A
COURSE FILE
ON

"JAVA PROGRAMMING"

III B-Tech II Semester (R20 Regulation)

ELECTRONICS & COMMUNICATIONS ENGINEERING

CMR ENGINEERING COLLEGE

UGC AUTONOMOUS

KANDLAKOYA (V), MEDCHAL (M), R.R.DIST.

A.Y 2022-23

COURSE FILE

Subject: JAVA PROGRAMMING

Year & SEM: III-II   **Branch: ECE**

Course code: CS614OE (OPEN ELECTIVE-I)

1. Department vision & mission

2. List of PEOs and Pos PSO's

3. Mapping of course outcomes with POs

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18. References (Text books/websites/Journals)

Department of Electronics and Communications Engineering

1. Department Vision Mission

Vision

To promote Excellence in Technical Education and Scientific Research in Electronics and Communication Engineering for the benefit of Society

Mission

1. To impart Excellent Technical Education with State of Art Facilities inculcating Values and lifelong learning attitude

2. To develop Core Competence in our students imbibing Professional Ethics and Team Spirit

3. To encourage Research benefiting Society through Higher Learning

2. List of PEOs and Pos PSO's

2.1 Program Educational outcome (PEO):

PEO 1: Establish themselves as successful professionals in their career and higher education in the field of Electronics & Communication Engineering and allied domains through rigorous quality education.

PEO 2: Develop Professionalism, Ethical values, Excellent Leadership qualities, Communication Skills and teamwork in their Professional front and adapt to current trends by engaging in lifelong learning

PEO 3: Apply the acquired knowledge & skills to develop novel technology and products for solving real life problems those are economically feasible and socially relevant

PEO 4: To prepare the graduates for developing administrative acumen, to adapt diversified and multidisciplinary platforms to compete globally.

2.2 Program Outcomes(POs):

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

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

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

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

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

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

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

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

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

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

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

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

2.3 PROGRAM SPECIFIC OUTCOMES(PSO'S)

1. Ability to apply concepts of Electronics & Communication Engineering to associated research areas of electronics, communication, signal processing, VLSI, Embedded systems, IoT and allied technologies

2. Ability to design, analyze and simulate a variety of Electronics & Communication functional elements using hardware and software tools along with analytic skills

3. Mapping of course outcomes with POs

CO1	**Elaborate** the use of OOP Techniques and Abstract classes
CO2	To **Examine** Multithreaded applications with synchronization
CO3	**Solve** the problems using Java Collection Framework and I/O classes
CO4	**Implement** exemplary applications related to JDBC-ODBC Connectivity
CO5	**Design** GUI based applications and Web applications

CORRELATION LEVELS CO-PO& PSO Matrix:

COURSE CO-PO&PSO-MATRIX	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	3	3	2	-	-	-	-	-	-	2	1	2
CO2	-	-	3	-	2	-	-	-	-	3	-	2	2	2
CO3	-	3	-	3	2	-	-	-	-	3	-	-	2	1
CO4	3	-	3	3	2	2	-	-	2	-	1	-	2	2
CO5	3	-	3	3	2	-	-	-	3	-	-	2	2	2
AVERAGE	3	3	3	3	2	2	-	-	3	3	1	2	2	2

4. Syllabus Copy and Suggested/Reference Books

JAVA PROGRAMMING

(OPEN ELECTIVE-I)

B.TECH III YEAR II SEM   **L T P C**

COURSE CODE:CS614OE   **3 0 0 3**

Course Objectives:

- To understand object oriented programming concepts, and apply them in problem solving.
- To learn the basics of java Console and GUI based programming.

Course Outcomes:

CO1	**Elaborate** the use of OOP Techniques and Abstract classes
CO2	To **Examine** Multithreaded applications with synchronization
CO3	**Solve** the problems using Java Collection Framework and I/O classes
CO4	**Implement** exemplary applications related to JDBC-ODBC Connectivity
CO5	**Design** GUI based applications and Web applications

Syllabus

UNIT-I

OOP concepts - Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms.

