

Waterford Institute of Technology

INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

Higher Diploma in Science in Computer Science

Introduction

Schedule for Induction Day

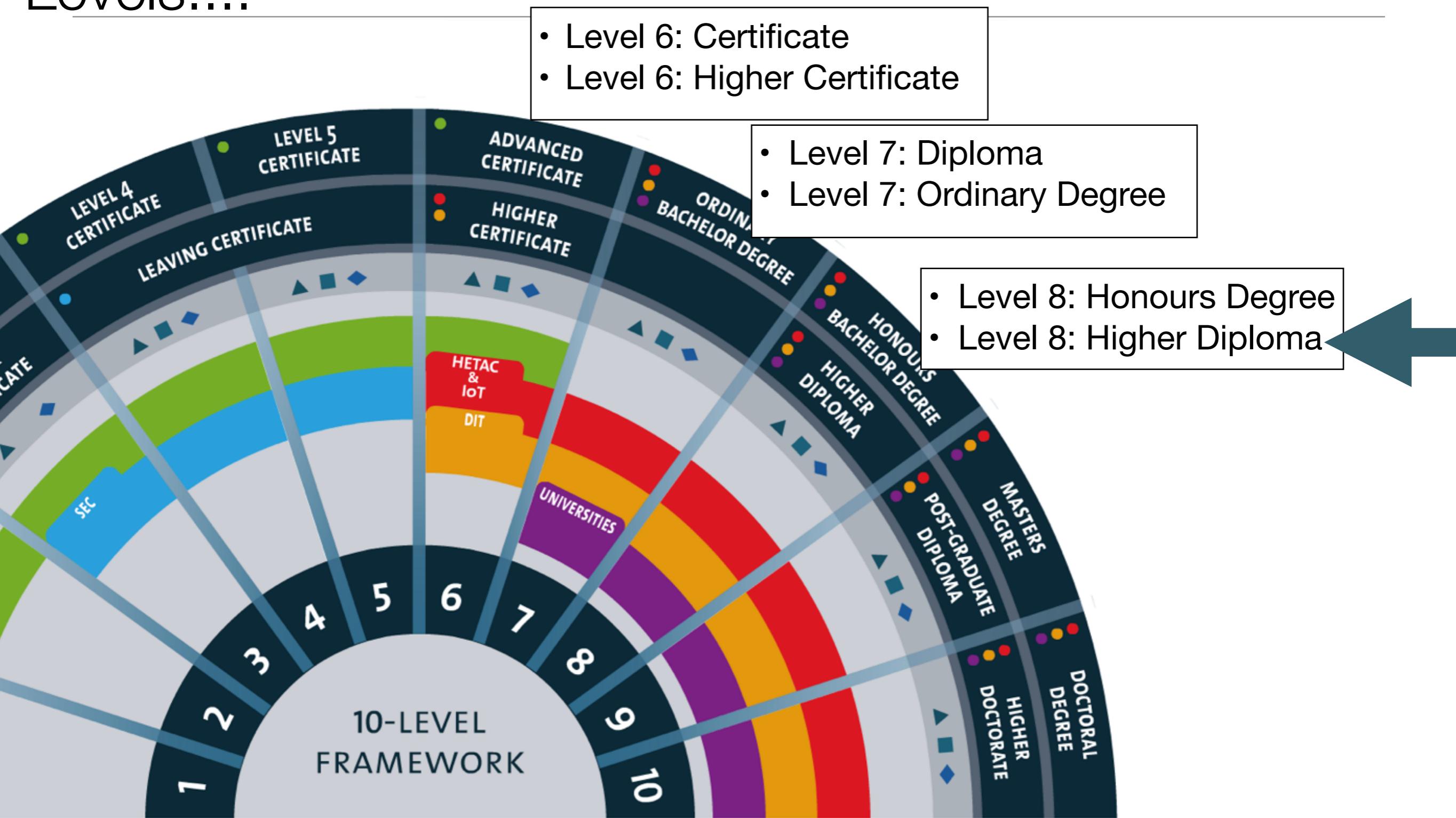
10:00 - 11:00	Overview of Programme (D01) <i>Programme Outline</i> <i>Timetable, Calendar & Assessment schedules</i> <i>Online resource structure and purpose</i>	
11:00 - 11:15	Coffee break (D01)	
11:15 - 1:00	Curriculum Overviews (D01) - <i>Web Development</i> - <i>Skills Studio</i> - <i>Programming</i> - <i>Computer Systems & Networks</i> - <i>Databases</i>	
1:00 - 2:00	Lunch (Gallery)	
2:00 - 3:15	<i>Web Development Lab Group A (D05)</i>	<i>Programming Lab Group B (FTG24)</i>
3:15 - 3:30	Coffee break	
3:30 - 4:45	<i>Web Development Lab Group B (D05)</i>	<i>Programming Lab Group A (FTG24)</i>

