MODULE DESCRIPTIONS

COMPUTATIONAL THINKING FOR PROBLEM SOLVING

Efficient and effective problem solving is a skill that is of benefit to any individual in his/her everyday life. In the field of computing, problem solving is a vital skill that every computer programmer requires. This module introduces computational thinking as a systematic approach to problem solving with the solution expressed in such a way that it can be carried out by a computer. This module covers the four pillars of computational thinking, namely, decomposition, data representation and abstraction, pattern recognition, and algorithms, as well as how computer scientists create and analyse algorithms. Students will be exposed to a variety of problem scenarios which will highlight the various ways of finding a solution to a problem. No computer programming skills are required as all examples will be approached in an "unplugged" way and solved by hand. The module will be useful to students from diverse fields by offering a systematic way of approaching problem solving, but especially to those intending to study computer programming. Skills developed in this module, such as logic and decomposition, will certainly facilitate understanding of the "Introduction to Programming and Program Design" module for the Higher Certificate qualification.

FUNDAMENTALS OF INFORMATION TECHNOLOGY

The increased importance and global reach of computing technology in today's society was the basis for the emergence of the information technology discipline. Information Technology is the study of systemic approaches to select, develop, apply, integrate, and administer secure computing technologies to enable users to accomplish their personal, organizational and societal goals. This module provides an overview of the discipline of IT, and how it relates to other computing disciplines. The goal is to help students understand the diverse contexts in which IT is used and the challenges inherent in the diffusion of innovative technology.

FUNDAMENTALS OF OBJECT-ORIENTED ANALYSIS AND DESIGN

This module provides students with a general understanding of the object-oriented approach to software analysis and design and develops their ability to apply object-oriented techniques that are commonly used for the analysis and specification of solution requirements. The analysis phase of systems development focuses on what the proposed system must be able to do. Students learn how to identify solution requirements based on 'objects', which are the real-world entities that the system will interact with. During object-oriented design, concepts identified in the analysis phase are mapped on to the implementing classes and interfaces, resulting in detailed models that describe how the system is to be built. The Unified Modelling Language (UML) is used to model the system requirements, supporting communication between designers, developers and other stakeholders.

INFORMATION SECURITY FOR IS PRACTITIONERS

The field of Information Security is becoming more important due to increased reliance on computer systems, the Internet and wireless network standards such as Bluetooth and WiFi, as well as the growth of "smart" devices, including smartphones, televisions, and the various devices that constitute the "Internet of Things". The aim of this module is to equip students with a sound knowledge of the underlying principles of information security and to provide them with the skills needed to analyse and evaluate information security problems. The student will also learn how to ensure that correct practices are incorporated regarding application security within the code. The student will be able to identify and deal with threats we face in the modern world and to apply various techniques to protect a network.

INTRODUCTION TO DATABASES

Information and raw data are the life blood of the various computing disciplines, either for their use in creating a solution to a given problem, or for storing after having been generated by information systems and other computational applications. As such algorithms for the efficient and effective collection, transformation, storage, access and updating of data, as well as for the representation, organization and presentation of the resulting information, constitute vital knowledge for computing professionals. Relational databases, which rely on the use of structured tables to store data, have traditionally been used for data storage. However, with the ever-increasing volume of data needed to be processed and stored by information systems, non-traditional, unstructured alternatives have recently become more popular. The main aim of this module is to introduce students to the theoretical concepts of databases as well as provide practical experience in designing and extracting information from both relational and semi-structured databases. This module introduces fundamental database concepts related to the design and creation of relational databases, as well as the extraction of information in the form of query building using SQL (structured query language). Also covered in the module are considerations of transactional processing and security of databases as well as an introduction to non-relational database models using XML to apply the theoretical concepts in semi-structured databases. Having completed this module, students will be able to manipulate a variety of databases, as well as design, implement and manage a database system.

STADIO is registered with the Department of Higher Education and Training as a private higher education institution under the Higher Education Act, 1997. Registration Number 2008/HE07/004.
DISCLAIMER: The content of this brochure is accurate at the time of publication. STADIO reserves the right to change the programme content due to changes in legislation, as well as for market requirements and other reasons. Notice of such changes will be published on our website.