Java programming - History of Java, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow block scope, conditional statements, loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

UNIT-II

Inheritance - Inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.

Polymorphism - dynamic binding, method overriding, abstract classes and methods.

Interfaces - Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interfaces.

Inner classes - uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

Packages - Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT-III

Exception handling - Dealing with errors, benefits of execution handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Multithreading - Difference between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, procedure consumer pattern.

UNIT-IV

Collection Framework in Java - Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calender and Properties

Files - streams - byte streams, character streams, text input/output, binary input/output, random access file operations, File managament using File class.

Connecting to Database - JDBC Type 1 to 4 drivers, connecting to a database, querying

a database and processing the results,updating data with JDBC.

UNIT-V

GUI Programming with Java - The AWT class hierarchy, Introduction to Swing, Swing vs, AWT, Hierarchy for Swing components, Containers - JFrame, JApplet, JDialog, JPanel,

Overview of some swing components Jbutton, JLabel, JTextField, JTextArea, simple swing applications, Layout management - Layout manager types - border, grid and flow

Event handling - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listerners, Delegation event model, Examples: handling a buttong click, handling mouse events, Adapter classes.

Applets - Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

5. **Individual Time Table**

Mrs.B.Mamatha						WL=12		
	I(9:10-10:10)	II(10:10-11:00)	III(11:00-11:50)	IV(11:50-12:40)		V(1:20-2:20)	VI(2:20-3:10)	VII(3:10-4:00)
MON	JAVA (III-II A)	SL LAB-(III-II A)						
TUE			JAVA (III-II A)					
WED				JAVA (III-II A)				JAVA (III-II A)
THU						SL LAB-(III-II A)		
FRI	JAVA - (III-II A)							
SAT		JAVA (III-II A)						

6. Session plan/ Lesson plan

S.No	Topics and / Sub-Topics Covered	Lecture No.	Text / Reference book	Remarks
1	**UNIT-1 OOP Concepts-** Data Abstraction, encapsulation, Inheritance	L1	T1	
2	benefits of inheritance, polymorphism, classes and objects,	L2	T1	
3	Procedural and object oriented programming paradigms, **Java programming –** History of java,	L3	T1	

	comments			
4	data types, variables, constants	L4	T1	
5	scope and life time of variables	L5	T1	
6	operators, operator hierarchy, expressions	L6	T1	
7	type conversion and casting, enumerated types	L7	T1	
8	control flow- block scope, conditional statements,	L8	T1	
9	loops, break and continue statements, simple java stand alone programs,	L9	T1	
10	arrays, console input and output, formatting output	L10	T1	
11	constructors, methods, parameter passing	L11	T1	
12	static fields and methods, access control, this reference	L12	T1	
13	overloading methods and constructors, recursion	L13	T1	
14	garbage collection, building strings, exploring string class.	L14	T1	
15	**UNIT-II** **Inheritance-** Inheritance hierarchies, super and sub classes,	L15	T1	
16	Member access rules,super keyword,	L16	T1	
17	preventing inheritance: final classes and methods, the Object class and its methods	L17	T1	

18	**Polymorphism-** dynamic binding, method overriding,	L18	T1	
19	abstract classes and methods, **Interfaces-** Interface vs., Abstract classes,	L19	T1	
20	defining an interface, implementing interfaces,	L20	T1	
21	accessing implementations through references, extending interface.	L21	T1	
22	**Inner classes-** uses of inner classes, local inner classes,	L22	T1	
23	anonymous inner classes, static inner classes, examples.	L23	T1	
24	**Packages –** Defining, creating and accessing a package,	L24	T1	
25	understanding CLASSPATH, importing packages.	L25	T1	
26	**UNIT-III** **Exception handling –** Dealing with errors, benefits of exception handling, the classification of exceptions	L26	T1	
27	exception hierarchy, checked exceptions and unchecked exceptions,	L27	T1	
28	usage of try, catch, throw, throws and finally	L28	T1	
29	Rethrowing exceptions, exception specification	L29	T1	
30	built in exceptions, creating own exception sub classes.	L30	T1	
31	**Multithreading –** Differences between multiple processes and multiple threads, thread states,	L31	T1	

