



II YEAR IV SEMESTER BSc MECs SYLLABUS

SRI RAMAKRISHNA DEGREE COLLEGE (AUTONOMOUS)

NANDYAL

SRI RAMAKRISHNA DEGREE(AUTONOMOUS) COLLEGE: NANDYAL
B.Sc. SECOND YEAR MATHEMATICS SYLLABUS (2021-2022)
SEMESTER – IV, PAPER - 4
REAL ANALYSIS-4

UNIT – I (12 Hours)

REAL NUMBERS :

The algebraic and order properties of \mathbb{R} , Absolute value and Real line, Completeness property of \mathbb{R} , Applications of Supremum property; intervals. (No question is to be set from this portion).

Real Sequences:

Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence. The Cauchy's criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-Weierstrass theorem – Cauchy Sequences – Cauchy's general principle of convergence theorem.

UNIT –II (12 Hours)

INFINITE SERIES :

Series : Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test
2. Cauchy's n^{th} root test or Root Test.
3. D'Alembert's Test or Ratio Test.
4. Alternating Series – Leibnitz Test.
5. Absolute convergence and conditional convergence

UNIT – III (12 Hours)

CONTINUITY :

Limits : Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. (No question is to be set from this portion).

Continuous functions : Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV (12 Hours)

DIFFERENTIATION AND MEAN VALUE THEOREMS :

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

UNIT – V (12 Hours)

RIEMANN INTEGRATION :

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for \mathbb{R} – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Real Analysis and its applications / Problem Solving.

Text Book: Introduction to Real Analysis by Robert G. Bartle and Donald R. Sherbert, published by John Wiley.

Reference Books:

1. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.
2. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisinghania, published by S. Chand & Company Pvt. Ltd., New Delhi.

SRI RAMAKRISHNA DEGREE (AUTONOMOUS) COLLEGE::NANDYAL
PART-II : MATHEMATICS
FOURTH SEMESTER END EXAMINATIONS
PAPER-IV –REAL ANALYSIS

Time:3 Hrs

Max.Marks:70M

SECTION – A

Answer any FIVE Questions.

5x4=20M

1. Show that every convergent sequence is bounded.
2. Test for convergence $\sum \frac{2^n}{n^3}$
3. Test for convergence $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \dots \dots \dots$
4. Examine the continuity of $f(x) = \frac{1-\cos 2x}{1-\cos 4x}$ when $x \neq 0$ and $f(0) = \frac{2}{3}$
5. By using Lagrange's Mean – Value theorem prove that $\frac{x}{1+x} < \log(1+x) < x$ for all $x > 0$
6. Show that $f(x) = |x - 1| + |x - 2|$ is not derivable at $x = 1$ and $x = 2$
7. Find the Upper and Lower Riemann sums of $f(x) = x^2$ on $[0,1]$ for the partition $p = \{0, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, 1\}$
8. If $f \in R [a, b]$ then show that $|f| \in R [a, b]$.

SECTION – B

Answer any FIVE Questions.

5x10=50M

- 9.A) If $s_n = \frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots + \frac{1}{n(n+1)}$ then prove that $\{s_n\}$ is convergent.

OR

- B) State and prove Cauchy's General Principle of convergence.

- 10.A) Test for convergence $\sum_{n=1}^{\infty} \frac{2n-1}{n(n+)(n+2)}$

OR

- B) State and prove Leibnitz's Test

- 11.A) Let $f: R \rightarrow R$ be such that $f(x) = \frac{\sin(a+1)x + \sin x}{x}$ for $x < 0$,

$$f(x) = c \quad \text{for } x = 0,$$

$$f(x) = \frac{(x+bx^2)^{\frac{1}{2}} - x^{\frac{1}{2}}}{bx^2} \quad \text{for } x > 0 \quad \text{Then determine the values of } a, b, c \text{ for}$$

which the function is continuous at $x=0$.

OR

- B) By using definition prove that $f(x) = x^3$ is uniformly continuous on $[-2, 2]$.

12.A) State and Prove Lagrange's Mean-Value theorem.

OR

B) Verify Cauchy's Mean-Value Theorem for the function $f(x) = x^2$, $g(x) = x^3$ in (1,2).

