JHARKHAND UNIVERSITY OF TECHNOLOGY
Jharkhand, Ranchi

Syllabus for

BACHELOR OF COMPUTER APPICATION
(B.C.A) Programme

Third Semester

Subject Code	Course Type	Subject Name	Load Allocation			Marks distribution		Total Marks	Credit
			L	T	P	Internal Marks	External Marks		
3CR01	Core	Computer Networks	4	0	0	30	70	100	4
3CR02	Core	Programming in JAVA	4	0	0	30	70	100	4
3CR03	Core	Fundamentals of Statistics	4	0	0	30	70	100	4
3OE01	Elective-I	Open Elective – I	4	0	0	30	70	100	4
3SE01	Skill Enhancement	PC Assembly & Troubleshooting	3	0	0	30	70	100	3
3CR01-L	Computer Lab-1	JAVA Lab	0	0	2	25	25	50	2
3SE02-L	Skill Enhancement -2	PC Assembly & TroubleshootingLab	0	0	2	25	25	50	2
Semester Total			18	0	4	200	400	600	22

SEMESTER-III

Course Code: 3CR01
Course Name: Computer Networks

Detailed Contents	Contact hours
Unit-I **Data communications concepts:** Digital and analog transmissions-Modem,parallel and serial transmission, synchronous and asynchronouscommunication. Modes of communication: Simplex, half duplex, full duplex. **Types of Networks:** LAN, MAN, WAN **Network Topologies:** Bus, Star, Ring, Mesh, Tree, Hybrid **Communication Channels: Wired transmissions:** Telephone lines, leased lines, switch line, coaxial cables-base band, broadband, optical fiber transmission. **Communication Switching Techniques**: Circuit Switching, Message Switching, Packet Switching.	12 Hours
Unit-II **Network Reference Models**: OSI Reference Model, TCP/IP Reference Model,Comparison of OSI and TCP/IP Reference Models. Transmission impairments – Attenuation, Distortion, Noise. Multiplexing – Frequency division, Time division, Wavelength division. **Data Link Layer Design Issues**: Services provided to the Network Layer, Framing, Error Control (error detection and correction code), Flow Control, Data Link Layer in the Internet (SLIP, PPP)	11 Hours
Unit-III **MAC sub layer:** CSMA/CD/CA, IEEE standards (IEEE802.3 Ethernet, Gigabit Ethernet, IEEE 802.4 Token Bus, IEEE 802.5 Token Ring) **Network Layer:** Design Issues, Routing Algorithms: Optimality Principle, Shortest Path Routing, Congestion Control Policies, Leaky bucket and token bucket algorithm, Concept of Internetworking.	12 Hours
Unit-IV **Transport Layer**: Design issues, Elements of transport protocols – Addressing, Connection establishment and release, Flow control and buffering,Introduction to TCP/UDP protocols. **Session, Presentation and Application Layers**: Session Layer – Design issues, remote procedure call. Presentation Layer – Design issues, Data	12 Hours

| compression techniques, Cryptography. Application Layer – Distributed application (client/server, peer to peer, cloud etc.), World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP), HTTP as an application layer protocol. | |

Text Books:

1. Computer Networks, Tanenbaum, Andrew, Fifth Edition, PHI.
2. Data Communication and Networking, Behrouz A. Forouzan, Fourth Edition.
3. Computer Today, S.K. Basandra, First Edition, Galgotia.

Reference Books:

1. Data Communication System, Black, Ulysse, Third Edition, PHI.
2. Data and Computer Communications, Stalling, Ninth Edition, PHI.
3. James F. Kurose and Keith W. Ross, "Computer Networking", Pearson Education.

Course Code: 3CR02
Course Name: Programming in JAVA

Detailed Contents	Contact hours
Unit-I Introduction to Java Features of java JDK Environment & tools like(java, javac, applet viewer, javadoc, jdb) OOPs Concepts Class, Abstraction , Encapsulation, Inheritance, Polymorphism Difference between C++ and JAVA Structure of java program Data types ,Variables ,Operators , Keywords ,Naming Convention Decision Making (if, switch), Looping(for, while) Type Casting Array Creating an arrayTypes of Array - One Dimensional arrays - Two Dimensional array String - Arrays , Methods. - StringBuffer class	12 Hours
Unit-II Classes and Objects Creating Classes and objects Memory allocation for objects Constructor Implementation of Inheritance Simple, Multilevel, Interfaces, Abstract classes and methods Implementation of Polymorphism Method Overloading, MethodOverriding Nested and Inner classes. Modifiers and Access Control Packages Packages Concept Creating user defined packages Java Built in packages java.lang->math java.util->Random, Date, Hash table Wrapper classes	12 Hours
Unit-III Collection Collection Framework. Interfaces - Collection - List - Set – Sorted Set - Enumeration - Iterator – List Iterator Classes – Linked List – Array List - Vector –Hash Set – Tree Set – Hash table Working with maps Map interface Map classes – Hash Map – Tree Map	8 Hours
Unit-IV File and Exception Handling Exception types Using try catch and multiple catch Nested try, throw , throwsand finally Creating user defined Exceptions File Handling Stream Byte Stream Classes Character Stream Classes File IO basics File operations Creating file Reading file(character, byte) Writing file(character, byte)	8 Hours
Unit-V Applet, AWT and Swing Programming Applet Introduction Types applet Applet Life cycle - Creating applet - Applet tag Applet Classes - Color - Graphics - Font AWT Components and containerused in AWT Layout managers Listeners and Adapter classes Event Delegation model Swing Introduction to Swing Component and Container Classes	12 Hours