32	creating threads, interrupting threads, thread priorities	L32	T1	
33	synchronizing threads, inter – thread communication, producer consumer pattern	L33	T1	
34	**UNIT-IV** **Collection Framework in Java** – Introduction to Java collections, overview of java collection framework,	L34	T1	
35	Generics,commonly used collection classes- ArrayList, Vector,	L35	T1	
36	Hash table, Stack, Enumeration, Iterator,	L36	T1	
37	String Tokenizer, Random, Scanner, calendar and properties	L37	T1	
38	**Files –** streams- byte streams, character streams	L38	T1	
39	text input/output, binary input/output,	L39	T1	
40	random access file operations, File management using File class.	L40	T1	
41	**Connecting to Database -** JDBC Type 1 to 4 drivers, connecting to a database,	L41	T1	
42	querying a database and processing the results,updating data with JDBC.	L42	T1	
43	**UNIT-V** **GUI programming with java -** The AWT class hierarchy,	L43	T1	
44	introduction to Swing, Swing vs. AWT,	L44	T1	

45	Hierarchy for swing components, Containers- JFrame,	L45	T1	
46	JApplet, JDialog, JPanel,	L46	T1	
47	Overview of swing components- Jbutton, JLabel,	L47	T1	
48	JTextField, JTextArea,	L48	T1	
49	simple swing applications, Layout management	L49	T1	
50	Layout manager types- border, grid and flow	L50	T1	
51	**Event handling** – Events, Event sources, Event classes,	L51	T1	
52	Event Listeners,Relationship between Event sources and Listeners,	L52	T1	
53	Delegation event model, Examples: handling a button click ,	L53	T1	
54	**Applets –** Inheritance hierarchy for applets,	L54	T1	
55	differences between applets and applications, lifecycle of an applet	L55	T1	
56	passing parameters to applets, applet security issues	L56	T1	

7. Session execution log

S.NO	UNIT No.	Starting Date	Ending Date
1	UNIT-I	19/12/2022	17/1/2023
2	UNIT-II	18/1/2023	31/1/2023
3	UNIT-III	1/2/2023	15/3/2023
4	UNIT-IV	16/3/2023	30/3/2023
5	UNIT-V	1/4/2023	20/4/2023

8. Assignment Questions and Innovative Assignments

Subject: Java Programming   **Branch: ECE**

I-Assignment Questions

Q1. **Distinguish** between Procedural language and Object- Oriented Language? **[CO1]**

Q2. **List** out types of inheritance in java with programs? **[CO3]**

Q3. **Explain** about "super" and "this" keyword in java with program? **[CO2]**

Q4a. **Discuss** about Method Overloading and Overriding. **[CO2]**

Q4b. **How** to create an access packages in java? **[CO3]**

Q5. **What** is an Exception? **Explain** exception Hierarchy. **[CO4]**

Subject: Java Programming   **Branch: ECE**

II-Assignment Questions

1. **Explain** the following utility class with syntax. **(CO4)**
    a) String Tokenizer   b) Random Class   c) Scanner Class

2. **Differentiate** between Array List and Vector? **Why** Array List is faster than Vector? **Explain**. **(CO4)**

3. **What** is Layout Manager? **List** and **explain** different types of Layout Manager with suitable example? **(CO5)**

4. a) **Differentiate** between Process and Thread. **(CO3)**

   b) **Write** a program to **solve** Producer consumer problem using Inter Thread Communication. **(CO3)**

5. a) **Describe** the four types of database drivers of JDBC with sample program. **(CO4)**

   b) **What** is an Event? **Describe** Delegation event model and **write** a program to handle Mouse Event. **(CO5)**

