Grammar.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

Continuous Internal Assessment

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini-Project/ solving Challenging Problems	Regular mode of Assessment	15
2	One Open Book written Exam at the end of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the regulations	5
		Total	50

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Elaine Rich, Automata, Computability and Complexity, 1st Edition, Pearson Education, 2012/2013.
2. K L P Mishra, N Chandrasekaran , 3rd Edition, Theory of Computer Science, PhI, 2012.
3. A. V. Aho & J. D. Ullman Narosa ,"Principles of Compiler Design".

Reference Books:

1. John E Hopcroft, Rajeev Motwani, Jeffery D Ullman, Introduction to Automata Theory, Languages, and Computation, 3rd Edition, Pearson Education, 2013.
2. Michael Sipser : Introduction to the Theory of Computation, 3rd edition, Cengage

learning,2013.
3. John C Martin, Introduction to Languages and The Theory of Computation, 3rd Edition, Tata McGraw –Hill Publishing Company Limited, 2013.
4. Peter Linz, “An Introduction to Formal Languages and Automata”, 3rd Edition, Narosa Publishers, 1998.
5. J Tremblay and Paul G. S ,”The Theory and Practice of Compiler Writing”.

COMPUTER GRAPHICS

Sub Code :	**21SCS55**	**IA Marks :**	**50**
Hrs/ Week :	**3**	**Exam Hours :**	**2**
Credits :	**3**	**Exam Marks:**	**50**
Mode of Delivery:	**PBL**	**Total Hours :**	**45**

Course Objectives:

- Explain hardware, software and OpenGL Graphics Primitives.
- Illustrate interactive computer graphic using the OpenGL.
- Design and implementation of algorithms for 2D graphics Primitives and attributes.
- Demonstrate Geometric transformations, viewing on both 2D and 3D objects.
- Infer the representation of curves, surfaces, Color and Illumination models.

Course Outcomes:

On Completion of this course the students are able to,

CO1: Design and implement algorithms for 2D graphics primitives and attributes.
CO2: Illustrate Geometric transformations on both 2D and 3D objects.
CO3: Apply concepts of clipping and visible surface detection in 2D and 3D viewing and Illumination Models.
CO4: Decide suitable hardware and software for developing graphics packages using OpenGL.
CO5: To understand and design Animation using OpenGL.

MODULE 1

Overview: Computer Graphics and OpenGL: Computer Graphics: Basics of computer graphics, Application of Computer Graphics, Video Display Devices: Random Scan and Raster Scan displays, graphics software. OpenGL: Introduction to OpenGL ,coordinate reference frames, specifying two-dimensional world coordinate reference frames in OpenGL, OpenGL point functions, OpenGL line functions, point attributes, line attributes, curve attributes, OpenGL point attribute functions, OpenGL line attribute functions, Line drawing algorithms(DDA, Bresenham‟s), circle generation algorithms (Bresenham‟s).

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept*.

9 Hours

MODULE 2

Fill area Primitives, 2D Geometric Transformations and 2D viewing: Fill area Primitives: Polygon fill-areas, OpenGL polygon fill area functions, fill area attributes, general scan line polygon fill algorithm, OpenGL fill-area attribute functions. 2DGeometric Transformations: Basic 2D Geometric Transformations, matrix representations and homogeneous coordinates. Inverse transformations, 2DComposite transformations, other 2D transformations, raster methods for geometric transformations, OpenGL raster transformations, OpenGL geometric transformations function, 2D viewing: 2D viewing pipeline, OpenGL 2D viewing functions.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 3

Clipping,3D Geometric Transformations, Color Clipping: clipping window, normalization and viewport transformations, clipping algorithms,2D point clipping.
3DGeometric Transformations: 3D translation, rotation, scaling, composite 3D transformations, other 3D transformations, affine transformations, OpenGL geometric transformations functions. Color Models: Properties of light, color models, RGB and CMY color models.
Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 4

3D Viewing and Visible Surface Detection: 3DViewing:3D viewing concepts, 3D viewing pipeline, 3D viewing coordinate parameters , Transformation from world to viewing coordinates. Visible
Surface Detection Methods: Classification of visible surface Detection algorithms, depth buffer method only and OpenGL visibility detection functions.
Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

MODULE 5

Curves and Computer Animation: Animating Interactive programs, Design of Interactive programs, Logic operations ,Curved surfaces, quadric surfaces, OpenGL Quadric-Surface and Cubic-Surface Functions, Bezier Spline Curves, Bezier surfaces, OpenGL curve functions, Corresponding OpenGL functions.
Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

