COURSE-IV
CBCS/ SEMESTER SYSTEM
(w.e.f. 2020-21 Admitted Batch)
B.A./B.Sc. MATHEMATICS
REAL ANALYSIS
SYLLABUS (75 Hours)

Course Outcomes:

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

1. get clear idea about the real numbers and real valued functions.
2. obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence/ series.
3. test the continuity and differentiability and Riemann integration of a function.
4. know the geometrical interpretation of mean value theorems.

Course Syllabus:

UNIT – I (12 Hours)

REAL NUMBERS :

The algebraic and order properties of R, Absolute value and Real line, Completeness property of 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)

INFINITIE 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'-Alemberts' Test or Ratio Test.

4. Alternating Series – Leibnitz Test.

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 THEORMS :

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 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 Donlad 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 VENKATESWARA UNIVERSITY

B.Sc COURSE IN PHYSICS

IV SEMESTER

(CBCS) REVISED SYLLABUS – 2021-22

For Mathematics Combinations

Course-IV: ELECTRICITY, MAGNETISM AND ELECTRONICS

Work load:60 hrs per semester   **4 hrs/week**

Course outcomes:

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

- ❖ *Understand the Gauss law and its application to obtain electric field in different cases and formulate the relationship between electric displacement vector, electric polarization, Susceptibility, Permittivity and Dielectric constant.*
- ❖ *Distinguish between the magnetic effect of electric current and electromagnetic induction and apply the related laws in appropriate circumstances.*
- ❖ *Understand Biot and Savart's law and Ampere's circuital law to describe and explain the generation of magnetic fields by electrical currents.*
- ❖ *Develop an understanding on the unification of electric and magnetic fields and Maxwell's equations governing electromagnetic waves.*
- ❖ *Phenomenon of resonance in LCR AC-circuits, sharpness of resonance, Q- factor, Power factor and the comparative study of series and parallel resonant circuits.*
- ❖ *Describe the operation of p-n junction diodes, zener diodes, light emitting diodes and transistors*
- ❖ *Understand the operation of basic logic gates and universal gates and their truth tables.*

UNIT-I

1. Electrostatics: (6hrs)

Gauss's law-Statement and its proof, Electric field intensity due to (i) uniformly charged solid sphere and (ii) an infinite conducting sheet of charge, Deduction of Coulomb's law from Gauss law, Electrical potential–Equipotential surfaces, Potential due to a (i) dipole (ii)uniformly charged sphere.

2. Dielectrics: (6 hrs)

Dielectrics-Polar and Non-polar dielectrics- Effect of electric field on dielectrics,Dielectric strength, Capacitance of a parallel plate condenser with dielectric slab between the plates, Electric displacement D, electric polarization P,Relation between D, E and P, Dielectric constant and electric susceptibility.

UNIT-II

3. Magnetostatics: (6 hrs)

Biot-Savart's law and its applications: (i) circular loop and (ii) solenoid, Divergence and curl of magnetic field, Ampere's Circuital Law and its application to Solenoid,Hall effect, determination of Hall coefficient and applications.

4. Electromagnetic Induction: (6 hrs)

Faraday's laws of electromagnetic induction, Lenz's law,Self induction and Mutual induction, Self inductance of a long solenoid, Mutual inductance of two coils, Energy stored in magnetic field, Eddy currents and Electromagnetic damping

UNIT-III

5. Alternating currents: (6 hrs)

Alternating current - Relation between current and voltage in LR and CR circuits,Phasor and Vector diagrams, LCR series and parallel resonant circuit, Q –factor, Power in ac circuits, Power factor.

6. Electromagnetic waves-Maxwell's equations: (6 hrs)

Idea of displacement current,Maxwell's equations-Derivation, Maxwell's wave equation (with derivation), Transverse nature of electromagnetic waves, Poynting theorem (Statement and proof)

UNIT-IV

7.Basic Electronic devices: **(12 hrs)**

PN junction diode, Zenerdiode andLight Emitting Diode (LED) and their I-V characteristics, Zener diode as a regulator- Transistors and its operation, CB, CE and CC configurations, Input and output characteristicsofa transistor in CE mode, Relation between alpha, beta and gamma; Hybrid parameters, Determination of hybrid parameters from transistor characteristics; Transistor as an amplifier.