Innovative Assignments

1. JAVA Program to change the host name to its specific IP address
2. JAVA program to validate an email address format

9. Sample Assignment Script

Attached

10. Mid exam question papers

I-Mid Question Paper

III-B.TECH II-SEM I-MID EXAMINATIONS

Date: 09-03-2023   **Time: 10 AM to 11:30 AM**
Subject: JAVA   **Branch: ECE**

Part-A	BTL	CO
Q1. Briefly **explain** about history of java.	2	**[CO1]**
Q2. **What** is a package? Write the syntax to define a package.	1	**[CO3]**
Q3. **Contrast** between Abstract class and Interface.	2	**[CO3]**
Q4. **Define** Constructor. **Explain** different types of Constructor.	1,2	**[CO2]**
Q5. **Distinguish** between Exception and Error.	4	**[CO4]**

Part-B

Q6.**Discuss** the basic concepts of Object-Oriented programming with examples.   6   **[CO1]**
                                        OR
Q7. **Explain** about super,this keywords in java.   2   **[CO2]**

Q8. **What** is Polymorphism? **Explain** different types of polymorphism with example. 1,2 **[CO2]**
                                        OR
Q9. **Define** Inheritance. **What** are the different types of inheritance? **How** to prevent a class from inheritance.   1 **[CO2]**

Q10.**What** is Exception Handling? **Explain** with an example of Exception Handling in the case of Division by zero.   1,2 **[CO4]**

                                        OR

Q11. **Explain** about Exception hierarchy.   2   **[CO4]**

II-Mid Question Paper

CMR ENGINEERING COLLEGE
UGC AUTONOMOUS
(Approved by AICTE - New Delhi. Affiliated to JNTUH and Accredited by NAAC & NBA)
Kandlakoya (V), Medchal (M), Medchal - Malkajgiri (D)-501401

III-B.TECH II-SEM II-MIDEXAMINATIONS

Date:28-04-2023   Time:10 AMto11:30 AM
Subject:JAVA   Branch:ECE

 Answer all questions in Part-A

Part-A	BTL	CO
Q1.**Differentiate** between Vector and ArrayList.	4	**[CO4]**
Q2. **Distinguish** between AWT and Swings.	2	**[CO5]**
Q3. **Write** the complete life cycle of a thread.	6	**[CO3]**
Q4. **Write** a program for Random class.	6	**[CO4]**
Q5. **Distinguish** between Byte Stream class and Character Stream class.	2	**[CO4]**

Answer anyone full question from each unit.

Part-B

Q6.**List** all the classes and interfaces available in Collection framework and **write** the syntax of each.

	1	**[CO4]**

OR

Q7.**Write** a program to **solve** producer-consumer problem using inter-thread communication.

	6	**[CO3]**

Q8. **What** is Layout Manager? **Explain** different types of Layout Manager.   1,2 **[CO5]**

OR

Q9. **What** is an applet? **Explain** the life cycle of applet with neat diagram.   1,2 **[CO5]**

Q10.**Simplify** the process of creating Thread by using Runnable Interface.   2   **[CO3]**

OR

Q11. **Describe** the 4 types of database drivers of JDBC with sample program.   1   **[CO4]**

11. Scheme of Evaluation

SCHEME OF EVALUATION

S.NO	THEORY	MARKS	TOTAL
	Part-A		
1	Briefly **explain** about history of java.	2	
2	**What** is a package? Write the syntax to define a package.	2	
3	**Contrast** between Abstract class and Interface.	2	10
4	**Define** Constructor. **Explain** different types of Constructor.	2	
5	**Distinguish** between Exception and Error.	2	
	Part-B		
6	**Discuss** the basic concepts of Object-Oriented programming with examples.	5	5
7	**Explain** about super, this keywords in java.		
8	**What** is Polymorphism? **Explain** different types of polymorphism with example.	5	5
9	**Define** Inheritance. **What** are the different types of inheritance? **How** to prevent a class from inheritance.		
10	**What** is Exception Handling? **Explain** with an example of Exception Handling in the case of Division by zero.	5	5
11	**Explain** about Exception hierarchy.		
	TOTAL MARKS	**25**	25

