MQF Level 7

CA7-11-21

Master of Arts in Product Design

Course Specification

Course Description

The Master of Arts in the Product Design programme develops the artistic and humanistic skills belonging to design culture together with the technical know-how that relates to production technology, materials, and manufacturing costs. It strives to meet the need of operating in a worldwide landscape of heightened competition where the designer can increase the value of a consumer product by creating innovation – in both aesthetics and usability – that takes advantage of available technologies and ever-changing consumer lifestyles.

Learners will build an improved critical capability to explore contemporary design languages, focus on experimentation with innovative inter-disciplinary technologies and materials from preliminary concept to finish, focus on developing sustainable production and consumption processes.

Programme Learning Outcomes

At the end of the programme the students are able to

1. *Evaluate and identify the appropriate representation and prototyping techniques through innovative materials and processes.*
2. *Appraise and justify the functional, performance and usability aspects in relation to the social and cultural phenomena related to design.*
3. *Identify the quantitative and qualitative data aspects of the discipline in order to pursue the profession at an international level or to pursue studies further.*
4. *Examine the essential contents of communication digital media, as well as through data processing and physical illustrations.*
5. *Master additional communication skills including those required for an audience of teachers or external subjects of different genres.*
6. *Analyse the social context of customer demands and be able to evaluate different design choices focusing on economic aspects, while also taking into account social, environmental and ethical consequences.*

Entry Requirements

Relevant degree

MQF Level 5 qualification and adequate professional experience are also considered.

Key Information

Awarding Body – MCAST

Accreditation Status – Accredited via MCAST's Self Accreditation Process (MCAST holds Self-Accrediting Status as per 1st schedule of Legal Notice 296/2012)

Type of Programme: Qualification

MQF Level	Examples of Qualifications	'Qualification' Minimum Credits Required	'Award' Credits Required
Level 8	Doctoral Degree Third Cycle Bologna Process	NA	NA
Level 7	Masters Second Cycle Bologna Process	90-120	Less than 30
	Post-Graduate Diploma	60	
	Post-Graduate Certificate	30	
Level 6	Bachelor[23]/Bachelor (Hons.)[24] First Cycle Bologna Process	180-240	Less than 180
Level 5	Short Cycle Qualification	120	Less than 60
	Undergraduate Higher Diploma	90	
	Undergraduate Diploma	60	
	Undergraduate Certificate	30	
	VET Level 5 Programme[25]	60-120	
Level 4	Pre-Tertiary Certificate	30	Less than 120
	VET Level 4 Programme[26]	120	
	MATSEC Certificate	NA	
Level 3	VET Level 3 Programme[27]	60	Less than 60
	General and Subject Certificate	NA	
Level 2	VET Level 2 Programme[28]	60	Less than 60
	General and Subject Certificate	NA	
Level 1	VET Level 1 Programme[29]	40	Less than 40
	General and Subject Certificate	NA	
Introductory Level A	Preparatory Programme	30	Less than 30
Introductory Level B	Pre-entry Basic Skills Course	30	Less than 30

Table 1: Minimum number of credits for 'Qualifications' and parameters for 'Awards'

Fig.1: p56, Ministry for Education and Employment & National Commission for Further and Higher Education Malta (2016). *Referencing Report, 4th Edition*. NCFHE.

Total number of Hours: 2250

Mode of attendance: Part Time

Duration: 3 Years

The official language of instruction at MCAST is English. All notes and textbooks are in English (except for language courses which will be in the respective language being instructed). International candidates will be requested to meet English language certification requirements for access to the course.

This course will be offered at

MCAST has four campuses as follows:

MCAST Main Campus
Triq Kordin, Paola, Malta

All courses except for the Institute for the Creative Arts, Centre of Agriculture, Aquatics and Animal Sciences are offered here.

Institute for the Creative Arts
Mosta Campus
Misraħ Għonoq Tarġa Gap,
Mosta

Institute of Applied Sciences,
Centre of Agriculture, Aquatics and Animal Sciences,
Luqa Road, Qormi

Gozo Campus
J.F. De Chambray Street
MCAST, Għajnsielem
Gozo

Teaching, Learning and Assessment

The programmes offered are vocational in nature and entail both theoretical lectures delivered in classes as well as practical elements that are delivered in laboratories, workshops, salons, simulators as the module requirements dictate.

