Northeastern University London

Discrete Structures Course Descriptor

Course code	LCSCI4212	Discipline	Computer & Data Science
UK credit	15	US credit	4
FHEQ level	4	Date approved	November 2022
Core attributes	Conducting Formal and Quantitative Reasoning (FQ)		
Pre-requisites	None		
Co-requisites	None		

Course Overview

This course introduces discrete structures that form the foundation of computer science. Learning starts with an understanding of mathematical notation, logic, and sets. Students then study proof techniques, combinatorics (counting), probability, asymptotic notation, recurrences, and an introduction to graph theory. By the end of this course, students will have become familiar with a number of discrete structures that are used throughout computer and data science.

Learning Outcomes

On successful completion of the course, students will be able to:

Knowledge and Understanding

K1a	Demonstrate knowledge and understanding of number representations, logical formulas, algorithms and data structures; and how to use them correctly in the context of a computer program.
K2a	Demonstrate knowledge and understanding of the underlying concepts and mathematical techniques (e.g., counting or sums) to analyse the complexity of algorithms.
K3a	Identify which data structures and algorithms are best suited to solve a typical data processing problem

Subject Specific Skills

S1a Identify the technical, social and management dimensions of algorithms, their correctness and complexity, in real-world applications.

S3a Evaluate basic data structures, algorithms and logical operations in existing software and interpret qualitative or quantitative results.

Transferable and Employability Skills

T1a Communicate results (e.g., complexity of basic data structures and algorithms) accurately with structured and coherent arguments in written reports.

T3a Display a developing technical proficiency in written English and an ability to communicate clearly and accurately in structured and coherent pieces of writing..

Teaching and Learning

This course has a dedicated Virtual Learning Environment (VLE) page with a syllabus and range of additional resources (e.g. readings, question prompts, tasks, assignment briefs, discussion boards) to orientate and engage students in their studies.

The scheduled teaching and learning activities for this course are:

- **Lectures/labs**. 40 scheduled hours – typically including induction, consolidation or revision, and assessment activity hours:
    - Version 1: All sessions in the same sized group, or
    - Version 2: most of the sessions in larger groups; some of the sessions in smaller groups

Faculty hold regular ‘office hours’, which are opportunities for students to drop in or sign up to explore ideas, raise questions, or seek targeted guidance or feedback, individually or in small groups.

Students are to attend and participate in all the scheduled teaching and learning activities for this course and to manage their directed learning and independent study.

Indicative total learning hours for this course: 150

Assessment

Both formative and summative assessment are used as part of this course, with purely formative opportunities typically embedded within interactive teaching sessions, office hours, and/or the VLE.

Summative Assessments

AE:	Assessment Activity	Weighting (%)	Duration	Length (words)
1	Set Exercises	50	24-32 hours	
2	Exam	30	75 min.	
3	Role Play	20	8-16 hours	

Further information about the assessments can be found in the Course Syllabus.

Feedback

Students will receive formative and summative feedback in a variety of ways, written (e.g. marked up on assignments, through email or the VLE) or oral (e.g. as part of interactive teaching sessions or in office hours).

Indicative Reading

Note: Comprehensive and current reading lists are produced annually in the Course Syllabus or other documentation provided to students; the indicative reading list provided below is for a general guide and part of the approval/modification process only.

- Harriet Fell and Javed Aslam. 2017. *Discrete Structures*. Cognella Academic Publishing
- Kenneth H. Rosen. 2019. *Discrete Mathematics and its Applications* (8th edition). McGraw-Hill.

Indicative Topics

Note: Comprehensive and current topics for courses are produced annually in the Course Syllabus or other documentation provided to students; the indicative topics provided below are used as a general guide and part of the approval/modification process only.

- Computing (i.e., number representations, circuits, and logic)
- Combinatorics (i.e., sets, counting, and probability)
- Algorithmic analysis (i.e., sequences, series, sums, recurrences, induction, and growth of functions)
- Graph algorithms

Version History

Title: LCSCI4212 Discrete Structures **Approved by: Dr Alison Statham** **Location: academic-handbook/programme-specifications-and-handbooks/undergraduate-programmes**					
Version number	**Date approved**	**Date published**	**Owner**	**Proposed next review date**	**Modification (as per AQF4) & category number**
1.0	November 2022	January 2023	Dr Alexandros Koliousis	November 2027	