Agenda

- Context & Objectives
- Semesters & Modules
- Calendar
- Timetable
- Assessment Sequencing
- Q & A

Context & Objectives

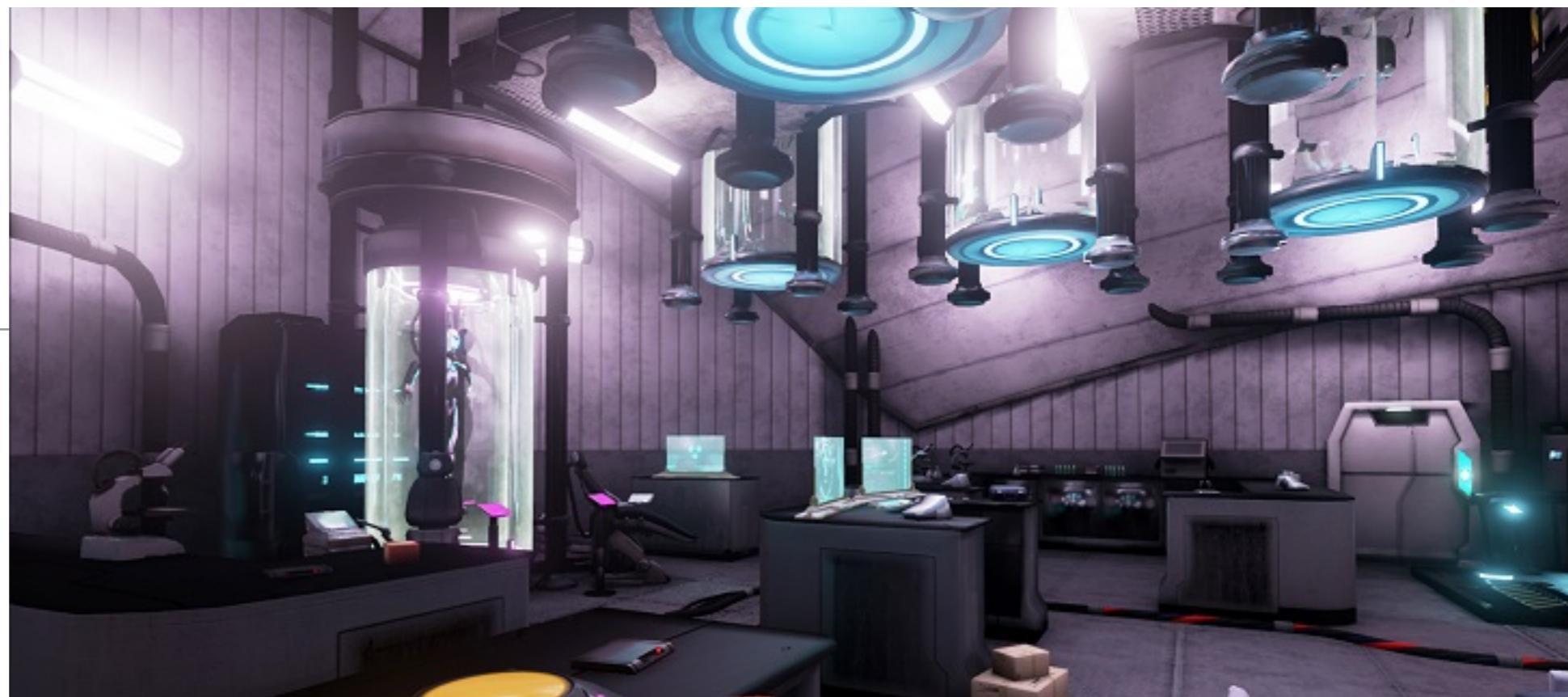
Qualification/ Programme Levels....



