



Constructive JAVA Programming



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Universities Press



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Programme: B.Sc Computer Science		SEM	II
Course Code	Programming using JAVA	Hours	Credits
CS540		4	4
Cognitive Level	K-1: Remembering K-2: Understanding K-3: Applying K-4: Analyzing K-5: Evaluating K-6: Creating		
Learning Objectives	The Course aims to <ul style="list-style-type: none"> To acquire the programming skills in core java and Classes and Objects. To learn the art of Inheritance, Interface and Packages.. To understand the Exceptions, I/O and Multithreading concepts. To recognize the Applet and AWT controls. To learn the Interaction between AWT control and Data Base. 		
UNIT	CONTENT	HOURS	
I	Foundation, Essentials, Control Statement and Classes & Objects Stage of Java – origin of Java – challenges - features - Object-Oriented Programming; Java Essentials: Elements - API - variables - primitive data types – String Class - operators –combined assignment operators - conversion –scope – comments - keyboard input; Control Statements: <i>if,if-else</i> , nested <i>if&if-else-if</i> statements – logical operators – comparison – conditional operator – <i>switch</i> – increment and decrement – <i>while, do-while&for</i> loops – nested loops – <i>break</i> and <i>continue</i> ; Classes and Objects: classes and objects - modifiers - passing arguments– constructors - package & import - static class members – method overloading– constructor overloading – returning objects – <i>this</i> variable – recursion – nested & inner classes – abstract classes & methods.	15	
II	Arrays, String Handling, Inheritance, Interface and Pacakes Introduction –processing array – passing arrays – returning arrays – String arrays – two Dimensional Arrays - Arrays with Three or More Dimensions; String Handling : String class – concatenation – comparison – substring – methods – other methods– <i>StringBuffer, StringBuilder&StringTokenizer</i> classes; Inheritance: basics –inheriting and overriding superclass methods – calling superclass constructor –	15	

	polymorphism – inherit from different classes – abstract classes – final Class; Interfaces:Basics – multiple Interfaces – multiple inheritance using interface – multilevel interface – Packages – Create and access packages in NetBeans IDE – static Import and package class – access specifiers.	
III	Exception Handling, I/O and File Handling and Multithreading Introduction - <i>try</i> and <i>catch</i> block - multiple <i>catch</i> block - nested <i>try</i> - finally Block – <i>throw</i> Statement – exception propagation – <i>throw</i> Clause - custom exception – built-in exception; Multithreading:Introduction – threads – thread creation – life cycle – joining a thread – scheduler & priority – synchronization – inter-thread communication – thread control – thread Pool – thread group – daemon thread; Files and I\O Streams: <i>file</i> Class – streams – byte streams – filtered byte streams – <i>RandomAccessFile</i> class – character streams.	10
IV	Applet and GUI Part I Fundamentals – applet class – life cycle – steps for applet program – passing values through parameters – graphics – event handling; GUI I:GUI – creating windows – dialog boxes – layout managers – AWT component classes – Swing component classes – applications of AWT controls.	10
V	GUI Part II and Java Database Connectivity Event handling – AWT components – AWT graphics classes – Swing controls – application using Swing and AWT; Java Database Connectivity: types of drivers – JDBC architecture – JDBC classes & interfaces – steps in JDBC applications – creating a new Database and table with JDBC.	10
Reference	<p>i. Text</p> <ol style="list-style-type: none"> S.Sagayaraj, R.Denis, P.Karthik&D.Gajalakshmi, “Constructive Java Programming“, Universities Press, 2021 Unit - I : Ch. 1.1 – 1.5, 2.1 – 2.11, 3.1 – 3.15 & 4.1- 4.13 Unit – II : Ch. 5.1 – 5.8, 6.1 – 6.9, 7.1 - 7.7 & 8.1 – 8.8 Unit – III : Ch. 9.1 – 9.10, 10.1 - 10.12 & 11.1 – 11.6 Unit – IV : Ch. 12.1 – 12.7 & 13.1 – 13.7 Unit - V : Ch. 14.1 – 14.5& 15.1 – 15.5. <p>ii. References</p> <ol style="list-style-type: none"> Patrick Naughton and Herbert Schildt. The Complete Reference JAVA 2. 3rd Edition. Tata McGraw-Hill Edition, 1999. Muthu C. Programming with JAVA. 2nd Edition. Vijay Nicole Imprints, 2011. 	

