Shri Vaishnav Vidhyapeeth Vishvavidhyalaya, Indore

Institute of Computer Applications

Name of Program: MCA (BANKING TECHNOLOGY)

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCBT201	COMPULSORY	Modeling and Simulation	3	1	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

***Teacher Assessment** shall be based on following components: Quiz / Assignment / Project / Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To develop mathematical models of phenomena involved in various chemical engineering processes and solutions for these models.
- To introduce students to basic simulation methods and tools for modeling and simulation of continuous, discrete and combined systems.

Course Outcomes (COs):

- Understand the important physical phenomena from the problem statement
- Develop model equations for the given system
- Demonstrate the model solving ability for various processes/unit operations
- Demonstrate the ability to use a process simulation

Unit-I

Introduction to Modeling and Simulation: Concept of Systems, Nature and Concept of Simulation, Steps in simulation study, Models and Simulation, Continuous and discrete system modeling, Model development life cycle, Components of a simulation study, Principles used in modeling system studies, Static and Dynamic physical models, Static and Dynamic Mathematical models Introduction to Static and Dynamic System Simulation, Advantages and Disadvantages of Simulation.

Unit-II

System Simulation: Techniques of simulation ,Types of System Simulation, Monte Carlo Method, Comparison of Simulation and analytical methods, Numerical Computation techniques for Continuous and Discrete Models, Cobweb Model ,Distributed Lag Models.

Continuous System Simulation: Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, CSSLs, Hybrid simulation, Real Time simulations, and Feedback systems.

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Unit –III

System Dynamics & Probability concepts in Simulation : Historical background Exponential growth and decay models, modified exponential growth models, logistic curves ,Generalization of growth models, System dynamics diagrams, dynamo language, Multi segment models, Representation of Time Delays, Stochastic variables, Discrete and Continuous probability functions, Continuous Uniform Distributed Random Numbers, Uniform random numbers generator, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method, Inversion, rejection, composition and Convolution.

Unit-IV

Discrete System Simulation: Discrete Events, representation of time, Generation of arrival patterns, Simulation programming tasks, simulation of telephone system, Gathering statistics, delayed calls.

Simulation of Queuing Systems: Poisson arrival patterns, Exponential distribution, Normal Distribution Queuing Disciplines, Service times, Simulation of single and two server queue, Application of queuing theory in computer system.

Unit-V

Introduction to Simulation languages and Analysis of Simulation output GPSS: Classification of simulation languages, Introduction to GPSS Action times, general description, Succession of events, facilities and storage, Choice of paths, Conditional transfers, program control statements, Estimation methods, Relication of Runs, Batch Means , Regenerative techniques, Time Series Analysis, Spectral Analysis and Autoregressive Processes, simulation programming techniques like entry types.

Suggested Readings:

1. W.A. Spriet - Computer Oriented Modeling and Simulation.
2. Gorden G., System simulation, Prentice Hall.
3. Seila, Simulation Modeling, Cengage Learning
4. Law .,Simulation Modeling And Analysis, McGraw Hill
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MCBT 202	Compulsory	Data Analytics and Business Intelligence	3	1	0	4	60	20	20	0	0

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.
***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks.

Course Objectives

- to provide students with comprehensive and in-depth knowledge of Business Intelligence (BI) principles and techniques
- to introduce the relationship between managerial and technological perspectives.
- to expose students to the frontiers of BI-intensive BIG data computing and information systems
- to provide a strong foundation to encourage further research.

Learning Outcomes

After completing this course, students will be able to:

- Identify the major frameworks of computerized decision support: decision support systems (DSS), data analytics and business intelligence (BI).
- Explain the foundations, definitions, and capabilities of DSS, data analytics and BI.
- Demonstrate the impact of business reporting, information visualization, and dashboards.
- Explain data mining, neural networks, support vector machines, text analytics, text mining, sentiment analysis, web mining, web analytics, social analytics, social network analysis.
- Outline the definitions, concepts, and enabling technologies of big data analytics.
- Apply big data technologies in business intelligence
- Identify the major ethical and legal issues of analytics.
- Describe how analytics are improves the business systems and creates opportunity for newer business.

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Unit I: Introduction to Analytics

Introduction to Analytics; its various forms viz., descriptive, predictive and prescriptive. Introduction to Data Warehousing and its concepts, Data Mining (DM), DM concepts, DM Process; CRISP-DM Methodology, Data Preparation/Pre-processing techniques - Feature Selection methodologies, dimension reduction techniques such as PCA and Transformations. Data Visualization Techniques, Data Balancing Techniques etc.

