BSC (HONS) INDUSTRIAL PHYSICS - CK409 (NOT ON OFFER 2023/24)

Overview

NFQ Level 8, Major Award

(Joint Degree Between Munster Technological University and University College Cork)

This is a joint degree programme delivered by University College Cork (UCC) and Munster Technological University (MTU). UCC is the co-ordinating institution. This programme includes a 10-week work placement/project (PY3114) in Third Year.

First Year - Industrial Physics

In First Industrial Physics, students take core modules to the value of **55** credits and one **5** credit elective module (module codes marked with ***** indicate the code of the coordinating institution).

UCC Code	MTU Code	Module Run by	Module Title	Credit
CM1006*	PHYS6047	UCC	Introduction to Chemistry for Physicists and Mathematicians	10
MA1011*	MATH6053	UCC	Mathematical Methods I	5
MA1012*	MATH6054	UCC	Mathematical Methods II	5
PY1052*	PHYS6047	UCC	Introductory Physics I	10
PY1053*	PHYS6048	UCC	Introductory Physics II	10
PY1055	ENVI6002*	MTU	Environmental Instrumentation and Pollution Monitoring	5
PY1056	PHYS6008*	MTU	Instrument Measurement Principles	5
PY1057	PHYS6006*	MTU	Introduction to Industrial Automation	5
CS1061*	COMP6038	UCC	Programming in C	5
CS1065*	COMP6039	UCC	Computer Applications Programming	5
CS1068*	COMP6040	UCC	Introductory Programming in Python	5

Second Year - Industrial Physics

In Second Industrial Physics, students take modules to the value of **60** credits (module codes marked with * indicate the code of the coordinating institution).

UCC Code	MTU Code	Module Run by	Module Title	Credit
EG2001*	INTR7023	UCC	Engineering Mechanics with Transform Methods	5
MA2071*	MATH7027	UCC	Multivariable Calculus	5
MA2054*	MATH7028	UCC	Ordinary Differential Equations	5
PY2102*	PHYS7022	UCC	Introduction to Quantum Physics	5
PY2103*	PHYS7023	UCC	Electrostatics and Magnetostatics	5
PY2104*	PHYS7025	UCC	Introduction to Thermodynamics and Statistical Physics	5
PY2105*	PHYS7026	UCC	Introduction to Computational Physics	5
PY2107*	PHYS7027	UCC	Experimental Physics I	5
PY2108*	PHYS7028	UCC	Experimental Methods I	5
PY2109	PHYS6025*	MTU	Introduction - Process Control	5
PY2110	PHYS6038*	MTU	Water Quality Instrumentation (potable and waste water)	5
PY2111	PHYS7008*	MTU	Industrial Automation & SCADA	5

Third Year - Industrial Physics

In Third Industrial Physics, students take modules to the value of **60** credits (module codes marked with * indicate the code of the coordinating institution).

PY3114 Work Placement / Project (extended) - Work Placement/Project (15 credits)

Students undertake a 10-week placement/project either directly in industry or in a university or research centre laboratory performing industrially related research and development. The placements are most frequently in Ireland though they may also be carried out at international sites subject to the approval of the programme co-ordinator. The placement/project is supported by a member of academic staff in MTU together with a workplace supervisor (where applicable). The typical placement will begin in March, and will continue into the summer: the other programme lectures and examinations are scheduled in the first half of the semester, so that the placement is the sole focus of the student. The aim of the industrial placement is to introduce the learner to structured employment in a relevant work sector and to develop in the learner an understanding of the organisation, its procedures and technology.

UCC Code	MTU Code	Module Run by	Module Title	Credit
PY3121*	PHYS8029	UCC	Optics	5
PY3103*	PHYS7024	UCC	Electromagnetism	5

PY3108*	PHYS8031	UCC	Experimental Methods II	5
PY3110	PHYS7002*	MTU	Digital Systems and Interfacing	5
PY3111	PHYS7004*	MTU	Industrial Communications and Networks	5
PY3112	PHYS7011*	MTU	Programming for Measurement	5
PY3113	PHYS7017*	MTU	Air Quality and Gas Analysis Instrumentation	5
PY3114	PHYS7019*	MTU	Work Placement / Project (extended)	15
PY3115	PHYS7021*	MTU	Introduction to Quality Systems	5
PY3116	PHYS7009*	MTU	Process Control Systems	5

Fourth Year - Industrial Physics

In Fourth Industrial Physics, students take modules to the value of **60** credits (module codes marked with * indicate the code of the coordinating institution).