13.A) Prove that $f(x) = x^2$ is Integrable on $[0, a]$ and $\int_0^a x^2 dx = \frac{a^3}{3}$

OR

B) State and Prove Fundamental theorem in Riemann Integration

SRI RAMAKRISHNA DEGREE(AUTONOMOUS) COLLEGE: NANDYAL
B.Sc. SECOND YEAR MATHEMATICS SYLLABUS (2021-2022)
SEMESTER – IV, PAPER - 5

LINEAR ALGEBRA-5

Course Outcomes:

After successful completion of this course, the student will be able to;

1. understand the concepts of vector spaces, subspaces, bases, dimension and their properties
2. understand the concepts of linear transformations and their properties
3. apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods
4. learn the properties of inner product spaces and determine orthogonality in inner product spaces.

Course Syllabus:

UNIT – I (12 Hours)

VECTOR SPACES-I:

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT –II (12 Hours)

VECTOR SPACES-II:

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space.

UNIT –III (12 Hours)

LINEAR TRANSFORMATIONS:

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

UNIT –IV (12 Hours)

MATRIX :

Matrices, Elementary Properties of Matrices, Inverse Matrices, Rank of Matrix, Linear Equations, Characteristic equations, Characteristic Values & Vectors of square matrix, Cayley – Hamilton Theorem.

UNIT –V (12 Hours)

INNER PRODUCT SPACE :

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram – Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Linear algebra and its applications / Problem Solving.

Text Book:

Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut- 250002.

Reference Books :

1. Matrices by Shanti Narayana, published by S.Chand Publications.
2. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi.
3. Linear Algebra by Stephen H. Friedberg et. al. published by Prentice Hall of India Pvt. Ltd. 4th Edition, 2007.

SRI RAMAKRISHNA DEGREE (AUTONOMOUS) COLLEGE::NANDYAL
PART-II : MATHEMATICS
FOURTH SEMESTER END EXAMINATIONS
PAPER-IV – LINEAR ALGEBRA

Time:3 Hrs

Max.Marks:70M

SECTION-A

I Answer ANY FIVE of the following

5x4=20M

1.If S is a Non empty Subset of Vector Space $V(F)$ Then Prove that $L(S)$ is a Subspace

2.Prove that the Set $S = \{(2,1,1,1)(1,3,1, -2)(1,2, -1,3)\}$ is linearly Independent

3.State and Prove Existence Theorem

4.Show that the mapping $T:V_3(R) \rightarrow V_2(R)$ is defined by $T(x, y, z) = (x - y, x - z)$ is a linear Transformation

5.Find the Characteristic equation of the matrix $A = \begin{bmatrix} 3 & 1 & 1 \\ 2 & 4 & 2 \\ 1 & 1 & 3 \end{bmatrix}$

6.If α, β are two vectors in a Unitary Space Prove That

$$\|\alpha + \beta\|^2 - \|\alpha - \beta\|^2 = 2\|\alpha\|^2 + \|\beta\|^2$$

7.If α, β are two Vectors in an inner product Space $V(F)$ then Prove that

$$\|\alpha + \beta\| \leq \|\alpha\| + \|\beta\|$$

8.Prove that $S = \left\{ \left(\frac{1}{3}, \frac{-2}{3}, \frac{-2}{3} \right) \left(\frac{2}{3}, \frac{-1}{3}, \frac{2}{3} \right) \left(\frac{2}{3}, \frac{2}{3}, \frac{-1}{3} \right) \right\}$ forms an Orthonormal Set in $V_3(R)$

SECTION-B

I Answer ANY FIVE of the following

5x10=50M

9. The Necessary and Sufficient Condition for a Non empty SubSet W of Vector Space $V(F)$ to be a Sub Space is $a, b \in F$ and $\alpha, \beta \in W \Rightarrow a\alpha + b\beta \in W$

OR

Express the Vector $\alpha = (1, -2, 5)$ as a linear Combination of the Vectors

$$e_1 = (1, 1, 1), e_2 = (1, 2, 3), e_3 = (2, -1, 1)$$

10. If W_1 and W_2 are two Sub Spaces of a finite dimensional Vector Space $V(F)$ Then Show that $\dim(W_1 + W_2) = \dim(W_1) + \dim(W_2) - \dim(W_1 \cap W_2)$

OR

If $V(F)$ is a Finite Dimensional Vector Space and W is a Sub Space of $V(F)$ then

Show that $\dim\left(\frac{V}{W}\right) = \dim V - \dim W$

11. Find $T(x, y, z)$ where $T: V_3 \rightarrow V_3$ is defined By $T(0, 1, 2) = (3, 1, 2)$ and $T(1, 1, 1) = (2, 2, 2)$

OR

State and Prove Rank –Nullity Theorem

12. Find the Characteristic Values and Characteristic Vectors of the matrix

$$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$

OR

By using Cayley-Hamilton Theorem find inverse of the Matrix $A =$

$$\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$$

13. State and Prove Cauchy's-Schwarz's Inequality

OR

Apply Gram Schmidt Process Obtain an Orthonormal Basis of $R^3(R)$ from the basis $\{(1, 0, 0), (1, 1, 0), (1, 1, 1)\}$

