

Course structure and syllabus
III BTech – II Semester CSE
(wef 2016-17)

Code No	Course	Credits	Lecture Hrs	Lab Hrs	Sessional Marks	Exam Marks	Total Marks
BTCSE601	Operations Research	4	4	--	25	75	100
BTCSE602	Computer Networks	4	4	--	25	75	100
BTCSE603	Data Warehousing and Data Mining	4	4	--	25	75	100
BTCSE604	OOAD with UML	4	4	--	25	75	100
BTCSE605	Network Security and Cryptography	4	4	--	25	75	100
BTCSE606	Elective I Distributed Systems/Image Processing/Wireless Adhoc Networks	4	4	--	25	75	100
BTCSE607	Data Mining with R Lab	2	--	3	50	50	100
BTCSE608	OOAD with UML Lab	2	--	3	50	50	100
BTCSE609	*MOOC	2	--	3	50	--	50
TOTAL		30	24	9			800

***MOOC marks will not be considered for CGPA calculation.**

BTCSE601: OPERATIONS RESEARCH

Instruction : 4 Periods/week

Time: 3 Hours

Credits : 4

Internal : 25 Marks

External: 75 Marks

Total : 100 Marks

UNIT-I:

Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem – Formulation of LPP, Graphical solution of LPP. Simplex Method, Artificial variables, big-M method, two-phase method, degeneracy and unbound solutions.

UNIT-II:

Transportation Problem. Formulation, solution, unbalanced Transportation problem. Methods for Finding initial solutions – Northwest corner rule, least cost method and Vogel's approximation method. Test for Optimality: the stepping stone method and MODI method.

UNIT-III:

Assignment model. Formulation. Hungarian method for optimal solution. Solving unbalanced problem. Travelling salesman problem and assignment problem Sequencing models. Solution of Sequencing Problem – Processing n Jobs through 2 Machines – Processing n Jobs through 3 Machines – Processing 2 Jobs through m machines – Processing n Jobs through m Machines

UNIT-IV:

Inventory management: functional classifications, phases, objectives and basic characteristics. Inventory models- Basic EOQ, EOQ with quantity discounts, Lead-time analysis in inventory, Re-order level, determining the optimal level of safety stock. Inventory control systems- fixed order quantity system, periodic review inventory system.

TEXT BOOKS:

- 1.V.K Kapoor, "Operation Research" Sultan Chand & Sons
2. P. Sankara Iyer, "Operations Research", Tata McGraw-Hill, 2008.
3. B.S. Goel, S.K. Mittal, Operations Research, Pragati Prakashan Publishers

REFERENCE BOOKS:

1. J K Sharma. "Operations Research Theory & Applications, 3e", Macmillan India Ltd, 2007.
2. P. K. Gupta and D. S. Hira, "Operations Research", S. Chand & co., 2007.
3. J K Sharma., "Operations Research, Problems and Solutions, 3e", Macmillan India

BTCSE602 COMPUTER NETWORKS

Instruction:4 Periods/week

Time: 3 Hours

Credits:4

Internal:25 Marks

External: 75 Marks

Total: 100 Marks

UNIT I

Introduction to Computer Networks: use of computer networks, Network Hardware, Network software, Reference Models.

Brief review of Physical Layer and Data Link Layer (only for the purpose of continuity from the previous semester subject Data Communications. Questions need not be asked from this topic for both internal and external examinations.)

Medium Access Control Sub layer: Channel allocation Problem, Multiple Access protocols- ALOHA, CSMA, Ethernet.

Network Layer: Network Layer Design issues, Routing algorithms-optimality principle, Shortest path, Flooding, Distance Vector Routing, Count To Infinity Problem, Link State Routing, Hierarchical Routing, Congestion Control algorithms, Quality Of Service – Requirements, Leaky Bucket algorithm, Token Bucket algorithm, Resource Reservations.

UNIT II

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, The Network layer in the Internet- IPv4, IPv6 Protocol, IP addresses, CIDR, ICMP, ARP, RARP, DHCP, OSPF, BGP.

