Faculty of Science + Engineering

Science + Engineering Structured PhD

Handbook

Foreword

To UL students and staff members,

The Science + Engineering (S+E) Structured PhD programme has been developed to provide PhD students with a high-quality experience of original research which is integrated with professional development. It aims to develop and broaden student's research knowledge and transferable skills through a formalised and integrated programme of activities that will serve them both in the completion of their research and in the career path that they may follow after their graduation. This involves incorporating research and innovation, knowledge transfer, inter-disciplinary and generic skills development and empowering students to make a significant impact in their chosen career so as to contribute to Ireland's "knowledge economy".

The purpose of this handbook is to provide assistance and information to PhD students and their supervisors and is designed to be a "one-stop-shop" to easily find out how the S+E Structured PhD works. The S+E Structured PhD is one of a number of PhD models available at UL, and nominally runs for four years. A number of national funding agencies, including Science Foundation Ireland (www.sfi.ie) and the Irish Research Council (www.research.ie) fully fund Structured PhD's for four years, including stipend and fees, and so is an attractive option for both the Student and the research project.

This document outlines a list of "pre-approved" specialised modules and a Certificate in Generic and Transferrable Research Skills, both of which are designed to help the student and supervisor select an appropriate path to the taught element of the structured PhD programme. The "research" part of the Structured PhD follows the traditional model where the research is carried out and assessed through thesis and/or publication.

I wish you the very best over the next four years and hope you find your Structured PhD to be both challenging and rewarding.

Best Wishes,

Dr Sean Fair, Coordinator of the Science and Engineering Structured PhD, September 2019.

Introduction

The *Structured PhD Programme in Science and Engineering* (S+E) is a four-year Level 10 Structured PhD, offered by the Faculty of Science and Engineering at the University *of* Limerick (UL). The first registration of students to the programme was in September 2013. The programme consists of two major components, which includes the PhD Research and Thesis (weighted at 270 credits) and the taught element, consisting of 12 credits (minimum) of specialised modules (which can be any Level 8 or 9 modules, taken from within or outside UL) and 18 credits of Generic and Transferrable Skills (again, can be taken from within or outside UL). The Faculty of Science and Engineering offers a significant number of "pre-approved" specialised modules, which have been selected as suitable modules for Structured PhD's. In addition, UL's Certificate in Generic and Transferrable Research Skills affords S+E Structured PhD students to obtain their 18 credits of generic and transferrable skills during the summer semester of their first or second year of study.

There are a number of recognised models for doctoral education within Ireland, and are,

- "structured" programmes with taught elements and wider skills training but with emphasis on a major research thesis
- the traditional PhD with a major research thesis, sometimes referred to as the 'apprenticeship model'
- professional doctorates which consists of significant taught elements with emphasis on a minor thesis
- work-based doctorates whereby the student is either based in a company/organisation or spends significant time in a company/organisation with emphasis on a major thesis

This handbook is designed to address the "structured" PhD model listed above only, and to help students, academics and stakeholders to quickly find out how the UL S+E Structured PhD works, including programme structure, registering for modules, duration and progression. The handbook is divided into two parts: Part A is a user-guide to the structured PhD where one can get familiar with the programme quickly, while Part B is dedicated to programme rational, objectives, learning outcomes, and is thus useful as a reference for programme auditors or for future accreditations.

It should be noted that several national funding agencies, including Science Foundation Ireland (www.sfi.ie) and the Irish Research Council (www.research.ie) fully fund Structured PhD's for four years, including stipend and fees. Given that the average finishing time for a PhD at UL is greater than 4.5 Years, opting for a Structured Programme can, thus, clearly provide significant advantages to both the student and the research project.

Part A: User Guide

General Programme Structure

All students registered on the S+E Structured PhD have to acquire 30 credits of taught modules, to consist of a minimum of 18 credits of Generic and Transferable Skills and a minimum of 12 credits of Specialist Modules (chosen from Level 8 or 9 modules). The general programme structure is shown in Table 1. The programme is very flexible in so far as the Specialised modules and Generic and Transferrable skills modules can be garnered from both within or outside UL over the four years of the programme. It is, however, strongly recommended that the specialised modules be taken during the first 18-24 months of the programme, and that student enrols in the Certificate in Generic and Transferrable Research Skills programme, and a typical programme route for this case is shown in Table 2.

