


PART A: Introduction			
Program: Diploma	Class: B.Sc.	Year: II Year	Session: 2022-23
Subject: Computer Science			
1.	Course Code	S2-COSC1T	
2.	Course Title	Computer Networks & Information Security	
3.	Course Type (Core Course/ Elective/ Generic Elective/ Vocational)	Core Course -(Major – I)	
4.	Pre-Requisite (if any)	NIL	
5.	Course Learning Outcomes (CLO)	<p>After completing this course student will be able to:</p> <ol style="list-style-type: none"> 1. Define and describe the components of Data Communications System such as various protocols, OSI Model, data transmission in analog and digital format. 2. Identify and differentiate among the network devices and drivers. 3. Learn and describe various error detection and correction methods. Define the various terminologies used in Network and Application layers. 4. Compare the various network technologies and can decide the suitable technology installation as per requirement and environment at any work place. 5. Describe the various protocols and can identify the application areas of each protocol. 6. Know the fundamentals of network and information security issues, laws, and various security technologies which can be applied on work place. 	
6.	Credit Value	Theory – 4 Credits Practical – 2 Credits	
7.	Total Marks	Max. Marks: 30+70	Min. Passing Marks: 33
PART B: Content of the Course			
No. of Lectures (in hours per week): 2 Hrs. per week			
Total No. of Lectures (in hours): 60 Hrs.			
Module	Topics		No. of Lectures
I	<p>Introduction to Computer Network: Use of computer network: Access to information, person to person communication, electronic commerce, internet of things; Types of computer network: Broadband access network, Mobile and wireless network, content delivery network, transit network, Enterprise network. Network Technology: Personal Area Network, Local Area Network,</p>		8


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 Chairman, Central Board of Studies, Computer Science

	<p>Metropolitan Area Network, Wide Area Network, internetworks, example of network (Internet, Mobile network, wireless network-Wi-Fi);</p> <p>Reference Model: OSI, TCP/IP, Critique of the OSI and TCP/IP reference models;</p> <p>Policy, Legal & Social Issues: Online speech, net neutrality, security & privacy, disinformation.</p> <p>Keywords: IoT, Broadband, LAN, MAN, WAN, OSI, TCP/IP.</p>	
II	<p>Physical Layer:</p> <p>Guided Transmission Media: Twisted pairs, coaxial cable, Fiber Optics;</p> <p>Wireless Transmission: The electromagnetic spectrum, frequency hopping spread spectrum, direct sequence, spread spectrum, ultra-wideband communication;</p> <p>Cellular Network: Common concepts – cells, handoff, paging, 1G, 2G, 3G, 4G & 5G technology.</p> <p>Keywords: Coaxial cable, fiber optics, 2G, 3G, 4G, 5G.</p>	8
III	<p>Data Link Layer:</p> <p>Service Provided to Network Layer: Data Link Control: Framing, Flow and Error Control; Error detecting codes, Error correcting codes;</p> <p>Data Link Protocols: Basic transmission and receipt, simplex link layer protocol, Full duplex, Sliding window protocol, Packet over SONET, ADSL, Point-to-Point Protocol.</p> <p>Switching Techniques: Packet Switching, Circuit Switching, Datagram Networks, Virtual-Circuit Networks, and Structure of a Switch.</p> <p>Network Devices & Drivers: Router, Modem, Repeater, Hub, Switch, Bridge and Gateways (fundamental concepts).</p> <p>Keywords: error correcting codes, error detecting codes, SONET, ADSL, point -to-point protocol, Router, Modem, Repeater, Hub, Switch, Bridge, Gateways.</p>	12
IV	<p>Network Layer:</p> <p>Network Layer Issues, Routing Algorithm: Optimality, principle of shortest path algorithm, Flooding, Distance Vector Routing, Broadcast Routing; congestion in network, traffic management approaches; IP Addresses, IPv4 Addresses, IPv6 Addresses,</p> <p>Virtual-Circuit Networks: Frame Relay and ATM,</p> <p>Transport Layer: Process-Process Delivery: UDP, TCP.</p> <p>Application layers: DNS, SMTP, POP, ftp, http and https.</p> <p>Basics of Wi-Fi (Fundamental concepts only).</p> <p>Streaming audio and video: digital audio and video, streaming stored media, real-time streaming.</p> <p>Keywords: routing algorithm, IPv4, IPv6, ATM, SMTP, POP, ftp, http, https, WiFi, video streaming.</p>	12
V	<p>Network Security and Information Security: Fundamentals of network and information security: principles of security and attack. Security Goals (Confidentiality, Integrity, and Availability), Non-Repudiation.</p> <p>Overview of Security Threats and Vulnerability: Types of attacks on</p>	10

