<table>
<tr><td>No</td><td colspan="2">Information of IT- 31055</td></tr>
<tr><td>1</td><td>Unit name:</td><td>Data Structure</td></tr>
<tr><td>2</td><td>Code:</td><td>IT- 31055</td></tr>
<tr><td>3</td><td>Classification:</td><td>Subject Engineering</td></tr>
<tr><td>4</td><td>Credit value:</td><td>3</td></tr>
<tr><td>5</td><td>Semester/ Year Offered:</td><td>1/III</td></tr>
<tr><td>6</td><td>Pre-requisite:</td><td>NA</td></tr>
<tr><td>7</td><td>Mode of delivery:</td><td>Lecture, Exam, Practical, Tutorial</td></tr>
<tr><td rowspan="2">8</td><td>Assessment system and breakdown of marks:
Practical, Tutorial</td><td>Practical, Tutorial

20%</td></tr>
<tr><td>Mid-term/ Final Examination</td><td>80%</td></tr>
<tr><td>9</td><td>Academic staff teaching unit:</td><td>Department of Information Technology Engineering</td></tr>
<tr><td>10</td><td colspan="2">Course outcome of unit:
After completion of this semester, students will be able
1. To write a computer programming in algorithms what can be very difficult language to learn.
2. To memorize the fundamentals of programming in C++ with Algorithms.
3. To learn details of programming in Algorithms.
4. To explain new concepts and their application to real programming problems.</td></tr>
<tr><td>12</td><td colspan="2">Topic:
1. Course Introduction
The Role of Algorithms in Computing
• Algorithms
• Algorithms as a technology

2. Getting Started
• Insertion sort
• Analyzing algorithms
• Designing algorithms</td></tr>
</table>

3. Divide-and Conquer

- The maximum-subarray problem
- Strassen's algorithm for matrix multiplications
- The substitution method for solving recurrences
- The recursion-tree method for solving recurrences
- The master method for solving recurrences
- Proof of the master theorem

4. Heapsort

- Heaps
- Maintaining the heap property
- Building a heap
- The heapsort algorithm
- Priority queues

5. Quicksort

- Description of quicksort
- Performance of quicksort
- A randomized version of quicksort
- Analysis of quicksort

6.Sorting in Linear Time

- Lower bounds for sorting
- Counting sort
- Radix sort
- Bucket sort

7.Elementary Data Structures

- Stacks and queues
- Linked lists
- Implementing pointers and objects
- Representing rooted trees

	8.Binary Search Trees • What is a binary search tree? • Querying a binary search tree • Insertion and Deletion • Randomly built binary search trees
13	Main references: Fundamentals of Data Structures in C++, Ellis Horowitz , Sartaj Sahni, Dinesh Mehta IT-31055: Introduction to Algorithm , The course covers the fundamental of programming in C++ with Algorithms. The course introduce students to very simple programming examples and working.
14	Additional references: Fundamentals of Data Structures in C++, Ellis Horowitz , Sartaj Sahni, Dinesh Mehta Fundamentals of Data Structures in C++, Algorithms