Table 1: Programme Structure for the S+E Structured PhD

Semester 1 (30 Credits)	Semester 2 (30 Credits)	Summer (30 Credits)
➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills	➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills	➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills
Semester 3 (30 Credits)	**Semester 4 (30 Credits)**	**Summer (30 Credits)**
➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills	➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills	➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills
Semester 5 (30 Credits)	**Semester 6 (30 Credits)**	**Summer (30 Credits)**
➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills	➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills	➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills
Semester 7 (30 Credits)	**Semester 8 (30 Credits)**	**Summer (30 Credits)**
➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills	➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills	➢ Research Work* ➢ Specialised Modules (Level 8 or 9) ➢ Transferable (Research) Skills

*Individual research work under supervision of a designated supervisor and/or Doctoral Studies Panel. "Research work" is taken to include all aspects to the non-taught element, including writing of PhD thesis, journal papers, conference papers and presentations, patents, etc.

Structure PhD Programme Structure (for students enrolling in Certificate in Generic and Transferrable Research Skills)

If students wish to enrol on UL's Certificate in Generic and Transferrable Research Skills programme, then sufficient credits for generic and transferrable skills (i.e. 18 credits) will be garnered during the first or second summer semester of the Structured PhD. In addition, students may wish to also obtain their 12 credits of Specialised modules during the first 18-24 months of the programme (and this is strongly recommended so that the research element becomes the focus towards the latter half of the PhD programme). Hence, a typical programme structure under this route is shown in Table 2.

Table 2: Typical Programme Structure for a Student enrolled in the Certificate in Generic and Transferrable Research Skills

Semester 1	Semester 2	Summer
➢ Research Work* ➢ Specialised Modules (Level 8 or 9)	➢ Research Work* ➢ Specialised Modules (Level 8 or 9)	➢ Research Work* ➢ **Certificate in Generic and Transferrable Research Skills†**
Semester 3 ➢ Research Work* ➢ Specialised Modules (Level 8 or 9)	**Semester 4** ➢ Research Work* ➢ Specialised Modules (Level 8 or 9)	**Summer** ➢ Research Work* ➢ **Certificate in Generic and Transferrable Research Skills†**
Semester 5 ➢ Research Work*	**Semester 6** ➢ Research Work*	**Summer** ➢ Research Work*
Semester 7 ➢ Research Work*	**Semester 8** ➢ Research Work*	**Summer** ➢ Research Work*

*Individual research work under supervision of a designated supervisor and/or Doctoral Studies Panel. "Research work" is taken to include all aspects to the non-taught element, including writing of PhD thesis, journal papers, conference papers and presentations, patents, etc.

† Certificate in Generic and Transferrable Research Skills is taken only once (save repeating modules), ideally during the summer semester of Year 1 or 2.

Duration of Structured PhD's

The duration of doctoral education in Ireland is normally 3-4 years. The duration of the S&E Structured PhD is nominally 4 Years.

Certificate in Generic and Transferable Research Skills

UL launched the *Certificate in Generic & Transferrable Research Skills* during the summer semester, 2014. The certificate consists of the following six modules in Generic and Transferrable Research Skills, listed in Table 3, and all are 3 ECTS credits each. For S+E Structured PhD Students the modules are taken on a pass/fail basis. More information can be found at http://www.ul.ie/cpe/node/1051.

Table 3: Modules in the Certificate in Generic & Transferrable Research Skills Programme

Module Code	Module Title	ECTS Credits
ES8002	Research Integrity	3
TL8003	Planning Research And Publication: Planning Research	3
TL8013	Developing Ideas and Arguments: Writing into Academic Communities	3
CM8003	Research Networking: Developing an Academic Profile	3
CS8013	Digital Research Management	3
LA8013	Research Ethics	3

The certificate is run as a summer school, with a residential week during a full week towards the end of May. The student is then required to complete on-line assignments and e-tivities during the rest of the summer semester, according to a typical schedule listed in Table 4.