	<p>Confidentiality, Integrity and Availability. Vulnerability and Threats: Phishing Attacks, E-mail threats, Web-threats; Intruders and Hackers, Insider threats, SQL injection Attacks, Ransomware. Malware: Worms, Virus, Spams, Adware, Spyware, Trojans.</p> <p>Security Technology: Firewalls, Intrusion detection and prevention systems, Scanning and Analysis Tools: Biometric access controls, Cipher methods, Cryptographic algorithms, Cryptographic tools, Protocols for secure communication.</p> <p>Keywords: phishing, SQL injection, Worms, Computer virus, Spyware, Trojans, Firewall, Cipher, Cryptography.</p>	
VI	<p>Computer and Cyber-crimes: Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber-crimes, cyber stalking, forgery and fraud, crime related to IPRs, cyber terrorism, Ransom ware attacks, computer vandalism.</p> <p>Cyber Laws- Introduction to IT laws & Cyber Crimes – Internet, Hacking, Cracking, Viruses, Virus Attacks, Software Piracy, Intellectual property, Legal System of Information Technology, Social Engineering, Mail Bombs, Bug Exploits. Scope of cyber laws: e-commerce, online contracts, IPRs (copyright, trademarks and software patenting), e-taxation, e-governance and cyber-crimes, Cyber law in India, with special reference to Information Technology Act, 2000 and Recent amendments.</p> <p>Keywords: cyber-crime, cyber stalking, cyber-fraud, IPR, IT laws, e-commerce, e-taxation, e-governance, mail bombs.</p>	10

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- Andrew S. Tanenbaum, Nick Feamster, David J. Wetherall, Computer Networks, 6th Edition, (2021), Pearson.
- Michael E Whitman and Herbert J Mattord, Principles of Information Security, Fourth Edition, CENGAGE Learning, 6th Indian Reprint.
- M. Merkow, J. Breithaupt, Information Security Principles and Practices, 2nd Edition, 2014, Pearson Education.
- G.R.F. Snyder, T. Pardoe, Network Security, Cengage Learning.
- Praveen Kumar Shukla, Surya Prakash Tripathi, Ritendra Goel "Introduction to Information Security and Cyber Laws", 2014, Dreamtech Press.
- Faiyaz Ahamad, KLSI "Cyber Law and Information Security", 2013, Dreamtech Press.
- Books published by M.P. Hindi Granth Academy, Bhopal

Reference books:

- Kurose James F., Ross Keith W., Computer Networking, A Top-Down Approach, Sixth Edition, 2017, Pearson
- Micki Krause, Harold F. Tipton, Handbook of Information Security Management, Vol. 1-3, CRC Press LLC.
- B. A. Forouzan: Data Communications and Networking, Fourth edition, TMH Publishing

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Company Ltd.

- Basta, W.Halton, Computer Security: Concepts, Issues and Implementation, Cengage Learning India.