Key Programme Features

- Immersion
- Specialisation
- Industry Partnership

Immersion in Computing Knowledge



“The participants will be graduates who have already obtained significant transferable skills by comparison with other undergraduate students...”

“Semester 1 participants will undertake a broad immersive set of modules in the fundamentals of computing...”

“The pace of delivery will have to be significantly higher than for normal undergraduate programmes...”

Deepening and Specialisation



“In semester 2 ... a specialisation which reflects their own strengths as demonstrated on the programme to date...”

“.. a focused set of modules and project-work designed to bring candidates quickly to the industry entry standard ...”

“Participants will be expected to select their specialisation based on their achievement in semester 1 and their own ambitions...”

Industry experience and professional development



“Internships or work placements are seen as crucial to providing graduates with the context and confidence in their new knowledge...”

“Outputs expected from the work placement would include a work placement report, a project ideally conducted in the work placement organisation...”

“...academic and industry partners will cooperate in the provision of appropriate academic supervision resources for the duration of this work placement activity...”

Semesters & Modules

Modules

- 12 Modules

Programming Fundamentals 



algorithms · data structures · processing · java · classes · libraries

10 Credits

Web Development 



html · css · layout · web apps · web frameworks · deployment

5 Credits

ICT Skills Studio 



javascript · node · express · git · github · glitch

5 Credits

Databases 

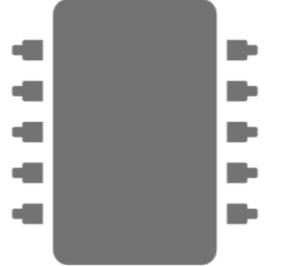


entities · tables · rows · sql · er · nosql

5 Credits

- 5 - 10 - 25 Credits

Computer Systems & Networks 



logic · computer organisation · os · networks · interfaces · sensors

10 Credits

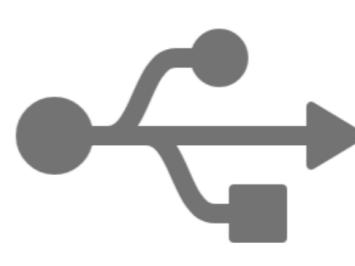
Enterprise Web Development 



mvc · node · security · apis · tdd · frameworks

10 Credits

Developer Operations 



cloud computing · scripting · scaling · automation · monitoring

5 Credits

Project Proposal 



proposal · scope · plan · mock up · prototype

5 Credits

Mobile App Development 



layouts · activities · resources · lifecycle · widgets · ux

10 Credits

Front End Development 



frameworks · events · mv* · responsive · esnext · less/sass

10 Credits

Project Implementation 



releases · iterations · implementation · report · demo

25 Credits

Work Placement 



industry partner · mentor · developer · experience · project

25 Credits

Year 1 - Semester 1

Semester 1

Programming Fundamentals



algorithms · data structures ·
processing · java · classes · libraries

10 Credits

Web Development



html · css · layout · web apps · web
frameworks · deployment

5 Credits

ICT Skills Studio



javascript · node · express · git ·
github · glitch

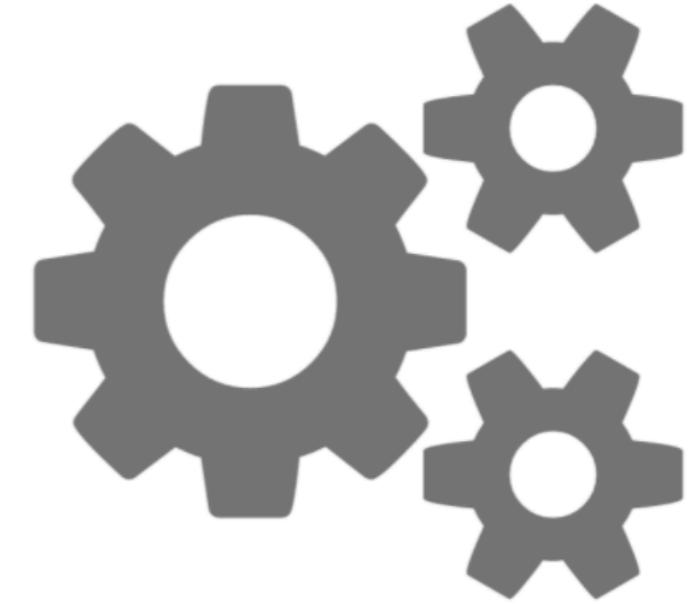
5 Credits

20 Credits

*“..a broad immersive set of modules in the
fundamentals of computing covering software
development, systems analysis & testing, databases,
architecture, OS & networking, web design / user-
experience..”*

