

**Syllabus for Third Year B.Tech Program in Computer Engineering- Semester V (Autonomous)  
(Academic Year 2021-2022)**

	Market Basket Analysis, Frequent Item sets, Closed Item sets, and Association Rule Frequent Item set Mining Methods: Apriori Algorithm, Association Rule Generation, Improving the Efficiency of Apriori. FP growth, Mining frequent Itemsets using Vertical Data Format Introduction to Mining Multilevel Association Rules and Multidimensional Association Rules	
7	<b>Spatial and Web Mining:</b> Spatial Data, Spatial Vs. Classical Data Mining, Spatial Data Structures, Mining Spatial Association and Co-location Patterns, Spatial Clustering Techniques: CLARANS Extension, Web Mining: Web Content Mining, Web Structure Mining, Web Usage mining, Applications of Web Mining	5

**Books Recommended:**

1. *Paulraj Ponniah, —Data Warehousing: Fundamentals for IT Professionals*, Wiley India.
2. *Reema Theraja —Data warehousing*, Oxford University Press.
3. *Han, Kamber, "Data Mining Concepts and Techniques"*, Morgan Kaufmann 3rd edition.
4. *M.H. Dunham, "Data Mining Introductory and Advanced Topics"*, Pearson Education.

**Suggested List of Experiments:**

Sr. No.	Title of Experiments
1.	Build Data Warehouse/Data Mart for a given problem statement <ol style="list-style-type: none"> <li>i. Identifying the source tables and populating sample data</li> <li>ii. Making information package diagram</li> <li>iii. Design dimensional data model i.e. Star schema, Snowflake schema and Fact Constellation schema (if applicable)</li> </ol>
2.	Perform data Pre-processing task on your dataset
3.	To perform various OLAP operations such as slice, dice, drilldown, rollup, pivot
4.	Implementation of Classification algorithm <ol style="list-style-type: none"> <li>i. Using Decision Tree ID3</li> <li>ii. Naïve Bayes algorithm</li> </ol>
5.	Implementation of Clustering algorithm <ol style="list-style-type: none"> <li>i. K-means</li> <li>ii. Hierarchical clustering (single/complete/average)</li> <li>iii. DBScan</li> </ol>
6.	Implementation of Association Rule Mining algorithm <ol style="list-style-type: none"> <li>1. Apriori algorithm</li> </ol>

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	2. FP Tree algorithm
7.	Demonstrate performing Classification, Clustering, Association algorithm on data sets using data mining tool ( <b>WEKA, R tool, XL Miner, etc.</b> )
8.	Case study on recent data mining applications

**Evaluation Scheme:**

***Semester End Examination (A):***

*Theory:*

1. Question paper based on the entire syllabus, summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

*Laboratory:*

1. Oral & Practical examination will be based on the entire syllabus including, the practical's performed during laboratory sessions.

***Continuous Assessment (B):***

*Theory:*

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

*Laboratory: (Term work)*

Laboratory work will be based on **DJ19CEL501** with experiments to be performed in Python / R programming languages.

The distribution of marks for term work shall be as follows:

- i. Laboratory work (Performance of Experiments): 15 Marks
- ii. Journal Documentation (Write-up and Assignments): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by

Checked by

Head of the Department

Principal

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***Suggested List of Experiments:***

Sr. No.	Title of Experiments
1.	To implement shift and add method of multiplication algorithm.
2.	To implement Booth's multiplication algorithm.
3.	To study and implement Restoring division algorithm.
4.	To study and implement Non- Restoring Division algorithm.
5.	To implement First Fit Memory allocation policy.
6.	To implement Best Fit Memory allocation policy.
7.	To study and implement FIFO page replacement policy
8.	To study and implement LRU page replacement policy
9.	Assembly program for 16-bit addition
10.	Assembly Program to transfer n block of data from one segment to another segment.
11.	Assembly program to sort numbers in ascending/ descending order
12.	Assembly program to find minimum/ maximum no. from a given array.
13.	Assembly language program using Macros.
14.	To implement mixed language programming using Assembly Language and C.

**Evaluation Scheme:**

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2. Total duration allotted for writing the paper is 3 hrs.

*Laboratory:*

1. Oral & Practical examination will be based on the entire syllabus including, the practical's performed during laboratory sessions.

***Continuous Assessment (B):***

*Theory:*

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

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### List of Laboratory Experiments:

1. Select a problem statement relevant to AI .
  - i)Identify the problem
  - ii)PEAS Description
  - iii)Problem formulation
2. Program to implement Family Tree in Prolog
3. Identify and analyze uninformed search Algorithm to solve the problem.  
Implement BFS/DFS/DFID search algorithms to reach goal state.
4. Identify and analyze informed search Algorithm to solve the problem.  
Implement A\* search algorithm to reach goal state.
5. Program to implement Local Search algorithm : Hill climbing search
6. Program on Genetic Algorithm to solve a optimization problem in AI.
7. Identify,analyze, implement a planning problem/Rule based Expert System in a real world scenario.
8. Implementation on any AI Problem : Wumpus world, Tic-tac-toe, 8-Queens Problem
9. Program to implement learning : Perceptron Learning/Backpropagation Algorithm.
10. Case study of an AI Application.