Suggestive digital platform web links

1. <https://www.youtube.com/watch?v=qiQR5rTSshw>
2. Free CCNA | Network Fundamentals - Day 1 (<https://www.youtube.com/watch?v=n2D1o-aM-2s>)
3. Free CCNA | Network Devices <https://www.youtube.com/watch?v=H8W9oMNSuwo>
4. Free CCNA | OSI Model & TCP/IP Suite (<https://www.youtube.com/watch?v=t-ai8JzhHuY>)
5. Free CCNA | Interfaces and Cables | Day3 (<https://www.youtube.com/watch?v=ieTH5IVhNaY>)
6. Free CCNA | Intro to the CLI | Day 4 (<https://www.youtube.com/watch?v=IYbtai7Nu2g>)
7. Free CCNA | Ethernet LAN Switching (Part 1) | Day 5 (<https://www.youtube.com/watch?v=u2n762WG0Vo>)
8. Free CCNA | Analyzing Ethernet Switching | Day 6 Lab (<https://www.youtube.com/watch?v=Ig0dSaOODI8>)
9. Free CCNA | IPv4 Addressing (Part 1) | Day7 (<https://www.youtube.com/watch?v=3ROdsfEUuhs>)
10. Free CCNA | IPv6 Part 1 | Day 31 (<https://www.youtube.com/watch?v=ZNuXyOXae5U>)
11. Free CCNA | IPv6 Part 3 | Day 33 (<https://www.youtube.com/watch?v=rwkHfsWQwy8>)
12. <http://www.mphindigranthacademy.org/>

Suggested equivalent online courses

NPTEL:

1. Demystifying Networking (04 weeks)
2. Cyber Security (15 Weeks)
3. <https://www.edx.org/learn/computer-networking>

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks : 100

Continuous Comprehensive Evaluation (CCE) : 30 marks University Exam (UE) : 70marks

Internal Assessment : Continuous Comprehensive Evaluation (CCE):30	Class Test Assignment/Presentation	Total 30
External Assessment : University Exam Section: 70 Time : 03.00 Hours	Section(A) : Objective Questions Section (B) : Short Questions Section (C) : Long Questions	Total 70

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Chairman, Central Board of Studies, Computer Science

PART A: Introduction			
Program: Diploma		Class: B.Sc.	Year: Second
Session: 2022-23			
Subject: Computer Science			
1.	Course Code	S2-COSC1P	
2.	Course Title	Computer Networks Lab	
3.	Course Type (Core Course/ Elective/ Generic Elective/ Vocational)	Core Course - (Major – I)	
4.	Pre-Requisite (if any)	Open for all	
5.	Course Learning Outcomes (CLO)	<p>After completing this lab course, students will be able to:</p> <ol style="list-style-type: none"> 1. Learn and identify various cables used in the networking. 2. Learn, identify various connectors used to connect different cables. 3. Use the various tools for preparing the connectors for cables. 4. Configure and manage various local area networks at home and at work place. 	
6.	Credit Value	Practical – 2 Credits	
7.	Total Marks	Max. Marks: 100	Min. Passing Marks: 33
PART B: Content of the Course			
No. of Lab. Practicals (in hours per week): 1 Hr. per week			
Total No. of Labs: 30 Hrs.			
Suggestive List of Practicals			No. of Labs.
<ol style="list-style-type: none"> 1. Study of UTP network cable <ul style="list-style-type: none"> ○ Study the color code of UTP cable ○ Categories of UTP n/w cable ○ Shielding of n/w cable ○ Electricity interference with n/w cable ○ Maximum length for which data cable can be used ○ Crimping of RJ45 connector and Punching of data n/w cable ○ Penta scanning of cabling work ○ Rules of UTP laying 2. Knowledge of Structured Cabling and its components <ul style="list-style-type: none"> ○ Information outlet with box ○ Network Rack (4U, 6U, 9U, 12U, 24U, 32U, 42U) ○ Patch Panel ○ Rack Management 3. Study of Optical Fiber cable 			30



