BCS-40 PROJECT PART- I

Course category	:	Department Core (DC)
Pre-requisite Subject	:	NIL
Contact hours/week	:	Lecture : 0, Tutorial : 0 , Practical: 10
Number of Credits	:	5
Course Assessment methods	:	Continuous assessment through three viva voce/presentation, preliminary project report, effort and regularity and end semester presentation
Course Outcomes	:	The students are expected to be able to demonstrate the

following knowledge, skills and attitudes after completing this course

1. Learning of latest trends and technology in selected field of interest.
2. Apply the acquired knowledge to practical situations.
3. Develop self-interest to explore the selected technical field of interest in future.
4. Acquire presentation skills.
5. Develop better interpersonal communication skills and increase self confidence

BCS-41 INTRODUCTION TO MACHINE LEARNING

Course Category	:	Department Core (DC)
Pre-requisite Subject	:	NIL
Contact Hours/Week	:	Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits	:	5
Course Assessment Methods	:	Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and Three Minor tests and One Major Theory & Practical Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. To explain theory underlying machine learning
2. To construct algorithms to learn linear and non-linear models
3. To implement data clustering algorithms
4. To construct algorithms to learn tree and rule-based models
5. To apply reinforcement learning techniques

Topics Covered

UNIT-I

FOUNDATIONS OF LEARNING- Components of Learning – Learning Models – Geometric Models – Probabilistic Models – Logic Models – Grouping and Grading – Learning Versus Design – Types of Learning – Supervised – Unsupervised – Reinforcement – Theory of Learning – Feasibility of Learning – Error and Noise – Training versus Testing – Theory of Generalization – Generalization Bound – Approximation- Generalization Tradeoff – Bias and Variance – Learning Curve 9

UNIT-II

LINEAR MODELS-Linear Classification–Univariate Linear Regression–Multivariate Linear Regression–Regularized Regression– Logistic Regression–Perceptron–Multilayer Neural Networks –Learning Neural Networks Structures – Support Vector Machines–Soft Margin SVM–Going Beyond Linearity – Generalization and Over Fitting – Regularization– Validation 9

UNIT-III

DISTANCE-BASED MODELS-Nearest Neighbour Models–K-Means–Clustering around Medoids–Silhouettes–Hierarchical Clustering–K-D Trees–Locality Sensitive Hashing–Non-Parametric Regression–Ensemble Learning–Bagging And Random Forests–Boosting–Meta Learning 9

UNIT-IV

TREE AND RULE MODELS- Decision Trees – Learning Decision Trees – Ranking and Probability Estimation Trees – Regression Trees – Clustering Trees – Learning Ordered Rule Lists – Learning Unordered Rule Lists – Descriptive Rule Learning – Association Rule Mining – First-Order Rule Learning 9

UNIT-V

REINFORCEMENT LEARNING-Passive Reinforcement Learning – Direct Utility Estimation – Adaptive Dynamic Programming – Temporal-Difference Learning – Active Reinforcement Learning – Exploration – Learning an Action-Utility Function – Generalization in Reinforcement Learning – Policy Search – Applications in Game Playing – Applications in Robot Control

EXPERIMENTS

1. A simple *linear regression* attempts to draw a straight line that will best minimize the residual sum of squares between the observations and the predictions in python program language
2. Linear Regression Logistic Regression in python program language
3. Decision Tree in python program language
4. SVMin python program language
5. Naive Bayesin python program language
6. KNNin python program language
7. K-Meansin python program language
8. Random Forestin python program language
9. Dimensionality Reduction Algorithms in python program language
10. Gradient Boost & Adaboost in python program language

Textbooks

1 Ethem Alpaydın -Introduction to Machine Learning Third Edition, MIT Press, 2004

Reference books

1. Y. S. Abu-Mostafa, M. Magdon-Ismail, and H.-T. Lin, Learning from Data, AML Book Publishers, 2012.
2. P. Flach, Machine Learning: The art and science of algorithms that make sense of data, Cambridge University Press, 2012.
3. K. P. Murphy, Machine Learning: A probabilistic perspective, MIT Press, 2012.
4. C. M. Bishop, Pattern Recognition and Machine Learning, Springer, 2007.
5. D. Barber, Bayesian Reasoning and Machine Learning, Cambridge University Press, 2012.
6. M. Mohri, A. Rostamizadeh, and A. Talwalkar, Foundations of Machine Learning, MIT Press, 2012.