9 Hours

Continuous Internal Assessment

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini-Project/ solving Challenging Problems	Regular mode of Assessment	30
2	One Open Book written Exam at the end of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics	Regular mode of Assessment	05
4	Attendance	As per the regulations	05
		Total	50

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Donald Hearn & Pauline Baker: Computer Graphics with OpenGL Version,3rd / 4th Edition, Pearson Education,2011
2. Edward Angel: Interactive Computer Graphics- A Top Down approach with OpenGL, 5th edition. Pearson Education, 2008

Reference Books:

1. James D Foley, Andries Van Dam, Steven K Feiner, John F Huges Computer graphics with OpenGL: pearson education
2. Xiang, Plastock : Computer Graphics , sham‟s outline series, 2nd edition, TMG.
3. Kelvin Sung, Peter Shirley, steven Baer : Interactive Computer Graphics, concepts and applications, Cengage Learning
4. M M Raikar & Shreedhara K S Computer Graphics using OpenGL, Cengage publication

MICROPROCESSOR AND INTERFACING LAB

Sub Code :	**21SCSL56**	**IA Marks :**	**50**
Hrs/ Week :	**2+1**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**		

Course Objectives:

- To provide practical exposure to the students on microprocessors, design and coding knowledge on 80x86 and 80x85 family/ARM.
- To give the knowledge and practical exposure on connectivity and execute of interfacing devices with 8086/ARM.

Course Outcomes:

On Completion of this course the students are able to,

CO1: Learn 80x86 instruction sets and gins the knowledge of how assembly language works.
CO2: Design and implement programs written in 80x86 and 80x86 assembly language
CO3: Know functioning of hardware devices and interfacing them to x86 family
CO4: Choose processors for various kinds of applications.

Lab Experiments

1. Study the architecture of 8085 and 8086 and familiarization with its hardware , commands and operations of microprocessor kit.
2. Write a program using 8085 & verify for :
   a) Addition of two 8-bit numbers.
   b) Addition of two 16-bit numbers. (with carry)
3. Write a program using 8085 & verify for :
   a) Subtraction of two 8-bit numbers. (display of barrow)
   b) Subtraction of two 16-bit numbers. (display of barrow)
4. Write a program using 8085 & test for typical data:
   a) Multiplication of two 8-bit numbers by bit rotation method
   B) Division of two 8-bit numbers by repeated subtraction method
5. Write a program using 8086 for division of a defined double word by another word & verify.
6. Write a program using 8085 for finding square-root of a number & verify.
7. Write a program using 8086 for copying 12 bytes of data from source to destination & verify.
8. Write a program using 8086 for arranging an array of numbers in descending order & verify.
9. Write a program to interface ADC & DAC with 8085 & demonstrate generation of square wave
10. Write a program to control the operation of steeper motor using 8085 and 8255 PPI.

Continuous Internal Assessment

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini-Project/ solving Challenging Problems	Regular mode of Assessment	15
2	One Open Book written Exam at the end of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the regulations	5
		Total	50

Scheme of Examination for End Semester Examination of 50 Marks:

- All laboratory experiments are to be included for practical examination.
- Students are allowed to pick one experiment from the lot.
- Strictly follow the instructions as printed on the cover page of answer script
- Marks distribution: Procedure + Conduction + Viva:12+28+10=50 Marks
- Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

OPERATING SYSTEMS LAB

Sub Code :	**21SCSL57**	**IA Marks :**	**50**
Hrs/ Week :	**2+1**	**Exam Hours :**	**3**
Credits :	**2**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**		

Course Objectives:

- To familiarize the students with the Operating System.
- To demonstrate the process, memory, file and directory management issues under the UNIX/ LINUX operating system
- To introduce LINUX basic commands
- To make students how to make simple programs in LINUX and administrative task of LINUX

Course Outcomes:

On Completion of this course the students are able to,

CO1: Describe OS support for processes and threads.
CO2: Recognize CPU Scheduling, synchronization, and deadlock.
CO3: Use C / C++ and Unix commands, and develop various system programs under Linux to make use of OS concepts related to process synchronization, shared memory, file systems, etc.

