

1. Advanced Java

Subject Reference No	CSC401	Subject Title	Advanced Java
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Course Objective

- This course assumes that students are aware of core java programming and hence it starts from threading and goes up to web programming. It covers some advance topics of reflection, applets, swings, JDBC, Networking, JSP and Servlet.

Prerequisites

- Student should know the programming in core java.

UNIT I: Threading

Threading Basics: Java Thread Model, Creating and Running Threads, Manipulating Thread State, Thread Synchronization, Volatile Fields vs. Synchronized Methods, wait and notify, join and sleep, The Concurrency API, Atomic Operations **Reflection:** Uses for Meta-Data, The Reflection API, The Class<T> Class, The java.lang.reflect Package, Reading Type Information, Navigating Inheritance Trees, Dynamic Instantiation, Dynamic Invocation, Reflecting on Generics

UNIT II: Java Database Connectivity

JDBC, JDBC Architecture (type 1, type 2, Type 3; type 4) the java.sql.* package, Connection, ResultSet, Statements

UNIT III: Servlets

Web Application Basics: How the Web works, Thin Clients, TCP/IP, HTTP overview, Brief HTML review, Overview of Java EE, servlets & Web applications., Servlet Basics, Servlet API:- HTML Forms, HTTP: Request-response, headers, GET, POST, Overview: How Servlets Work, Servlet Lifecycle: init(), service(), destroy(), Requests and responses, Core Servlet API: Generic Servlet, Servlet Request, and Servlet Response, HTTP Servlets: Http Servlet Request, Http Servlet Response and Http Servlet, Accessing Parameters, Additional Servlet Capabilities, HTTP headers and MIME types Request Dispatcher: Including and forwarding, Sharing data with the request object attributes, Sharing data with ServletContext attributes, Error Handling

UNIT IV: Java Server Pages

Basics and Overview, JSP architecture, JSP tags and JSP expressions, Fixed Template Data, Lifecycle of a JSP, Model View Controller (MVC), Model 1/Model 2 Architecture, Data Sharing among servlets & JSP: Object scopes or "buckets", Request, application, session and page scope, Predefined JSP implicit objects (request, session, application, page), <jsp:useBean>, <jsp:getProperty>, <jsp:setProperty>, <jsp:include>, <jsp:forward>, More JSP Capabilities and Session Management, HTTP as a stateless protocol, Hidden form fields, Cookies: Overview, API, Using cookies, Session overview: Cookies and session tracking, Http Session, Putting data into a

session object, Retrieving data from a session object, Using session data in servlets and JSPs
Additional JSP Capabilities, Exception handling and error pages, Directives (page, include, others), Import declarations, Multithreading considerations and data safety, Single Thread Model interface, Additional JSP Capabilities, JSP Directives, JSP Er Pages, JSP and Java Declarations, Scriptlet overview, Scriptlet syntax

UNIT V:JSTL

Using Custom Tags, Custom tags overview, Reducing JSP complexity, Tag Libraries, Tag Library Descriptor (TLD), Loading a tag library in a web app, The JSTL, JSP Expression Language (EL), Using custom tags, The c:url, c:param, c:forEach, c:out tags, Overview of JSTL libraries, The JSTL Expression Language, Expressions, Type Coercion, Operators, String concatenation, Implicit Objects, The Core JSTL Library, General Purpose: c:out, c:set, c:catch, Conditional: c:if, c:choose,, Overview of other capabilities, Additional Topics : Servlet Filter overview, Filtering examples, lifecycle, & filter chains, Filter API, Modifying a request, Modifying a response, Struts Overview Advanced MVC – Struts overview, Command and State patterns, Struts View and Controller elements

Books

- Java 2 Complete Reference by Herbert Schildt (Sixth Edition)
- Core Java Vol 1: Sun Press
- Core Java Vol 2: Sun Press

Additional Web Reference

<http://www.javapassion.com/javaintro/>

Presentation Slides (Available in .ppt format)

E-book:

1. Java 2 Complete Reference by Herbert Schildt (Fourth Edition)

Lab Exercise: CSC451 Practical based on CSC401

At least two experiments should be carried out on each unit.