7. T. M. Mitchell, Machine Learning, McGraw Hill, 1997.
8. S. Russel and P. Norvig, Artificial Intelligence: A Modern Approach, Third Edition, Prentice Hall, 2009.

BCS-42 PARALLEL & DISTRIBUTED COMPUTING

Course Category	:	Department Core (DC)
Pre-requisite Subject	:	NIL
Contact Hours/Week	:	Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits	:	5
Course Assessment Methods	:	Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and Three Minor tests and One Major Theory & Practical Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. understand and account for models, limitations, and fundamental concepts in the area of message passing and shared memory concurrency, and apply this understanding to example systems and algorithms
2. adapt, and design algorithms for execution in parallel and distributed settings, and analyze the algorithms for correctness, reliability, security, and performance

Topics Covered

UNIT-I

Parallel Computing, Parallel Computer Model, Parallel Architectural Classification Schemes, Multiprocessor System and Interconnection Networks. Theoretical Foundation For Distributed System: Limitation of Distributed System, Absence of Global Clock, Shared Memory, Logical Clocks, Lamport's & Vectors Logical Clocks, Causal Ordering of Messages, Global State, Termination Detection. 9

UNIT-II

Distributed Mutual Exclusion: Classification of Distributed Mutual Exclusion, Requirement of Mutual Exclusion Theorem, Token Based and Non Token Based Algorithms, Performance Metric for Distributed Mutual Exclusion Algorithms. 9

UNIT-III

Distributed Deadlock Detection: System Model, Resource vs Communication Deadlocks, Deadlock Prevention, Avoidance, Detection & Resolution, Centralized Dead Lock Detection, Distributed Dead Lock Detection, Path Pushing Algorithms, Edge Chasing Algorithms. Agreement Protocols: Introduction, System Models, Classification of Agreement Problem, Byzantine Agreement Problem, Consensus Problem, Interactive Consistency Problem, Solution to Byzantine Agreement Problem, Application of Agreement Problem. 9

UNIT-IV

Distributed File Systems: File Service Architecture, Sun Network File System, The Andrew File System, Recent Advances. 9

Distributed Algorithms: Introduction to Communication Protocols, Balanced Sliding Window Protocol, Routing Algorithms, Destination Based Routing, APP Problem, Deadlock Free Packet Switching, Introduction to Wave & Traversal Algorithms, Election Algorithm, CORBA Case Study: CORBA RMI, CORBA Services.

EXPERIMENTS

1. Write a program to simulate the functioning of Lamport's logical clock in 'C'.
2. Write a program to simulate the Distributed Mutual Exclusion in 'C'.
3. Write a program to implement a Distributed chat server using TCP sockets in 'C'.
4. Implement RPC mechanism for a file transfer across a network in 'C'.
5. Write a JAVA code to implement 'JAVA RMI' mechanism for accessing methods of remote systems.
6. Write a code in 'C' to implement sliding window protocol.
7. Implement corba mechanism by using c++ program at one end and JAVA program at the other.
8. Write a code in 'C' to Increment a counter in shared memory.

Textbooks

1. Singhal Mukesh & Shivaratri N. G., Advanced Concepts in Operating Systems, TMH

Reference books

2. D. Culler, J. P. Singh, A. Gupta, Parallel Computer Architecture, Elsevier
3. Andrew S. Tanenbaum and Maarten Van Steen, Distributed Systems Principles and Paradigms, PHI
4. Tanenbaum, A. S. Distributed Operating Systems, Prentice Hall 199
5. Tanenbaum, A. S. Modern Operating Systems, 2nd Edition, Prentice Hall 2001.
6. Bacon, J., Concurrent Systems, 2nd Edition, Addison Wesley 1998.
7. Silberschatz, A., Galvin, P. and Gagne, G., Applied Operating Systems Concepts, 1st Edition, Wiley 2000.
8. Coulouris, G. et al, Distributed Systems: Concepts and Design, 3rd Edition, Addison Wesley 2001.
9. Galli, D.L., Distributed Operating Systems: Concepts and Practice, Prentice-Hall 2000.