Text Books:

1. Programming with JAVA – E Balagurusamy

Reference Books:

1. The Complete Reference – JAVA Herbert Schildt

Course Code: 3CR03
Course Name: Fundamentals of Statistics

Detailed Contents	Contact hours
Unit I Statistics and Probability: Introduction to Statistics – Origin of Statistics, Features of Statistics, Scope of Statistics, Functions of Statics, Uses and importance of Statistics, Limitation of Statistics, Distrust of Statistics Collection of Data: Introduction to Collection of Data, Primary and Secondary Data, Methods of Collecting Primary Data, Methods of Secondary Data, Statistical Errors, Rounding off Data (Approximation).	8 hours
Unit II Classification of Data Frequency Distribution: Introduction Classification of Data, Objectives of Classification, Methods of Classification, Ways to Classify Numerical Data or Raw Data. Tabular, Diagrammatic and Graphic Presentation of Data: Introduction to Tabular Presentation of Data, Objectives of Tabulation, Components of a Statistical Table, General Rules for the Construction of a Table, Types of Tables, Introduction to Diagrammatic Presentation of Data, Advantage and Disadvantage of Diagrammatic Presentation, Types of Diagrams, Introductionto Graphic Presentation of Data, Advantage and Disadvantage of Graphic Presentation, Types of Graphs.	12 hours
Unit III Measures of Central tendency: Introduction to Central Tendency, Purpose and Functions of Average, Characteristics of a Good Average, Types of Averages, Meaning of Arithmetic Mean, Calculation of Arithmetic Mean, Merit and Demerits of Arithmetic Mean, Meaning of Median, Calculation of Median, Merit and Demerits of Median, Meaning of Mode, Calculation of Mode, Merit and Demerits of Mode, Harmonic Mean- Properties- Merit and Demerits.	12 hours
Unit IV Measures of Dispersion: Meaning of Dispersion, Objectives of Dispersion, Properties of a good Measure of Dispersion, Methods of Measuring Dispersion, Range Introduction, Calculation of Range , Merit and Demerits of Range	8 hours
Unit V	

Mean Deviation, Calculation of Mean Deviation , Merit and Demerits of Mean Deviation, Standard Deviation Meaning, Calculation of Standard Deviation , Merit and Demerits of Standard Deviation, Coefficient of Variation, Calculation of Coefficient Variance, Merit and Demerits of Coefficient of Variation.	8 hours

Text Books:

      1. Statistics and Data Analysis, A.Abebe, J. Daniels, J.W.Mckean, December 2000.
      2. Introduction to Statistics, David M. Lane.

Reference Books:

      1. Bhattacharya,G.K. and Johnson, R.A.(19977), Statistical Concepts and Methods,New York, John Wiley & Sons.

Course Code: 3OE01
Course Name: Open Elective –I (Operating System)

UNIT-I **Introduction:** Role of OS: Types of OS, Batch Systems; Multiprogramming; Time Sharing; Distributed & Real time OS. Computer structure and OS: System Architecture – I/O, Storage, Processors; System components- OS Services, System Calls , System Programs; System Design, Implementation and Generation.	12 hours
UNIT-II **Process Management:** Concepts of process: Process status, Process description, Process model. Process Scheduling: Concepts, Scheduler organization, preemptive and non-preemptive scheduler strategies, scheduling algorithms: FCFS, SJN, Priority Scheduling, Round Robin Scheduling, Multiple Processor scheduling, Thread Concepts and Multiple threaded OS.	12 hours
UNIT-III **Process Synchronization and Deadlock:** Process Co-operation, Concepts of Inter-process communication, Process Synchronization, Synchronization Issues, Critical Section problem, Mutual exclusion Primitives and Algorithms, Process Synchronization with semaphores. Concepts of Deadlock, Conditions for Deadlocks, Resource Concepts & Abstractions, Deadlock Prevention, Avoidance and Recovery, Banker Algorithms for Deadlock Avoidance	8 hours
UNIT-IV **Memory Management and File system:** Paging, Segmentation and Contiguous memory allocation. Virtual Memory: Demand Paging, Page replacement and Frame Allocation policies, Thrashing. File System: Concepts, Access Method, Directory Structure, and File System Management.	8 hours
UNIT-V **Disk management and other issues:** Disk management: Disk Structure and Scheduling. File systems, and operating system support for distributed systems. Protection and Security related issues. Case studies of contemporary operating systems.	8 hours