- Different cores of OFC (6 core, 12, 24 core)
- Multimode & Single mode OFC cable
- Shielding of OFC
- Splicing/Termination of OFC.
- OTDR Testing
- LIU fixing
- LIU management (pigtail/fiber patchcord)
- Media Convertor
- SFP module
- Rules of OFC laying

4. Use of tools

- Crimping Tool
- Punching Tool
- Nose plier
- Wire Stripping and Cable Cutter
- Multimeter
- RJ45 RJ11 RJ12 Cat5 Cat6 Network Cable Tester
- In-Line Coupler (RJ45 F/F)
- RJ45 NETWORK SPLITTER-ADAPTER 2-way.

5. Configuration/ Management of Local Area Network

- Implementation of file and printer sharing.
- Installation of ftp server and client.
- Connect the computers in Local Area Network.
- Configuring Class A IP Address on LAN Connection in Computer LAB and then use following tools:
ping, ipconfig, getmac, hostname, nslookup, tracert, arp, pathping, systeminfo.
- Configure static routing using packet tracer software
- Configure Dynamic routing using packet tracer
- Configure VLAN using Managed switch Device / Packet tracer
- Implementation of Subnetting in Class A, B and C
- Ping between 2 systems using IPv6
- Configuration of NAT for incoming packet request
- Configuration of Software / Hardware firewall to block outgoing requests to facebook.com

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PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

- Andrew S. Tanenbaum, Nick Feamster, David J. Wetherall, Computer Networks, 6th Edition, (2021), Pearson.
- Michael E Whitman and Herbert J Mattord, Principles of Information Security, Fourth Edition, CENGAGE Learning, 6th Indian Reprint.
- Books published by M.P. Hindi Granth Academy, Bhopal

Reference books:

- Hacking Exposed, Stuart McClure, Joel Scrambray, George Kurtz, TMH.
- Computer Security Art and Science, Matt Bishop, Pearson/PHI.

Suggestive digital platform web links

<https://www.edx.org/learn/computer-networking>
<http://www.mphindigranthacademy.org/>

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105081/>

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz		Viva Voce on Practical	
Attendance		Practical Record File	
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)		Table work / Experiments	
TOTAL	30		70



PART A: Introduction			
Program: Diploma		Class: B.Sc.	Year: II Year
Session: 2022-23			
Subject: Computer Science			
1.	Course Code	S2-COSC2T	
2.	Course Title	Object Oriented Programming with Java	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Core Course – (Major – II) / Minor / Elective	
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming Methodology at Certificate Level.	
5.	Course Learning Outcomes(CLO)	<p>After the completion of this course, a successful student will be able to do the following:</p> <ol style="list-style-type: none"> 1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. 2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to a specific problem. 3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved. 4. Demonstrate understanding and use of different exception handling mechanisms and concepts of multi-threading for robust faster and efficient application development. 5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events. 6. Identify, Design & Develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture. 	
6.	Credit Value	Theory - 4 Credits Practical – 2 Credits	
7.	Total Marks	Max. Marks : 30+70	Min. Passing Marks: 33



PART B: Content of the CourseNo. of Lectures (in hours per week): **2 Hrs. per week**Total No. of Lectures: **60 Hrs.**

Module	Topics	No. of Lectures
I	<p>OOPS - Object Oriented Paradigm, Benefits of OOP, Applications of OOP.</p> <p>Java - History, Java Features, How Java Differs from C and C++, Java and internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Supports Systems, Java Environment.</p> <p>Java Program Structure - Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, and Programming Style.</p> <p>Keywords: OOPS, JVC, WWW, Java Environment</p>	12
II	<p>Java Basics - Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variable, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values.</p> <p>Operators - Arithmetic Operator, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators.</p> <p>Arithmetic Expressions - Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions. Decision Making with if Statement, Simple if Statement, if.....Else Statement, Nesting of if ...else Statement, if-else Ladder, The Switch Statement, The ? Operator.</p> <p>Loops - While Statement, Do Statement, For Statement, Jump in Loops, Labeled Loops.</p> <p>Keywords: Operators, Arithmetic Expressions, Decision Making, Loops</p>	12
III	<p>Class - Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members,</p> <p>Constructors – definition and types, Methods Overloading, Static Members, Nesting of Methods.</p> <p>Inheritance - Extending a Class, Overloading Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract Methods and Classes, Visibility Control Arrays, One Dimensional Array, Strings, Vectors, Wrapper Classes. Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables.</p> <p>Keywords: Class, Constructors, Inheritance, Final, Abstract Methods,</p>	12