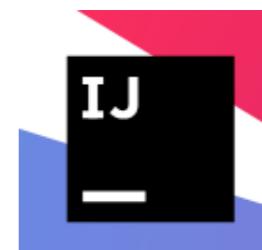
- Apply core problem solving approaches suitable to the programming discipline to build algorithms.
- Construct small applications using standard sequence, conditional and iterative control structures. Change and expand small applications.
- Construct small applications that use simple UI, computation and data structures.
- Apply techniques to effectively test, debug and document small applications.
- Defend and explain how the above applications work.
- Apply problem-solving strategies to various computing problems of increasing complexity.
- Plan, code, test and document applications using advanced programming constructs and data structures

Programming Fundamentals



algorithms · data structures ·
processing · java · classes · libraries

10 Credits



- Understand the fundamentals of the HTML markup language.
- Understand the role of Human Computer Interaction and manipulate CSS to present HTML content.
- Be able to integrate HTML, CSS and Java script to structure simple web sites.
- Understand how a dynamic web page is generated and be familiar with the role of html templating techniques
- Have an initial exposure to a web application framework and understand the roles of Models, Views and Controllers in this context.

Web Development



html · css · layout · web apps · web frameworks · deployment

5 Credits



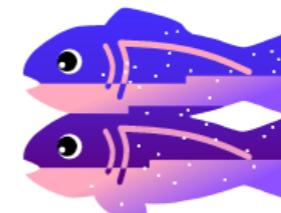


- Continue the journey into web application development
- Establish a competence in Javascript programming language
- Explore the basics of the Node.js framework
- Design, build and deploy a complete web application using these tools
- Understand the role of Agile methods in this context



javascript · node · express · git ·
github · glitch

5 Credits



Year 1 - Semester 2

Semester 2

Computer Systems & Networks	Databases
	
	
logic · computer organisation · os · networks · interfaces · sensors	entities · tables · rows · sql · er · nosql
10 Credits	5 Credits

15 Credits

“..a broad immersive set of modules in the fundamentals of computing covering software development, systems analysis & testing, databases, architecture, OS & networking, web design / user-experience..”

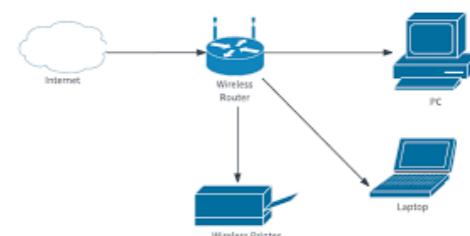
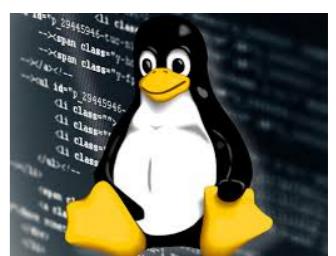
- Identify and explain the role various hardware components play in a computer system.
 - Use an operating system on a chosen computer architecture.
 - Demonstrate an ability to configure systems using the command line.
 - Describe the memory management, process management and file management components of a modern operating system.
 - Explain basic concepts and theory of networked operating systems and virtualisation.
 - Configure a contemporary operating system (within a virtual machine environment)
 - Demonstrate competency in a limited set of utilities provided by a contemporary operating system.
 - Complete basic automation tasks using scripting.