Unit II: Descriptive and Predictive Analytical techniques

Association Rule Mining and its Algorithms & Applications; Clustering, Hierarchical and Partition clustering – Techniques and applications; Forecasting- Simple Linear Regression, Multiple Linear Regression; Classification - Logistic Regression, Decision Trees, k-NN, Neural Networks, Case Based Reasoning etc.

Unit III: Practical Considerations in Analytics Projects

Determination of best analytical/data mining technique, MSE, NRMSE, MAPE, Confusion Matrix, ROC, AUC, Lift, Comprehensibility etc.

Unit IV: Applications and Case Studies

Analytical CRM applications such as bankruptcy prediction, churn prediction, default prediction, customer segmentation, market basket analysis, credit scoring, Financial Fraud detection.

Unit V: Advanced Analytics and Case Studies

Unstructured data mining, Text Analytics, Web Mining etc., Cyber Fraud Detection including Phishing/Spam/Malware detection; Overview of prescriptive analytics and application in time series data mining with a case study from banking operations.

Suggested Readings:

1. IH Witten, E.Frank, "Data Mining: Practical machine learning tools and techniques", Morgan Kaufmann, 3e, 2011.
2. Kimball, Ralph; Reeves, Laura et al, "The Data Warehouse Lifecycle Toolkit: Expert Methods for Designing, Developing and Deploying Data Warehouses", John Wiley & Sons, 1998.
3. Galit Shmueli, Nitin R. Patel, Peter C. Bruce, "Data Mining for Business Intelligence: Concepts, Techniques, and Applications in Microsoft Office Excel with XLMiner", 2e, Wiley, 2010.
4. Gary Miner, John Elder, Andrew Fast, Thomas Hill, Robert Nisbet, Dursun Delen, "Practical Text Mining and Statistical Analysis for Non-structured Text Data Applications", Academic Press, 2012.
5. Arun K. Pujari, "Data Mining Techniques", 2e, Universities Press, 2010.
6. Han, Jiawei; Kamber, Micheline, J. Pei, "Data mining: Concepts and Techniques", 3e, Morgan Kaufmann, 2011.
7. M. N. Murty and V. S. Devi, "Pattern Recognition: An Algorithmic Approach", Springer, 2011.
8. C. Bishop, "Pattern Recognition and Machine Learning", Springer, 2011.

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9. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning: Data Mining, Inference, and Prediction", 2e, Springer, 2009.
10. Pang-Ning Tan, "Introduction to Data Mining", Pearson Education, 1e, 2016.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA701	COMPULSORY	Linux and Shell Programming	3	1	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To develop the understanding of student about basic Linux feature and architecture.
- To make the students aware on Linux processing fundamentals.
- To make them aware about various Linux administrative tasks.
- To develop their programming skills in Shell.

Course Outcomes (Cos):

- The student will be able to understand Linux features and its file system.
- The student will be able to demonstrate Linux processing system.
- The student will be able to perform Linux administrative tasks.
- The student will be able to use language skills in practical problems.

UNIT – I

Linux introduction and file system - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories. Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons – cmp&comm, View files, disk related commands, checking disk free spaces. Partitioning the Hard drive for Linux, Installing the Linux system .

UNIT–II

Processes in linux-process fundamentals, connecting processes with pipes, tee, Redirecting input output, manual help, Background processing, managing multiple processes, changing process priority with nice, scheduling of processes at command, cron, batch commands, kill, ps, who, sleep, Printing commands, find, sort, touch, file, file related commands-ws, sat, cut, dd, etc. Creating and editing files with vi, joe & vim editor.

UNIT–III

System administration Common administrative tasks, identifying administrative files – configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disable user's accounts, creating and mounting file system, checking and monitoring system performance file security & Permissions

UNIT–IV

Shell programming- Basic of shell programming, Various types of shell available in Linux, comparisons between various shells, shell programming in bash, read command, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automate system tasks.

UNIT-V

Simple filter commands – pr, head, tail, cut, paste, sort, uniq, tr. Flter using regular expressions – grep, egrep, and sed. awk programming – report printing with awk.