SRI RAMAKRISHNA DEGREE COLLEGE(AUTONOMOUS)
II B.Sc; ELECTRONICS (SEMESTER-IV)
(2021-2022 Regulation)
PAPER-IV : MICROPROCESSOR SYSTEMS

UNIT -I: (12Hrs)

INTRODUCTION TO 8085

Evaluation of Microprocessor, INTEL-8085, Architecture-CPU, ALU, Register Organization, Address and data bus and control bus – Pin configuration of 8085 – Fetch and Execute Cycles – Addressing Modes.

UNIT -II: (12 Hrs)

INSTRUCTION SET OF 8085:

Data transfer Instruction, Logical Instructions, Arithmetic Instructions, Branch Instructions, Machine Control instructions.

UNIT -III: (12Hrs)

PROGRAMMING WITH 8085:

Assembly Language Programming using 8085, Programmes for Addition, Subtraction, Multiplication, Division, largest and smallest number in an array, **Ascending and descending order, BCD to ASCII and ASCII to BCD.**

UNIT -IV: (12Hrs)

INTRODUCTION TO 8086:

Architecture- Pin Description-Flag manipulation-Instruction set-Addressing modes-Basic 8086 configuration-Minimum mode and Maximum Mode.

UNIT -V: (12Hrs)

ARM PROCESSOR: Introduction to 16/32 bit processors, Arm architecture & organization, Arm based MCUs, Instruction set.

TEXT BOOKS:

1. Microprocessor Architecture, Programming and Applications with the 8085 – Penram International Publishing, Mumbai.- Ramesh S. Gaonakar
2. Microcomputer Systems the 8086/8088 family – YU-Cheng Liu and Glenn SA Gibson
3. Microcontrollers Architecture Programming, Interfacing and System Design– Raj Kamal Chapter: 15.1, 15.2, 15.3, 15.4.1
4. 8086 and 8088 Microprocessor by Tribel and Avatar Singh.

MICROPROCESSOR SYSTEMS

MODEL PAPER(522-B1)

PART-A

Answer any **FIVE** Questions

5x4M=20M

1. Explain the evolution of Microprocessors.
2. What are the interrupts of 8085 microprocessor?
3. What are the addressing modes of 8085?
4. Give a note on minimum and maximum modes of 8086.
5. Write an assembly language program for addition of two 8-bit numbers.
6. Explain the Pin Description of 8085.
7. Write a note on loop instructions of 8086.
8. What are the features of ARM processors?

PART-B

Answer **ALL** Questions

5x10M=50M

9. Explain the Architecture of 8085.
Or
Explain the Register Organization of 8085.
10. Explain the Arithmetic and Data transfer group instructions of 8085 with examples.
Or
Write an ALP to find the largest Number from data array.
11. Explain the Flag-Register of 8085 with examples.
Or
Explain the Architecture of 8086.
12. Explain Pin Description of 8086.
Or
Explain Loop instructions and rotate instructions of 8086.
13. Explain the Architecture of ARM processor.
Or
Explain ARM based MCUs.

SRI RAMAKRISHNA DEGREE COLLEGE (AUTONOMOUS)
II B.Sc; ELECTRONICS (SEMESTER-IV)
(2021-2022 Regulation)
PAPER-V : MICROCONTROLLER AND INTERFACING

UNIT-I: (10Hrs) :INTRODUCTION TO 8051:

Introduction, comparison of Microprocessor and micro controller, Evolution of microcontrollers from 4-bit to 32 bit, Development tools for micro controllers, Assembler-Compiler-Simulator/Debugger.

UNIT -II: (10Hrs): 8051 ARCHITECTURE:

Overview and block diagram of 8051, Architecture of 8051, program counter and memory organization, Data types and directives, PSW register, Register banks and stack, pin diagram of 8051, Interrupts and timers.

UNIT-III:(10Hrs): ADDRESSING MODES AND INSTRUCTION SET:

Addressing modes and accessing memory using various addressing modes, instruction set: Arithmetic, Logical, Simple bit, jump, loop and call instructions and their usage. Timer/Counter Programming.