HIGHER CERTIFICATE IN SOFTWARE DEVELOPMENT (SF)

INTRODUCTION TO PROGRAMMING AND PROGRAM DESIGN

Efficient and effective problem solving is a skill that is of benefit to any individual in his/her everyday life. In the field of computing, problem solving as well as familiarity with computer programming concepts, development of computer programs, and the syntax and semantics of programming languages are fundamental to successful software development. This module first introduces computational thinking as a systematic approach to understanding and solving a problem in such a way that the solution can be carried out by a computer. Thereafter, all aspects of software development are covered, including, creating an algorithm, coding this algorithm to develop a program, debugging and executing the program, and finally, testing the program. The main focus of the module is on the programming aspect, where students will be exposed to the Python programming language, from the basic programming constructs (sequencing, decisions and looping) and data structures (such as simple types and lists) to more advanced constructs (such as the use of functions) and more complex data structures (such as dictionaries).
The module will be useful to students from diverse fields in that it offers a systematic way of approaching problem solving and then creating a solution that can be executed by a computer. No prior programming experience is required to complete this module. Students will be taken from first principles to being able to develop a non-trivial Python program.

INTRODUCTION TO WEB PROGRAMMING

With the ever-growing demand for availability of application programmes on the Web, the inclusion of a module on the development of these applications is essential in an IT programme. The aim of this module is to lay a solid foundation in the discipline of developing application software for the web. The student will gain a breadth of knowledge about the development platforms and underlying technology, as well as the range of methods, tools, and techniques utilized in developing web applications. The student will also gain practical experience in developing applications for the web. The first part of the module focuses on important client-side and limited server-side interaction aspects of the Web. The aim is to provide practical training in the design and creation of usable Web pages. Although only introductory client-side programming is covered, students will be given meaningful exposure to more advanced topics such as HTML hand-coding, Cascading Style Sheets (CSS), JavaScript programming, designing Web pages and sites with good usability, and graphics file formats, their manipulation and preparation. The second part of the module covers the development of more dynamic Web-based applications centered around the manipulation of data stored in online databases.

SOFTWARE DEVELOPMENT PROJECT

This module makes use of a software development project to integrate the practical and theoretical knowledge that students have acquired in the corequisite modules listed above. Student teams will be expected to prepare, maintain and follow a basic project management plan; maintain relevant documentation relating to the analysis, design, development, and coding and testing phases of the project; and present their final software product for assessment. Each team member will assume each of the roles of project manager, analyst, designer, developer, and tester at least once during the project. The final group projects will include an appendix documenting the students' experience of each stage of the project, and discussing any issues relating to e.g. privacy, data security, ethics, or social impact that could affect users of the system.

SOFTWARE ENGINEERING

Software engineering is the use of an organized and regulated approach for the design, development, testing, documentation and maintenance of software by applying principles from engineering, project management, computer science, programming, cost management and other areas.
The Software Engineering module specifically aims to lay a solid foundation in the discipline of developing and maintaining software systems that behave reliably and efficiently, are affordable to develop and maintain, and satisfy all the requirements that customers have defined for them. The student will acquire broad knowledge about the Software Engineering process and the range of methods, tools, and techniques utilised, illustrated by means of a variety of case studies.
Skills in the practical application of methods and techniques and the use of software development platforms and tools, will mostly be acquired through the 20 credit Software Development Project module. In particular, students will obtain practical guidance on elicitation and feedback techniques within a project environment.

TECHNOLOGY AND SOCIETY

The cyber world is a world with countless interactions in different forms. Online interaction has become part of our daily routine and it presents a number of challenges to both developers, owners and users. Given the different types of personal and corporate data that can be generated, it is important to establish awareness of possible ethical contraventions in which we can unintentionally participate. The development of new technologies also potentially poses threats to the livelihoods of many. Ethical behaviour by all stakeholders is crucial in sustaining the fair development and implementation of technologies. It is also important to ensure fair online interaction and the sharing of information. This module aims to establish an initial awareness of ethical issues in students as they start their studies in technology. It will assist with understanding the rights of people in the world of technology.

STADIO is registered with the Department of Higher Education and Training as a private higher education institution under the Higher Education Act, 1997. Registration Number 2008/HE07/004.
DISCLAIMER: The content of this brochure is accurate at the time of publication. STADIO reserves the right to change the programme content due to changes in legislation, as well as for market requirements and other reasons. Notice of such changes will be published on our website.