5 Advanced Java

Course Code	CSC411	Course Title	Advance Java
Number of Credits	3 Credits (TH)	Internal	20%
Total Contact Hours	2 Credits (PR)	External	80%
	3 HRS (TH/Week)	(Semester/1erm Exam)	
	4 HRS (PR/Week)		

Course Objective:

This course assumes that students are aware of core java programming and hence it starts from Threading and goes up to web programming. It covers some advance topics JSP, Servlet, RMI, EJB, XML, Struts and Hibernate.

Learning Outcomes:

After completion of this course students can write good application based on java. Students can appear for java certification examinations. Student can also work on networking and web projects

Course Outline

Unit-1:

Java Server Pages: Basics and Overview, JSP architecture, JSP tags and JSP expressions, Fixed Template Data, Lifecycle of a JSP, Model View Controller (MVC), Model 1/Model 2 Architecture, Data Sharing among servlets & JSP: Object scopes or "buckets", Request, application, session and page scope, Predefined JSP implicit objects (request, session, application, page), <jsp:useBean>, <jsp:getProperty>, <jsp:setProperty>, <jsp:include>, <jsp:forward>, More JSP Capabilities and Session Management, HTTP as a stateless protocol, Hidden form fields, Cookies: Overview, API, Using cookies, Session overview: Cookies and session tracking, HttpSession, Putting data into a session object, Retrieving data from a session object, Using session data in servlets and JSPs Additional JSP Capabilities, Exception handling and error pages, Directives (page, include, others), Import declarations, Multithreading considerations and data safety, SingleThreadModel interface, Additional JSP Capabilities, JSP Directives, JSP Error Pages, JSP and Java Declarations, Scriptlet overview, Scriptlet syntax

Unit-2:

JSTL: Using Custom Tags, Custom tags overview, Reducing JSP complexity, Tag Libraries, Tag Library Descriptor (TLD), Loading a tag library in a web app, The JSTL, JSP Expression Language (EL), Using custom tags, The c:url, c:param, c:forEach, c:out tags, Overview of JSTL libraries, The JSTL Expression Language, Expressions, Type Coercion, Operators, String concatenation, Implicit Objects, The Core JSTL Library, General Purpose: c:out, c:set, c:catch, Conditional: c:if, c:choose, Overview of other- capabilities, Additional Topics : Servlet Filter overview, Filtering examples, lifecycle, & filter chains, Filter API, Modifying a request, Modifying a response, Struts Overview Advanced MVC Struts overview, Command and State patterns, Struts View and Controller elements

Unit-3:

API:Servlets:-HTML Web Forms, Application HTTP:Request Basics:- response, How the Web headers, works, GET, Thin POST, Clients, Overview: TCP/IP, How HTTP Servlets overview,

Work, Brief review, Overview of Java EE, servlets & Web applications., Servlet Basics, Servlet Lifecycle: init(), service(), destroy(), Requests and responses, Core Servlet API: Generic Servlet, Servlet Request, and Servlet Response, HTTP Servlets: Http Servlet Request, Http Servlet Response and Http Servlet, Accessing Parameters, Additional Servlet Capabilities, HTTP headers and MIME types Request Dispatcher: Including and forwarding, Sharing data with the request object attributes, Sharing data with Servlet Context attributes, Error Handling

Unit-4:

A. RMI: RMI Architecture, Designing RMI application, Executing RMI application, **B. Enterprise Java Beans:** Types of Enterprise Java beans, Session Bean & Entity Bean, Features of Session Bean, Life-cycle of Stateful, Session Bean, Features of Entity Bean, Life-cycle of Entity Bean Container-managed Transactions & Bean-managed Transactions Implementing a container-managed Entity Bean

Unit-5:

Java Struts and Hibernate: Introduction to the Apache Struts, MVC Architecture, Struts Architecture, Struts Working, Introduction to the Struts Controller, Introduction to the Struts Action Class, Using Struts Action From Class, Using Struts HTML Tags, Introduction to Struts Validator Framework, Client Side Address Validation in Struts, Custom Validators Example Developing Application with Struts Tiles. Introduction to Hibernate, Hibernate framework 3.0, Hibernate Architecture, First Hibernate Application

Reference Books:

1. Java 2 Complete Reference by Herbert Schildt (Sixth Edition)
2. Core Java Vol 1: Sun Press, Eighth Edition
3. Core Java Vol 2: Sun Press

E-books

- Java 2 Complete Reference by Herbert Schildt (Fourth Edition)

Lab Exercise for CSC458, Practical based on CSC411: There should be minimum 20 lab assignment on the topics discussed in the course using Open Source Platform (Eclipse, Net Bean etc.).