Each module or unit entails a number of in person and/or online contact learning hours that are delivered by the lecturer or tutor directly (See also section 'Total Learning Hours).

Access to all resources is provided to all registered students. These include study resources in paper or electronic format through the Library and Resource Centre as well as tools, software, equipment and machinery that are provided by the respective institutes depending on the requirements of the course or module.

Students may however be required to provide consumable material for use during practical sessions and projects unless these are explicitly provided by the College.

All Units of study are assessed throughout the academic year through continuous assessment using a variety of assessment tools. Coursework tasks are exclusively based on the Learning Outcomes and Grading Criteria as prescribed in the course specification. The Learning Outcomes and Grading Criteria are communicated to the Student via the coursework documentation.

The method of assessment shall reflect the Level, credit points (ECTS) and the schedule of time-tabled/non-timetabled hours of learning of each study unit. A variety of assessment instruments, not solely Time Constrained Assignments/Exams, are used to gather and interpret evidence of Student competence toward pre-established grading criteria that are aligned to the learning outcomes of each unit of the programme of study.

Grading criteria are assessed through a number of tasks, each task being assigned a number of marks. The number of grading criteria is included in the respective Programme Specification.

The distribution of marks and assessment mode depends on the nature and objectives of the unit in question.

Coursework shall normally be completed during the semester in which the Unit is delivered.

Time-constrained assignments may be held between 8 am and 8 pm during the delivery period of a Unit, or at the end of the semester in which the Unit is completed. The dates are notified and published on the Institute notice boards or through other means of communication.

Certain circumstances (such as but not limited to the Covid 19 pandemic) may lead Institutes and Centres to hold teaching and assessment remotely (online) as per MCAST QA Policy and Standard for Online Teaching, Learning and Assessment (Doc 020) available via link https://www.mcast.edu.mt/college-documents/

The Programme Regulations referenced below apply. (DOC016 available at: link https://www.mcast.edu.mt/college-documents/

Total Learning Hours

The total learning hours required for each unit or module are determined as follows:

Credits (ECTS)	Indicative contact hours	Total Student workload (hrs)	Self-Learning and Assessment Hours
1	5 – 10 hrs	25 hrs	20-15 hrs*
2	10 – 20 hrs	50 hrs	40-30 hrs*
3	15 – 30 hrs	75 hrs	60-45 hrs*
4	20 – 40 hrs	100 hrs	80-60 hrs*
6	30 – 60 hrs	150 Hrs	120-90 hrs*
9	45 – 90 hrs	225 hrs	180-135 hrs*
12	60 – 120 hrs	300 hrs	240-180 hrs*

* The 'Self-Learning and Assessment Hours' amount to the difference between the contact hours and total student workload.

Grading system

All MCAST programmes adopt a learner centred approach through the focus on Learning Outcomes. The assessment of MCAST programmes is criterion-referenced and thus assessors are required to assess learners' evidence against a pre-determined set of Learning Outcomes and assessment criteria.

For a student to be deemed to have successfully passed a unit, a minimum of 50% (grade D) must be achieved. In case of part time programmes, the student must achieve a minimum of 45% to successfully pass the unit.

All units are individually graded as follows:
A* (90-100)
A (80-89)
B (70-79)

C (60-69)
D (50-59)
Unsatisfactory work is graded as 'U'.

Work-based learning units are graded on a Pass/Fail basis only.

Detailed information regarding the grading system may be found in the following document: DOC 016 available at: link https://www.mcast.edu.mt/college-documents/

Intake Dates

•MCAST opens calls for application once a year between July and August of each year for prospective applicants residing in MALTA.
•Applications to full-time courses from international students not residing in MALTA are accepted between April and Mid-August.
•For exact dates re calls for applications please follow this link https://www.mcast.edu.mt/online-applications-2/

Course Fees

MCAST course are free for Maltese and EU candidates. International candidates coming from outside the EU need to pay fees for the respective course. Course fees are set on a per-level and course duration basis. For access to course fee structure and payment methods please visit https://www.mcast.edu.mt/fee-payments-for-non-eu-candidates/.