Text Books:

1. Silberschatz, Galvin and Gagne, Operating System Principles, 7th Ed. AddisonWesley.

2. Gary Nutt, Operating Systems, 3rd Ed. Pearson Education, India
3. Tanenbaum, Modern Operating Systems, PHI.

Reference Books:

1. H. M. Dietel, Operating Systems, Addison Wesley Longman.
2. Maurice J. Bach, The design of Unix Operating system, Pearson Education,India.
3. Sumitabha Das, Unix Concepts & Applications: includes SCO UNIX & Linux,Tata McGraw Hill.

Course Code: 3OE01
Course Name: Open Elective –I (Data Mining)

Unit I Introduction – Data mining – Data mining functionalities – kinds of patterns can be mined – classification – major issues. Data warehouse – A multidimensional data model – Data warehouse architecture – Data warehouse implementation – From data warehouse to data mining.	12 hours
Unit II Data pre-processing – Data cleaning – Data Integration and Transformation – Data Reduction – Discretization and concept hierarchy generation – Data mining primitives – Data mining Task	12 hours
Unit III Association Rule Mining – Mining single dimensional Boolean association rules from transactional databases –. Classification and prediction – Issues regarding classification and prediction – Bayesian classification- Classification by Back propagation – classification based on concepts from association rule mining	8 hours
Unit IV Cluster Analysis – A categorization of Major clustering methods - Partitioning methods- Hierarchical methods – Grid based methods -Model based clustering methods – Density – based methods	8 hours
Unit V Applications and Trends in Data Mining – Data mining system products and Research prototypes – Additional themes on Data mining – Social Impacts of Data Mining – Trends in Data mining-Mining Spatial Databases – Mining Time-series and sequence data – Mining the World wide web.	8 hours

Text Book:
1. Jiwei Han, Michelien Kamber, Data Mining Concepts and Techniques, Morgan Kaufmann Publishers an Imprint of Elsevier, 2011.

Books for Reference:
1. Arun K.Pujari, Data Mining Techniques, Universities Press (India) Limited, 2011.
2. George M. Marakas, Modern Data warehousing, Mining and Visualization: Core Concepts, Printice Hall, First Edition, 2011.

Course Code: 3SE01
Course Name: PC Assembly &Troubleshooting

Unit I: Brief history of computer on the basis Hardware. Computer system modules/ components and its operations, need of hardware and software for computer to work, different hardware components within a computer and connected to a computer as peripheral devices, different processors used for personal computers and notebook computers.	9 hours
Unit II: Perform installation, configuration, and upgrading of microcomputer/ computer: Hardware and software requirement, Assemble/setup microcomputer/ computer systems, accessory boards, types of motherboards, selection of right motherboard, Installation replacement of motherboard, troubleshooting problems with memory.	8 hours
Unit III: Install/connect associated peripherals: Working of printers and scanners, Installation of printers and scanners, sharing a printer over a local area network, troubleshooting printer and scanner problems, troubleshooting hard drive problems. Drivers: Meaning, role and types.	8 hours
Unit IV: Diagnose and troubleshooting of microcomputer/ computer systems hardware & software and other peripheral equipment: Approaches to solve a PC problem, troubleshooting a failed boot before the OS is loaded, different approaches to installing and supporting I/O device, managing faulty components. Booting and its types.	8 hours

Text Books:

1. PC Hardware: The Complete Reference, McGraw-Hills

Reference Books:

1. The Indispensable PC Hardware Book (4th Edition) Hans-Peter Messmer
2. PC Hardware: A Beginner's Guide by Ron Gilster.

Course Code: 3SE02-L
Course Name: PC Assembly & Troubleshooting Lab

List of assignments:

1.	Assembling and De Assembling of Computer System
2.	Loading and configuration procedure of Microsoft Client O/S Win XP /Win 7 and Windows 8
3.	Installation of utility tools (Software)
4.	Installation of utility tools (Drivers)
5.	Firewall configuration, Antivirus/Internet security loading and configuration procedure
6.	Installation and configuration of I/O devices – Printers, Webcams, Scanners.
7.	Installation and configuration of I/O devices – Digital Camera, USB Wi-fi, USB BT, USB Storages, Projectors
8.	Multiple OS loading and trouble shooting

Text Books:

1. PC Hardware: The Complete Reference, McGraw-Hills

Reference Books:

1. The Indispensable PC Hardware Book (4th Edition) Hans-Peter Messmer PC Hardware: A Beginner's Guide by Ron Gilster

Course Code: 3CR01-L
Course Name: JAVA

LabList of assignments:

1	Implementing Classes and Objects
2	Implementing String Functions
3	Implementing Interface Methods
4	Implementing Thread Methods
5	Implementing Packages
6	Implementing Class Methods