

ಬೆಂಗಳೂರು ನಗರ
ವಿಶ್ವವಿದ್ಯಾನಿಲಯ



**BENGALURU CITY
UNIVERSITY**

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No:BCU/BoS/BCA-Comp.Appl'n/ 234/2021-22

Date: 13.10.2021.

NOTIFICATION

Sub: Elective Syllabus for BCA 5th and 6th Semester of
Bengaluru City University.

Ref: 1. Recommendations of the Board of Studies in
Computer Science and Applications.
2. Resolution of the Academic Council at its meeting
held on 12.10.2021.
3. Orders of the Vice-Chancellor dated 13.10.2021.

In pursuance to the recommendations of the Board of Studies in Computer Science & Applications and the resolution of the Academic Council, cited at reference (1) & (2) above, the Elective Syllabus for BCA 5th and 6th Semester of Bengaluru City University are hereby notified for implementation from the academic year 2021-22.

The copy of the above Elective Syllabus are notified in the University Website: www.bcu.ac.in for information of the concerned.


REGISTRAR

To,

1. The Dean, Faculty of Science , BCU.
2. The Chairman & Members of BoS in Computer Science & Application , BCU.
3. The Principals of the concerned affiliated Colleges of BCU – through email.
4. The P.S. to Vice-Chancellor/Registrar/Registrar (Evaluation), BCU.
5. Office copy / Guard file/University Website www.bcu.ac.in

BANGALORE CITY UNIVERSITY

BACHELOR OF COMPUTER APPLICATIONS (BCA)

ELECTIVES SYLLABUS FOR V AND VI SEMESTER

CBCS Scheme

**THE BOARD OF STUDIES IN COMPUTER SCIENCE
BANGALORE CITY UNIVERSITY, BANGALORE**

MEMBERS OF THE BoS IN COMPUTER SCIENCE

1	Dr. Muralidhara B L Professor Department of Computer Science Bangalore University	CHAIRPERSON
2	Dr. Guru D.S Professor PG Department of Computer Science Mysore Univeristy	Member
3	Dr. Susesha Professor, PG Department of Computer Science Mysore Univeristy	Member
4	Dr. Prabhakar C.J Professor Kuvempu University, Shimogga	Member
5	Dr. Chandrakanth Naikodi Associate Professor Department of Computer Science Davanagere University	Member
6	Dr. Prathibha V Kalburgi Ramaiah College of Arts Science, and Commerce Bangalore	Member
7	Mrs. Amalorpavam Sambram Academi of Management Studies Bangalore	Member
8	Dr. H.K. Gundurao Associate Professor Vijaya College, Bangalore	Member
9	Dr. Bhagyawana S Mudigowda Associate Professor Maharani Cluster University, Bangalore	Member
10	Smt. Nagarathamma S.M Associate Professor Maharani Cluster Univeristy, Bangalore	Member

V SEMESTER ELECTIVE I: THEORY OF COMPUTATION

Total Teaching Hours : 50

No of Hours / Week : 04

Unit – I [12 Hours]

Introduction to Finite Automata: The central concepts of Automata theory; Deterministic finite automata; Nondeterministic finite automata. Finite automata with Epsilon transitions. Application of finite automata; Language of Finite machines.

Unit - II [12 Hours]

Regular Expressions: Finite Automata and Regular Expressions Applications of Regular Expressions. Regular languages; Pumping Lemma for regular languages; Closure properties of regular languages; Equivalence and minimization of automata.

Unit - III [12 Hours]

Definition of the Pushdown automata; Deterministic Pushdown Automata; The languages of a PDA; Context-free grammars: Parse trees; Ambiguity in grammars and Languages. Equivalence of PDA's and CFG's. Normal forms for CFGs: Chomsky' Normal form, Griebach Normal form. Closure properties of CFLs.

Unit – IV [15 Hours]

The Turing machine: Types of Turing machines, Programming techniques for Turing Machines. Decidability of languages with Turing machines. Transducers: Automata with outputs, Mealy machine, Moore machine. Designing simple counters with transducers.

Text Book:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman: Introduction to Automata Theory, Languages and Computation, 3rd Edition, Pearson Education, 2011.

Reference Books:

1. John C Martin: Introduction to Languages and Automata Theory, 3rd Edition, Tata McGraw-Hill, 2007.
2. Daniel I.A. Cohen: Introduction to Computer Theory, 2nd Edition, John Wiley & Sons, 2009.
3. Thomas A. Sudkamp: An Introduction to the Theory of Computer Science, Languages and Machines, 3rd Edition, Pearson Education, 2006
4. A. Anand kumar: Fundamentals of digital circuits, PHI publications, 2016

V SEMESTER: ELECTIVE II: Data Mining

Total Teaching Hours : 50

No of Hours / Week : 04

Unit I:

[10 Hours]

Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi-Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Marting.

UNIT -II

[10 Hours]

Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse.

UNIT – III

[10 Hours]

Overview, Motivation(for Data Mining),Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. Data Reduction

UNIT– IV

[10 Hours]

Concept Description:- Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisons, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases

UNIT – V [12 Hours]

Classification and Predictions: What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods K-nearest neighbor classifiers, Genetic Algorithm. Cluster Analysis: Data types in cluster analysis

Reference

1. M.H.Dunham,"Data Mining:Introductory and Advanced Topics" Pearson Education,2013
2. Jiawei Han, Micheline Kamber, "Data Mining Concepts & Techniques" Elsevier, 2013.
3. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World: A Practical Guide for Building Decision Support Systems, 1/e", Pearson Education. 2009.
4. Mallach,"Data Warehousing System", McGraw –Hill, 2008.