4 Computer Networks

Subject Reference	CSI408	Subject Title	Computer Network
no			
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Objective: To Study various structure and topologies of communication mediums

Prerequisite: Student must have knowledge of operating systems and data communications.

UNIT I:

Introduction to Computer Networks: Types of Network, Topologies, Client Server Model, Connection-oriented, connection less services, Transmission Media-Guided, Unguided, types of it, types of cables, VLANs, VPNs, Multiplexing, Bit rate, Baud Rate, Bandwidth etc. Network Hardware Components: Hub, Switch, Bridge, Router, Repeater, Gateway, etc. Reference Models: Introduction, ISO-OSI Referencemodel, TCP/IP reference model, comparison of OSI and TCP/IP models, Asynchronous Transfer Mode (ATM): Cells, Header and Cell Formats, Layers in ATM

UNIT II:

Data Link Layer: Introduction, DLL Protocols, Frame Relay, X.25 protocol, MAC subs layer protocols, Local Area Networks (LANs): IEEE 802.4 and 802.5 Protocols, Performance of Ethernet and Token ring protocols, FDDI Protocol, Distributed Queue Dual Bus (DQDB) protocol, Network layer and Transport layer Introduction, Routing Algorithms, Congestion Control, TCP and UDP services, Multicasting, Spanning Tree.

UNIT III:

IP Addressing & DNS: What are IP address?, The hierarchical scheme pf IP addresses, class A,B,C,D IP address, Subnetting Network, Subnet Masks, MAC address, IPv4 and IPv6 IP address, The Domain Name System, zones of DNS, Switching: Switching concept, Circuit Switching, Packet Switching, Virtual circuits& data grams, Message switching, Queuing models, ASN(abstract syntax Notation).

UNIT IV:

Network Security: Cryptography, Algorithms: Secret key and Public key, DNS-Domain Name Service, Digital Signature, Firewalls, Proxy server.

UNIT V:

Special Topics: Next Generation Networks, Data Centers, Cloud Computing, Bluetooth Technology, Green Networking, GSM, GIS, etc.

Books:

1. Computer Networks – A. Tanenbaum, (PHI pub.)

2. Data and Computer Communication – Willam Stallings, PHI pub.

References:

1. Data Communication & Network – Forouzan (TMH)
2. Internetworking with TCP/IP Vol-I – Comer (PHI pub.)
3. Data Communications and distributed Networks-V.B, Black, (Prentice Hall pub.)

Lab Exercise: CSI458 Practical based on CSI408

At least two experiments should be carried out on each unit.

Network Security

Subject Reference No	CSI503	Subject Title	Network Security
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Objective: To learn various techniques to secure information while traveling through different communication mediums

Prerequisite: Student must know basics of data communications, protocols, and concepts of computer networks

UNIT I:

- 1 - Overview
- 2 - Classical Encryption Techniques
- 3 - Block Ciphers

UNIT II:

- 4 - Advanced Encryption Standard
- 5 - Confidentiality Using Symmetric Encryption
- 6 - Number Theory

UNIT III:

- 7 - Public-Key Cryptography and RSA
- 8 - Public-Key Cryptosystems
- 9 - Hash Algorithms

UNIT IV:

- 10 - Digital Signatures
- 11 - Authentication Applications
- 12 - Electronic Mail Security

UNIT V:

- 14 - Web Security
- 15 - Intruders
- 16 - Malicious Software
- 17 - Firewalls

Textbook

1. The official course text is Cryptography and Network Security: Principles and Practice; Second Edition . By William Stallings, Prentice Hall, Hardcover

