

# GUIDE TO IMPLEMENTATION OF STRUCTURED ENGINEERING PHD PROGRAMMES - AN IRISH PERSPECTIVE

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# Overview

- PhD programme Structures
- Module types
- National and EU Guidelines
- Structured PhD programmes in Ireland
- Suggestions for Structured PhD implementation

# PhD Structures

- Traditional PhD – thesis showing significant novel knowledge gain and contribution to the area of study
- Structured PhD
  - thesis component = 270 credits
  - taught component = 30 credits
- Generic and subject specific modules
- Benefits
  - better performance on research project
  - more informed career choices
  - more employable
  - instils life long learning ethos
  - documented record of training
  - counteracts isolation of postgraduate student

# Generic modules

Commercialisation; Entrepreneurship; Project Management; Academic English; Leadership, Team Working, and Innovation; Research Skills; Qualitative Methods; Quantitative Methods; Statistical Analysis; Ethics; Design; Social Understanding; Communication Skills; Personal Effectiveness; Professional Development and Career Management; Innovation and Entrepreneurship; Tutoring and Demonstrating.

# Additional items for experiential taught elements

- Industrial placements
- Research laboratory placements
- Paper preparation
- Oral presentation
- Invention Disclosure; Patents filed
- Successful completion of project work packages

# National and EU Guidelines

- Strategy for Science, Technology, and Innovation (SSTI)
- National Development Plan (NDP)
- Irish Universities Quality Board (IUQB)
- European University Association's Council for Doctorate Education (launched 2008)
- Irish Universities Association 4<sup>th</sup> Level Network – signed agreement to recognise PG modules

# Structured PhD programmes in Ireland

- TCD – PhD student must participate in 30 ECTS selected between student, supervisor team and PG director – Research Methods and Intro to Statistics are compulsory
- NUIM – compulsory structured PhD similar to TCD
- UCD – specific structured PhDs in Bioinformatics; System Biology; Software Engineering
- DCU – University wide structure of 270 credit thesis and 30 ECTS modules; supervisor panels
- NUIG/UL/UCC – structured PhD options



# DCU structured PhD programmes

## **IRCSET funded**

- International Centre for Graduate Education in Micro and Nano-Engineering

## **HRB funded**

- Diagnostics and Therapeutics for Human Disease

## **HEA funded**

- Irish Social Science Platform – social, cultural and economic transformations shaping Ireland
- LERO Graduate School in Software Engineering (LGSEE)
- INSPIRE (formerly NANOTIRE) - nanoscience and nanotechnology
- BioAnalysis and Therapeutics (BioAT) - bioanalytics applied to disease diagnosis and treatment
- Telecommunications Graduate Initiative (TGI)
- National Biophotonics and Imaging Platform (NBIP)
- **DrHEA Discipline Programmes – ITs and Universities – SIF funded**

## **EU Funded**

- Politics and International Relations - Centre for International Studies
- **Extreme-ultraviolet and X-ray training in Advanced Technologies for Interdisciplinary Cooperation (EXTATIC)**



# DrHEA Engineering Strand

<p><b>NUI Maynooth (NUIM)</b>            Dynamics and Control            Applied Linear Algebra and Linear Systems            Convex Optimization and Applications            Applied Probability            Stochastic Processes and Applications            Ocean Energy            Information, Literacy and Communication            Dublin Institute of Technology            Digital Signal Processing            Optoelectronics (Devices): Photonic            Microwaves and RF Engineering</p>	<p><b>Dublin City University (DCU)</b>            LabVIEW, Data Acquisition, Analysis &amp; Control            Manufacturing Process Analysis and Tool Design            Product Design, Development and Value Analysis            Computational Thermo-Fluid Dynamics            Professional &amp; Personal Development            Research Practice &amp; Methodology            Renewable Energy, Systems, Technology &amp; Economics            Fundamentals of Photonic Devices            Entrepreneurship for Engineers            Designing for Dynamic and impact loading</p>
<p><b>University College Dublin (UCD)</b>            Power System Design            Applications of Power Electronics            Advanced Composites and Polymer Nanomaterials            Energy Systems in Buildings            Materials Thermodynamics and Kinetics            Renewable Energy</p>	<p><b>Trinity College Dublin (TCD)</b>            A Unified Theory of Structures            Neural Signal Analysis            Applied Transportation Analysis            Statistical Signal Processing            Time-Frequency Analysis            Advanced Structural Analysis            Flow-induced Vibration</p>

# Structured PhD implementation - Delivery modes

- Semester long modules
- Tutored on-line delivery of modules / video conferencing
- Self learning on-line modules
- Block mode delivery of modules
  - flexible for institutions; postgraduate students and external cohort delivery
  - summer schools, workshops, seminar series

# Structured PhD implementation

## - some suggestions

- **Training of staff** - recruiting, institution policies, conflict resolution, transfer exam, editing papers and thesis, managing a research group and protecting IP, promoting students
- **Organisational structures** – recording of modules taken, FRAB, and issuing of transcripts; FRC – URC – GSB – USC – AC
- **Securing funding**
- **Establishing and maintaining strategic alliances**

# Structured PhD implementation

## - some suggestions

- Set up a Postgraduate Representative Committee or ensure rep.
- Initiate University Graduate Research Day
- Make visible excellent research work though web
- National Academy for Integration of Research, Teaching and Learning (NAIRTL)
- Provide one day workshop to final year students on PG structured funding scheme opportunities
- Collate bank of previous successful funding applications
- Support editing of proposals including provision of boiler plate text
- Provide staff for above and subsidise with overhead from successful graduate studies applications
- Increase number of co-tutelle agreements

Thanks for listening