Table 4: Typical Schedule for *Certificate in Generic & Transferrable Research Skills Programme*

Week 1 (End of May)	Week 2 – 5	Week 6 – 9	Week 10 – 13	Week 14
Residential Week at UL	Digital Research Management CS8013	Planning Research and Publication TL8003	Research Ethics LA8013	Complete and submit all outstanding assignments
	Developing Ideas and Arguments: Writing Into Academic Communities TL8013	Research Networking: Developing An Academic Profile CM8003	Research Integrity ES8002	

Successful completion of this certificate will fulfil the minimum requirements for the Generic and Transferrable Skills element of the S+E Structured PhD.

Registration protocol for the Certificate in Generic and Transferrable Research Skills

In March/April of each year the Continuing & Professional Education (CPE) division at UL, who manage the programme, will issue a request by email for PhD students to register for the Generic and Transferrable Research Skills programme. Each PhD student must register their interest by emailing CPE. Registration must be completed before the Start of May (normally) and must contain the following information.

1. Confirmation that you wish to enrol on this programme with your student ID;
2. Confirmation of the modules you wish to take from the list of 6 modules (see link http://www.ul.ie/cpe/node/1051); There is no obligation to take all 6 modules in one year.
3. A further email from your supervisor, confirming you're a current structured PhD student and indicating their support for your participation on this programme.

The timetable for a typical residential week is given below. Note that in addition to the 6 modules there are a number of talks on additional topics which are not examinable. More information can be found at http://www.ul.ie/cpe/node/1051.

CERTIFICATE IN GENERIC AND TRANSFERABLE RESEARCH SKILLS 2019 SUMMER SCHOOL

Monday 20th May to Friday 24th May 2019

Computer Lab S204– Lecture Room S205

CS8013 Digital Research Management Michelle Breen/Aisling Hayes	CM8003 Research Networking: Developing An Academic Profile Caoilfhionn Ni Bheachain/ Deirdre Brady
TL8003 Planning Research & Publication Michelle Breen/Aisling Hayes	LA8013 Research Ethics Hope Davidson
TL8013 Developing Ideas & Arguments: Writing into Academic Communities Ide O' Sullivan	ES8002 Research Integrity Alan Donnelly

Time	Monday 20 May	Tuesday 21st May	Wednesday 22nd May	Thursday 23rd May	Friday 24th May
09:00 09:15 09:30	Welcome & Introduction (10 mins) (Sean Fair) Intro. to SULIS (ITD) (Eamonn Fitzgerald) Networking CM8003 (C.NiB/DB)	ES8002 Research Integrity (AD)	TL8013 Writing for Publication (IOS)	CS8013 The importance of Research Data Management (MB/AH)	LA8013 Background to Research Ethics (HD) LA8013 Research Design (HD)
10.45	Break	Break	Break	Break	Break
11.00	CM8003	ES8002	TL8003 Reference Management Using EndNote (MB/AH)	CS8013 Data Management Planning (MB/AH)	LA8013 Consent & Data Protection (HD)
12.00	CM8003	ES8002		CS8013 (MB/AH)	LA8013 Research Ethics Committees Funding Applications (HD)
13.00	Lunch	Lunch	Lunch	Lunch	Lunch
14.00	TL8003 Finding Research Information (MB/AH)	Research Funding (Puneet.Saidha)	Intro. To Bibliometrics TL8003 (MB/AH) Copyright Issues (MB/AH)	IP (Paul Dillon)	Grant Writing (Conor McCarthy) TBC
15.00	TL8003 Finding Research Information (MB/AH))	Career Support (Elaine Kiely)	CM8003 (C.NiB/DB)	Commercialization & Entrepreneurship (Gert.O'Rourke) TBC	

Specialised Modules

Students are required to select a minimum of two specialised modules as agreed with the PhD supervisor, which will be valued at a minimum of 12 credits. The purpose of these modules will be to strengthen the student's background in the research area which they have selected for their research PhD. Normally, specialised modules should be selected from fourth year level 8 or Level 9 post-graduate modules. However, a special case can be made to select Level 8 modules from 1st, 2nd or 3rd Year, where it can be demonstrated that the module aligns with, and will benefit, the research. Any 1st, 2nd or 3rd Year Level 8 modules must be approved, in the first instance by the PhD Supervisor and Head of Department/School, and then validated for synergies with the PhD project by the S+E Structured PhD Course Director.

