

DEPARTMENT OF INFORMATION TECHNOLOGY
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Course	Code	L	T	P	Credits
Java Programming	IT 601	3	0	0	3

UNIT I

INTRODUCTION:

What is Java? Background/History of Java, Java Virtual Machine, JVM Architecture, Byte code, HotSpot JVM and JIT Compilation, Basics of OOP. Introduction to Classes and Objects. Data types. Garbage collection: Eden space, Survivor Space, Tenured generation, Permanent generation, Code cache, loops and flow control.

UNIT II

OBJECT ORIENTED PROGRAMMING CONCEPTS:

Abstraction, Encapsulation, Polymorphism and Overloading, Constructors and destructors scope of declarations, Access Control, Nested and Inner classes. Array handling. Using extends keyword, subclass, super-class, over-riding methods, dynamic method dispatch, The Object class, Abstract and final classes. Packages: defining, importing, Access Control. Interface: Defining, Implementing and applying interface. Wrapper classes.

UNIT III

EXCEPTION AND STRING HANDLING:

Basic exceptions, user defined exceptions, catching exceptions – try, catch and multi try catch, throwing and re-throwing, finally clause. String Handling: Creation, concatenation and conversion of a string, searching and modification, string comparison. StringBuffer and StringBuilder classes and Date class.

UNIT IV

CONCURRENT PROGRAMMING AND FILE HANDLING:

Generics & Collections: List interface, ArrayList, LinkedList, Queue, Stack, Threads: Create new threads – extending java.lang.Thread, implementing java.lang.Runnable Interface, Understanding thread execution, multithreading, thread priorities and scheduling, synchronization Introduction to java.util.concurrent classes and interface and using java.util.concurrent.Callable interface. Introduction to Fork-Join Framework. File handling, Creating, writing, reading, updating, touching and deleting files, Byte Streams and Character Streams, InputStream & OutputStream classes and their subclasses, Reader and Writer classes and their subclasses.

UNIT V

GUI COMPONENTS:

Introduction to AWT and Swing, frames, panels, buttons and events, layout managers, text fields, labels. Working with controls and layout managers, event handling and data validation, Applets. Introduction to JavaFx.

Text Books:

1. Java for Programmers, P.J. Dietel, H. M. Dietel, Pearson Education.
2. Java SE 6, Joel Murach, A. Steelman, SPD Pvt. Ltd.
3. Head first java, Kathy Sierra, Bert Bates, Oreilly.
4. Core Java, Cay Horstman and Gary Cornell, Prentice Hall

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Course	Code	L	T	P	Credits
Java Programming Lab	IT 602 P	0	0	2	1

List of experiments:

1. Java package with simple stack and queue class
2. Complex number manipulation
3. Date class similar to java.util package
4. Implementing dynamic polymorphism in java
5. Java interface for ADT stack
6. Developing a simple paint like program using applet
7. Developing a scientific calculator
8. Developing a template for linked list
9. Develop a multi threaded producer consumer Application
10. Generating prime numbers and Fibonacci series
11. Multithreaded GUI application

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Course	Code	L	T	P	Credits
Big Data	IT 603	3	1	0	4

Unit I

INTRODUCTION:

Big Data Overview, Introduction to the Big Data problem. Current challenges, trends, and applications, Algorithms for Big Data analysis. Data sets, Mining and learning algorithms that deal with large datasets Technologies for Big Data management. Big Data technology and tools, special consideration made to the Map-Reduce paradigm and the Hadoop ecosystem. What is data sciences, The rising and importance of data sciences, Big data analytics in industry verticals, Data Analytics Lifecycle and methodology, Data Understanding, Data Preparation.

Unit II

MODELING:

Evaluation, Communicating results, Deployment, Data exploration & preprocessing.

Unit III

MEASURES AND EVALUATION:

Data Analytics: Theory & Methods, Supervised learning, Linear/Logistic regression, Decision trees, Naïve Bayes, Unsupervised learning, K-means clustering, Association rules

Unit IV

UNSTRUCTURED DATA ANALYTICS:

Technologies & tools, Text mining, Web mining, Operationalizing an Analytics project, Data Visualization Techniques, Creating final deliverables

Term project: Using Amazon AWS, BlueMix, Cognos, Biginsights.