UNIT III

Transport Layer: Services Provide to the Upper Layers, Elements of Transport protocol, The Internet Transport protocols- UDP, RPC, Real Time Transport Protocols, Introduction to TCP, TCP Service Model, TCP Segment Header, Connection Establishment, TCP Connection Release, TCP Connection Management Modeling, TCP Sliding Window, TCP Congestion Control, TCP Timer Management.

UNIT IV

Application Layer: DNS, SNMP, Electric Mail, WWW-Architectural overview, HTTP, FTP.

Text Books:

1. Computer Networks, Andrews S Tanenbaum, Edition 4, PHI.
2. Data Communications and Networking, Behrouz A Forouzan, Tata McGraw-Hill Co Ltd, Second Edition.

BTCSE 603 Data Warehousing and Data Mining

Instruction:4 Periods/week
Internal:25 Marks

Time: 3 Hours
External: 75 Marks

Credits:4
Total: 100 Marks

UNIT I

Data Warehouse and OLAP Technology: An overview Data Warehouse Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Architecture Data Warehouse Implementation,

Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization, from Data Warehousing to Data Mining.

UNIT II

Introduction to Data Mining: Motivation and importance, What is Data Mining, Data Mining on what kind of data, What kinds of patterns can be mined, Which technologies are used, integration of data mining system with a database or DWH system, Major issues in Data Mining.

Getting to know your Data: Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring data Similarity and Dissimilarity.

UNIT III

Concept Description: Characterization and comparison What is Concept Description, Data Generalization by Attribute-Oriented Induction(AOI), AOI for Data Characterization, Efficient Implementation of AOI, AOI for Class comparisons.

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Frequent Itemset Mining Methods: Apriori method, generating Association Rules, Improving the Efficiency of Apriori, Pattern-Growth Approach for mining Frequent Item sets, Mining Frequent Itemsets using vertical data format, Mining Closed.

UNIT IV

Classification Basic Concepts: Basic Concepts, Decision Tree Induction: Decision Tree Induction, Attribute Selection Measures, Tree Pruning, Bayes Classification Methods, Classification by Back Propagation, Support Vector Machines.

Cluster Analysis: Cluster Analysis, Partitioning Methods, Hierarchical methods, Density based methods-DBSCAN..

Text Book:

1. Data Mining Concepts and Techniques—Jiawei Han, Micheline Kamber and Jian Pei, Morgan Kaufman Publications 3rd edition.

Reference Books:

1. Introduction to Data Mining –Pang-Ning Tan, Michael Steinbach, Vipin Kumar
2. Introduction to Data Mining, Adriaan, Addison Wesley Publication
3. Data Mining Techniques, A.K. Pujari, University Press

BTCSE 604 OBJECT ORIENTED ANALYSIS & DESIGN USING UML

Instruction: 4 Periods/week
Internal: 25 Marks

Time: 3 Hours
External: 75 Marks

Credits:4
Total: 100 Marks

UNIT– I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modelling, Conceptual model of the UML, Architecture, and Software Development Life Cycle.

Structural Modeling: Classes, Relationships, common Mechanisms, and Diagrams (Structural and Behavioural), Common Modeling Techniques.

UNIT-II

Advanced Structural Modelling: Advanced classes, advanced relationships, class diagrams, object diagrams

Basic Behavioural Modelling: Interactions, Interaction diagrams. Use cases, Use case Diagrams, and Activity Diagrams.

UNIT– III

Advanced Behavioural Modelling-1: Events and signals, State machines, Processes and Threads, Time and space, State Diagrams

Architectural Modelling: Components, Deployment, Component diagrams, Deployment diagrams.

UNIT-IV

Design Patterns: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

TEXT BOOKS:

1. “Object- Oriented Analysis And Design with Applications”, Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, 3rd edition, 2013, PEARSON.
2. “The Unified Modelling Language User Guide”, Grady Booch, James Rumbaugh, Ivar Jacobson, 12th Impression, 2012, PEARSON.
3. Design Patterns By Erich Gamma, Richard Helmm Ralph Johnson, John Vlissides, Pearson Education.