2. Network Security Essentials : Applications and Standards by William Stallings. Prentice Hall, Hardcover, Published November 1999, 366 pages, ISBN 0130160938

References:

- Cryptography: Theory and Practice by Douglas R. Stinson, CRC press, hardcover.
- Secrets and Lies: Digital Security in a Networked World by Bruce Schneier John Wiley, Published August 2000, 412 pages, ISBN 0471253111.
- A Course in Number Theory and Cryptography (Graduate Texts in Mathematics),(Hardcover) by Neal Koblitz Number theory with computer applications, by Ramanjuachary Kumandari and Christina Romero (1998)
- Get details of threats to information and system security. Discuss Virus, worms, Trojans etc in details.
- Study any library for packet tearing and packet sniffing.
- Implement Generic Cipher, Fiestal Cipher and DEC
- Implement Packet Sniffing using the library studied in Assg No 2
- Study of Firewall
- Implementing firewall in Windows server/ Linux Server

Lab Exercise: CSI56 Practical based on CSI503

At least two experiments should be carried out on each unit.

1. Programming in Advance Java

Subject Reference No	CSI501	Subject Title	Programming in Advance Java
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Course Objective

This course assumes that students are aware of core java programming and hence it starts from threading and goes up to web programming. It covers some advance topics of reflection, applets, swings, JDBC, Networking, JSP and Servlet.

At Course Completion

After completion of this course students can write good application based on java. Students can appear for java certification examinations. Student can also work on networking and web projects.

Prerequisites

Student should know the programming in core java.

UNIT I:

Threading: Threading Basics: Java Thread Model, Creating and Running Threads, Manipulating ThreadState, Thread Synchronization, Volatile Fields vs. Synchronized Methods, wait and notify, join and sleep, The Concurrency API, Atomic Operations, Reflection: Uses for Meta-Data, The Reflection API, The Class<T> Class, The java.lang.reflect Package, Reading Type Information, Navigating Inheritance Trees, Dynamic Instantiation, Dynamic Invocation, Reflecting on Generics

UNIT II: Java Database Connectivity: JDBC, JDBC Architecture (type 1, type 2, Type 3, type 4) the java.sql.* package, Connection, ResultSet, Statements

UNIT III: Servlets: Web Application Basics: How the Web works, Thin Clients, TCP/IP, HTTP overview, Brief HTML review, Overview of Java EE, servlets & Web applications., Servlet Basics, Servlet API:-HTML Forms, HTTP: Request-response, headers, GET, POST, Overview: How Servlets Work, Servlet Lifecycle: init(), service(), destroy(), Requests and responses, Core Servlet API: GenericServlet, ServletRequest, and ServletResponse, HTTP Servlets: HttpServletRequest, HttpServletResponse and HttpServlet, Accessing Parameters, Additional Servlet Capabilities, HTTP headers and MIME types RequestDispatcher: Including and forwarding, Sharing data with the request object attributes, Sharing data with ServletContext attributes, Error Handling.

UNIT IV: Java Server Pages: Basics and Overview, JSP architecture, JSP tags and JSP expressions, Fixed Template Data, Lifecycle of a JSP, Model View Controller (MVC), Model 1/Model 2 Architecture, Data Sharing among servlets & JSP: Object scopes or "buckets", Request, application, session and page scope, Predefined JSP implicit objects (request, session, application, page), <jsp:useBean>, <jsp:getProperty>, <jsp:setProperty>, <jsp:include>, <jsp:forward>, More

JSP Capabilities and Session Management, HTTP as a stateless protocol, Hidden form fields, Cookies: Overview, API, Using cookies, Session overview: Cookies and session tracking, HttpSession, Putting data into a session object, Retrieving data from a session object, Using session data in servlets and JSPs Additional JSP Capabilities, Exception handling and error pages, Directives (page, include, others), Import declarations, Multithreading considerations and data safety, SingleThreadModel interface, Additional JSP Capabilities, JSP Directives, JSP Error Pages, JSP and Java Declarations, Scriptlet overview, Scriptlet syntax

