## A COURSE MODULE DESCRIPTOR FORM

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| Module Information | | | |
| **Course Module Title** | **Data Structures** | | |
| **ناوى کۆرس مۆدیول** | بنچینەكانى شێوەى پێكهاتنى | | |
| **عنوان الوحدة** | هياكل البيانات | | |
| **Course Module Type** | Core | **Module Code** | IT104 |
| **ECTSs** | 5 | | |
| **Department** | Information Technology Department | | |
| **Department Code** | IT | | |
| **Module Website (CMW)** | https://lms.noble.edu.krd | | |
| **Module Leader (ML)** | Murthad Hussein Sabri | | |
| **NTI - E – mail** | marthed.hussain@edu.krd | | |
| **ML Acad. Title** | Asst. Lect. | | |
| **ML ORCID** | 0000-0003-3705-7062 | | |
| **ML Google Scholar Acc** | https://scholar.google.com/citations?user=2OKNS34AAAAJ&hl=en | | |

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| Relation with Other Modules | | |
| **Pre-requisites** |  |
| Module Aims, Learning Outcomes and Indicative Contents | | |
| Module Introductory Description | The Data Structures course cover the key ideas involved in designing algorithms. We shall see how they depend on the design of suitable data structures, and how some structures and algorithms are more efficient than others for the same task. We will concentrate on a few basic tasks, such as storing, sorting and searching data, that underlie much of computer science, but the techniques discussed will be applicable much more generally. |
| Module Aims | The course objectives can be listed as follows:  • Understand dictionary/search data structures (lists, trees, has tables).  • Understand graph representations and algorithms.  • Understand time and space analysis for both iterative and recursive algorithms and be able to prove the correctness a non-trivial algorithm. Be able to translate high-level, abstract data structure descriptions into concrete code.  • Understand how real-world problems map to abstract graph problems.  Be able to communicate clearly and precisely about the correctness and analysis of basic algorithms (both oral and written communication). |
| Module  Learning Outcome | * By the end of the course, students should be able to: * Have a wide knowledge about different types of currently used data structures applications. * they may encounter in real life problems. * Understand the working mechanism of each data structure and the used methods to contain data |
| Learning and Teaching Strategies | | |
| **Strategies** | • Data Show  • Whiteboard  • Laser pointer  • Slides  • Group Work  • Practical Sessions  • LAB Sessions   * Assignments   video learning, working on projects, student center (presenting seminars by students), scientific trips to telecommunication companies, letting students become an assistant at lab. |

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| **Required texts and References** |
| * **Data Structure Through C++, G.S. BALUJA.** * **Data Structure Using C++ 2, D.S.Malik.** * PowerPoint presentation lecture notes prepared by lecturer |

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| Module Delivery | |
| **Total workload** | |
| **Contact Theoretical Hours – Per semester** | 135 hours |
| **Contact Practical Hours – Per Semester** | - |

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| Module Assessment | | | |
| **Module Activities** | **Time /Number** | **Weight (Marks)** | **Week Due** |
| Contact hours - Participation | 1 | 5% | All the weeks |
| (Science / Lab)  (Social science / Critical thinking) | 1 | 5% | 4 |
| Presentation /  Seminar | 1 | 5% | 6 |
| Tutorial | 1 | 5% | 5 |
| Quiz | 3 | 5% | 3,6,8, |
| Midterm Exam | 1 | 20% | 8 |
| Self-study | 1 | 5% |  |
| Projects | 1 | 5% | 10 |
| Oral assessment | 1 | 5% | 12 |
| Final Exam | 1 | 40% | 15 |
| **Total** |  | 100% |  |

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| Delivery Plan (Designed Syllabus) | |
|  | **Course Module Content** |
| Week 1 | Introduction |
| Week 2 | Data Structures , concept of Abstract Data Types (ADTs) |
| Week 3 | Arrays |
| Week 4 | Stacks, insertion , delectation. |
| Week 5 | Queues insertion , delectation |
| Week 6 | Linked Lists insertion , delectation |
| Week 7 | Linear Search |
| Week 8 | Binary Search |
| Week 9 | Sorting – Bubble |
| Week 10 | Insertion sort |
| Week 11 | Selection sort |
| Week 12 | Quick Sort |
| Week 13 | Radix Sort Algorithm |
| Week 14 | Linear vs Non-Linear |
| Week 15 | **Final Exam** |

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| Course Keywords |
| Data, Array, Sort, Bubble, Searching, Sorting. |