

**Skills Enhancement Program (Blended Mode Internship)-2023**

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| <b>Name of Department</b>     | <b>Department of Computer Science and Engineering</b>  |
| <b>Module Name</b>            | <b>Data structures &amp; Data Retrieval techniques : Problem solving approaches</b>  |
| <b>Module Coordinators</b>    | 1) Dr. Ranjeet Kumar Singh<br>2) Prof. Jaimala Jha<br>3) Prof. Manisha Pathak<br>4) Prof. Giyasha Mishra   |
| <b>Module Objective</b>       | The course is designed to develop skills to design and analyze database retrieval techniques and simple linear, non-linear data structures. It strengthens the ability to the students to identify and apply the suitable data structure for the given real-world problem and also able to retrieve query from the database. It enables them to gain knowledge of algorithm design and practical applications of data storage data extraction techniques.  |
| <b>Module Content</b>         | Database concept, data model, SQL operators, Functions regular expression, data objects, Pointer, Pointer in Array, Pointer in String, Link List, Stack, Queue, Tree, Graph, Time Complexity Analysis, Asymptotic Notation, Divide and Conquer, greedy and dynamic programming.  |
| <b>Module Methodology</b>     | The workshop will start with theoretical concept of data, data type and their storage retrieval techniques. Further, Various SQL operations on single and multiple tables, data structure & their working, storage functionality will be discussed, finally time and space complexity analysis are shown for different algorithmic structure i.e. divide and conquer, greedy, etc....  |
| <b>Module Outcome/ Impact</b> | <ul style="list-style-type: none"><li>• Understand the basic concepts of Data, database, Models, Data storage, and their structure.</li><li>• Understand the basic concepts of SQL operations, linear and non-linear data structure, overview about machine learning.</li><li>• Able to identify the data structure to solve the various specific problem.</li><li>• Able to evaluate Time and Space complexity of different type of algorithm and program for a specific problem.</li><li>• Able to make database for any real world problem.</li><li>• Analyzed the performance of various data structure.</li></ul> |
| <b>Duration</b>               | 5 Weeks  |

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| <b>Day Wise Schedule</b> |             |              |  |  |
|--------------------------|-------------|--------------|--|--|
|                          | <b>Date</b> | <b>Day</b>   | <b>Module Contents to be covered/Interactive Session/Assignment/Quiz/Exercises/Daily practice sheets (DPP)/Tutorial/Project etc. (3:00 PM onward, 2-3 Hrs./ Day)</b>   | <b>Faculty</b>   |
| <b>Week 1</b>            | 17.05.2023  | Wed. to Fri. | <ol style="list-style-type: none"> <li>1. Introduction to database, database schemas, data models.</li> <li>2. Concepts of SQL, SQL Data Types, SQL Commands</li> <li>3. SQL TRANSACTIONS , SQL Views</li> </ol>   | Prof. Jaimala Jha<br>Prof. Manisha Pathak                            |
|                          | 18.05.2023  |              |  |  |
|                          | 19.05.2023  |              |  |  |
| <b>Week 2</b>            | 22.05.2023  | Mon to Fri   | <ol style="list-style-type: none"> <li>1. SQL Basic operators</li> <li>2. Regular expressions.</li> <li>3. SQL functions: Aggregate, Null, string, numeric.</li> <li>4. SQL Grant / Revoke Privileges</li> <li>5. SQL Trigger, Database objects</li> </ol>   | Prof. Jaimala Jha<br>Dr. Ranjeet Kumar Singh                         |
|                          | 23.05.2023  |              |  |  |
|                          | 24.05.2023  |              |  |  |
|                          | 25.05.2023  |              |  |  |
|                          | 26.05.2023  |              |  |  |
| <b>Week 3</b>            | 29.05.2023  | Mon to Fri   | <p>An Introduction to Data, Data type and pointer variable:</p> <ol style="list-style-type: none"> <li>1. Data Type</li> <li>2. Pointer in Array and String.</li> </ol> <p>Data Structure and Design:</p> <ol style="list-style-type: none"> <li>3. Stack, Queue</li> <li>4. Linked List</li> <li>5. Tree design and analysis</li> </ol> <p>Weekly Assignment, Quiz and discussing related placement Papers.</p> | Prof. Jaimala Jha<br>Dr. Ranjeet Kumar Singh<br>Prof. Giyasha Mishra |
|                          | 30.05.2023  |              |  |  |
|                          | 31.05.2023  |              |  |  |
|                          | 01.06.2023  |              |  |  |
|                          | 02.06.2023  |              |  |  |
| <b>Week 4</b>            | 05.06.2023  | Mon to Fri   | <p>Algorithm Design and Computational cost analysis:</p> <ol style="list-style-type: none"> <li>6. Introduction to Algorithm, Asymptotic Notation. Divide and Conquer approach.</li> </ol>   | Prof. Manisha Pathak<br>Prof. Giyasha Mishra                         |
|                          | 06.06.2023  |              |  |  |
|                          | 07.06.2023  |              |  |  |

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|   | 08.06.2023  |                  | Algorithm Design and Computational cost analysis:<br>7. Greedy and Dynamic Programming.<br>Weekly Assignment, Quiz and discussing related placement Papers. |   |
|   | 09.06.2023  |                  |   |   |
|   | 12.06.2023  | Mon<br>to<br>Fri | Machine Learning Algorithms   | Dr. Ranjeet Kumar Singh<br>Prof. Manisha Pathak |
|   | 13.06.2023  |                  |   |   |
|   | 14.06.2023  |                  |   |   |
|   | 15.06.2023  |                  |   |   |
|   | 16.06.2023  |                  |   |   |
| <b>Module Coordinators Email Id and Mobile Number</b> | 1)Dr. Ranjeet Kumar Singh- ranjeets@mitsgwalior.in (6201037963)<br>2)Prof. Jaimala Jha - jaimala.jha@mitsgwalior.in(9907313413)<br>3)Prof. Manisha Pathak- manisha.pits1995@mitsgwalior.in(9691206039)<br>4)Prof. Giyasha Mishra- jijyasagyasa@mitsgwalior.in(9584011118) |                  |   |   |

**Eligibility and Important Instructions:-**

1. The Online Skills Enhancement Program is designed only for Pre-final & Final Year students of MITS Gwalior.
2. The students may apply online.
3. The Skills Enhancement Program / Summer Internship Program is free for the participants of Pre-final & Final year students of MITS, Gwalior.
4. The participants outside the Institute may also join the Program on payment basis.
5. This online module will be conducted under the Skills Enhancement Program which will be considered equivalent to offline Internship of Pre-final year students who could not get any Internship during this situation.

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6. Duration of this program will be of four weeks which is equivalent to summer Internship period as per AICTE and our Institute policy. Daily no. of hours of online training may be flexible.
7. Certificates will be issued to candidates who have attendance 75% or more and also score more than 60% in the test.