BCS-53 LAMP TECHNOLOGY

Course Category	:	Program Elective (PE1&PE2)
Pre-requisite Subject	:	NIL
Contact Hours/Week	:	Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits	:	4
Course Assessment Methods	:	Continuous assessment through tutorials, attendance, home assignments, quizzes and Three Minor tests and One Major Theory Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this

course.

1. Use Open Source Operating system and its distributions like Fedora, Google chrome OS, Ubuntu.
2. To comprehend framework of BSD (Berkley System Distribution) and its installation
3. Study of Web technologies based on open Software's LAMP (Linux Apache MySql and PHP/Python)
4. To Learn HTML, XHTML, PHP and JAVA Script

Topics Covered

UNIT-I

Introduction to LAMP Terminologies, Two Tier and Three Tier Web based Application Architecture; Advantages of using LAMP based Technologies, Linux: Distributions – Fedora and Ubuntu; Installation – Disk Partitioning, Boot Loader, Etc; Using Linux – Shell, File System Familiarity; Linux Administration – Managing Users, Services and Software; Network Connectivity and Configurations; Security. 9

UNIT-II

Apache: Web Server Conceptual Working, Web Browser, HTTP, Installation and Configuration; *Httpd. Conf* File; Logging; Security; Running Website 9

UNIT-III

Mysql: Database Management System, ER Diagram, Relational Database, Installation, Configuration, Administration, Common SQL Queries – Create, Describe, Select, Insert, Delete, Update, Etc. 9

UNIT-IV

PHP: Dynamic Content, Server Side Scripting, Installation, Configuration, Administration, Language Syntax, Built-in Functions, PHP and Mysql Connectivity, Installation, Configuration and Administration of All Four LAMP Components Namely Linux, Apache Web Server, Mysql and PHP, Testing with Any Project Example. 9

Textbooks

1. Eric Rosebrock, Setting Up LAMP, Sybex Publishers.
2. James Lee, Brent Ware, Open Source Development with LAMP, Addison-Wesley Professional.
3. Jason Gerner, Elizabeth Naramore, Professional LAMP, John Wiley & Sons.

Reference books

1. Ben Laurie, Peter Laurie, Apache – Definitive Guide, O'Reilly Publications.
2. Paul DuBois, MySQL, Addison-Wesley.
3. Rasmus L Erdorf, Kevin Tatroe, Programming PHP, O'Reilly Publications.

BCS-56 LINUX ADMINISTRATION AND SYSTEM CALL PROGRAMMING

Course Category	:	Program Elective (PE1&PE2)
Pre-requisite Subject	:	NIL
Contact Hours/Week	:	Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits	:	4
Course Assessment Methods	:	Continuous assessment through tutorials, attendance, home assignments, quizzes and Three Minor tests and One Major Theory Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. use the LINUX based system through various commands
2. understand the task of LINUX system administration
3. write programs for system programming like IPC, semaphore etc.

Topics Covered

UNIT-I

History of Unix and Linux, Architecture of Linux, Advantages of Linux, Introduction to Kernel, Introduction to Linux Shell: Types of Shell, Feature and Benefits of Shell. I/O Redirection and Piping, Pipes, Filters, Introduction to Various Text Editor, Various Vi Editing Modes, Scrolling, Yank and Paste, Put and Delete, Set Commands, Comparison of Emacs Editor, Vi Editor, Pico Editor. 9

UNIT-II

Introduction to Linux Files: Rules for Creating Files, Linux Files System, File Printing, Searching Files using Grep, Change Permission to Set Files and Change Owner of Files. Process, Listening with Ps, Killing with Kill, PID, UID, GID, Signals, Nice, Renice. 9

UNIT-III

General Administration Issues: Root Account, Creating User in Linux, Changing Password, Deleting User, Disabling User Account, Linux Password & Shadow File Formats System Shutdown and Restart Creating Groups, Custom Configuration and Administration Issues, Simple Commands 9

UNIT-IV

System Call Programming: System Calls, Usage of File Related System Calls through C Programming. Process: Concept, Types, Related Commands & System Calls, Usage of Process Related System Calls through C Programming 9