The S&E faculty offers a significant number of "pre-approved" specialised modules, which have been selected by each of the overarching S+E disciplines as suitable modules for Structured PhD's. These pre-approved modules are listed in Appendix I. A memorandum of understanding has been agreed, where any module on the "pre-approved" list can be taken by any student registered on the S&E Structured PhD from any Department in the faculty. **It should be noted that students are free to take other modules outside of those listed in Appendix I.**

Specialised Modules will be weighted as per academic regulations (normally 6 credits in UL). It is assumed that the taught element, and therefore the Specialised Modules, of the programme should be taken during the first two years of the Structured PhD with modules only being taken in years three and four by way of exception, e.g. if the direction of the thesis discloses some deficiency or if other skills are required. Specialised Modules should be taken on a Pass/Fail basis.

Modules taken from Outside UL

External Generic & Transferrable Skills Modules

It is possible to take other Generic & Transferrable Skills modules (not listed in Table 3) from UL or from other institutions once they adhere to the skills identified by the Irish Universities Association's fourth level network of Deans of Graduate Studies as relevant to PhD student education. These skills are, but not limited to, Research skills and awareness, Ethics and social understanding, Communication skills, Personal effectiveness/development and Team-working and leadership. This is not an exhaustive list, and their relevance to students will vary upon experiential learning, disciplinary and professional development needs. All external modules must be approved by the PhD Supervisor and validated for quality and credit level by the Head of Department <u>and</u> the S&E Structured PhD Course Director by filling in **Section A** of the 'Structured PhD Programme and Research Student Module(s) Registration Form' - **<u>prior</u>** to taking the module.

Modules taken from other institutions will be registered on the module registration form as (see Appendix II for the form),

- GT8301 SEN GENERIC AND TRANSFERABLE SKILLS PORTFOLIO: 3- Credits
- GT8302 SEN GENERIC AND TRANSFERABLE SKILLS PORTFOLIO: 6- Credits
- GT8303 SEN GENERIC AND TRANSFERABLE SKILLS PORTFOLIO: 9- Credits
- GT8304 SEN GENERIC AND TRANSFERABLE SKILLS PORTFOLIO: 12- Credits

Students must notify the S&E Structured PhD Course Director (Dr Sean Fair; sean.fair@ul.ie) of these modules once completed. Students will need to supply evidence of successful completion of modules. **Note: These modules are only graded in Semester II of each year**.

These module codes will subsequently appear on the student transcript. It is currently not possible to have external modules (Module Name, credit value) explicitly listed on UL transcripts. Hence, **all Structured PhD Students are strongly encouraged to keep a portfolio of the modules they take, and this Portfolio should be available to Programme Auditors or funding agencies.**

External Specialised Modules

It is also possible to take any Level 8 or 9 Specialised modules from other Institutions. These modules can currently only be registered as XP Modules and consequently they will only appear as XP Modules on the student's transcript. Hence, **all Structured PhD Students are strongly encouraged to keep a portfolio of the modules they take, and this Portfolio should be available to Programme Auditors or funding agencies.**

All external modules must be approved by the PhD Supervisor and validated for quality and credit level by the Head of Department <u>and</u> the S&E Structured PhD Course Director by filling in **Section C** of the 'Structured PhD Programme and Research Student Module(s) Registration Form' – **prior to taking the module.** It should be noted that a minimum of 12 credits are required for specialised modules in the Structured PhD programme and so where external modules are valued at less than 6 credits more than two modules may be required to reach the 12 credit value. Students must notify the S&E Structured PhD Course Director (Dr Sean Fair; sean.fair@ul.ie) of these modules once completed. Students will need to supply evidence of successful completion of modules.