SCHEME OF EVALUATION

S.NO	THEORY	MARKS	TOTAL
1	**Part-A** **Differentiate** between Vector and ArrayList.	2	10
2	**Distinguish** between AWT and Swings	2	
3	**Write** the complete life cycle of a thread.	2	
4	**Write** a program for Random class.	2	
5	**Distinguish** between Byte Stream class and Character Stream class.	2	
6	**Part-B** **List** all the classes and interfaces available in Collection framework and **write** the syntax of each. OR	5	5
7	**Write** a program to **solve** producer-consumer problem using inter-thread communication.		
8	**What** is Layout Manager? **Explain** different types of Layout Manager. OR	5	5
9	**What** is an applet? **Explain** the life cycle of applet withneat diagram.		
10	**Simplify** the process of creating Thread by using Runnable Interface. OR	5	5
11	**Describe** the 4 types of database drivers of JDBC with sample program.		
TOTAL MARKS		**25**	25

12. Sample mid answer script

Attached

13. Unit-wise course material

Attached

14. Material collected from Internet/Websites

      a.   https://onlinecourses.nptel.ac.in/noc21_cs03/preview

      b.   https://www.coursera.org/specializations/object-oriented-programming

      c.   http://www.btechsmartclass.com/

      d.   http://www.javatpoint.com/

      e.   https://www.tutorialspoint.com/

15. Power point presentations

java ppts.rar

16. Innovation teaching methods (if any)

Seminars, PPTs

17. Previous question papers

R16

Code No: 136FM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, November/December - 2020
JAVA PROGRAMMING
(Common to CE, EEE, ME, ECE, EIE, ETM)

Time: 2 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a) Differentiate between Procedure Oriented Programming and Object Oriented Programming.
  b) Write short notes on type casting.   [9+6]

2.a) What is the need of abstract class in Java?
  b) Write a java program for implementing method overriding concept.   [7+8]

3. How to implement user defined exceptions in java? Explain with example.   [15]

4.a) What is the use of JDBC? Describe Driver Manager, SQL query and Order by clause of JDBC.   [8+7]

5. What is Listener Interfaces? Illustrate Mouse motion listener interfaces with suitable java program.   [15]

6.a) What are the rules of constructor?
  b) Write a Java Program to generate Fibonacci series using recursive functions. [5+10]

7.a) What are the advantages of interfaces?
  b) Write a JAVA program for creating a sub package in JAVA.   [5+10]

8.a) Implement listIterator( ) method with appropriate java program.
  b) Explain the various binary input/output file operations.   [7+8]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester (Special) Examinations, January/February - 2021
JAVA PROGRAMMING
(Common to ME, ECE)

Time: 2 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a) How do JAVA programs maintain platform independency with the need of the JVM?
 b) What are the major features of object oriented programming paradigms?   [8+7]

2. With an example JAVA program illustrate various parameter passing mechanism. [15]

3. Demonstrate method overloading and method overriding with suitable examples. [15]

4. What is inheritance? Explain different types of inheritances in JAVA with clear examples.   [15]

5. How does a class differ from a package? Discuss the various levels of access protection available for packages in JAVA and mention their implications.   [15]

6. Explain try-catch-finally block of JAVA's exception handling mechanism with an example.   [15]

7. Give a detail description of commonly used collection classes in JAVA with illustrative examples.   [15]

8. Explain three UI components of swing and their classes and constructors.   [15]

---ooOoo---

18. References (Text books/websites/Journals)

TEXT BOOKS:

1. Java Fundamentals - A comprehensive Introduction, Herbet Schidt and Dale Srien, TMH.

REFERENCES BOOKS:

1. Java for Programmers, P.J. Deitel and H.M. Deitel, Pearson education (OR) Java: How to Program P.J. Deitel and H.M. Deitel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, Bruce Eckel, Pearson Education
5. Programming in Java, S. Malhotra and S. Choudhary, Oxford Univ. Press.