UNIT-V:

8.Digital Electronics: **(12 hrs)**

Number systems, Conversion of binary to decimal system and vice versa, Binary addition & Binary subtraction (1's and 2's complement methods), Laws of Boolean algebra, DeMorgan's laws-Statements and Proofs, Basic logic gates, NAND and NOR as universal gates, Exclusive-OR gate, Half adder and Full adder circuits.

REFERENCE BOOKS
- ❖ *BSc Physics, Vol.3, Telugu Akademy, Hyderabad.*
- ❖ *Electricity and Magnetism, D.N. Vasudeva. S. Chand & Co.*
- ❖ *Electricity and Magnetism, B.D.Duggal and C.L.Chhabra. Shobanlal& Co.*
- ❖ *Electricity, Magnetism with Electronics, K.K.Tewari, R.Chand& Co.,*
- ❖ *Electricity and Magnetism, R.Murugeshan, S. Chand & Co.*
- ❖ *Principles of Electronics, V.K. Mehta, S.Chand& Co.,*
- ❖ *Digital Principles and Applications, A.P. Malvino and D.P.Leach, McGrawHill Edition.*

SRI VENKATESWARA UNIVERSITY

B.Sc COURSE IN PHYSICS

IV SEMESTER – W.E.F. 2021-22

For Mathematics Combinations

Practical Course IV: Electricity, Magnetism and Electronics

Work load: 30 hrs   **2 hrs/week**

Course outcomes (Practical's):

On successful completion of this practical course the student will be able to;

 ➢ *Measure the current sensitivity and figure of merit of a moving coil galvanometer.*

 ➢ *Observe the resonance condition in LCR series and parallel circuit*

 ➢ *Learn how a sonometer can be used to determine the frequency of AC-supply.*

 ➢ *Observe the variation of magnetic field along the axis of a circular coil carrying current using Stewart and Gee's apparatus.*

 ➢ *Understand the operation of PN junction diode, Zener diode and a transistor and their V-I characteristics.*

 ➢ *Construct the basic logic gates, half adder and full adder and verify their truth tables. Further, the student will understand how NAND and NOR gates can be used as universal building blocks.*

Minimum of 6 experiments to be done and recorded

1. *Figure of merit of a moving coil galvanometer.*
2. *LCR circuit series/parallel resonance, Q factor.*
3. *Determination of ac-frequency –Sonometer.*
4. *Verification of Kirchoff's laws and Maximum Power Transfer theorem.*
5. *Field along the axis of a circular coil carrying current-Stewart & Gee's apparatus.*
6. *PN Junction Diode Characteristics*
7. *Zener Diode –V-I Characteristics*
8. *Zener Diode as a voltage regulator*
9. *Transistor CE Characteristics- Determination of hybrid parameters*
10. *Logic Gates- OR,AND,NOT and NAND gates. Verification of Truth Tables.*
11. *Verification of De Morgan's Theorems.*
12. *Construction of Half adder and Full adders-Verification of truth tables*

RECOMMENDED CO-CURRICULAR ACTIVITIES:

MEASURABLE
- ❖ *Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)*
- ❖ *Student seminars (on topics of the syllabus and related aspects (individual activity))*
- ❖ *Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams)*
- ❖ *Field studies (individual observations and recordings as per syllabus content and related areas (Individual or team activity)*
- ❖ *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)*

GENERAL
- ❖ *Group Discussion*
- ❖ *Visit to Research Stations/laboratories and related industries*
- ❖ *Others*

RECOMMENDED ASSESSMENT METHODS

Some of the following suggested assessment methodologies could be adopted;
- ❖ *The oral and written examinations (Scheduled and surprise tests),*
- ❖ *Practical assignments and laboratory reports,*
- ❖ *Observation of practical skills,*
- ❖ *Efficient delivery using seminar presentations,*
- ❖ *Viva voce interviews.*

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SRI VENKATESWARA UNIVERSITY
B.Sc COURSE IN PHYSICS
IV SEMESTER
(CBCS) REVISED SYLLABUS – 2021-22

For Mathematics Combinations
Course V: MODERN PHYSICS

Work load:60hrs per semester   **4 hrs/week**

Course outcomes:

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

- ❖ *Develop an understanding on the concepts of Atomic and Modern Physics, basic elementary quantum mechanics and nuclear physics.*
- ❖ *Develop critical understanding of concept of Matter waves and Uncertainty principle.*
- ❖ *Get familiarized with the principles of quantum mechanics and the formulation of Schrodinger wave equation and its applications.*
- ❖ *Examine the basic properties of nuclei, characteristics of Nuclear forces, salient features of Nuclear models and different nuclear radiation detectors.*
- ❖ *Classify Elementary particles based on their mass, charge, spin, half life and interaction.*
- ❖ *Get familiarized with the nano materials, their unique properties and applications.*
- ❖ *Increase the awareness and appreciation of superconductors and their practical applications.*