VI SEMESTER ELECTIVE I: MACHINE LEARNING

Total Teaching Hours : 50

No of Hours / Week : 04

UNIT I : Introduction to Machine Learning [10 Hours]

Introduction, Perspectives & Issues in ML, designing learning systems, Concepts of hypotheses, Version space, inductive bias, Performance metrics-accuracy, precision, recall, sensitivity, specificity, AUC, RoC.

UNIT II : Supervised Learning [10 Hours]

Decision Trees Learning: Basic algorithm (ID3), Issues in Decision Tree Learning – Overfitting, Solutions to overfitting. Instance-based learning: k-nearest neighbour learning. Support Vector Machines: Introduction, Handling data that are linearly separable. Artificial Neural networks: Introduction, Perceptrons, Multi-layer networks and back-propagation.

UNIT III: Probabilistic and Stochastic Models: [10 Hours]

Bayesian Learning – Bayes theorem, Concept learning, Maximum likelihood, Bayes optimal classifier, Naive Bayes classifier. Expectation Maximization and Gaussian Mixture Models, Hidden Markov models.

UNIT IV: Association Mining and Unsupervised Learning [10 Hours]

Association Mining: Apriori algorithm. Finding frequent itemsets, mining association rules, FP-growth – FP trees, mining frequent items from an FP-Tree. Hierarchical vs non-hierarchical clustering, Agglomerative and divisive clustering, K-means clustering, K-medoid clustering,

UNIT V: Genetic Algorithms [10 Hours]

Genetic Algorithms – Representing hypothesis, Genetic operators and Fitness function and selection, Simple applications of the Genetic Algorithm, application of GA in Decision tree, Genetic Algorithm based clustering.

Text Books:

1. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Prentice Hall of India, Third Edition 2014
2. Jiawei Han and Micheline Kamber and Jian Pei, "Data Mining – Concepts and Techniques", 3rd edition, Morgan Kaufman Pub

Reference Books:

1. Charu C. Aggarwal, "Data Classification Algorithms and Applications", CRC Press, 2014.
2. Charu C. Aggarwal, "DATA CLUSTERING Algorithms and Applications", CRC Press, 2014.
3. "Machine Learning", Tom Mitchell, McGraw Hill Education (India), 2013.

VI SEMESTER ELECTIVE II: SOFTWARE TESTING

Total Teaching Hours: 50

No. of Hours / Week: 04

UNIT – I

[10 Hours]

Fundamental of Test and Analysis: Software Test and Analysis in a Nutshell: Engineering Process and Verification, Basic Questions; When do Verification and Validation Start and End? What Technique should be Applied? How can we Assess the Readiness of a Product? How can we ensure the Quality of Successive Releases? A Framework for Test and Analysis: Validation and Verification, Degrees of Freedom, Verities of Software. Basic Principles: Sensitivity, Redundancy, Restriction, Partition, Visibility and Feedback. Test and Analysis Activities within a Software Process: The Quality Process, Planning and Monitoring, Quality Goals, Dependability Properties, Analysis, Testing, Improving the Process and Organizational Factors.

UNIT – II

[10 Hours]

Problems and Methods: Test Case Selection and Adequacy: Test Specification and Cases, Adequacy Criteria, Comparing Criteria, Functional Testing: Random versus Partition Testing Strategies, A Systematic Approach, Choosing a Suitable Approach, Combinatorial Testing: Category-Partition Testing, Pairwise Combination Testing, Catalog-Based Testing, Structural Testing: Statement Testing, Branch Testing, Condition Testing, Path Testing, Procedure Call Testing, Comparing Structural Testing Criteria.

UNIT – III

[10 Hours]

Data Flow Testing: Definition-Use Associations, Data Flow Testing Criteria, Data Flow Coverage with Complex Structures, The Infeasibility Problem. Testing Object Oriented Software: Issues in Testing Object Oriented Software, An Orthogonal Approach to Test, Intraclass Testing, Testing with State Machine Models, Interclass Testing, Structural Testing of Classes, Oracles for Classes, Polymorphism and Dynamic Binding, Inheritance, Genericity and Exception.

UNIT – IV

[10 Hours]

Process: Planning and Monitoring the Process: Quality and Process, Test and Analysis Strategies, Test and Analysis Plans, Risk Planning, Monitoring the Process, Improving the Process, The Quality Team. Integration and Component-based Software Testing: Integration Testing Strategies, Testing Components and Assemblies. System, Acceptance and Regression Testing: System Testing, Acceptance Testing, Usability, Regression Testing, Regression Test Selection Techniques, Test Case Prioritization and Selective Execution.

UNIT – V

[10 Hours]

Model Based Testing: Deriving Test Cases from Finite State Machines, Testing Decision Structures, Deriving Test Cases from Control and Data Flow Graphs, Deriving Test Cases from Grammars. Automating Analysis and Test: Automation and Planning, Process Management, Static Metrics, Test Case Generation and Execution, Static Analysis and Proof, Cognitive Aids, Version Control, Debugging, Choosing and Integrating Tools. Documenting Analysis and Test:

Organizing Documents, Test Strategy Document, Analysis and Test Plan, Test Design Specification Documents, Test and Analysis Reports.

Text Book

1. Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles and Techniques, 1st edition, John Wiley & Sons, 2011.

Reference Books

1. Paul C. Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach Publications, 2012.
2. Brian Marrick: The Craft of Software Testing, 1st edition, Pearson, 2012.
3. Aditya P Mathur: Foundations of Software Testing, Pearson, 2008.
4. Srinivasan Desikan, Gopaldaswamy Ramesh: Software testing Principles and Practices, 1st Edition, Pearson, 2012.

