

<b>Module code</b>	DSB706	<b>Level</b>	7
<b>Module title</b>	<b>Coding</b>	<b>Credit value</b>	20
<b>Programme(s) on which the module is taught</b>	MSc Data Science in Business	<b>ECTS Credits</b>	10
		<b>Notional learning hours</b>	200

### 1. Pre-requisite modules

None.

### 2. Module aims and objectives

In a world where a robust digital presence is key, learning the fundamentals of computer programming can help improve the online experience and allow functionality and application for end users. Coding can help improve communication and enhance productivity among business teams. By increasing your tech literacy, you will develop skills in problem solving that will prove an advantage in many business scenarios. Your understanding of the fundamentals coding will make it easier for you to support other teams in the business evaluate various digital tools, and assist them with web development. This course will cover the essential building blocks of programming, data types, data structures, control flow and object-oriented design and how to write stimulating and useful programs that can benefit business efficiency. Other key concepts covered in this course include algorithms, recursion and dynamic programming. You will be introduced to a programming language such as Python to explore the basic components of computer programming. The course will include workshops with hands-on activities that start from basics while helping you grasp the fundamentals of the programming language and gradually move to developing more complex systems.

### 3. Learning outcomes

Upon successful completion of this module, you will be able to:

- LO 2: Analyse and critically evaluate complex situations to solve problems, using data.
- LO 4: Create flexible, innovative data-driven solutions for strategic objectives.
- LO 5: Apply creative and relevant methods, production skills and technical competencies, understanding the processes at the forefront of practice.
- LO 6: Apply effective interpersonal communication skills in a range of complex and specific contexts.
- LO 8: Manage working and delivering as part of a team for successful outcomes.
- LO 9: Negotiate the ethical, legal and regulatory dimensions of data analysis, to deliver sustainable outcomes.

### 4. What you will do on this module

This module will introduce you to the key terminologies for programming, familiarising you to the process of designing and developing applications using programming languages such as Python. This includes understanding fundamental programming concepts such as how algorithms and how they are used in problem solving and how techniques like recursive programming and dynamic

programming can make the algorithms run in an efficient way. You will also be introduced to a technique called object-oriented programming, which is a method for modelling your real-life problem in a computer program. You will learn to identify key components of software design and the development process, and to analyse factors to develop relevant solutions while adhering to ethical and legal regulations. You will learn to communicate with code which is a key skill in any business. Coding is another language and it allows you to communicate and engage with other developers from around the world. You will have a better understanding of how technology works as most is based on code, and you will be able to apply it in future business scenarios as organisations adopt more emerging technologies.

## 5. Learning and teaching methods

This module employs a flipped learning approach which engages students through experiential learning and a hands-on experience.

In addition, the following learning and teaching methods are employed:

- Seminar/Lab sessions
- Self-directed online exercises
- Case study group work
- Discussion forums
- Guest speakers

The notional learning hours for this module are:

20 credit module – 200 learning hours	
<b>Directed learning</b>	<b>44 hours</b>
Workshops / Classes	44
<b>Collaborative Learning</b>	<b>6 hours</b>
Tutorials (1:1 and group) and asynchronous interaction	6
<b>Self-directed learning</b>	<b>150 hours</b>
Self-Directed learning (pre & post class)	75
Preparation for assessment, response to feedback and summative assessment	75
<b>Total</b>	<b>200 hours</b>

## 6. Assessment and relative weightings

You will have two summative assessments, both of which have a formative component. Formative assessment will be in the form of peer assessment and feedback.

### Summative Assessment 1: Group work (40% TMM)

As a group, design and implement a program such as a brain or logic problem solving puzzle like sudoku. The program needs to apply your knowledge in data-structures, algorithms and techniques for efficient computations.

### Formative Assessment 1

You will have the opportunity to get group feedback on the design of your program.

### Summative Assessment 2: Individual work, 2500-word Report (+/- 10%) (60% TMM)

Write a 2500-word report on the design and process of your group program and critically reflect on the learning experience, and how you applied programming concepts and techniques.

### Formative Assessment 2:

You will get the opportunity to submit a draft copy of your report for feedback

7. Mapping of assessment tasks for the module									
Assessment tasks	Programme Learning Outcomes								
	1	2	3	4	5	6	7	8	9
Assessment 1: Group work	n/a	x	n/a	x	x	x	n/a		
Assessment 2: Report	n/a		n/a				n/a	x	x

### 8. Key reading

#### Core Textbooks:

Gutttag, John (2021) *Introduction to Computation and Programming Using Python (With Application to Computational Modelling and Understanding Data)*, 3rd edition, The MIT Press

Matthes, Eric (2019) *Python Crash Course A Hands-On, Project-Based Introduction to Programming*, 2<sup>nd</sup> edition, Penguin Random House Group

#### Additional Reading:

Erich Gamma, E., Helm, R., Johnson, R and Vlissides, J. (1994) *Design patterns: elements of reusable object-oriented software*, Addison Wesley

#### Other Resources:

Stack Overflow - <https://stackoverflow.com>

Github <https://github.com/caiodabarbosa/tensflow>