Text Books:

1. Big Data: A Revolution That Will Transform How We Live, Work, and Think by Viktor Mayer-Schönberger, Kenneth Cukier.
2. Hadoop: The Definitive Guide by Tom White (Goodreads Author), Doug Cutting , oreily Publications.
3. Real-Time Big Data Analytics: Emerging Architecture [Kindle Edition], Mike Barlow

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Course	Code	L	T	P	Credits
Computer Networks	IT 604	3	1	0	4

UNIT I

INTRODUCTION:

Introduction to computer networks: network operating system. Network hardware: LAN, WAN – Network software - Reference Models: OSI Reference model, TCP/IP Reference model- network topologies.

UNIT II

DATA LINK AND SWITCHING THEORY:

Switching Theory: Circuit Switching, Packet switching - Guided Transmission Media-encoding. Design Issues: Framing, Error control services, Flow Control- Sliding window protocol- HDLC.

UNIT III

MAC LAYER AND STANDARDS:

Multiple Access Protocols: Carrier sense multiple access protocol, Collision free protocols- Ethernet: IEEE 802.3, IEEE 802.4 token bus , IEEE 802.2 Logical link control, Fast Ethernet- HUB- Bridge- FDDI.

UNIT IV

NETWORK DESIGN ISSUES:

Design Issues: Service provided to the transport layer, comparison of virtual circuits and datagrams. Routing algorithms: Subnets, shortest path routing, flooding, Distance vector routing - congestion control: jitter control, load shedding. Routing and Traffic Control Chapter 12 & 13 Dijkstra, Bellman-Ford Algorithms

UNIT V

TRANSPORT LAYER AND APPLICATIONS:

Service: Service provided to the upper layer. Elements: Flow control and buffering, multiplexing-transport protocol as a finite machine- TCP protocol header- congestion control- UDP- Email- WWW. Link State vs Distance Vector Methods, Flow and Congestion Control Layer 2 Switches & Bridges, Spanning Tree Algorithm Virtual LANs Internetworking Routers and Gateways Internet IP Network Applications

Text Books:

1. Andrew S. Tanenbaum, Computer Networks.

References Books:

1. Douglas E. Comer ,”Computer Networks & Internet “.
2. Fred Halsall , Data Communication, Computer Networks & Open System.
3. William Stallings, Data and Computer Communications.

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Course	Code	L	T	P	Credits
Computer Networks Lab	IT 605 P	0	0	2	1

List Of Experiments:

1. Identification of guided media (UTP,Fibre) /Color coding.
2. To Connect two pc using peer to peer communication/via switch/via router.
3. IP addressing (static and dynamic).
4. Sharing the resources in wired network (software and hardware).
5. Configuring the Windows server (Active directory) and DHCP server.
6. Simulation of ARP / RARP.
7. Simulation of Sliding-Window protocol.
8. Simulation of BGP / OSPF routing protocol.
9. Study of NS2/ GLOMOSIM / OPNET.
10. To implement wired network topology and wireless network topology in NS2.
11. To Plot Efficiency of pure Aloha and slotted ALOHA in MATLAB.

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Course	Code	L	T	P	Credits
Computer Graphics	IT 606	3	1	0	4

UNIT I

INTRODUCTION:

computer graphics, Co-ordinate representation, Pixel, Raster Scan & Random Scan methods, color, CRT Raster, scan basics, video basics, interactive devices, graphics input and output devices, mouse, track ball, light pen, digitizer, thumb wheel, raster scan graphics, applications.

UNIT II

Line GENERATION:

Points and lines generation algorithm, DDA lines drawing algorithm, Bresenham's lines drawing algorithm, circle generating algorithm, midpoint circle algorithm, midpoint ellipse generating algorithm, other curves, conic sections, polynomial and spline curves, Pixels addressing, filled- area primitives, scan-line polygon filled algorithms, inside-outside tests, scan-line fill of curved boundary algorithms, boundary fill algorithms, flood-fill algorithms, fill-area functions, character generation.

Segments: Segments table, Creating, Deleting and renaming a segment Visibility, Image transformation.

Transformation: 2D Transformation, An introduction to 3D transformation, Projections, Light, color and shading.

UNIT III

WINDOWING AND CLIPPING:

Viewing transformation, Clipping. Generalized clipping IN 2D.