UNIT V:JSTL: Using Custom Tags, Custom tags overview, Reducing JSP complexity, Tag Libraries, Tag Library Descriptor (TLD), Loading a tag library in a web app, The JSTL, JSP Expression Language (EL), Using custom tags, The c:url, c:param, c:forEach, c:out tags, Overview of JSTL libraries, The JSTL Expression Language, Expressions, Type Coercion, Operators, String concatenation, Implicit Objects, The Core JSTL Library, General Purpose: c:out, c:set, c:catch, Conditional: c:if, c:choose,, Overview of other capabilities, Additional Topics : Servlet Filter overview, Filtering examples, lifecycle, & filter chains, Filter API, Modifying a request, Modifying a response, Struts Overview Advanced MVC – Struts overview, Command and State patterns, Struts View and Controller elements

Books:

1. Java 2 Complete Reference by Herbert Schildt (Sixth Edition)
2. Core Java Vol 1: Sun Press
3. Core Java Vol 2: Sun Press

Additional Web Reference

<http://www.javapassion.com/javaintro/>

Presentation Slides (Available in .ppt format)

E-book:

1. Java 2 Complete Reference by Herbert Schildt (Fourth Edition)

Lab Exercise: CSI55 Practical based on CSI501

At least two experiments should be carried out on each unit.

1. Network Security

Course Code	CSI524	Course Title	Network Security
Number of Credits	3 Credits (TH)	Internal	20
	2 Credits (PR)		
	3 HRS	External	
Total Contact Hours	(TH/Week)	(Semester/Term Exam)	80
	4 HRS		
	(PR/Week)		

Course Objective:

To study the main security threats of communication networks. To establish certain security mechanisms that avoids or considerably diminishes these threats. To introduce modern cryptography techniques. To study specific cryptography techniques that guarantee security in certain applications (email, e-commerce, web access, etc.). To introduce the most widely known standards for each case

Prerequisite:

Before attending this course, students must have:
Programming experiences in C/C++ or JAVA.

At Course Completion:

After completing this course, students will be able to:

- Explain concepts related to applied cryptography, including plaintext, cipher text, symmetric cryptography, asymmetric cryptography, and digital signatures.
- Explain the theory behind the security of different cryptographic algorithms.
- Explain common network vulnerabilities and attacks, defense mechanisms against network attacks, and cryptographic protection mechanisms.
- Outline the requirements and mechanisms for identification and authentication.
- Identify the possible threats to each mechanism and ways to protect against these threats.
- Explain the requirements of real-time communication security and issues related to the security of web services.
- Explain the requirements of non-real-time security (email security) and ways to provide privacy, source authentication, message integrity, non-repudiation, p

Course Outline

Unit - 1:

Introduction, Security Concepts, Threats and Risks, Attacks – Passive and Active, Security Services, Confidentiality, Authentication, Non-Repudiation, Integrity, Access Control, Availability. Security attacks, Unauthorized Access, Impersonation, Denial of Service Malicious Software, Viruses, Worms, Trojan, spyware

Unit - 2:

Access Control Models, Bell-LaPadula, Biba Integrity Model, Role Base Model. Cryptography: Secret Key and Public Key Cryptosystems: Cryptanalysis and attacks Symmetric Ciphers, Block Ciphers and Stream Ciphers: DES, Triple DES, RC4 and RC5, Cryptographic Modes, RSA.,

Deffie Hellman key exchange Message Authentication: MD5 and SHA 512 Public Key Infrastructure (PKI): Digital Certificates , Certificate Authorities

Unit - 3:

Network Attacks: Buffer Overflow, IP Spoofing, TCP Session Hijacking, Sequence Guessing, Network Scanning, ICMP, TCP sweeps, Basic Port Scans Network Security: Objectives and Architectures, Internet Security Protocols, IP encapsulating , Security Protocol Virtual Private Network: concepts, PPTP, L2TP

Unit - 4:

Web security Consideration: Secured Socket Layer and Transport layer security, Secured Electronic Transaction (SET) and Secured Mail: Pretty Good Privacy (PGP), S/MIME Network Security Authentication Mechanisms: a) Passwords, b) Cryptographic authentication protocol, c) Smart Card, d) Biometrics) Digital Signatures and seals, f) Kerberos, g) X.509 LDAP Directory

Unit - 5:

Intruders, Intrusion Detection and Prevention, Firewall: Firewall Design Principles, Firewall Characteristics, Types of Firewalls: Packet Filtering Router, Stateful Inspection Firewall, Application Level Gateway or Proxy, Circuit level gateway, Bastion Host Firewall Configuration: Screened Host Firewall System, Screened Subnet Firewall System. Cybercrimes: Crimes against the computer, Crimes using a computer, Indian IT Act 2000: Objectives, Provisions, And Offenses.