Lab Experiments

1. i. Write a shell script program to find the Maximum three numbers .
   ii. Write a shell script program for comparison of strings
2. i. Perform Arithmetic operation using CASE
   iii. Write a program to draw a Pascal's Triangle
3. i. Calculate the factorial value of a number using shell script .

   ii. To write a shell program to generate fibonacci series.
4. i. Write a program to demonstrates a one-way pipe between two Process .

   ii. Write a program to illustrate IPC through pipe and fork system calls – Printing only odd numbers.
5. i. To write a program to create a process in LINUX.
   ii. To study Dinning Philosophers Problem.
6. Write a program to implement the following process scheduling algorithms
   i. First Come First Serve
   ii. Shortest Remaining Job First
   iii. Round Robin
7. Write a program To simulate banker's algorithm for deadlock avoidance.
8. Write a program To Page replacement algorithm for FIFO.
9. Write a program To Page replacement algorithm for LRU.
10. Write a program To Page replacement algorithm for LFU.

Continuous Internal Assessment

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini-Project/ solving Challenging Problems	Regular mode of Assessment	15
2	One Open Book written Exam at the end of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the regulations	5
		Total	50

Scheme of Examination for End Semester Examination of 50 Marks:

- All laboratory experiments are to be included for practical examination.
- Students are allowed to pick one experiment from the lot.
- Strictly follow the instructions as printed on the cover page of answer script
- Marks distribution: Procedure + Conduction + Viva:12+28+10=50 Marks
- Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

ESEP-3

Sub Code :	**21SQA58**	**IA Marks :**	**50**
Hrs/ Week :	**2**	**Total Hours :**	**25**
Credits :	**2**		
Mode of Delivery:	**RM**		

Course Objectives:

This course enables students to develop their ability to reason by introducing them to elements of formal reasoning. The primary focus will be on recognizing the logical structure of arguments. Topics will include types of statements, symbolism, logical connectives, logical relations, basic deductive inferences, truth tables, validity, invalidity, and soundness. To enhance the problem-solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.

Course Outcomes:

On Completion of this course the students are able to,

CO1: Understand the basic concepts of QUANTITATIVE ABILITY

CO2: Understand the basic concepts of LOGICAL REASONING Skills

CO3: Acquire satisfactory competency in use of VERBAL REASONING

CO4: Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability

CO5: Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

PART – A

Sentence completion - "a. Using sentence clues. b. Using Hints.c. Structure Words.d. Visualize. e. Pro-active thinking. f. Reactive thinking (signpost words, root words, prefix suffix, sentence structure clues).g. Structure Words. h. Elimination.i. Working Backwards. " **Verbal classification -** "a. Familiarity. b. Systematic approcach.c. Logical thinking. d. Elimination. e. Practice makes perfect."

Time, Speed and Distance - "a. Basics of time, speed and distance b. Relative speed c. Problems based on trains d. Problems based on boats and streams e. Problems based on races"

"Average,Problems on Ages Profit and Loss, Discount"- "a. concept of Average b. Weighted Average c. Problems on Ages(based on average) d. Problems on ages (based on Ratio) e.Concept and Problem soving tecnic in Profit and Loss f. Successive Discount"

Syllogism and Venn diagrams, Blood Relations - " a. Syllogisms b. Venn Diagrams – Interpretation c. Venn Diagrams – Solving d.Basic concept and terminology in Blood Relations e. Option Elimination method in Blood Relation"

Logarithms, Algebra - "a. Logarithm concept and problem solving tecnic b. Different types of Algebraic expressions c.Different types of Algebraic equations"

Verbal reasoning - "a. Reading techniques. b. Removing assumptions.c. Managing time. d. Honing analytical skills. e. Practicing the right format. f. Learning from mistakes. "

Spotting errors - "a. Subject Verb Agreement.b. Right usage of Participles and Infinitives. c. Right usage of Verbs.d. Right usage of Adjectives. e. Checking spelling and punctuation errors. "

PART - B

Java

Network Security

Continuous Internal Assessment

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Mini-Project/ solving Challenging Problems	Regular mode of Assessment	15
2	One Open Book written Exam at the end of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the regulations	5
		Total	50

Question paper pattern:

- 10 assessment tests will be conducted based on Multiple choice questions.
- Final marks are based on the test marks conducted during the semester.

Reference Books

1. Quantitative abilities by Arun Sharma
2. Quantitative Aptitude for Competitive Examinations by R S Agrawal
3. Verbal and Non-Verbal reasoning by R S Agrawal

MOOC-1

Sub Code :	**21SCSS01**	**IA Marks :**	**50**
Self Study Hours/Week:	**2**	**Credits :**	**1**

Course Objectives:

- To improve learnability
- Acquire additional knowledge in the field of study
- Skill development
- Industry readiness
- Increased confidence level

Course Outcomes:

- On completion of this course, students will be able to:
- CO1: Improve learnability
- CO2: Acquire additional knowledge in the field of study
- CO3: Develop the skill
- CO4: Industry ready
- CO5: Have more confidence level

About the Course:

- A common Online MOOC/SWAYAM/COURSERA Course is offered in Blended mode.
- The MOOC Coordinator will recommend a department specific common course in MOOC/SWAYAM/COURSERA to all the students of the batch.
- The assessment will be taken by the MOOC Coordinator for 50 Marks at the end of the Course and the remaining 50 marks will be awarded for the Course Completion.
- The student must attend all continuous assessment taken by the MOOC/COURSERA Course Faculty.