REFERENCE BOOKS:

1. “Object-oriented analysis and design using UML”, Mahesh P. Matha, PHI
2. “Head first object-oriented analysis and design”, Brett D. McLaughlin, Gary Pollice, Dave West, O'Reilly
3. “Object-oriented analysis and design with the Unified process”, John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning
4. “The Unified modeling language Reference manual”, James Rumbaugh, Ivar Jacobson, Grady Booch, Addison-Wesley

BTCSE 605 : NETWORK SECURITY AND CRYPTOGRAPHY

Instruction: 4 Periods/week

Time: 3 Hours

Credits:4

Internal: 25 Marks

External: 75 Marks

Total: 100 Marks

UNIT I

Introduction: The need for security-security approaches-principles of security-Plain Text and Cipher Text-substitution and Transposition Techniques-Encryption and Decryption-Symmetric and Asymmetric Cryptography-Steganography-key range and key size-types of attacks.

Number Theory: Introduction to number theory- Modular Arithmetic, Euclidean algorithm, Euler theorem, Fermat Theorem, Totient Function, Multiplicative and Additive Inverse.

UNIT II

Symmetric Key Cryptographic Algorithms: Algorithm types and modes-overview of symmetric key cryptography-DES-IDEA-Blowfish-AES-Differential and Linear Cryptanalysis.

Asymmetric Key Cryptographic Algorithms: Overview of asymmetric key cryptography-RSA algorithm-symmetric and asymmetric key cryptography together-digital signatures.

UNIT III

User Authentication Mechanisms: Introduction-Authentication basics-passwords-authentication tokens-certificate based authentication-biometrics authentication-Hash functions-SHA1.

System Security : Intruders: Introduction, Intrusion Techniques, Intrusion Detection.

Viruses: Definition, Types of Viruses, Trusted Systems: Introduction to Trusted Systems.

UNIT IV

Internet Security Protocols: Basic concepts-SSL-SHTTP-TSP-SET-SSL versus SET- 3D secure protocol-Electronic money-Email security-WAP security-security in GSM.

Network Security: Brief Introduction to TCP/IP -Firewalls -IP security-Virtual Private Networks.

Text Books:

1. Cryptography and Network security, AtulKahate, Tata McGraw-Hill Pub company Ltd., New Delhi
2. Network Security Essentials Applications and Standards, William Stallings, Pearson Education, New Delhi

Reference Books:

1. Network Security Private Communication in a public world, Charlie Kaufman, Radia Perlman & Mike Speciner, Prentice Hall of India Private Ltd., New Delhi
2. Network Security: The Complete Reference by Roberta Bragg, Mark Phodes - Ousley, Keith Strass berg Tata McGraw-Hill.

BTCSE 606 DISTRIBUTED SYSTEMS
(Elective-I)

Instruction: 4 Periods/week
Internal: 25 Marks

Time: 3 Hours
External: 75 Marks

Credits:4
Total: 100 Marks

UNIT I

Introduction to Distributed Systems:

Distributed systems: Goals, Hardware Concepts: Bus Multiprocessor Timesharing Systems, Design Issues: Reliability, Performance, Scalability etc.

UNIT II

Communication distributed systems:

ATM Networks: Asynchronous Transfer Mode, The ATM Physical Layer, The ATM Layer, The ATM Adaptation Layer, ATM Switching, Applications of ATM for DS, Client-server model: Clients and Servers, Addressing, Blocking versus Nonblocking Primitives, Buffered versus Unbuffered Primitives, Reliable versus Unreliable Primitives, Implementing the Client-Server Model. Remote procedure call:RPC Operation, RPC semantics in the presence of Failures, Implementation Issues.

Synchronization:

Clock synchronization: Logical Clocks, Physical Clocks, Clock Synchronization Algorithms, Use of Synchronized Clocks, Mutual exclusion:Centralized Algorithm, Distributed Algorithm,Token Ring Algorithm,Comparison of the Three Algorithms, Election Algorithms: The Bully Algorithm, A Ring Algorithm, Atomic Transactions: Introduction, The Transaction Model, Implementation, concurrency Control, Dead locks.

UNIT III

Processes and Processors:

Threads: Introduction, Thread Usage, Design Issues for Thread packages, Implementing a Thread Package, Threads and RPC, System models: The Workstation Model, The Processor pool model, A hybrid model, Processor allocation – Scheduling in Distributed Systems, Fault tolerance: Component Faults, System failures, Real time distributed systems: Design Issues, Real Time Communication, Real Time Scheduling.