Any problems, or conflicting issues, will be brought forward to the S+E Faculty Research Committee for consideration and resolution.

Module Registration

Students are required to register for all their taught modules. The module registration form is listed in Appendix II and can be downloaded from,

https://www.ul.ie/graduateschool/sites/default/files/Structured%20PhD%20Module%20Registration%20Form%20July%202019.pdf

Once completed this registration form should be returned to Student Academic Administration, during Week 1 of each Semester.

Repeat Structures for Modules

A student who fails to pass any elements of *Certificate in Generic & Transferrable Research Skills Programme* will have an opportunity to repeat the individual modules (shown in Table 3), or the programme in full, in the following summer.

A student who fails to pass a Specialised module will have an opportunity to repeat according to University norms for Level 8 & 9 modules.

Student Transcripts

Student transcripts can be obtained from the S+E Structured PhD Course Director.

Progression of Structured PhD Students

Progression of a Structured PhD Student will follow the normal UL Research Postgraduate progression protocol (PGR-9 Process), where each Department Research Committee will assess each student's performance at the Annual PGR-9 Meetings (normally held in October/November). The PGR-9 process is outlined in detail in the postgraduate handbook which is available at https://www.ul.ie/graduateschool/sites/default/files/Research%20Postgrad%20Guide%20Final%20Version%20Dec%2015.pdf

First Year PhD Progression

The Faculty of Science & Engineering requires a **first year progression review meeting** to be conducted with **all PhD students enrolled since April 2018**. In terms of timing, the progression review meeting should take place **12 months after enrolment**, but a 'window' of 9 – 18 months after enrolment is feasible The review meeting aims to help ensure the successful and timely completion of the research degree. Further details can be found at http://www.scieng.ul.ie/research/first-year-progression/

Part B: Rationale, Aims and Objectives, Learning Outcomes of the Programme

Rationale

The traditional structure of the PhD in Ireland has been under review with the objective of developing PhD graduates with the necessary skills to develop and manage their careers across a broad range of employment sectors, including academia. As part of the revised model of the PhD, Irish Universities are encouraged to provide more structured support for students. This involves incorporating research, knowledge transfer, inter-disciplinary and generic skills development, empowering the students to make a significant impact in their chosen career to contribute to Ireland's "knowledge society". The skills and awareness identified by the Irish Universities Association's Fourth Level Network of Deans of Graduate Schools include:

- Exhibit knowledge of advances and developments in their fields
- Demonstrate knowledge of research in related fields and disciplines and effectively employ research methodologies
- Critically analyse and synthesise new and complex information from diverse sources
- Formulate and apply solutions to research problems
- Apply principles of ethical conduct of research
- Understand the relevance of researching society and the potential impact of research on individuals and society
- Exercise critical judgement and thinking to create new ways of understanding

A Structured PhD programme is the advancement of knowledge through a high-quality experience of original research which is integrated with professional development. It develops student's research knowledge and transferable skills through a formalised and integrated programme of activities. This programme develops advanced research skills for postgraduate research students in the Science + Engineering Faculty. Specifically, the programme:

- Broadens the educational experience in specified advanced research areas;
- improves the quality of graduate education;
- raises the international research profile of the University and attracts international students;
- develops the research capacity and profile of the Faculty;
- creates stronger links between postgraduate teaching and research.

Further the programme is a response to align with IUA structured research and produce high quality researchers with advanced skills.

Aims and Objectives

The aims and objectives of the programme are to,

- To provide a programme that is academically rigorous to the highest standards of its national and international counterparts;

- To engage students with a range of concepts, methods, theories and knowledge derived from research;
- To educate students to work with a variety of Science/Engineering problems across a variety of context;
- To enable students to develop a thesis that will have the potential to impact on their profession.

The Structured PhD:

- Provides a taught element to the programme to help understanding in areas that may be deemed lacking that would be necessary to perform the research;
- Provides a core programme that will give its graduates research skills that are necessary in an international context;
- Provides specialist disciplinary teaching for its graduates so that they develop research to international standards;
- Develops student skills as active researchers able to engage with their peers through research networks and collaborative international research;
- Develops student skills as autonomous researchers able to evaluate different research problems, select and apply appropriate research tools and methods to these problems and gather an evaluate appropriate evidence for the resolution of research questions;
- Generates student research work that will contribute to the redefinition of existing Science & Engineering knowledge.

