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

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

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.

Unit II
Data Science:

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, 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, Opertionalizing 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

   Publiactions.

3. Real-Time Big Data Analytics: Emerging Architecture [Kindle Edition], Mike Barlow
4. Big Data (Black Book) , DT Editorial Services.

DEPARTMENT OF INFORMATION TECHNOLOGY
NATIONAL INSTIUTE OF TECHNOLOGY SRINAGAR

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

UNIT I - INTRODUCTION:
History and development of computer networks, networks topologies. Layering and protocols.

UNIT II - PHYSICAL LAYER:
Different types of transmission media, errors in transmission: attenuation, noise. Encoding (NRZ, NRZI, Manchester, AMI, etc.).

UNIT III - DATA LINK LAYER AND SWITCHING:
MAC Layer: Aloha, CSMA, CSMA/CD, CSMA/CA protocols. Data Link Layer: Error detection (Parity, CRC), Framing, Sliding Window, Stop and Wait protocols, HDLC. Switching Theory: Circuit Switching, Message switching, Packet switching.

UNIT IV - NETWORK LAYER:
Network layer: Internet Protocol, IPv6, ARP, DHCP, ICMP, Routing algorithms: Distance vector, Link state, Metrics, Inter-domain routing. Dijkstra, Bellman-Ford Algorithms. Subnetting, Classless addressing, Network Address Translation.

UNIT V - TRANSPORT LAYER:
UDP, TCP. Connection establishment and termination, sliding window revisited, flow and congestion control, timers, retransmission, TCP extensions.

UNIT VI - APPLICATION LAYER:

Session, Presentation, and Application Layers. Examples: DNS, SMTP, IMAP, HTTP, etc.

Recommended Books:
1. JF Kurose, KW Ross, Computer Networking: A Top-Down Approach.
2. Behrouz A. Forouzan, Data communications and Networking.
3. Andrew S. Tanenbaum, Computer Networks.
4. William Stallings, Data and Computer Communications.

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

List Of Experiments:

1. Study and implementation of colour coding standards of guided media (UTP).

2. Implementation and understanding of basic network utilities: ping, ipconfig/ifconfig, mstsc, nslookup, tracert.

3. Network traffic capture and analysis using Wireshark.

4. Introduction to Cisco Packet Tracer: Building a LAN with HUBs and Switches, understand and implement address learning in switches.

5. Router Configuration Using Packet Tracer, IP addressing (static and dynamic), subnetting.

6. Static/Dynamic Route Configuration.

7. Implementation of routing protocols (RIP, OSPF, BGP).

8. Standard access control list (ACL) configuration, Extended access control list (ACL) configuration.

9. Implementation of flow control protocols.

10. Implementation of a wireless network in NS-3.

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, Feinerand Hughes, Addisen 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

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 librarires.
17. To implement image compression algorithm using librarires.
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.

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", Addision Wesley.
2. Winston, "LISP", Addison Wesley.

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