Distributed file systems:

Distributed File system design:File Service Interface, Directory Server interface, File System Implementation: File Usage, System Structure, Caching, Replication.

UNIT IV

Distributed Shared Memory:

Introduction, Bus based multi processors, Ring based multiprocessors, Switched multiprocessors, Comparison of shared memory Systems, Consistency Models: Strict Consistency, Sequential Consistency, Causal Consistency, PRAM Consistency and Processor Consistency, Weak Consistency, Release Consistency, Entry Consistency, Page based distributed shared memory: Replication, Granularity, Achieving Sequential Consistency, Finding the owner, finding copies, page replacement, Synchronization.

Text Book:

Andrew S.Tanenbaum: Distributed Operating System, Prentice Hall Intl Inc 1995.

Reference Book:

Distributed Systems – Concepts and Design, George Coulouris, Jean Dollimore, Tim Kindberg, Pearson Education.

BTCSE 606 IMAGE PROCESSING
(Elective-II)

Instruction: 4 Periods/week
Internal: 25 Marks

Time: 3 Hours
External: 75 Marks

Credits:4
Total: 100 Marks

UNIT - I

Introduction: What Is A Digital Image Processing, Examples Of Fields that Use Digital Image Processing, Fundamental Steps In Digital Image Processing, Components Of An Image Processing System.

Digital Image Fundamentals: Image Sensing and Acquisition, Image Sampling And Quantization, Basic Relationships Between Pixels.

UNIT - II

Image enhancement in the spatial domain: Basic Gray-Level Transformation, Histogram Processing, Enhancement Using Arithmetic And Logic Operators, Basic Spatial Filtering, Smoothing And Sharpening Spatial Filters.

Image enhancement in the Frequency domain: Introduction to fourier transform and the frequency domain-One dimensional Fourier transform and its inverse, Two DFT and its inverse, Filtering in the frequency domain.

UNIT – III

Image Compression: Fundamentals, image compression models, error-free compression, Loss predictive coding, image compression standards.

Morphological image processing: Preliminaries, Dilation and Erosion, Opening and Closing, Hit -or- Miss transformations, Some Basic Morphological Algorithms.

UNIT - IV

Image Segmentation: Detection of Discontinuous, Edge Linking and Boundary Detection, Thresholding, Region–Based Segmentation, Segmentation by Morphological Watersheds.

Text Book:

Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI.

References:

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Digital Image Processing, William K. Prat, Wily Third Edition
4. Digital Image Processing and Analysis, B. Chanda, D. Datta Majumder, Prentice Hall of India, 2003.

BTCSE 606 WIRELESS AND ADHOC NETWORKS

(Elective III)

Instruction: 4 Periods/week

Time: 3 Hours

Credits: 4

Internal: 25 Marks

External: 75

Marks Total: 100 Marks

UNIT I

Introduction: Introduction to Wireless Networks, Various Generations of Wireless Networks, Virtual Private Networks- Wireless Data Services, Common Channel Signaling, Various Networks for Connecting to the Internet, Blue tooth Technology, Radio Propagation mechanism, Path loss Modeling and Signal Coverage

UNIT II

Wireless Adhoc Networks: Basics of Wireless Networks, Infrastructured Versus Infrastructureless Networks – Properties of Wireless Ad hoc Networks, Types of Ad hoc Networks, Challenges in Adhoc Networks, Applications of Wireless Ad Hoc Networks

Wireless Local Area Networks: Introduction-WLAN topologies-IEEE 802.11 Standards, MAC Protocols, Comparison of 802.11 a,b,g and n Standards, HIPER LAN, , Wireless Local Loop.

UNIT III

Routing Protocols for Ad hoc Networks: Introduction-Proactive Routing Protocols- Reactive Routing protocols-Hybrid Routing Protocols-QoS Metrics-Energy impact issues in Routing.

Other Wireless Technologies: Introduction, IEEE 802.15.4 and Zigbee, General Architecture, Physical Layer, MAC layer, Zigbee, WiMAX and IEEE 802.16, Layers and Architecture, Physical Layer, OFDM Physical layer.

UNIT IV

Security in Ad hoc Networks: Introduction- Security Attacks, Intrusion Detection System, Intrusion Prevention system, Intrusion Response system, Wired Equivalent Privacy (WEP) -A Security Protocol for Wireless Local Area Networks (WLANs), Security in MANETs.

