NUI Galway
OÉ Gaillimh

ATLANTIC UNIVERSITY ALLIANCE

Specialist Diploma in MEDICAL DEVICE SCIENCE

Duration: 1 year part-time

- **Curriculum focused on the thriving medical devices sector**
- **Delivery via blended learning teaching methodologies**
- **Medium-term up-skilling for career advancement or specialisation and/or cross-skilling for career change or cross-team roles**
- **Minor award at Degree level (NFQ level 8)**

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ENTRY REQUIREMENTS

- Applicants must be in receipt of the Diploma in Science & Technology Studies or a related Diploma or higher qualification. Applicants may use experience in addition to academic qualifications to demonstrate that they satisfy the course prerequisites.

WHAT TYPE OF COURSE IS IT?

- This one-year, part-time Diploma aims to develop specialist knowledge of the medical devices sector and to develop relevant technical and soft skills. The qualification is considered a minor award at Degree level.

  The programme is delivered by blended learning, participants receive learning materials in both online and in hard copy format for each module. Materials are specifically designed for independent study and are supplemented by supporting online learning resources where appropriate. The course requires attendance at tutorials in NUI Galway once every four weeks, or approximately ten Saturdays, from September to June. Between campus visits you will interact with tutors and peers via an online learning system.

HOW WILL I BENEFIT?

This course is intended for those who require up-skilling for career advancement within the medical devices sector, or for those looking for focused re-skilling with a view to a career change. It will be of benefit to those with a biology background to gain an appreciation of the technology and engineering aspects of the sector, and equally engineers will benefit from exposure to the science behind the devices.

On completion of the course graduates will have highly marketable, up-to-date knowledge and skills relevant to the medical devices sector. They will have practiced and been assessed on a range of technical and transferable skills which will be beneficial at both the personal and enterprise levels.

If graduates so wish, they can progress to the B.Sc. in Science & Technology Studies (NQF level 8) with credit for their studies. In this case they will be exempt from one elective stream in the Degree cycle.

CURRICULUM

This Specialist Diploma consists of four inter-related taught modules and a project, each worth 6 ECTS, giving a total of 30 ECTS.

The four taught modules are:

- Human Anatomy & Physiology
- Biocompatibility & Device Design
- Mechanics of Solids
- Medical Device Science

The module contents are presented at the end of this document. The project topic is chosen by the participant in consultation with their supervisor.

LEARNING OBJECTIVES

On completion of the course participants should have:

- An holistic understanding of the science and engineering behind various medical devices
- Specialised knowledge of human anatomy, physiology and biochemistry and disease states which can be monitored or improved by the use of medical devices
- Good knowledge of the chemistry and physics of materials and an appreciation of which materials can be used to best effect in medical devices
- Technical knowledge and skills in the design, development and manufacture of medical devices
- An appreciation of best practice, industry standards, policies and regulations within the medical devices sector

ASSESSMENT

Assessment of the taught modules is through continuous assignments, practical laboratory sessions and written examinations. Exams take place at the end of each semester. The project is assessed through staged delivery of a project report. The award mark is based on an average result of all five modules.

COURSE STRUCTURE

The course is offered over one academic year (September to June) on a part-time basis. Two taught modules are completed each semester (September to December and January to June) while the project is completed over the academic year.

FEES

The fees for the course are €1,900 for EU students and €2,400 for non-EU students.

This fee includes:

- Registration
- Tuition fees
- Course materials
- Examinations and assessments

HOW DO I APPLY?

Applications should be made online at www.nuigalway.ie/apply

CONTACT

Further information is available from:

Niamh McHugh
Centre for Adult Learning and Professional Development,
Nuns' Island,
NUI Galway.
091 495845
niamh.mchugh@nuigalway.ie

www.aua.ie

MODULE CONTENTS

HUMAN ANATOMY & PHYSIOLOGY

MECHANICS OF SOLIDS

BIOCOMPATIBILITY & DEVICE DESIGN

- **UNIT 1** BIOMATERIALS AND MEDICAL DEVICES
- **UNIT 2** CLASSES OF BIOMATERIALS
- **UNIT 3** TISSUE ENGINEERING
- **UNIT 4** DEVICE DESIGN
- **UNIT 5** BIOMATERIALS PROCESSING
- **UNIT 6** DEVICE FABRICATION
- **UNIT 7** DEVICE CHARACTERISATION - SURFACE PROPERTIES
- **UNIT 8** DEVICE CHARACTERISATION – BULK PROPERTIES
- **UNIT 9** DEVICE CHARACTERISATION – IN VITRO STUDIES / BIOLOGICAL RESPONSE
- **UNIT 10** DEVICE CHARACTERISATION – IN VIVO STUDIES
- **UNIT 11** DEVICES DEGRADATION & FAILURE
- **UNIT 12** INFLAMMATION, IMMUNE RESPONSE AND THROMBOSIS
- **UNIT 13** WOUND HEALING IN THE PRESENCE OF BIOMATERIALS
- **UNIT 14** ADVERSE REACTIONS TO BIOMATERIALS
- **UNIT 15** FUTURE DIRECTIONS
- **UNIT 16** CLINICAL TRIALS, ETHICAL CONSIDERATIONS AND REGULATIONS

MEDICAL DEVICE SCIENCE

- **UNIT 1** EVOLUTION OF MEDICAL DEVICES THROUGH TECHNOLOGY
- **UNIT 2** MEDICAL DEVICE INDUSTRY IN IRELAND
- **UNIT 3** TYPES OF MEDICAL DEVICES
- **UNIT 4** GENERAL REQUIREMENTS FOR MEDICAL DEVICES
- **UNIT 5** MATERIAL USED IN MEDICINE I: METALS AND CERAMICS
- **UNIT 6** MATERIALS USED IN MEDICINE II: POLYMERS AND COMPOSITES
- **UNIT 7** STRENGTHS OF DEVICES
- **UNIT 8** MECHANICAL FAILURE OF MEDICAL DEVICES
- **UNIT 9** CARDIOVASCULAR DEVICES I
- **UNIT 10** CARDIOVASCULAR DEVICES II
- **UNIT 11** CARDIOVASCULAR DEVICES III
- **UNIT 12** JOINT REPLACEMENT I
- **UNIT 13** JOINT REPLACEMENT II
- **UNIT 14** FRACTURE FIXATION I
- **UNIT 15** FRACTURE FIXATION II
- **UNIT 16** PATENTS

For further information see **www.aua.ie**