F28SG Introduction to Data Structures & Algorithms

COURSE DETAILS
Course Code: F28SG
Full Course Title: Introduction to Data Structures & Algorithms
SCQF Level: 8
SCAF Credits: 15
Available as Elective: No

DELIVERY LEVEL
Undergraduate: Yes  Postgraduate Taught: No  Postgraduate Research: No

Additional Information:
Course being delivered at the specified campus(es) and also by a collaborative partner; Ocean University of China on BEng Robotics programme

COURSE AIMS
To develop further skills and techniques in programming in a high-level language. The ability to construct data structures in a high level language, and implementation algorithms over these data structures.

LEARNING OUTCOMES – SUBJECT MASTERY
- To understand properties of and algorithms for fundamental static, dynamic and linked data structures
- To know when to deploy fundamental data structures and algorithms in practical problem solving
- To gain mastery of fundamental linear and recursive programming techniques
- To know when to deploy linear and recursive programming techniques in practical problem solving
- To understand fundamental techniques for processing very large data sets from files
- To gain skill in elementary analyses of fundamental algorithms and data structures to give insight into their time and space complexity bounds
- To understand correspondences between different programming techniques
- To understand correspondences between different data structures and algorithms
- To make effective usage of version control in software development tasks

LEARNING OUTCOMES – PERSONAL ABILITIES
- To understand how the choice of algorithms and data structures determines the efficacy of proposed solutions to problems
- To be able to explain the implications of choosing particular algorithms and data structures for the time and space behaviour of solutions.

SYLLABUS
- static structures – arrays
- linear techniques e.g. search, delete, update
- dynamic structures - stacks & queues
- recursive techniques – linear recursion, accumulation recursion
- sorting & searching e.g. binary search, linear sorting, divide and conquer sorting
- linked structures – lists and trees: construction, traversal, delete, update
F28SG Introduction to Data Structures & Algorithms

- introductory complexity & "big O" notation
- introduction to parallelism and concurrency

### COURSE RELATIONSHIPS

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<tr>
<th>Course Code</th>
<th>Level</th>
<th>Title</th>
<th>School</th>
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<td>7</td>
<td>Software Development 1</td>
<td>School of Math and Comp Sci.</td>
<td>Pre-Requisite</td>
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<td>F27SB</td>
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<td>Software Development 2</td>
<td>School of Math and Comp Sci.</td>
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### LOCATION AND ASSESSMENT METHODS

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ALP - Assessment is 100% examination. Summative coursework will be assessed by the ALP and moderated by HWU. All summative coursework must be completed to a satisfactory standard (Grade D) for a student to pass the course but will not form part of a student’s final grade.