	Overloading	
IV	<p>Java API Packages - Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, and Hiding Classes. Creating Threads, Extending the Thread Class, Stopping and Blocking a Threads, Life Cycle of a Thread, Using Threads Methods, Threads Exceptions, Threads Priority, Synchronization, Implementing the 'Runnable' interface.</p> <p>Types of Errors - Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using Finally Statements, Throwing Our Own Exceptions, Using Exceptions for Debugging.</p> <p>Preparing to Write Applets - Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet.</p> <p>Keywords: API, threads, synchronization, errors, Applets, debugging</p>	12
V	<p>More About the Applet tag - Passing Parameters to Applets, Aligning the Display, More About HTML Tags, Displaying Numbering Values, Getting Input from the user.</p> <p>The Graphics Class - Lines and Rectangles, Circles and Ellipses, Drawing Arcs, Drawing Polygons, Line Graphs, Using Control Loops in Applets, Drawing Bar Charts.</p> <p>Concept of Stream - Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams,</p> <p>Other Useful I/O Classes - Using the File Class, Input / Output Exceptions, Creation of Files, Reading / Writing Characters, Reading / Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Random Access, Files, Interactive Input and Output, other Stream Classes.</p> <p>Keywords: Stream, files, Graphics class, buffering, HTML tags</p>	12



PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks -

- E Balguruswami, Programming with Java, Tata McGraw-Hill Publication.

Reference Books -

- Bruce Eckel, Thinking in Java.
- Herbert Schildt, Java: The Complete Reference .
- Y. Daniel Liang, Introduction to Java Programming .
- Paul Deitel, Harvey Deitel, Java: How To Program .
- Cay S. Horstmann, Core Java Volume I –Fundamentals .
- Java Projects, BPB Publication.
- Dr. S.S. Kandare, Programming in Java, S Chand Publication .
- Books published by M.P. Hindi Granth Academy, Bhopal

Suggestive digital platform web links

<https://www.cs.cmu.edu/afs/cs.cmu.edu/user/gchen/www/download/java/LearnJava.pdf>

https://www.tutorialspoint.com/java/java_tutorial.pdf

<https://www.youtube.com/watch?v=7s3xDfdqfDw>

<http://www.mphindigranthacademy.org/>

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105191/>

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks :100

Continuous Comprehensive Evaluation (CCE) : 30marks University Exam (UE) 70marks

Internal Assessment : Continuous Comprehensive Evaluation (CCE):30	Class Test Assignment/Presentation	
External Assessment : University Exam Section: 70 Time : 03.00 Hours	Section(A) : Objective Questions Section (B) : Short Questions Section (C) : Long Questions	Total 70

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PART A: Introduction			
Program: Diploma		Class: B.Sc.	Year: II Year
Session: 2022-23			
Subject: Computer Science			
1.	Course Code	S2-COSC2P	
2.	Course Title	Java Programming Lab	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Core Course - (Major- II) / Minor / Elective	
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming Methodology at Certificate Level.	
5.	Course Learning Outcomes(CLO)	<p>After the completion of this course, a successful student will be able to do the following:</p> <ol style="list-style-type: none"> 1. Implement Object-Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. 2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to a specific problem. 3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved. 4. Demonstrate understanding and use of different exception handling mechanisms and concepts of multi-threading for robust faster and efficient application development. 5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events. 6. Identify, Design & Develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture. 	
6.	Credit Value	Practical – 2 Credits	
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 33