Programme Learning Outcomes

Knowledge – breadth & kind:
- Utilise appropriate range of research skills required for thematic investigation in their chosen field of enquiry
- Be able to critically reflect on issues related to theory, policy and praxis at all levels of education

Know-how and Skills – range and selectivity:

- Acquire understanding of a substantial body of knowledge in Science/Engineering and create and interpret new knowledge through individual research
- Acquire an understanding of relevant research methodologies and techniques and their appropriate application within one's research field
- Conduct a doctoral thesis with particular reference to the specified field of knowledge drawing on a wide range of methodological approaches and informed by ethical and professional issues

Competence – Context and Role:

- Support original, independent and critical thinking, and ability to develop theoretical concepts
- Communicate results and potential impact of their own research and innovation to peers by engaging in critical dialogue, exploring potential dissemination approaches

for how the thesis, in whole or in part, might be disseminated to the peer professional community
- Align with IUA structured research and produce high quality researcher with advanced skills

Competence – Learning to Learn:

- Critically investigate their research topic resulting in the creation and interpretation of knowledge which extends the forefront of their discipline through original research
- Show a broad understanding of the context in which research takes place
- Utilise a variety of media for accessing knowledge broadly

Competence – Insight:

- Shows competence as an independent researcher in their discipline and capable of continuing to undertake research at an advanced level, contributing substantially to the development of new techniques, ideas or approaches
- Show confidence in defending their research in terms of the approach adopted, the methodology used, the results obtained and the interpretation of those results

Educational Principles

Taught modules can be taken over the full program, these are of three types:

- Specialised academic modules (taken within years 1 and/or 2). These modules are primarily taught in UL, but a module can also be taken in one of our partner IUA universities and approved level 8 and level 9 modules from NUI Galway.
- Transferable skills modules providing students with techniques necessary to complete their research.
- Any other module/training which the Research supervisor or supervisory team deems appropriate, subject to the approval of the Faculty Research Committee.

The research component of the programme requires the completion and examination of a PhD thesis based on original research and under current University regulations.

ECTS Credits for the S+E Structured PhD

The Module Credit breakdown for all years of the S+E Structured PhD is as listed in Table 5. The following distribution of credits are:

- The Programme total: 270-360
- Thesis is: 270 credits as per regulations
- Subject specific taught modules: (min 12 credits) (Module credits as per academic regulations)
- Transferable and generic skills courses: 18 credits total: (6 Modules - 3 credits each)

Table 5: Module Credit breakdown for all years

Year 1	Autumn	Spring	Summer	Year Totals	Cumulative Total
Research	(12-30)	(12-30)	(12-30)	90	90
Transferable skills	(0-9)	(0-9)	(0-9)		
Taught	(0-12)	(0-12)	(0-12)		
Year 2					
Research	(12-30)	(12-30)	(12-30)	90	180
Transferable skills	(0-9)	(0-9)	(0-9)		
Taught	(0-12)	(0-12)	(0-12)		
Year 3					
Research	(12-30)	(12-30)	(12-30)	90	270
Transferable skills	(0-9)	(0-9)	(0-9)		
Taught	(0-12)	(0-12)	(0-12)		
Year 4					
Research	(12-30)	(12-30)	(12-30)	90	360
Transferable skills	(0-9)	(0-9)	(0-9)		
Taught	(0-12)	(0-12)	(0-12)		

ECTS Credits for the S+E Structured PhD

Entry Qualifications

Entry Requirements, Application Procedures and Registration

Applicants applying for admission onto a Structured PhD programme should follow the normal procedures for a postgraduate admission. These are as follows:

- All students applying to the University of Limerick to undertake a structured PhD programme must fulfil the University's admissions requirements and procedures.
- Applicants will be considered formally for admission at the monthly meeting of the Postgraduate Research Committee and processed by the Postgraduate Admissions Office.
- The candidate will be registered on the PhD register in accordance with the regulations specified by UL.
- Students with prior learning can apply to get exemptions from some of the taught material of the structured PhD.

