BSc(Hons) Multimedia Computing

PE424001 Algorithm and Data Structure

| Date | Topic |
|---|---|
| 22-Feb-2021 | Introduction & programming fundamental |
| 26-Feb-2021 | Data Structure: Stacks & Queues |
| 1-Mar-2021 | Data Structure: Lists & Graphs |
| 5-Mar-2021 | Data Structure: Trees |
| 8- Mar -2021 | Algorithm: Searching & Sorting |
| 12-Mar-2021 | Algorithm: Recursion |
| 15-Mar-2021 | Algorithm: Greedy algorithm |
| 19-Mar-2021 | Time and space complexity |
| 22-Mar-2021 | Asymptotic notation |
| 26-Mar-2021 | Analysis of algorithms |
| 31-Mar-2021 (Exam) | 2 hours Examination |

Assignment 1 Deadline: 15 Mar 2021

Assignment 2 Deadline: 31 Mar 2021

**Learning Contents and Indicative Contact Hours:**

| Learning Contents | Indicative Contact Hours |
|---|---|
| **1.** Data Structures<br>- Lists<br>- Trees<br>- Stacks<br>- Queues<br>- Self-balancing trees<br>- Graphs | **12 hours** |
| **2.** Algorithms<br>- **Searching and sorting**<br>- **Recursion (Divide and Conquer strategies)**<br>- **Greedy algorithm** | **9 hours** |
| **3. Complexity and Efficiency**<br>- **Time and space complexity**<br>- **Asymptotic notation: Big-O, Big-**$\Omega$ and Big-$\Theta$<br>- **Analysis of algorithms**<br>- **The Best, Average and Worst Cases** | **9 hours** |

**Mapping of Learning Contents with Intended Learning Outcomes:**

| | Learning Contents | Intended Learning Outcomes |
|---|---|---|

| | | 1 | 2 | 3 |
|---|---|---|---|---|
| 1 | Data Structures | | ✓ | |
| 2 | Algorithms | ✓ | ✓ | ✓ |
| 3 | Complexity and Efficiency | ✓ | | ✓ |

**Learning and Teaching Strategies:**

This module is delivered through a mixture of lectures and labs. Theoretical concepts will be illustrated with concrete examples during lectures. Labs are integrated throughout the module to reinforce students' learning in the lectures. The lab exercises associated with this module will require students to demonstrate an ability to apply methods and techniques as well as the ability to understand concepts. Students are also encouraged to take part in self-learning and continuous learning to keep themselves up-to-date of the new technologies and trends in the field of information technology.

**Assessment Scheme:**

| | |
|---|---|
| **Continuous Assessment (CA)**<br>***Assignments*** | **50%** |
| **End-of-Module Assessment (EA)**<br>***One Final Examination*** | **50%** |
| **Total** | **100%** |

**Pass Requirement:**

40% of Total Marks

**Requirements for Supporting Tools:**

In order to perform the lab exercises, resources such as Java SE SDK, NetBeans, Eclipse, Visual C++ Express and related software of the up-to-date version are required.

**Essential Reading:**


1. Cormen, T., Leiserson, C., Rivest, R. and Stein, C. (2009), Introduction to Algorithms, MIT press


**Recommended Reading:**

**Java Stream:**


1. Collins, W. (2011). Data Structures and the Java Collections Framework (2nd ed), John Wiley & Sons.
2. Horstman, C. (2013). Big Java (5th ed), Wiley.


**C++ Stream:**


3. Mark A. (2013). Data Structures & Algorithm Analysis in C++, Pearson.
4. Main, M. and Savitch, W (2010). Data Structures and Other Objects using C++, Addison-Wesley.


**C Stream:**


5. Mark A. Weiss(1996). Data Structures and Algorithm Analysis in C, Addison-Wesley.
6. Brian W. Kernighan, Dennis M. Ritchie (1988) .The C Programming Language, 2nd Edition, Prentice Hall.