UNIT-I :

1.Atomic and Molecular Physics:(12 hrs)

Vector atom model and Stern-Gerlach experiment, Quantum numbers associated with it, Angular momentum of the atom, Coupling schemes, Spectral terms and spectral notations, Selection rules, Intensity rules, Fine structure of Sodium D-lines, Zeeman effect, Experimental arrangement to study Zeeman effect; Raman effect, Characteristics of Raman effect, Experimental arrangement to study Raman effect, Quantum theory of Raman effect, Applications of Raman effect.

UNIT-II:

2.Matter waves & Uncertainty Principle: (12 hrs)

Matter waves, de Broglie's hypothesis, Wave length of matter waves, Properties of matter waves, Davisson and Germer's experiment, Phase and group velocities, Heisenberg's uncertainty principle for position and momentum& energy and time, Illustration of uncertainty principle using diffraction of beam of electrons (Diffraction by a single slit)and photons(Gamma ray microscope),Bohr's principle of complementarily.

UNIT-III:

3.Quantum (Wave) Mechanics: (12 hrs)

Basic postulates of quantum mechanics, Schrodinger time independent and time dependent wave equations-Derivations, Physical interpretation of wave function, Eigen functions, Eigen values, Application of Schrodinger wave equation to (i) one dimensional potential box of infinite height(Infinite Potential Well) and (ii) one dimensional harmonic oscillator

UNIT-IV:

4.Nuclear Physics: (12 hrs)

Nuclear Structure:General Properties of Nuclei, Mass defect, Binding energy; Nuclear forces: Characteristics of nuclear forces- Yukawa's meson theory; Nuclear Models: Liquid drop model, The Shell model, Magic numbers; Nuclear Radiation detectors: G.M. Counter, Cloud chamber, Solid State detector; Elementary Particles: Elementary Particles and their classification

UNIT-V:

5.Nano materials: (7hrs)

Nanomaterials – Introduction, Electron confinement, Size effect, Surface to volume ratio, Classification of nano materials– (0D, 1D, 2D); Quantum dots, Nano wires, Fullerene, CNT, Graphene(Mention of structures and properties),Distinct properties of nano materials (Mention-mechanical,optical, electrical, and magnetic properties); Mention of applications of nano materials: (Fuel cells,Phosphors for HD TV, Next Generation Computer chips, elimination of pollutants, sensors).

6.Superconductivity: (5 hrs)

Introduction to Superconductivity, Experimental results-critical temperature, critical magnetic field, Meissner effect , Isotope effect,Type I and Type II superconductors, BCS theory (elementary ideas only),Applications of superconductors

REFERENCE BOOKS

- ❖ *BSc Physics, Vol.4, Telugu Akademy, Hyderabad*
- ❖ *Atomic Physics by J.B. Rajam; S.Chand& Co.,*
- ❖ *Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath. S. Chand & Co.*
- ❖ *Concepts of Modern Physics by Arthur Beiser. Tata McGraw-Hill Edition.*
- ❖ *Nuclear Physics, D.C.Tayal, Himalaya Publishing House.*
- ❖ *S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publ.Co.)*
- ❖ *K.K.Chattopadhyay & A.N.Banerjee, Introd.to Nanoscience and Technology (PHI LearningPriv.Limited).*
- ❖ *Nano materials, A K Bandopadhyay. New Age International Pvt Ltd (2007)*
- ❖ *Textbook of Nanoscience and Nanotechnology, BS Murthy, P Shankar, Baldev Raj,BB Rath and J Murday-Universities Press-IIM*

SRI VENKATESWARA UNIVERSITY

B.Sc COURSE IN PHYSICS

IV SEMESTER

(CBCS) REVISED SYLLABUS – 2021-22

For Mathematics Combinations

Practical Course V: Modern Physics

Work load: 30 hrs   **2 hrs/week**

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

- *Measure charge of an electron and e/m value of an electron by Thomson method.*
- *Understand how the Planck's constant can be determined using Photocell and LEDs.*
- *Study the absorption of α-rays and β-rays, Range of β-particles and the characteristics of GM counter*
- *Determine the Energy gap of a semiconductor using thermistor and junction diode.*