Assessment Method for MOOC/SWAYAM/COURSERA Course:

- The Department Faculty Coordinator for the MOOC/SWAYAM/COURSERA Course has to recommend a common course for the students to register the MOOC/SWAYAM/COURSERA Course for a Specific Title.

- The Students have to take all continuous assessment as recommended by the Course Faculty in the MOOC/SWAYAM/COURSERA Course for the internal assessment of 25 Marks.
- The Department Faculty Coordinator for the MOOC/SWAYAM/COURSERA Course is responsible to conduct Assessment (MCQs) for 25 Marks in the Internal Assessment of 50 Marks.

Sl. No.	**Type of Assessment**	**Weightage**	**Marks**
1	Continuous Assessment taken by the MOOC/Coursera Course Faculty	25	25
2	MOOC/SWAYAM/COURSERA Faculty Coordinator has to Conduct Assessment (MCQs & Assignments)	25	25
Total			**50**

INTERNSHIP-1

Sub Code :	**21SCS59**	**IA Marks :**	**50**
Credits:	**2**	**Self study Hours/week :**	**4**

Course Objectives:

- Demonstrate a sound technical knowledge of their internship area / topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.

Course Outcomes:

Each student, under the guidance of a Faculty, is required to:

CO1: Present the work done in his/her internship on the selected topic orally and/or through power point slides.

CO2: Answer the queries and involve in debate/discussion.

CO3: Submit two copies of the typed report with a list of references.

CO4: The participants shall take part in discussion to foster friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

CO5: Demonstrate the presentation with sound technical knowledge and communication skills

Instructions:

Following are the guidelines to be followed for the Internship Programme:

1. The Internship Programme duration is of Four weeks.

2. The internship can be carried out in any industry / R and D Organization / Research Institute Educational institute of repute.

3. The institutions may also suggest the students to enroll for the Internshala platform for free internships as there is MoU with the AICTE for the beneficial of the affiliated Institutions (https://internshala.com/)

4. The Examination of Internship will be carried out in line with the University Project Viva-Voce examination.

5. The Department/college shall nominate staff member/s to facilitate, guide and supervise students under internship.

6. The students shall report the progress of the internship to the guide in regular intervals and seek his/her advice.

7. After the completion of Internship, students shall submit a report with completion and attendance certificates to the Head of the Department with the approval of both internal and external guides.

8. There will be 50 marks for CIE (Seminar: 15, Internship report: 05) and 25 marks for Viva - Voce conducted during SEE. The minimum requirement of CIE marks shall be 50% of the maximum marks.

9. The internal guide shall award the marks for seminar and internship report after evaluation. He/she will also be the internal examiner for Viva-Voce conducted during SEE.

10. The external guide from the industry shall be an examiner for the viva voce on Internship. Viva-Voce on internship shall be conducted at the college and the date of Viva-Voce shall be fixed in consultation with the external Guide. The Examiners shall jointly award the Viva- Voce marks.

11. In case the external Guide expresses his inability to conduct viva voce, the Chief Superintendent of the institution shall appoint a senior faculty of the Department to conduct viva-voce along with the internal guide. The same shall be informed in writing to the concerned Chairperson, Board of Examiners (BOE).

12. The students are permitted to carry out the internship anywhere in India or abroad. The University will not provide any kind of financial assistance to any student for carrying out the Internship.

INTERNATIONAL CERTIFICATION COURSE ON CURRENT TRENDS-3

Sub Code:	**21SCS50**	**Credits:**	**01**
Self study Hrs / Week :	**2**		

Course Objectives:

- Exposure to the latest development in the field
- Learn the new skills
- To make the students Industry ready
- To increase the confidence level of students
- To provide additional knowledge

Course Outcomes:

On completion of this course, students will be able to:

- CO1: Have exposure on the latest development
- CO2: Acquire new skills
- CO3: Become Industry ready
- CO4: Have more confidence
- CO5: Get additional knowledge

About the Course:

- A common Certification Course on current trends will be offered to all the students of the batch.
- The course will be conducted on blended mode.
- At the end of the course, the student has to produce/submit the certificate issued by the certification agency after completing the assessment for the programme.