Hidden line and surfaces: Back-face Removal Algorithms, Hidden line methods

Rendering and Illumination: Introduction to curve generation, Bezier, Hermite and B-spline algorithms and their Comparisons

Text Books:

1. Computer Graphics (Principles and Practice) by Foley, van Dam, Feiner and Hughes, Addison Wesley.
2. Computer Graphics by D Hearn and P M Baker, Printice Hall of India.
3. Mathematical Elements for Computer Graphics by D F Rogers, McGraw Hill
4. Procedural Elements for Computer Graphics by D F Rogers, McGraw Hill

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Course	Code	L	T	P	Credits
Computer Graphics Lab	IT 607 P	0	0	2	1

List Of Experiments:

1. Point drawing to understand co-ordinate system of display device.
2. To implement Bresenham's algorithms for line generation.
3. To implement DDA algorithm for line generation.
4. To implement midpoint circle generation algorithm
5. To implement midpoint ellipse generation algorithm
6. To implement flood-fill and boundary fill algorithm.
7. To perform 2D Transformations such as translation,
8. To perform 2D Transformations such as rotation,
9. To perform 2D Transformations such as scaling,
10. To perform 2D Transformations such as reflection
11. To perform 2D Transformations such as shearing.
12. To implement Cohen-Sutherland 2D clipping and window-viewport mapping.
13. To perform 3D Transformations such as translation, rotation and scaling.
14. To visualize projections of 3D images.
15. To convert between color models.
16. To implement text compression algorithm using libraries.
17. To implement image compression algorithm using libraries.
18. To perform animation using any Animation software.
19. To perform basic operations on image using any image editing software.
20. Implementation of viewing/rendering pipeline.

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Course	Code	L	T	P	Credits
Artificial Intelligence	IT 608	3	0	0	3

UNIT I

INTRODUCTION:

Introduction to AI and intelligent agents. Problem Solving : Solving Problems by Searching, heuristic search techniques, constraint satisfaction problems, stochastic search methods, adversarial search, Game playing : minimax, alpha-beta pruning.

UNIT II

KNOWLEDGE REPRESENTATION AND REASONING:

Building a Knowledge Base : Propositional logic, first order logic, Theorem Proving in First Order Logic. Production Systems, Semantic Nets, Frames and Scripts Formalisms. Resolution in Predicate Logic, Unification, Strategies for Resolution by Refutation. Knowledge Acquisition and learning: Learning from examples and analogy, Rote learning, Neural Learning, Integrated Approach. Planning, partial order planning. Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks.

UNIT III

NEURAL NETWORKS:

Overview of different forms of learning, Learning Decision Trees, Neural Networks- Basics of Neural Networks: Perceptrons, Feedforward nets Backpropagation algorithm, preliminary understanding of unsupervised learning.

Pattern Recognition: Introduction to Pattern Recognition, Structured Description, Symbolic Description, Machine perception, Line Finding, Interception, Semantic & Model, Object Identification, Speech Recognition.

UNIT IV

EXPERT SYSTEM:

Existing Systems (DENDRAL, MYCIN), domain exploration, Meta Knowledge, Expertise Transfer, Self Explaining System. Fuzzy logic: Fuzzy Logic Propositional logic, Membership functions, Fuzzy logic, Fuzzy rule generation, De-fuzzification, Time dependent fuzzy logic, Temporal fuzzy logics, Case study-to use fuzzy logic for processes control problem
Programming Language: Introduction to programming Language- LISP, PROLOG

Text Books:

1. Rich & Knight, "Artificial Intelligence".
2. Elamie, "artificial Intelligence", Academic Press.

Reference Books:

1. Char nick "Introduction to Artificial Intelligence", Addison Wesley.
2. Winston, "LISP", Addison Wesley.

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Course	Code	L	T	P	Credits
Artificial Intelligence Lab	IT 609 P	0	0	2	1

List Of Experiments:

PROLOG LAB CONTENTS

1. Input & Output
2. Operators and Arithmetic
3. Facts & Variables
4. Simple facts and facts with arguments
5. Rules & Predicates
6. Simple Predicates, Predicate Inference, Goal queries
7. Recursion
8. Graph Traversal
9. Depth First Search, Breadth First Search

Simulators:- 1) Win-Prolog
2) Strawberry Prolog

LISP LAB CONTENTS

1. Data Types
2. symbols & lists
3. Local variables & global variables
4. Standard input/output
5. Functions & predicates
6. User defined functions
7. Recursion
8. factorial, fibanocci

Simulators:- ANSI common Lispworks Studio 6