Minimum of 6 experiments to be done and recorded

1. *e/m of an electron by Thomson method.*
2. *Determination of Planck's Constant (photocell).*
3. *Verification of inverse square law of light using photovoltaic cell.*
4. *Determination of the Planck's constant using LEDs of at least 4 different colours.*
5. *Determination of work function of material of filament of directly heated vacuum diode.*
6. *Study of absorption of α-rays.*
7. *Study of absorption of β-rays.*
8. *Determination of Range of β-particles.*
9. *Determination of M & H.*
10. *Analysis of powder X-ray diffraction pattern to determine properties of crystals.*
11. *Energy gap of a semiconductor using junction diode.*
12. *Energy gap of a semiconductor using thermistor*
13. *GM counter characteristics*

RECOMMENDED CO-CURRICULAR ACTIVITIES:

MEASURABLE

- ❖ *Assignments (in writing and doing forms on the aspects of*

syllabus content and outside the syllabus content. Shall be individual and challenging)

- ❖ *Student seminars (on topics of the syllabus and related aspects (individual activity)*
- ❖ *Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))*
- ❖ *Field studies (individual observations and recordings as per syllabus content and related areas (Individual or team activity)*
- ❖ *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)*

GENERAL

- ❖ *Group Discussion*
- ❖ *Visit to Research Stations/laboratories and related industries*
- ❖ *Others*

RECOMMENDED ASSESSMENT METHODS

Some of the following suggested assessment methodologies could be adopted;

- ❖ *The oral and written examinations (Scheduled and surprise tests),*
- ❖ *Practical assignments and laboratory reports,*
- ❖ *Efficient delivery using seminar presentations,*
- ❖ *Viva voce interviews.*

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BOS Chairman

Note:

1. *The duration of the examination for each theory course is 3.00 hrs. The duration of each practical examination is 3 hrs with 50 marks*

2. *Each course in theory is of 100 marks and practical course is of 50 marks.*
   - ➤ *Semester End University Examination in Theory Course: 75*

marks [Externalevaluation]

> *Mid-Semester Examination in Theory Course at the college level:*
> *25 marks [Internal evaluation]*

3. *The University (external) examination for Theory and Practical shall be conducted atthe end of each Semester.*

4. *In each semester the evaluation in Practical courses shall be done by an externalexaminer appointed by the University.*
There shall not be Internal valuation in any semester end practical examinations.

5. *The candidate shall prepare and submit at the time of practical examination a certified Record based on the practical course with a minimum of **6** experiments from each semester.*

6. *Numerical Problems must be solved at the end of every chapter of all Units.*

7. *Numerical problems, each having a weightage of 4 marks, should be asked in theSemester end University examinations.*

8. *The minimum passing marks in each theory course is 40 (External:30 and Internal:10) The minimum passing marks in each Practical/Lab course is 20.*

9. *The teaching work load per week for semesters I to IV is 4 hours for theory courseand 2 hours for all laboratory (practical) courses.*

10. *Visits to industry, national research laboratories, and scientific exhibitions should beencouraged.*

11. *The syllabus for Practical courses is same for both Mathematics and Non-Mathematics combinations.*

12. *The marks distribution for the Semester End practical examination is as follows:*

(i) Formula/ Principle / Statement with explanation of symbols and	*05*
(ii) Diagram/Circuit Diagram / Tabular Columns … … … … …	*10*
(iii) Setting up of the experiment and taking readings/Observations	*10*
(iv) Calculations (explicitly shown) + Graph + Result with Units…	*10*
(v) Viva-voce … … … … … … … … … … … … … … … …	*05*
(vi) Class Records (to be valued at the time of practical	*10*
Total Marks :	**50**

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BOS Chairman

B.Sc. PHYSICS

[For Mathematics combinations]

W.E.F. 2021-22

MODEL QUESTION PAPER

Time : 3 hrs   *Max marks : 75*

SECTION-A

(Essay Type Questions)   *Marks : 5x10M = 50M*

Answer All questions with internal choice from each Unit

1. *Essay type question from Unit-I*
     Or
   Essay type question from Unit-I

2. *Essay type question from Unit-II*
     Or
   Essay type question from Unit-II

3. *Essay type question from Unit-III*
     Or
   Essay type question from Unit-III

4. *Essay type question from Unit-IV*
     Or
   Essay type question from Unit-IV

