**Modules Catalogue: DL836 – BSc (Honours) in Creative Computing**

Erasmus students can study either year 2 for the full academic year or semester 1, or year 3 semester 1.

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| **YEAR**  | **MODULE TITLE** | **ECTS** | **SEMESTER**  | **MODULE AIMS / LEARNING OUTCOMES** |
| 2 | **Interaction Design** | 5 | Semester 1 | The aim of this module is to introduce learners to interaction design fundamentals and the range of methods used for designing interfaces between computers and humans, and evaluating such interfaces. On successful completion of this module, the learner will be able to:1. Explain the main concepts of interaction design.
2. Apply best practice interaction design principles to a prototype interface.
3. Design an interface using appropriate principles and tools.
4. Evaluate an interface using appropriate heuristics.
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| 2 | **Creative Coding I** | 5 | Semester 1 | The aim of this module is to provide the student with an introduction to the application of real-world mathematics and physics to object-oriented environments and develop object-oriented programming concepts needed to model and simulate real world scenarios.On successful completion of the module, the learner will be able to:1. Identify and describe the role of mathematics and physics in the process of modelling, visualising and animating data and phenomena.
2. Solve a range of fundamental mathematical problems, using a given set of mathematical rules and techniques.
3. Apply the appropriate laws of motion and programming techniques to model, visualise and animate data and phenomena using object-oriented programming principles.
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| 2 | **Web Design Frameworks** | 5 | Semester 1 | The aim of this module is to introduce learners to the processes involved in implementing contemporary Web Design frameworks and pre-processing strategies to create responsive web designs.On successful completion of this module, the learner will be able to:1. Design and develop responsive web page layouts using best practice frameworks for client-side front end design.
2. Apply an appropriate visual design language and/or system through HTML and CSS.
3. Demonstrate an understanding of advanced/pre-processing CSS methods when implementing responsive web design solutions.
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| 2 | **Advanced Web Development** | 10 | Semester 1 | The aim of this module is to improve students' knowledge and skills in relation to the development and testing of web applications, and provide students with the understanding, skills and competencies to use server-side web application frameworks.On successful completion of this module, the learner will be able to:1. Explain the principles of server-side Web Application Frameworks.
2. Design, develop, test and debug a web application using a server-side web application framework.
3. Document, explain and defend the design and implementation of web applications.
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| 2 | **Advanced Databases** | 5 | Semester 1 | The aim of this module is to build upon and improve students’ knowledge and skills in relation to database design; provide students with the skills and competencies to design, model, develop, test, and document advanced databases; and explore non-relational data design models and latest techniques of data management.On successful completion of this module, the learner will be able to:1. Design and develop a Relational Database from a set of requirements using Data Definition Language queries.
2. Manipulate data using Data Manipulation Language queries.
3. Use advanced queries for a range of database functions.
4. Compare multiple types of data models including non-relational databases.
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| 2 | **User Experience Design** | 5 | Semester 2 | The aim of this module is to introduce learners to the user experience (UX) design lifecycle, and the range of methods used for gathering requirements, designing an artefact to solve a UX problem, and evaluating the solutions. On successful completion of this module, the learner will be able to:1. Explain the main concepts of user experience (UX) design with particular emphasis on human-centred approaches.
2. Conduct research and construct a persona and scenario for a UX project.
3. Design an artefact to represent and communicate a potential solution to a UX problem.
4. Evaluate a solution to a UX problem with real users.
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| 2 | **Creative Coding II** | 5 | Semester 2 | The aim of this module is to provide the student with an introduction to the Data Visualisation and Statistics, and building on more advanced techniques in object-oriented programming such as inheritance and polymorphism.On successful completion of the module, the learner will be able to:1. Identify and describe the role of statistics in the evaluation and classification of data.
2. Demonstrate a range of data visualisation methods, using OOP programming principles and using array methods to filter and manipulate data.
3. Apply the appropriate statistical calculations to a dataset and Implement a visual output to evaluate the data.
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| 2 | **Software Project** | 10 | Semester 2 | The aim of this module is to provide students with the opportunity to develop their skills and competencies in relation to the specification, design, development and testing of software applications.On successful completion of this module, the learner will be able to:1. Apply project management principles and practices to manage a software project.
2. Analyse users’ software needs and define the requirements for a software project.
3. Apply object-oriented design techniques to define a software project.
4. Produce a software application, demonstrating competence in programming, debugging, testing and deploying a software program.
5. Demonstrate professional report writing skills.
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| 2 | **Architecture + Operating Systems** | 5 | Semester 2 | The aim of this module is to provide students with the theoretical and applied knowledge of computer platforms, including architecture and operating systems concepts.On successful completion of this module, the learner will be able to:1. Explain the fundamental principles of computer architecture and operating systems
2. Demonstrate knowledge of processes and threads and the related issues that arise within operating systems and applications
3. Discriminate between different forms of memory and memory management techniques
4. Prepare and execute command-line operations to control and manipulate an operating system.
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| 2 | **Elective Module** | 5 | Semester 2 | The aim of this module is to:* provide the learner with an opportunity to study outside of their normal discipline and to encounter a range of practices, themes, ideas, creative and critical approaches which are new to them.
* allow learners to work with students and staff from across the Faculty, to collaborate and encounter new areas of study.
* provide professional development, networking and learning opportunities with peers and lecturing staff from across the Faculty.
* gain a basic level of proficiency in a specified practical skill through workshops **OR** develop their critical understanding of disciplines in the Faculty and the associated research skills through lectures and seminars.