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

### Books Recommended:

#### *Text Books*

1. Stuart J. Russell and Peter Norvig, "Artificial Intelligence A Modern Approach "Second Edition" Pearson Education.
2. Saroj Kaushik "Artificial Intelligence", Cengage Learning.
3. George F Luger "Artificial Intelligence" Low Price Edition, Pearson Education., Fourth edition.
4. Deepak Khemani." A First Course in Artificial Intelligence", McGraw Hill Education (India), 2013.

#### *Reference Books*

1. Ivan Bratko "PROLOG Programming for Artificial Intelligence", Pearson Education, Third Edition.
2. Elaine Rich and Kevin Knight "Artificial Intelligence" Third Edition
3. Davis E.Goldberg , "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
4. Hagan, Demuth, Beale, "Neural Network Design" CENGAGE Learning, India Edition.
5. Patrick Henry Winston, "Artificial Intelligence", Addison-Wesley, Third Edition.
6. Han Kamber, "Data Mining Concepts and Techniques", Morgann Kaufmann Publishers.
7. N.P.Padhy , "Artificial Intelligence and Intelligent Systems", Oxford University Press.

### Evaluation Scheme:

#### **Semester End Examination (A):**

##### *Theory:*

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

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**Books Recommended:**

*Text books:*

1. Elmasri&Navathe, “Fundamentals of Database Systems” IV edition. PEARSON Education.
2. Korth, Silberschatzsudarshan, “Database systems, concepts” 5th edition McGraw Hill
3. Raghu Ramkrishnan& Johannes Gehrke, “Database Management System” Tata McGraw Hill. III edition.
4. Ruosell J.T. Dyer, Learning MySQL and Mariadb.

*Reference Books:*

1. Chhanda Ray, “Distributed Database System”, Pearson Education India.
2. Hector Garcia-Molina, Jeffery D. Ullman, Jennifer Widom, “Database system Implementation”
3. Thomas M.Connolly Carolyn Begg, Database Systems: A practical Approach to Design, Implementation and Management, 4/e.

***Suggested List of Experiments:***

LAB	Topic / Activity	Explanation of Activity
Lab1	SQL Programming	Case study on Professional and Commercial Databases: Summary and Comparison
Lab2	Query Optimization	Simulate Query optimization by applying an SQL Query on any database.
Lab3	Query Monitoring	Implementation of Query monitor (QEP- Query Execution Plan, Query Statistics)
Lab4	Distributed Database Design	Perform Fragmentation (Range, List, Hash and Key) in DDBS design.
Lab5	Distributed Database Design	Implementation of Replication transparency in DDB
Lab6	Distributed Database Design	Implementations of two phase / three phases commit protocol.
Lab7	XML Programming	Query execution on XML database.
Lab8	Document Database	Data handing using JSON. (eg. Display user information from JSON file downloaded from Mobile)
Lab9	Spatial and Temporal Data Handling	Processing of Spatial and temporal data
Lab10	Case study	Case study on Database security issues and measures taken to handle those issues.

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1. "The Python Tutorial", <http://docs.python.org/release/3.0.1/tutorial/>
2. <http://spoken-tutorial.org>
3. [www.staredusolutions.org](http://www.staredusolutions.org)
4. <https://www.tutorialspoint.com/python/index.htm>

**Suggested experiments using Python:**

Expt No	Experiment Title
1	Exploring basics of python like data types (strings, list, array, dictionaries, set, tuples) and control statements.
2	Creating functions, classes and objects using python.
3	Menu driven program for data structure using built in function for link list, stack and queues.
4	Demonstrate exception handling.
5	Python program to explore different types of Modules
6	Demonstrate File handling and Directories <ol style="list-style-type: none"><li>a. Python program to append data to existing file and then display the entire file.</li><li>b. Python program to count number of lines, words and characters in a file.</li><li>c. Python program to display file available in current directory</li></ol>
7	Make use of RE module to perform text processing.
8	Creating GUI with python containing widgets such as labels, textbox, radio, checkboxes and custom dialog boxes.
9	Program to demonstrate CRUD (create, read, update and delete) operations on database (SQLite/MySQL) using python.
10	Implementation of simple socket programming for message exchange between server and client.
11	Make use of advance modules of Python like OpenCV, Matplotlib, NumPy
12	Creating web application using Django web framework to demonstrate functionality of user login and registration (also validating user detail using regular expression).

**Evaluation Scheme:**

***Practical and Oral(A):***

Oral & Practical examination will be based on the practical's performed during laboratory sessions.

1. Implementation:15 Marks
2. Oral:10 Marks

**Total :25 Marks**

***Continuous Assessment (B):***

***Term Work:***