Method of Application

Applications to full-time courses are received online via the College Management Information System. Candidates can log in using Maltese Electronic ID (eID) or European eIDAS (electronic identification and trust services) to access the system directly and create an account as the identity is verified electronically via these secure services.

Non-EU candidates need to request account creation though an online form by providing proof of identification and basic data. Once the identity is verified and the account is created the candidate may proceed with the online application according to the same instructions applicable to all other candidates.

Non-EU candidates require a study visa in order to travel to Malta and joint the course applied for. For further information re study-visa please access https://www.identitymalta.com/unit/central-visa-unit/.

For access to instructions on how to apply online please visit https://www.mcast.edu.mt/online-applications-2/

Academic qualification leading to a Regulated Profession

Council for Professions Complementary to Medicine
St. Luke's Hospital,
Ex-OPD (Level 1), St. Luke's Square,
Gwardamangia PTA 1010

Contact details for requesting further information about future learning opportunities:

MCAST Career Guidance
Tel: 2398 7135/6
Email: career.guidance@mcast.edu.mt

Current Approved Programme Structure

Unit Code	Unit Title	ECTS
CAPRD-706-1801	Product Representation	6
CAPRD-706-1802	Design Issues	6
CAPRD-706-1803	Optimisation of Topology and Design	6
CAPRD-706-1804	Theoretical and Applied Mechanics	6
CAPRD-706-1805	Mechanical Tests, Models and Prototypes	6
CAPRD-706-1806	Principles of Product Design	6
CAPRD-706-1807	Product Design Studio	6
CAPRD-706-1808	Human-Centred Product Design	6
CAPRD-706-1809	Internet of Things (IoT)	6
CAPRD-706-1810	Culture and Communication	6
CDDIS-730-1801	Dissertation	30
	Total ECTS	90

CAPRD-706-1801: Product Representation

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Fully Face-to-Face Learning

Total Learning Hours: 150

Unit Description

Modern engineering design and manufacturing with four areas of emphasis: engineering design, systems, design for manufacturing and manufacturing processes. This unit will introduce students to the perception of an object as a product. System thinking is the essence of engineering design. Students will learn about tools for object interpretation. This unit will enable students to learn how to articulate design specifications, how to make a system design based upon selected components in mechanical electronics/electrical domain, how to document the system integration of subsystems and finally, develop this into a prototype. Students will also learn how to respect standard requirements in design with the aim to make the product compatible to other standardised parts and components in different engineering fields. This unit will be oriented to the analysis of product shape requirements, especially with respect to the involvement of relevant stakeholders and the use of methodical tools for product design.

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Synthesize and apply existing research methodologies, techniques, and technical skills to determine an approach by using mechanical drawing rules and standards.*
2. *Master the principles of mechanical design with respect to the technology of production.*
3. *Evaluate, model and provide the appropriate technology for the production of parts and devices.*
4. *Design, with respect to standards, requirements for standards parts.*
5. *Analyse, evaluate and present a designed product and consider the potential possibilities for further improvement of the product or device.*
6. *Present a determined product to a specific audience.*

CAPRD-706-1802: Design Issues

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Fully Face-to-Face Learning

Total Learning Hours: 150

Unit Description

This unit exposes learners to the integration of the engineering design approach and management disciplines for determining manufacturing rate, cost, quality and flexibility. Topics include process physics, equipment design and automation/control, quality, design for manufacturing, industrial management, and systems design and operation.

This unit will be oriented to the analysis of product life cycles, especially with respect to the involvement of relevant stakeholders and the use of methodical tools for product life-oriented design (DFX).

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Synthesise and apply existing research methodologies in design and technical skills to determine the analytical approach to design.*
2. *Evaluate the physical principles of mechanical design in respect to static loading and deflection criteria.*
3. *Synthesise and apply the physical principles of mechanical design with respect to vibration loading.*
4. *Develop functional products with respect to stress, strain and deflection.*
5. *Implement integrated engineering design with respect to assembly design.*

CAPRD-706-1803: Optimisation of Topology and Design

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Blended Learning

Total Learning Hours: 150

Unit Description

The optimisation of topology in design is an important issue in order to reduce mass, stress concentration, cost of production and prevent mistakes that are often the consequence of the lack of experience of the designer. A designer can perform an optimisation by using different software automatically; however, optimisation is interactive process, where the new design of the product should be estimated in regards to the mechanical carry capacity and material capability.