	<p>3. Ken Arnold Gosling and Davis Holmen. The Java Programming Language. 3rd Edition. Addition Wesley Publication.</p> <p>iii. Web References</p> <p>(i) Online tutorials</p> <ol style="list-style-type: none"> 1. http://www.roseindia.net/java/ 2. www.tutorialspoint.com/java <p>(ii) Online quiz</p> <ol style="list-style-type: none"> 1. www.bullraider.com/quiz/core-java-quiz 2. www.javatpoint.com/examaccess. 	
Course Outcomes	On completion of the course, students should be able to	
	CO1: Identify classes, objects, members of a class and the relationships among them needed for a specific problem.	K1,K2,K5
	CO2: Design program using inheritance, interface and packages	K1,K2,K3
	CO3: Create Java application programs using package and exception handling	K1,K2,K4
	CO4: Develop programs using the Java standard class library.	K1,K2,K5
	CO5: Develop software using applet, AWT controls, and JDBC	K1,K2,K6

Mapping of COs with PSOs & POs:

CO/PO	PO								PSO						
	1	2	3	4	5	6	7	Avg	1	2	3	4	5	6	Avg
CO1	3	3	1	3	3	3	2	2.57	3	3	3	3	2	3	2.83
CO2	3	3	1	3	3	3	2	2.57	3	3	3	3	2	3	2.83
CO3	3	3	1	3	3	3	2	2.57	3	3	3	3	2	3	2.83
CO4	3	3	1	3	3	3	2	2.57	3	3	3	3	2	3	2.83
CO5	3	3	1	3	3	3	2	2.57	3	3	3	3	2	3	2.83
PO Mean								2.57	PSO Mean						2.83
Strength of Correlation of PO Average				Strongly Correlating				Strength of Correlation of PSO Average				Strongly Correlating			

CO Mapping Score with PO/PSO		Average PO/PSO Mapping Score	
Strength of Correlation	Value	Strength of Correlation	Range
Strongly Correlating(S)	3	Strongly Correlating(S)	Above 2.5
Moderately Correlating (M)	2	Moderately Correlating (M)	2.0 – 2.49
Weakly Correlating (W)	1	Weakly Correlating (W)	1.0 – 1.99
No Correlation (N)	0	No Correlation (N)	Below 1

	Name of the Faculty	Signature
Prepared by	Dr. S. Sagayaraj	
	Mr. P. Karthik	
Verified by	Dr. L. Ravi	

About the Authors



S Sagayaraj is Associate Professor, Department of Computer Science, Sacred Heart College (Autonomous), Tirupattur, Tamil Nadu, India. He has about twenty-eight years of experience in teaching computer science courses. He earned his Ph.D. degree from Bharathidasan University in 2012 for his work on developing a framework for code mining through method ontology. His research interests include knowledge engineering, semantic web, big data, E-learning and semantic web services.

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PROGRAMMING USING JAVA

1. Learning Objectives

- To acquire the programming skills in core java applications.
- To learn the art of GUI programming with Applet.
- To write interface with Applet Controls.
- To understand the Layouts of Applets.
- To establish database connectivity.
- To learn the Interaction between AWT control and Data Base.

2. Course Outline**Unit – I: Foundation, Essentials, Control Statement and Classes & Objects**

Stage of Java – origin of Java – challenges - features - Object-Oriented Programming; **Java Essentials:** Elements - API - variables - primitive data types – String Class - operators –combined assignment operators - conversion –scope – comments - keyboard input; **Control Statements:** *if, if-else*, nested *if&if-else-if* statements – logical operators – comparison – conditional operator – *switch* – increment and decrement – *while, do-while&for* loops – nested loops – *break* and *continue*; **Classes and Objects:** classes and objects -modifiers - passing arguments– constructors - package & import - static class members –method overloading– constructor overloading – returning objects – *this* variable – recursion – nested & inner classes – abstract classes & methods.