5. *Essay type question from Unit-V*
     Or
   Essay type question from Unit-V

SECTION-B

(Short Answer Type Questions)   *Marks : 5x5M = 25M*

Answer any five out of the following ten questions

6.   *Short answer type question from Unit-I*
7.   *Short answer type question from Unit-I*
8.   *Short answer type question from Unit-II*
9.   *Short answer type question from Unit-II*
10.   *Short answer type question from Unit-III*
11.   *Short answer type question from Unit-III*
12.   *Short answer type question from Unit-IV*
13.   *Short answer type question from Unit-IV*
14.   *Short answer type question from Unit-V*
15.   *Short answer type question from Unit-V*

*[***Note:****Question Paper setters are instructed to add Numerical Problems (each of 4 marks) with a maximum weightage of 16 marks either in Section-A or Section-B covering all the fiveunits in the syllabus]*

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C4-OBJECT ORIENTATED PROGRAMMING THROUGH JAVA

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 uingFileInputStream, 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 Callable Statements, 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

SRI VENKATESWARA UNIVERSITY

B.Sc. DEGREE COURSE IN COMPUTER SCIENCE

IV SEMESTER - W.E.F. 2021-22

PAPER-C4 **OBJECT ORIENTATED PROGRAMMING THROUGH JAVA**
MODEL QUESTION PAPER

Time: 3 hours   Marks: 75 marks

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A.
Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III,   Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

PART – A

Answer any _Five_ of the following question.   **(5X5=25M)**

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

PART – B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A)
	OR
	(B)
10.	(A)
	OR
	(B)
11.	(A)
	OR
	(B)
12.	(A)
	OR
	(B)
13.	(A)
	OR
	(B)

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN COMPUTER SCIENCE

C4-P - OBJECT ORIENTATED PROGRAMMING THROUGH JAVA LAB

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

C5-OPERATING SYSTEMS

Objectives:

This course aims to introduce the structure and organization of a file system. It emphasizes various functions of an operating system like memory management, process management, device management, etc.

Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

1. Know Computer system resources and the role of operating system in resource management with algorithms

2. Understand Operating System Architectural design and its services.

3. Gain knowledge of various types of operating systems including Unix and Android.

4. Understand various process management conceptsincluding scheduling, synchronization, and deadlocks.

5. Have a basic knowledge about multithreading.

6. Comprehend different approaches for memory management.

7. Understand and identify potential threats to operating systems and the security features design to guard against them.

8. Specify objectives of modern operating systems and describe how operating systems have evolved over time.

9. Describe the functions of a contemporary operating system

UNIT- I

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

UNIT- II

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

UNIT III

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, Semaphores, Methods for Inter- process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

UNIT IV

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

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, Small Application Development using Android Development Framework.

REFERENCE BOOKS:

1. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (7thEdition) 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)
4. Online Resources for UNIT V

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

SRI VENKATESWARA UNIVERSITY

B.Sc. DEGREE COURSE IN <u>COMPUTER SCIENCE</u>

IV SEMESTER - W.E.F. 2021-22

PAPER-C5 OPERATING SYSTEMS

MODEL QUESTION PAPER

Time: 3 hours   Marks: 75 marks

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A.
Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III, Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

PART – A

Answer any *Five* of the following question.   **(5X5=25M)**

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A) OR (B)
10.	(A) OR (B)
11.	(A) OR (B)
12.	(A) OR (B)
13.	(A) OR (B)

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN COMPUTER SCIENCE

SEMESTER SYSTEM WITH CBCS
SEMESTER IV
W.E.F. 2021-2022
C5-P - OPERATING SYSTEMS LAB USING C/JAVA

1. Write a program to implement Round Robin CPU Scheduling algorithm
2. Simulate SJF CPU Scheduling algorithm
3. Write a program the FCFS CPU Scheduling algorithm
4. Write a program to Priority CPU Scheduling algorithm
5. Simulate Sequential file allocation strategies
6. Simulate Indexed file allocation strategies
7. Simulate Linked file allocation strategies
8. Simulate MVT and MFT memory management techniques
9. Simulate Single level directory File organization techniques
10. Simulate Two level File organization techniques
11. Simulate Hierarchical File organization techniques
12. Write a program for Bankers Algorithm for Dead Lock Avoidance
13. Implement Bankers Algorithm Dead Lock Prevention.
14. Simulate all Page replacement algorithms.
    a) FIFO
    b) LRU
    c) LFU
15. Simulate Paging Techniques of memory management