On successful completion of this module, the learner will be able to:1. Identify key concepts and approaches to work in a discipline
2. Research the historical and cultural context for their project.
3. Develop a project that demonstrates proficiency in a specified skill OR a critical understanding of a new discipline.
4. Maintain a reflective journal of work undertaken and knowledge / insight gained.
5. Present final project work.
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| **YEAR**  | **MODULE TITLE** | **ECTS** | **SEMESTER**  | **MODULE AIMS / LEARNING OUTCOMES** |
| 3 | **Networks + Cloud Computing** | 10 | Semester 1 | The aim of this module is to provide:* a foundation in computer networks theory.
* practical examples of network implementations.
* students with the understanding, skills, and competencies to deploy, test, and manage cloud applications.

On successful completion of this module, the learner will be able to:1. Explain how computer networks operate.
2. Describe different network protocols used on different layers of the internet protocol stack.
3. Implement a network operating system and associated software
4. Develop client-server applications.
5. Deploy, test, and manage applications on several cloud computing platforms.
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| 3 | **Data Visualisation (Elective)** | 10 | Semester 1 | The aim of this module is to:* introduce the history, current debates and key practitioners in data visualisation.
* enable learners to apply the principles of data visualisation to the analysis, design and presentation of complex information in order to provide insights, clarity and meaning.
* create awareness of the role of data visualisation in a data-driven society and associated issues relating to truth, privacy and ethics.

On successful completion of this module, the learner will be able to:1. Identify and critically appraise the history of graphics, the work of key practitioners, and the emerging themes and critical debates relating to a data-driven society.
2. Understand the grammar of graphics and visualise data in one, two and higher dimensions.
3. Appreciate the role of geospatial analysis in data analysis and develop interactive map-based visualisations.
4. Present, test and critique the design of a selected data visualisation which may include audience feedback.
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| 3  | **Front-End Development (Elective)** | 10 | Semester 1 | The aim of this module is to provide students with:* the understanding, skills, and competencies to use front-end web application frameworks, in the design, development, and testing of web applications.
* an understanding of the latest state representation architectures and paradigms, and the skills needed to consume data using a Front-End framework.

On successful completion of this module, the learner will be able to:1. Develop a web application that consumes external data using application programming interfaces.
2. Explain the principles of front-end web application frameworks.
3. Design, develop and test a web application using a front-end framework.
4. Document, explain and defend the design and implementation of web applications built using a front-end framework.
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| 3 | **Interactive Graphics (Elective)** | 10 | Semester 1 | The aim of this module is to enable students to create, design and develop simulated interactive environments using a range of programming techniques and principles of computer simulated natural systems.On successful completion of the module, the learner will be able to:1. Implement code based Interactive graphic visualisations.
2. Evaluate and choose appropriate web based graphic libraries used in the development of interactive graphics.
3. Understand and apply concepts in mathematics and physics to digital simulations of natural systems.
4. Implement the principles that underpin object-oriented programming applied to visual simulations.
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| 3 | **Games Development (Elective)** | 10 | Semester 1 | The aim of this module is to:* introduce the core concepts of computer game.
* provide an overview of computer game genres, prototype development including techniques for building levels, interfaces and interactivity.
* identify project life cycle, game documentation and management skills specific to a multidisciplinary development team.

On successful completion of this module, the learner will be able to:1. Identify skills and competencies required for developing a game prototype within a multidisciplinary development team.
2. Appraise and Evaluate core game production concepts, different game development technologies, game genres and the management of game development process.
3. Outline and Produce game documentation requirements of a specification for a game product,
4. Enumerate, Integrate and Develop the digital artefacts and components required to develop a computer game prototype using appropriate technologies.
5. Examine and Evaluate game prototypes using appropriate technologies.
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| 3  | **Mobile Computing (Elective)** | 10 | Semester 1 | The aim of this module is to provide the students with the knowledge and skills required to:* design, implement, test and deploy mobile computing applications
* develop the student’s understanding of object-oriented programming techniques.

On successful completion of the module students will be able to:1. Define the components of a mobile computing platform.
2. Understand and apply object-oriented design principles to mobile app development.
3. Design, implement, test and debug object oriented mobile computing applications.
4. Apply the principles of user interface design for mobile computing platforms.
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**\* Elective modules in year 3: students will choose two elective modules. Modules will be offered subject to demand.**