Unit – II: Arrays, String Handling, Inheritance, Interface and Packages

Introduction –processing array – passing arrays – returning arrays – String arrays – two Dimensional Arrays - Arrays with Three or More Dimensions; **String Handling :** String class – concatenation – comparison – substring – methods – other methods– *StringBuffer, StringBuilder&StringTokenizer* classes;**Inheritance:** basics –inheriting and overriding superclass methods – calling superclass constructor – polymorphism – inherit from different classes – abstract classes – final Class; **Interfaces:**Basics – multiple Interfaces – multiple inheritance using interface – multilevel interface – **Packages** – Create and access packages in NetBeans IDE – static Import and package class – access specifiers.

Unit – III: Exception Handling, I/O and File Handling and Multithreading

Introduction - *try* and *catch* block - multiple *catch* block - nested *try* - finally Block – *throw* Statement – exception propagation – *throw* Clause - custom exception – built-in exception; **Multithreading:**Introduction – threads – thread creation – life cycle – joining a thread – scheduler & priority – synchronization – inter-thread communication – thread control – thread Pool – thread group – daemon thread; **Files and I\O Streams:** *file* Class – streams – byte streams – filtered byte streams – *RandomAccessFile* class – character streams.

Unit – IV: Applet and GUI Part I

Fundamentals – applet class – life cycle – steps for applet program – passing values through parameters – graphics – event handling; **GUI I:** GUI – creating windows – dialog boxes – layout managers – AWT component classes – Swing component classes – applications of AWT controls.

Unit – V: GUI Part II and Java Database Connectivity

Event handling – AWT components – AWT graphics classes – Swing controls – application using Swing and AWT; **Java Database Connectivity:** types of drivers – JDBC architecture – JDBC classes & interfaces – steps in JDBC applications – creating a new Database and table with JDBC.

3. Teaching Resources

i. Text

1. S.Sagayaraj, R.Denis, P.Karthik&D.Gajalakshmi, “Constructive Java Programming“, Universities Press, 2021

Unit - I	: Ch. 1.1 – 1.5, 2.1 – 2.11, 3.1 – 3.15 & 4.1- 4.13
Unit - II	: Ch. 5.1 – 5.8, 6.1 – 6.9, 7.1 - 7.7 & 8.1 – 8.8
Unit - III	: Ch. 9.1 – 9.10, 10.1 - 10.12 & 11.1 – 11.6
Unit - IV	: Ch. 12.1 – 12.7 & 13.1 – 13.7
Unit - V	: Ch. 14.1 – 14.5& 15.1 – 15.5.

ii. References

1. Patrick Naughton and Herbert Schildt. The Complete Reference JAVA 2. 3rd Edition. Tata McGraw-Hill Edition, 1999.
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iii. Web References

(i) Online tutorials

1. <http://www.roseindia.net/java/>
2. www.tutorialspoint.com/java

(ii) Online quiz

1. www.bullraider.com/quiz/core-java-quiz
2. www.javatpoint.com/examaccess.

4. Learning Outcomes

Upon completion of this course, students should be able to:

- Understand the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
- Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
- Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifies, and

create user define package for specific task,(reusability concepts) error exception handling)

- Develop programs using the Java standard class library.
- Develop software in the Java programming language, (using applet, AWT controls, and JDBC)

About the Authors



S Sagayaraj is Associate Professor, Department of Computer Science, Sacred Heart College (Autonomous), Tirupattur, Tamil Nadu, India. He has about twenty-eight years of experience in teaching computer science courses. He earned his Ph.D. degree from Bharathidasan University in 2012 for his work on developing a framework for code mining through method ontology. His research interests include knowledge engineering, semantic web, big data, E-learning and semantic web services.

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