UCC Code	MTU Code	Module Run by	Module Title	Credit
PY3105*	PHYS8034	UCC	Introduction to Condensed Matter Physics	5
PY4108*	PHYS8032	UCC	Introduction to Lasers and Photonics	5
PY4118*	PHYS8033	UCC	Physics of Semiconductor Devices	5
PY4119	ENVI8003*	MTU	Air Quality	5
PY4120	PHYS8001*	MTU	Advanced Signal Processing	5
PY4121	PHYS8012*	MTU	Advanced Industrial Automation	5
PY4122	PHYS8014*	MTU	Advanced Programming for Measurement	5
PY4123	PHYS8017*	MTU	Process Analytical Technology	5
PY4124	PHYS8020*	MTU	Advanced Process Control	5
PY4125	PHYS8026*	MTU	Project	15
PY4113*	PHYS8036	UCC	Experimental Physics III	5
PY4115*	PHYS8035	UCC	Research Project	10

Programme Requirements

For information about modules, module choice, options and credit weightings, please go to Programme Requirements (p. 2).

Programme Requirements

Code	Title	Credits
Year 1		
Students take **60** credits as follows – all listed core modules (**55** credits) and **5** credits of elective modules:		
Core Modules		
CM1006	Introduction to Chemistry for Physicists and Mathematicians [1]	10
MA1011	Mathematical Methods I [1]	5
MA1012	Mathematical Methods II [1]	5
PY1052	Introductory Physics I [1]	10
PY1053	Introductory Physics II [1]	10
PY1055	Environmental Instrumentation and Pollution Monitoring [2]	5
PY1056	Instrument Measurement Principles [2]	5
PY1057	Introduction to Industrial Automation [2]	5
Elective Modules		
Students take modules to the value of **5** credits from the following:		5
CS1061	Programming in C (5) [1]	
CS1065	Computer Applications Programming (5) [1]	
CS1068	Introductory Programming in Python (5) [1]	
Year 2		
Students take **60** credits as follows:		
Core Modules		
EG2001	Engineering Mechanics with Transform Methods [1]	5
MA2071	Multivariable Calculus [1]	5
MA2054	Ordinary Differential Equations [1]	5
PY2102	Introduction to Quantum Physics [1]	5
PY2103	Electrostatics and Magnetostatics [1]	5
PY2104	Introduction to Thermodynamics and Statistical Physics [1]	5
PY2105	Introduction to Computational Physics [1]	5
PY2107	Experimental Physics I [1]	5
PY2108	Experimental Methods I [1]	5
PY2109	Introduction - Process Control [2]	5
PY2110	Water Quality Instrumentation (potable and waste water) [2]	5
PY2111	Industrial Automation & SCADA [2]	5
Year 3		
Students take **60** credits as follows:		
Core Modules		
PY3121	Optics [1]	5
PY3103	Electromagnetism [1]	5
PY3108	Experimental Methods II [1]	5
PY3110	Digital Systems and Interfacing [2]	5
PY3111	Industrial Communications and Networks [2]	5
PY3112	Programming for Measurement [2]	5
PY3113	Air Quality and Gas Analysis Instrumentation [2]	5
PY3114	Work Placement / Project (extended) [2]	15
PY3115	Introduction to Quality Systems [2]	5
PY3116	Process Control Systems [2]	5
Year 4		
Students take **60** credits as follows:		

Core Modules		
PY3105	Introduction to Condensed Matter Physics [1]	5
PY4108	Introduction to Lasers and Photonics [1]	5
PY4118	Physics of Semiconductor Devices [1]	5
PY4119	Air Quality [2]	5
PY4120	Advanced Signal Processing [2]	5
PY4121	Advanced Industrial Automation [2]	5
PY4122	Advanced Programming for Measurement [2]	5
PY4123	Process Analytical Technology [2]	5
PY4124	Advanced Process Control [2]	5
Select one of the following:		15
PY4125	Major Research Project (15) [2]	
PY4113	Experimental Physics III (5)	
plus PY4115	***plus*** Research Project () [1]	
Total Credits		**240**

[1] Module run by UCC as coordinating institution.
[2] Module run by MTU as coordinating institution.

Examinations

Full details and regulations governing Examinations for each programme will be contained in the *Marks and Standards Book* and for each module in the *Book of Modules*.

Programme Learning Outcomes

Programme Learning Outcomes for BSc in Industrial Physics (NFQ Level 8, Major Award)

On successful completion of this programme, students should be able to:

- Construct solutions to industrial measurement and control problems using fundamental physical principles;
- Apply solutions from fundamental and applied physics to industrial production and manufacturing problems;
- Design, implement and test strategies for industrial testing and quality control;
- Apply fundamental physics to industrial research and developments;
- Choose experimental physics techniques to analyse and manage complex instrument systems;
- Develop and adapt systems for data acquisition, management and archiving;
- Communicate effectively within an industrial environment;
- Write laboratory reports that provide a description of the experiment, explain the experiment and reasoning clearly, and provide an appropriate conclusion.