Text Books:

1. Principles of Wireless Networks , Kaveth Pahlavan, K. Prasanth Krishnamurthy, Pearson Publications, Asia, 2002
2. Mobile Cellular Communications, G.Sasibhusan Rao, Pearson Publications.

Reference Book:

1. Guide to Wireless Ad hoc Networks: Series: Computer Communications and Networks, Misra, Sudip; Woungang, Isaac; Misra, Subhas Chandra, 2009, Springer

BTCSE 607 DATA MINING WITH R LAB

LAB:3 Periods/week

Time: 3 Hours

Credits: 2

Internal: 50 Marks

External: 50

Marks Total: 100 Marks

Students should be aware of usage of few packages and libraries of R. They should also be familiar with few functions used in R for visualization.

1. Implement all basic R commands
2. Interact data through .csv files(Import from and export to .csv files).
3. Get and Clean data using swirl excercises.(Use 'swirl' package, library and install that topic from swirl).
4. Visualize all Statistical measures(Mean,Mode, Median, Range, Inter Quartile Range etc., using Histograms, Boxplots and Scatter Plots).
5. Create a data frame with the following structure.

EMP ID	EMP NAME	SALARY	START DATE
1	Satish	5000	01-11-2013
2	Vani	7500	05-06-2011
3	Ramesh	10000	21-09-1999
4	Praveen	9500	13-09-2005
5	Pallavi	4500	23-10-2000

- a. Extract two column names using column name.
 - b. Extract the first two rows and then all columns.
 - c. Extract 3rd and 5th row with 2nd and 4th column.
6. Write R Program using 'apply' group of functions to create and apply normalization function on each of the numeric variables/columns of iris dataset to transform them into
 - i. 0 to 1 range with min-max normalization.
 - ii. a value around 0 with z-score normalization.
 7. Create a data frame with 10 observations and 3 variables and add new rows and columns to it using 'rbind' and 'cbind' function.
 8. Create a function to discretize a numeric variable into 3 quantiles and label them as low, medium, and high. Apply it on each attribute of any dataset to create a new data frame. 'discrete' with Categorical variables and the class label.
 9. Create a simple scatter plot using any dataset using 'dplyr' library. Use the same data to indicate distribution densities using boxwhiskers.
 10. Write R Programs to implement k-means clustering, k-medoids clustering and density based clustering on any dataset.
 11. Write a R Program to implement decision trees using 'readingSkills' dataset.
 12. Implement decision trees using any dataset using package party and 'rpart'.

References:

1. www.tutorialspoint.com/r
2. www.r-tutor.com
3. R and Data Mining: Examples and Case Studies Yanchang Zhao.

BTCSE 608 OOAD WITH UML LAB

LAB:3 Periods/week

Time: 3 Hours

Credits: 2

Internal: 50 Marks

External: 50

Marks Total: 100 Marks

OBJECTIVES:

- Construct UML diagrams for static view and dynamic view of the system.
- Generate creational patterns by applicable patterns for given context.
- Create refined model for given Scenario using structural patterns.
- Construct behavioural patterns for given applications.

Document the Software Project Management and Software Engineering activities for any SIX of the following projects. Any other project of interest also can be chosen.

1. Student Management System
2. Library Management System
3. Employee Management System
4. Railway Reservation System
5. Automatic Teller Machine
6. Hostel Management System
7. Hospital Management System
8. Online Shopping System
9. Blood Bank Management System
10. Restaurant Management System
11. Journal Publication System

Software Project Management and Software Engineering activities specified below can be customized according to the features of the project.

- Problem Statement
- Feasibility Study
- Software Requirements Specification Document
- Estimation of Project Metrics
- Entity Relationship Diagram
- Use Case Diagrams
- Class Diagram
- Sequence Diagrams
- Activity Diagrams
- State Chart Diagrams
- Test coverage

References:

1. The Unified Modeling Language User Guide. Grady Booch, James Rumbaugh and Ivar Jacobson. Addison-Wesley.
2. Object Oriented Software Engineering: Practical Software Development using UML and Java. Timothy C Lethbridge & Robert, Langaneire, Mc Graw Hill.