The regulations, policies and codes of practice governing the UL Structured PhD Programme are available at: Website: www.graduateschool.ul.ie

A level 8 bachelor degree at upper second level minimum (2.1) or taught postgraduate degree at upper second level minimum (2.1), or equivalent, from a recognised third level institution. In addition, the candidate is required to submit a research proposal outlining proposed research area. If the Student is funded by the IRC, a copy of the proposal is sufficient to replace the research outline. Candidates should be proficient in the use of English for academic purposes, and minimum English language requirements are necessary for student where English is not their 1st language (see http://www.ul.ie/graduateschool/ for more details on minimum language requirements).

Extern Examiners

External examiners for the structured PhD will be appointed using the current University procedures for research degrees.

References

1. IUA - 2006, National qualifications Authority of Ireland National Framework.

Appendix I: Pre-approved list of Specialised Modules

(updated 18 July 2019)

1. Electronic and Computer Engineering

EE6411	C++ Programming
EE6011	Cryptography and Security Fundamentals
EE6461	Information Theory and Coding
EE6452	Digital Control (Computer Controlled Systems)
EE6462	Digital Communications
EE6022	Biometrics
EE6012	Data Forensics
EE6042	Network and Host Security
EE6032	Communication and Security Protocols
EE6421	Software Engineering
EE6422	Real Time Systems (Parallel Programming)
CE4708	Artificial Intelligence
RE4017	Machine Vision
RE4006	Spatial Robotics
EE4032	Tensor & GPU fundamentals (from Sept 2020)
EE6041	Text Analytics and Natural Language Processing (from Sept 2020)

2. Computer Science and Information Systems

CS 4007	Information Society
CS 5703	Software Engineering Quality
CS 5721	Software Design
CS 6021	Foundations of Interactive Media & Design
CS 6022	Principles of Interactive Media Design
CS 6332	Research Methods for Art & Design
CS7222	Software Architecture

3. Product Design & Architecture

DM4028	Engineering Sustainable Products
DM4038	Advanced Manufacturing

Architecture Electives - Advanced Theory	
AR4327	Culture Place Environment
AR4347	Design Philosophy
AR4357	Architectural Form and Culture
AR4397	Utopian Studies

Architecture Electives - Advanced Technology	
AR4367	Digital Technology
AR4377	Engineering Research
AR4387	Experimental Construction
AR4417	Digital Media and Representation

Architecture Electives – Advanced Practice	
AR4337	Urban Design
AR4407*	Architecture Intelligence Unit
AR4000*	Local History and Urban

* Offered as part of the Architecture Summer School

4. Engineering

MT6031	Management Systems Standards
MT6011	Advanced Characterisation of Materials 1
ME6001	Fundamentals of Continuum Mechanics
ME6062	Advanced Computational Fluid Dynamics
ME6071	Non-Linear Finite Element Analysis
ME6052	Fracture Mechanics
ME6008	Microfluidics
MT6062	Biopolymer Science: Polymer Therapeutics
ME6091	Aerospace Metallic Materials

5. Mathematics and Statistics

MS6011	Advanced Methods 1
MS6012	Advanced Methods 2
MA6002	Mathematical Geoscience
MA6012	Mathematical Biology and Physiology

(suitable only for students with a significant undergraduate mathematics foundation)

6. Chemical Sciences

BC4907	Cell Biochemistry
CH4417	Pharmaceutical Formulation
CH4017	Chemical Nanotechnology

7. Physics
Autumn Semester

PH5041	Condensed Mater Physics 1
PH5094	Nanoscience & Technology 1
PH5098	Semiconductor Processing 1
PH5093	Physics of Advanced Metrology
PH5091	Physics of Materials

Spring Semester

PH5042	Condensed Matters Physics 2
PH6031	Physics of Medical Instrumentation
PH5095	Nanoscience & Technology 2
PH5092	Semiconductor Processing 2
PH6022	Reporting Results in Physical Science