PART B: Content of the Course		
No. of Lab. Practicals (in hours per week): 1 Hr. per week		
Total No. of Lab.: 30 Hrs.		
	Suggestive List of Practicals	No. of Labs.
	<p style="text-align: center;">(Using any Text editor: Notepad/Eclipse/Netbeans/Sublime etc.)</p> <ol style="list-style-type: none"> 1. Find greater number between two numbers -using conditional operator. 2. Find the factorial of number if number is given by user using command line argument. 3. Write a program to check if a number is prime or not. 4. Write a program to display tables from 2 to 10. 5. Write a program to print Fibonacci series. 6. Enter a no. and check whether it is even or odd. 7. Write a Program to find sum & average of 10 no. using arrays. 8. Write a program to display reverse of a digit no. using array. 9. Write a program to demonstrate function overloading. 10. Write a program to display grade according to the marks obtained by the student. 11. Write a program to calculate the salary of an employee if salary is greater than or equal to 20000 and year of service is greater than or equal to 5 years then bonus will be 2000 otherwise 1000 and print gross salary of employee. 12. Write a program to convert the given no. of days into months & days using with classes, objects and method. 13. Write a program to convert given string into Uppercase and lowercase and get the length of string using array. 14. Create a package called "Arithmetic" that contains methods to deal all arithmetic operations. Also write a program to use the package. 15. Write a program to demonstrate use of constructor and destructor. 16. Define an exception called "Marks out of Bound" exception that is thrown if the entered marks are greater than 100. 17. Write a program using application of single inheritance. Find the area of rectangle & volume of cube. 18. Develop a simple real life application to illustrate the use of multithreading. 19. Write a program using multiple inheritance to calculate area and perimeter of a circle using interface. 20. Write an applet program to draw a Rectangle (color = orange) and a 	30



	<p>right aligned oval.</p> <p>21. Develop an applet that receives 3 numeric values as inputs from the user and then displays the largest no. on the screen.</p> <p>22. Write a Java Program to read data from the inputted text file name, and print its content on the console.</p> <p>23. Write a Java Program to merge two files into third file</p> <p>24. Write a Java program to delete duplicate lines in text file</p> <p>25. Write a Java Program to implement FileInputStream class to read binary data from any image file.</p>	
PART C: Learning Resources		
Textbooks, Reference Books, Other Resources		
Suggested Readings		
<p>Textbooks -</p> <ul style="list-style-type: none"> ● E Balguruswami, Programming with Java, Tata McGraw-Hill Publication, 2nd Edition ● Books published by M.P. Hindi Granth Academy, Bhopal <p>Reference Books -</p> <ul style="list-style-type: none"> ● Bruce Eckel, Thinking in Java (4e) ● Herbert Schildt, Java: The Complete Reference (9e) ● Y. Daniel Liang, Introduction to Java Programming (10e) ● Paul Deitel, Harvey Deitel, Java: How To Program (10e) ● Cay S. Horstmann, Core Java Volume I - Fundamentals (10e) ● Java Projects, BPB Publication. ● Dr. S.S. Kandare, Programming in Java, S Chand Publication 		
Suggestive digital platform web links		
https://www.cs.cmu.edu/afs/cs.cmu.edu/user/gchen/www/download/java/LearnJava.pdf		
https://www.tutorialspoint.com/java/java_tutorial.pdf		
https://www.youtube.com/watch?v=7s3xDfdqfDw		
http://www.mphindigranthacademy.org/		
Suggested equivalent online courses		
https://nptel.ac.in/courses/106/105/106105191/		



Part D-Assessment and Evaluation			
Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz		Viva Voce on Practical	
Attendance		Practical Record File	
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)		Table work / Experiments	
TOTAL	30		70

Higher Education

AKumar