UNIT-IV : (15Hrs) : PROGRAMMING WITH 8051:

Assemble language programming Examples: Addition, Multiplication, Subtraction, division, arranging a given set of numbers in largest/smallest order, **ascending and descending order of an given array.**

UNIT-V: (15Hrs) : INTERFACING AND APPLICATION OF 8051:

Interfacing of – PPI 8255, interfacing seven segment displays, displaying information on a LCD, control of a stepper Motor (Uni-Polar)- **interfacing of ADC and DAC.**

TEXT BOOKS:

1. The 8051 microcontroller and embedded systems using assembly and c-kennet j. Ayalam, Dhananjay V. gadre, cengage publishers
- 2.The 8051 microcontrollers and Embedded systems - By Muhammad Ali Mazidi and Janice Gillispie Mazidi – Pearson Education Asia, 4th Reprint, 2002.

MICRO CONTROLLER AND INTERFACING

MODEL PAPER (522-B2)

Section – A

Answer any **FIVE** of the following:

5x4M=20M

1. Distinguish between Microprocessor and Microcontroller.
2. Write about evaluation of Microcontroller.
3. Explain about Program Status Word.
4. Write about Memory Organization of 8051.
5. Define the following.
(i). PUSH & POP. (ii). CJNE
6. Explain Instruction Format of 8051.
7. Write an ALP for Division of Two 8-bit numbers using Microcontroller.
8. Draw & Explain the pin diagram of PPI 8255.

Section - B

Answer any **ALL** of the following:

5x10=50M

9. What are the programming development tools for microcontroller and explain.

or

Explain about data types and directives.

10. Draw & Explain Block diagram of 8051 Microcontroller.

or

Explain pin diagram of 8051.

11. Explain the addressing modes of 8051 with the help of examples.

or

Explain the following instructions with an example.

- (i) RRL A (ii) DA A (iii) SWAP A (iv) MUL AB

12. Write an ALP to find the smallest number from the given data using 8051 Microcontroller.

or

Write an ALP to arrange an array of numbers in both ascending and Descending orders.

13. Draw & Explain the interfacing of LCD module to 8051 Microcontroller.

or

Explain interfacing of Stepper Motor with 8051 Microcontroller.

OBJECT ORIENTATED PROGRAMMING THROUGH JAVA

Semester	Course Code	Course title	Hours	Credits
IV	C4	OBJECT ORIENTATED PROGRAMMING THROUGH	60	3

Objectives:

To introduce the fundamental concepts of Object-Oriented programming and to design & implement object oriented programming concepts in Java.

Course Learning Outcomes: At the end of this course student will:

1. Understand the benefits of a well-structured program
2. Understand different computer programming paradigms
3. Understand underlying principles of Object-Oriented Programming in Java
4. Develop problem-solving and programming skills using OOP concepts
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java

UNIT – I

Introduction to Java: Features of Java, The Java virtual Machine, Parts of Java

Naming Conventions and Data Types: Naming Conventions in Java, Data Types in Java, Literals

Operators in Java: Operators, Priority of Operators

Control Statements in Java: if... else Statement, do... while Statement, while Loop, for Loop, switch Statement, break Statement, continue Statement, return Statement

Input and Output: Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output with System.out.printf(), Displaying Formatted Output with String.format()

Arrays: Types of Arrays, Three Dimensional Arrays (3D array), arrayname.length, Command Line Arguments

UNIT – II

Strings: Creating Strings, String Class Methods, String Comparison, Immutability of Strings

Introduction to OOPs: Problems in Procedure Oriented Approach, Features of Object- Oriented Programming System (OOPS)

Classes and Objects: Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors

Methods in Java: Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods

Inheritance: Inheritance, The keyword 'super', The Protected Specifier, Types of Inheritance

UNIT – III

Polymorphism: Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class

Type Casting: Types of Data Types, Casting Primitive Data Types, Casting Referenced Data Types, The Object Class

Abstract Classes: Abstract Method and Abstract Class

Interfaces: Interface, Multiple Inheritance using Interfaces

Packages: Package, Different Types of Packages, The JAR Files, Interfaces in a Package, Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document

Exception Handling: Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re – throwing an Exception

UNIT – IV

Streams: Stream, Creating a File using FileOutputStream, Reading Data from a File using FileInputStream, Creating a File using FileWriter, Reading a File using FileReader, Zipping and Unzipping Files, Serialization of Objects, Counting Number of Characters in a File, File Copy, File Class

Threads: Single Tasking, Multi Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Deadlock of Threads, Thread Communication, Thread Priorities, thread Group, Daemon Threads, Applications of Threads, Thread Life Cycle

UNIT – V

Applets: Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, An Applet with Swing Components, Animation in Applets, A Simple Game with an Applet, Applet Parameters

Java Database Connectivity: Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, Working with MySQL Database, Stages in a JDBC Program, Registering the Driver, Connecting to a Database, Preparing SQL Statements, Using jdbc-odbc Bridge Driver to Connect to Oracle Database, Retrieving Data from MySQL Database, Retrieving Data from MS Access Database, Stored Procedures and CallableStatements, Types of Result Sets

BOOKS:

1. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao & Kogent Learning Solutions Inc.
2. E. Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw- Hill Company.
3. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TMH.