The objective of this unit is to give students the necessary knowledge to use topology optimisation as a design tool.

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Synthesise and apply existing research methodologies in design approach by using topology optimisation tools.*
2. *Evaluate the principles and challenges of the optimization process.*
3. *Understand the methods for solutions regarding minimum mass, target natural frequencies and maximum possible stiffness.*
4. *Use commercial software for product optimization of geometry.*
5. *Use optimized topology tools in product design.*
6. *Justify own choices in a presentation given to a particular audience.*

CAPRD-706-1804: Theoretical and Applied Mechanics

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Fully Face-to-Face Learning

Total Learning Hours: 150

Unit Description

Theoretical and Applied Mechanics provides a foundation in engineering science and applied mathematics that prepares students to carry out analytical or numerical research and to develop models to solve a wide variety of engineering problems. This unit provides basic knowledge from classical fields such as solid and fluid mechanics to more novel trends in science such as computational methods for engineering design.

It covers not only traditional mechanics of rigid and deformable bodies, and fluid mechanics, but also mechanics of different materials that are used in structural design, and finite element methods (FEM) in mechanics. Some practical problems will be solved both analytically and numerically. Finite elements will be used not just for stress analysis, but also for design and optimisation.

Projects are an integral part of the unit and the appropriate software for FEM should be available for students.

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Solve engineering problems in the field of structural analysis.*
2. *Understand the physical principles controlled by the laws of continuum mechanics.*
3. *Define, model and calculate a mechanical issue with the emphasis on methodological design, strength conditions, thermodynamics, dynamics or flow.*
4. *Solve simple physical problems numerically using the appropriate software.*
5. *Analyse, evaluate and interpret the results and consider potential possibilities for further improvement of the structure.*

CAPRD-706-1805: Mechanical Tests, Models and Prototypes

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Fully Face-to-Face Learning

Total Learning Hours: 150

Unit Description

This unit introduces the student to the different types of mechanical tests, physical models and prototypes. Mechanical testing covers a wide range of tests with the purpose to determine the mechanical properties of material to analyse the structural response to a given action. The most commonly used mechanical tests will be explained in detail, such as hardness, tensile, fracture, fatigue, and creep testing. This unit also describes the fundamental principles of different methods of model making and prototyping and questions how they can be used in the conceptual and detailing design stages of the design process.

Focus will be placed on the designed product in terms of usability and technical functionality. Special attention will be given to rapid prototyping as a group of techniques used to quickly fabricate a scale model of a physical part or assembly using three-dimensional computer aided design (CAD) data. Construction of the part or assembly is usually done using 3D printing or "additive layer manufacturing" technology.

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Formulate experiments involving hardness tests, tensile tests, fatigue tests, fracture mechanics and creep tests, destructive and non-destructive test methods as well as interpret the results and their effect on structural design.*
2. *Construct the necessary tests to find out the structural response and analyse the results.*
3. *Understand the fundamental principles of the different methods of model making and prototyping.*
4. *Identify the optimal technique to quickly create scale models and other assembly parts with the use of emergent digital fabrication technologies.*
5. *Design, rationalise and fabricate physical artefacts by using the available technology.*

CAPRD-706-1806: Principles of Product Design

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Blended Learning

Total Learning Hours: 150

Unit Description

This unit exposes learners to the demands and complexity of product design in respect to shape, material, colour and other sensory properties of physical artefacts and their relation to the user-product interaction. Students will gain insight into social, cultural, economic and technological influences on product aesthetics.

The focus of the unit is on standards and guidelines, culture, environment, aging and complexity in the product design process while also providing strategies for their application with the goal of enhancing user satisfaction.

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Apply the fundamental principles of product design.*
2. *Identify and implement the universal, cultural and individual aspects of product aesthetic.*
3. *Understand how product design affects perception and interaction.*

CAPRD-706-1807: Product Design Studio

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Fully Face-to-Face Learning

Total Learning Hours: 150

Unit Description

Project work that will provide experience in solving realistic design problems for consumer products by combining the intellectual and manual skills required for product design. Emphasis is given to the identification and framing of the design problem and the application of advanced design methods for creating feasible design solutions. Students will be guided through every phase of the design process, from initial research and idea generation to the final design of the chosen concept.