Reference Books:

1. Network Security Essentials, William Stallings, Prentice-Hall.
2. Fundamentals of Computer Security Technology, Edward Amoroso, Prentice-Hall.
3. Cryptography and Data Security, Dorothy E. Denning, Addison-Wesley.
4. Computers under Attack, Peter J. Denning, Addison-Wesley.
5. Cryptography: Theory and Practice, Douglas R. Stinson, CRC Press.
6. Computer Crime and Computer Forensics, Dr. R.K.Tiwari, P.K.Sastri, K.V.Ravikumar, First Edition, 2002,
7. Select Publishers
8. Computer Security Gollmann, Dieter, First Edition, 1999, John Wiley & Sons Ltd.

Lab Exercise:

CSI560 Practical based on CSI524: Lab exercise will cover the program related to each unit.

1. Computer Network

Course Code	CSI411	Course Title	Computer Network
Number of Credits	3 Credits (TH) 2 Credits (PR)	Internal	20
Total Hours	3 (TH/Week) 4 (PR/Week)	External (Semester/Term Exam)	80

Course Objective:

- To Study various structure and topologies of communication mediums.
- Topics covered include: network protocols, Network architecture, network security, and some special topics like wireless and sensor networks.
- The focus is on both: the existing technologies as well as the current and emerging research topics in computer networking.

Prerequisite:

Basic knowledge of Computer.

At Course Completion:

The student will be well acquainted with how computer network works, what are the architectures and protocols required for it., as well as some special topics.

Course Outline

Unit - 1:

Introduction to Computer Networks: Types of Network, Topologies, Client Server Model, Connection oriented, connection less services, Transmission Media-Guided, Unguided, Multiplexing, Bit rate, Baud Rate, Bandwidth etc. Network Hardware Components: Hub, Switch, Bridge, Router, Repeater, Gateway, peer to peer networks etc. Network architecture – layers: Reference Models ISO-OSI Reference model, TCP/IP reference model. Asynchronous Transfer Mode (ATM): Cells, Header and Cell Formats, Layers in ATM.

Unit - 2:

Data Link Layer: Introduction, DLL Protocols, Frame Relay, X.25 protocol, MAC sub layer protocols, IEEE Standards for LAN, error detection and correction at DLL.

Unit - 3:

Network layer : Routing Algorithms, Congestion Control, IP Addressing & DNS: What are IP address?, class of IP address, Subnet Masks, MAC address, IPv4 and IPv6 IP address, The Domain Name System: concept, zones of DNS, Switching: Switching concept, Circuit Switching, Packet Switching. Transport layer: Introduction, TCP and UDP services, Multicasting, Spanning Tree.

Unit - 4:

Network Security: Cryptography Techniques, Algorithms: Secret key and Public key, DES, RSA. Digital Signature, Firewalls, Proxy server.

Unit - 5:

Special Topics: current and emerging trends: Next Generation Networks, Data Centers, Cloud Computing, GSM, GIS, Queuing models, ASN(abstract syntax Notation), Introduction to wireless and sensor networks, distributed Networks.

Books:

1. Computer Networks – A. Tanenbaum, (PHI pub.)
2. Data and Computer Communication – Willam Stallings, PHI pub.

Reference Books:

1. Data Communication & Network – Forouzan (TMH)
2. Internetworking with TCP/IP Vol-I – Comer (PHI pub.)
3. Data Communications and distributed Networks-V.B, Black, (Prentice Hall pub.)

E-books:

<http://newwayofengineering.blogspot.in/2014/12/computer-networks-tanenbaum-5th-edition.html>

Lab Exercise:

CSI458 Practical based on CSI411: At least two experiments should be carried out on each unit.

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