4. Deitel&Deitel. Java TM: How to Program, PHI (2007)

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity

B. General

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

Semester	Course Code	Course Title	Hours	Credits
IV	C4-P	OBJECT ORIENTATED PROGRAMMING THROUGH JAVA LAB	30	2

1. Write a program to read *Student Name, Reg.No, Marks[5]* and calculate *Total,Percentage, Result*. Display all the details of students
2. Write a program to perform the following String Operations
 - a. Read a string
 - b. Find out whether there is a given substring or not
 - c. Compare existing string by another string and display status
 - d. Replace existing string character with another character
 - e. Count number of works in a string
3. Java program to implements Addition and Multiplication of two N X N matrices.
4. Java program to demonstrate the use of Constructor.
5. Calculate area of the following shapes using method overloading.
 - a. Triangle
 - b. Rectangle
 - c. Circle
 - d. Square
6. Implement inheritance between *Person (Aadhar, Surname, Name, DOB, and Age)* and *Student (Admission Number, College, Course, Year)* classes where *ReadData(), DisplayData()* are overriding methods.
7. Java program for implementing Interfaces
8. Java program on Multiple Inheritance.
9. Java program for to display *Serial Number from 1 to N* by creating two Threads
10. Java program to demonstrate the following exception handlings
 - a. Divided by Zero
 - b. Array Index Out of Bound
 - c. File Not Found
 - d. Arithmetic Exception
 - e. User Defined Exception
11. Create an Applet to display different shapes such as Circle, Oval, Rectangle, Square and Triangle.
12. Write a program to create *Book (ISBN,Title, Author, Price, Pages, Publisher)* structure and store book details in a file and perform the following operations
 - a. Add book details
 - b. Search a book details for a given ISBN and display book details, if available
 - c. Update a book details using ISBN
 - d. Delete book details for a given ISBN and display list of remaining Books

IV Semester: Paper- V

Operating Systems Syllabus(2020-23 Batch)

UNIT- I

What is Operating System? History and Evolution of OS, Basic OS functions, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Real time Systems.

UNIT- II

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process State Diagram, Process Control Block, Process Abstraction, Process Hierarchy, Threads, Single and Multi level threads, Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

UNIT- III

Memory Management: Physical and Virtual Address Space; Memory Allocation Strategies–Fixed and -Variable Partitions, Paging, Segmentation, Virtual Memory and Demand Paging

UNIT- IV

Process Management: Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery. Concurrent and Dependent Processes, Critical Section.

UNIT- V

File and I/O Management, OS security: Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Security Policy Mechanism, Protection, Authentication and Internal Access Authorization.

Introduction to Android Operating System, Android Development Framework, Android Application Architecture, Android Process Management and File System.

REFERENCE

BOOKS:

1. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (7th Edition) Wiley India Edition.
2. Operating Systems: Internals and Design Principles by Stallings (Pearson)
3. Operating Systems by J. Archer Harris (Author), Jyoti Singh (Author) (TMH)

562-B2
Sri Ramakrishna Degree (Autonomous) Degree College: Nandyal
B.Sc (ZCCs) Computer Science-Semester-IV
Paper II- Operating Systems

Time: 3 Hours

Max. Marks: 70

SECTION-A

Answer any **FOUR** of the following questions

4X5=20 Marks

- 1) Write the basic functions of Operating System.
- 2) Write about Real time Systems.
- 3) Explain process state diagram.
- 4) Write about process Abstraction.
- 5) Write a note on Segmentation.
- 6) Write about deadlock characteristics.
- 7) Write about deadlock avoidance.
- 8) Write about directory structure.

SECTION-B

Answer **ALL** the following questions

5X10=50 Marks

- 9) Explain (a) Multi-programming Operating systems
(b) Time Sharing Operating systems

[OR]

- 10) Explain History & Evolution of operating system

- 11) Explain about process hierarchy

[OR]

- 12) Write about primitive scheduling algorithms.

- 13) Explain memory allocation strategies.

[OR]

- 14) Write about demand passing segmentation

- 15) Explain deadlock detection and recovery process

[OR]

- 16) Write a short note on critical section

- 17) Write about file allocation methods

[OR]

- 18) Write about android application architecture.