8. Biological Sciences

BY4015	Plant Physiology
FT4355	Advanced Nutrient Metabolism & Health
FT4457	Research Trends in Health & Food
ER4708	Biometrics
BY4036	Agricultural Biotechnology

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Appendix II: Structured PhD Programme and Research Student Module(s) Registration Form

Structured PhD Programme and Research Student Module(s) Registration Form

Structured PhD and Research Students should ensure that the relevant Generic and Transferable Skills Module, Research Skills Module(s) and Taught Module(s) are recorded on their Student Record. All the module requirements for the Structured PhD programme should be agreed with your supervisor(s) and signed off below. Please refer to explanatory information on page 2.

Name:	Student I.D.:
Programme:	Year (1,2,3,4):
Faculty/Dept.	Date:

Section A: Generic & Transferable Skills Module(s): Academic Year_____Semester_____

Module Code(s)	Module Title(s)	Circle appropriate registration type (Note 1)		
		N	P	G
		N	P	G
		N	P	G

Section B: Research Skills Requirements: Academic Year_____ Semester_____

Module Code(s)	Module Title(s)	Circle appropriate registration type (Note 1)		
		N	P	G
		N	P	G
		N	P	G

Section C: Taught Module Requirements: Academic Year_____ Semester_____

Module Code(s)	Module Title(s)	Circle appropriate registration type (Note 1)		
		N	P	G
		N	P	G
		N	P	G

Primary Supervisor: _____   Date: _____

Joint Supervisor: _____   Date: _____

Candidate*: _____   Date: _____

Chair of Panel/Course Director/Head of Dept. _____   Date: _____

Note 1: Registration Types

Depending on the requirements of the Structured PhD programme, students can register for the modules in the following ways.

N: Normal – modules required as part of your course must be taken on this basis P:
Pass/Fail – credits given but grade does not affect QCA
G: Audit –   no credits given and doesn't affect QCA, attend classes only and do not sit exams

Generic and Transferable Skills Module(s)

Structured PhD Students and Research students who undertake Generic and Transferable Skills Modules may receive ECTS credits for the courses/seminars or workshops that they successfully undertake during their studies. The number of ECTS credits awarded depending on the number of contact hours and/or associated work that is undertaken. The appropriate amount of ECTS credits awarded on a Pass/Fail basis should be signed off by the Supervisor (s), the Research Review Panel, or the Director of Structured PhD Programme. Please note that there may be a minimum and/or a maximum ECTS credits requirement for Generic and Transferable Skills associated with individual Structured PhD Programmes.

GT8001	AHS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	3
GT8002	AHS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	6
GT8003	AHS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	9
GT8004	AHS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	12
GT8101	BUS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	3
GT8102	BUS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	6
GT8103	BUS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	9
GT8104	BUS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	12
GT8201	EHS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	3
GT8202	EHS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	6
GT8203	EHS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	9
GT8204	EHS	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	12
GT8301	SEN	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	3
GT8302	SEN	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	6
GT8303	SEN	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	9
GT8304	SEN	GENERIC AND TRANSFERABLE SKILLS PORTFOLIO	12

Research Skills Requirements:

Structured PhD Students and Research students who undertake Research Methods Modules may receive ECTS credits for the courses that they successfully complete during their studies. The number of ECTS credits awarded depends on the Structured PhD Programme being undertaken. The appropriate amount of ECTS credits awarded, normally, on a Pass/Fail basis should be signed off by the Supervisor (s), the Research Review Panel, or the Director of Structured PhD Programme. Please note that there may be a minimum and/or a maximum ECTS credits requirement research skills associated with individual Structured PhD Programmes.

Taught Module Requirements:

Structured PhD Students and Research students who undertake Taught Modules may receive ECTS credits for modules that they successfully complete during their studies. Registration for the appropriate taught modules should be agreed and signed off by the Supervisor (s), the Research Review Panel, or the Director of Structured PhD Programme. Please note that there may be a minimum and/or a maximum ECTS credits requirements associated with individual Structured PhD Programme.

A copy of the completed registration form (Page.1) should be kept in the department office and the original registration form should be returned to the Student Academic Administration Office.