This unit will also cover the basic organisational aspects of product design and writing design documentation. The inclusion of product design professionals from the industry in the discussions of students' ideas during the design concept evaluation is recommended.

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Identify how to translate design research into useful and usable products.*
2. *Create, evaluate and select product design concepts.*
3. *Formulate and communicate constructive criticism on the work of others.*
4. *Develop, evaluate and iterate prototypes.*
5. *Prepare a comprehensive visual presentation of a design and present it to a professional audience.*

CAPRD-706-1808: Human-Centred Product Design

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Fully Face-to-Face Learning

Total Learning Hours: 150

Unit Description

This unit introduces students to human-centred and experience-driven design with special focus on a multi-disciplinary approach to product design projects. Product designers should consider the complete context of a user's interaction and experience with the designed products, with attention to cognitive, emotional, physical, social and cultural factors. By applying ergonomic, ethnographic and social science methodologies, the designer is able to gain a better understanding of users, their needs and the context of use, with the goal of designing engaging products.

This unit provides a combination of theoretical background on the demands, opportunities, tools and methods for achieving good User Experience and their practical application through collaborative product design project work.

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Incorporate a user-centred approach into the design process.*
2. *Understand the full complexity of product design and its impact on people's lives.*
3. *Apply rapid prototyping techniques to build prototypes for evaluation.*
4. *Develop usability tests and subjective evaluations during the design process.*

CAPRD-706-1809: Internet of Things (IoT)

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Blended Learning

Total Learning Hours: 150

Unit Description

With tens of billions of smart devices in use and their vast network connections, the importance of Internet of Things (IoT) technologies cannot be overemphasised. Development of networking, intelligent things with the aim of enhancing quality of life, increasing safety and overall productivity are among the imperatives of the digital age we live in.

An enormous emerging job market implies that a dedicated unit on the Internet of Things is a crucial component in any up-to-date product design curriculum.

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Understand the different embedded computing technologies available.*
2. *Analyse the influence of the falling costs of hardware, software and wireless communications on the emergence of the new markets with the universal networking of non-electronic devices and ordinary things.*
3. *Arrange M2M communication protocol options and design procedures of the Industrial IoT networks.*
4. *Design intelligent home systems and propose products to be deployed in smart city systems.*
5. *Assemble basic IoT interface solutions by identifying the required hardware and software.*
6. *Analyse different opportunities for IoT application, focusing on entertainment performance and interpret the study to develop a product.*
7. *Understand how to integrate various cloud services and the IoT network of sensors and actuators.*
8. *Secure IoT data collection into the cloud-based server, perform massive data analytic transformation in the cloud and generate user friendly graphic enhanced reports.*

CAPRD-706-1810: Culture and Communication

Unit Level (MQF/EQF): 7

Credits: 6

Delivery Mode: Fully Face-to-Face Learning

Total Learning Hours: 150

Unit Description

The unit of Culture and Communication provides many opportunities for students to relate their own life experiences to contemporary cultural differences and highlights the concepts that are intimately linked with what is intrinsically human. This unit introduces students to the understanding of intergroup relationships as opposed to interpersonal ones. Close examination of cultural practices, humanistic skills, and knowledge of the design of creative products, will give students an understanding of cultural products. This leads to a deeper understanding of aesthetics and human-centred design, the study of which helps find and formulate cross-cultural generalisations and better business organisation. It also provides students with a better understanding of the perception and physical requirements of users, which is followed by improved information on new product design.

In communication it is an important point to find the convergence between the different methods of understanding reality. Even concepts that translate easily across languages do not have identical meanings, so one must pay attention to the many different aspects when aiming to understand and compare cultures and design products.

Learning Outcomes

Upon successful completion of this unit, learners will be able to:

1. *Define the origins of culture, with a focus on the more contemporary aspects.*
2. *Understand communication as a means of exchanging information, what communicational skills entail and also verbal, non-verbal and electronic means of communication.*
3. *Analyse cultural individualism /collectivism and its relationship with culture.*
4. *Understand the historical relations between culture, communication and academic practice.*
5. *Identify the resources required to interpret cultural products and practices.*
6. *Relate own cultural values through design, the practical and theoretical aspects of cultural bound product design and solve cultural differences using communication.*