Suggested Readings:

1. UNIX – Concepts & Applications (Third Ed.) – Sumitabha Das, Tata McGraw Hill Publications.
2. M.J. Bach "Design of UNIX O.S. ", Prentice Hall of India.
3. Y.Kanetkar "Unix shell programming", BPB Pub.
4. Unix for programmers and users (Third Ed.) – Graham Glass & King Ables, Pearson Education India. (Low Prices Edition)
5. Red Hat Linux 9 Bible – Cristopher Negus, IDG Books India Ltd.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCBT205	COMPULSORY	Distributed Systems	3	1	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

***Teacher Assessment** shall be based on following components: Quiz / Assignment / Project / Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- Understand foundations of Distributed Systems
- Understand the network virtualization, remote method invocation and objects and RPC.
- Introduce the idea of peer to peer services and file system
- Methods of understanding clock synchronization protocols &replication
- Understand the issues involved in studying process and resource management

Course Outcomes (COs):

- Discuss trends in Distributed Systems
- Demonstrate an understanding of the challenges faced by future distributed systems
- Learn and apply the concept of network virtualization and remote method invocation
- Apply network virtualization in Real time systems like
- Analyze the mechanism of peer to peer systems, DFS and DNS.
- Understand key mechanisms and models for distributed systems including logical clocks, causality, distributed mutual exclusion, distributed deadlocks.
- Design process and resource management systems.

UNIT-I

Concepts of Distributed Systems: Introduction, Goals of Distributed Systems, Distributed computing models Hardware and Software concepts, the client server model, Remote procedure call, remote object invocation, message and stream oriented communications.

UNIT-II

Process and synchronization in Distributed Systems: Threads, clients, servers, code migration, Clock synchronization, Logical clocks, Global state, Mutual exclusion, Election algorithms: Bully

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algorithm, Ring algorithm, Leader election in rings, anonymous rings, Asynchronous rings, synchronous rings, election in wireless networks, Deadlocks in Distributed systems, Deadlocks in Message communication, Distributed transactions.

UNIT-III

Consistency, Replication, Fault Tolerance and Security : Object replication, Data centric consistency model, client-centric consistency models, Introduction to fault tolerance, process resilience, recovery, distributed security architecture, security management, KERBEROS, secure socket layer, cryptography.

UNIT-IV

Distributed Based File Systems: Introduction - File service architecture, File System: Features- File model -File accessing models - File sharing semantics Naming: Identifiers, Addresses, Name Resolution – Name Space Implementation – Name Caches – LDAP.

UNIT-V

Distributed shared memory, DSM servers, shared memory consistency model and distributed document based systems: the World Wide Web, distributed co-ordination based systems: JINI Implementation: JAVA RMI, OLE, ActiveX, Orbix, Visbrokes, Object oriented programming with SOM

Suggested Readings:

1. Andrew S. Tanenbaum, Maarten Van Steen, "Distributed Systems Principles and Paradigms", Pearson
Education Inc. 2002.
2. Lui, "Distributed Computing Principles and Applications".
3. Harry Singh, "Progressing to Distributed Multiprocessing", Prentice-Hall Inc.
4. B.W. Lampson, "Distributed Systems Architecture Design & Implementation", 1985 Springer Varlag.
5. Parker Y. and Verjies J. P., "Distributed computing Systems, Synchronization, Control & Communications", PHI.
6. Robert J. & Thieranf, "Distributed Processing Systems" 1978, Prentice Hall.
7. George Coulouris, J. Dollimore, and T. Kindberg, "Distribute System: Design and Concepts", Pearson Education

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MCBT206	COMPULSORY	Lab1 (Modeling and Simulation Lab)	0	0	4	2	0	0	0	30	20

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List of Experiments:

1. Simulate CPU scheduling algorithm using queuing system
   a) FCFS b) SJF c) Priority Algo
2. Simulate multiplexer/concentrator using queuing system.
3. Simulate congestion control algorithms.
4. Simulate disk scheduling algorithms.
5. Simulate a Manufacturing shop and write a program in GPSS.
6. Simulate Telephone system model and write a program in SIMSCRIPT.
7. Simulation of continuous system.
8. Simulation of the R-C amplifier circuit.
9. Generation of Random number.
10. Simulation mass spring damper system
11. . Simulation of National econometric system.

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3. Seila, Simulation Modeling, Cengage Learning
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5. Deo, System Simulation with Digital Computer, PHI
6. Harrington, Simulation Modeling methods, McGraw Hill
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8. T.A. Payer - Introduction to simulation
9. B.Barnes - Modelling and Performance Measurement of Computer System.
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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA707	COMPULSORY	Lab-2 (Linux and Shell Programming Lab)	0	0	4	2	0	0	0	30	20

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Note: Labs shall be conducted as per the prescribed syllabus.

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2. M.J. Bach "Design of UNIX O.S. ", Prentice Hall of India.
3. Y.Kanetkar "Unix shell programming", BPB Pub.
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