Computer Systems & Networks

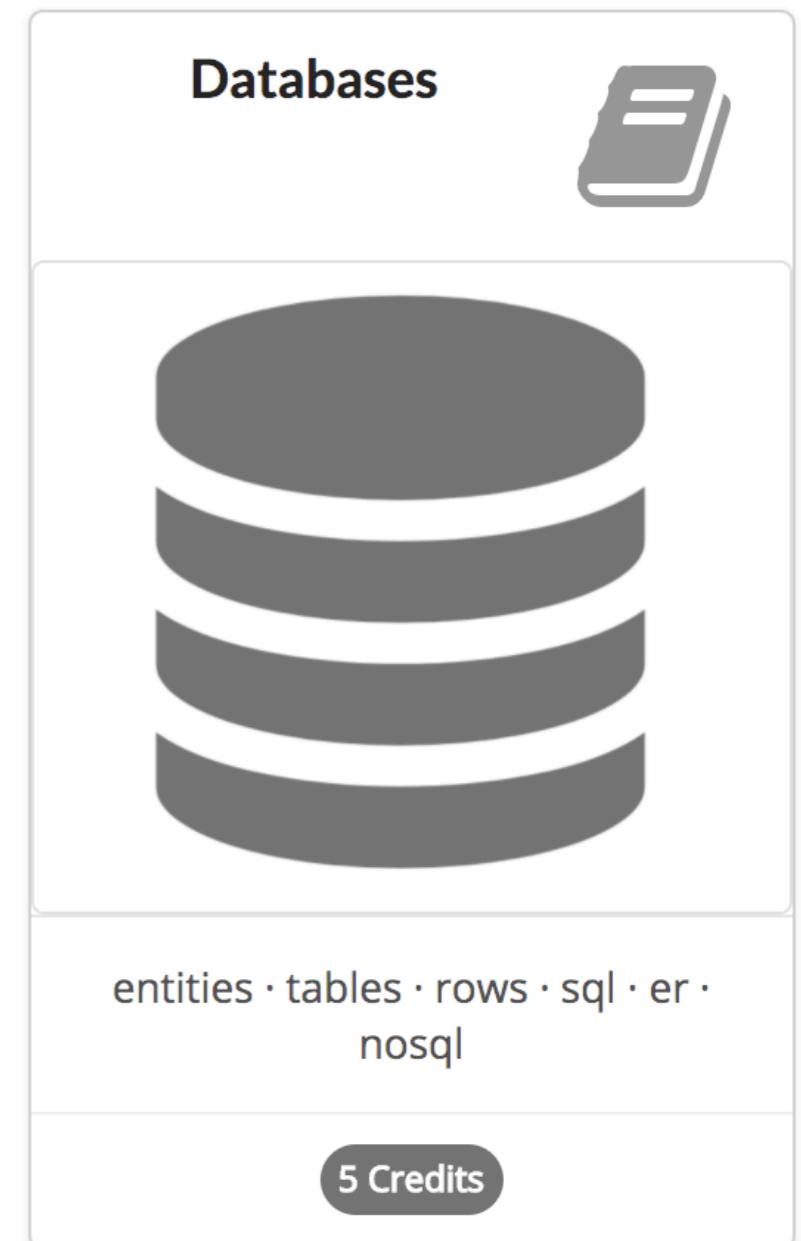


logic · computer organisation · os ·
networks · interfaces · sensors

10 Credits



- Discuss the role of a database and its management system.
- Draw Entity Relationship (ER) diagram from an application problem and reproduce this diagram into a set of normalised relations, which are ready for database implementation.
- Design a NoSQL database suitable for a distributed environment with consideration of the CAP theorem.
- Gain an understanding of the physical database design process, its objectives and deliverables.
- Design and implement a database system



Year 2 - Semesters 3

Semester 3

Enterprise Web Development  mvc · node · security · apis · tdd · frameworks 10 Credits	Developer Operations  cloud computing · scripting · scaling · automation · monitoring 5 Credits	Project Proposal  proposal · scope · plan · mock up · prototype 5 Credits
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20 Credits

“... students are expected to take a specialisation which reflects their own strengths as demonstrated on the programme to date...”

- Examine the key components of a server rendered web application and incorporate them into a running application.
- Use Model View Controller & related patterns in the implementation of a web project.
- Relate the request/response lifecycle, routing & session management in the context of a modern application framework.
- Model the user requirements and realize the model in a simple database.
- Apply best practice principles and patterns to the design and documentation of a web API.
- Apply best practice principles and patterns to the design of a medium-sized Single Page Web App.
- Develop an end-to-end web app that supports session management and persistence for a constrained functional requirement set.
- Demonstrate specific security problems that can arise with web applications and how to address them.
- Compare and contrast alternative approaches to authentication in both enterprise and consumer-oriented

Enterprise Web Development



mvc · node · security · apis · tdd ·
frameworks

10 Credits



- Build, configure and manage essential network infrastructure services.
- Build, configure and manage essential application services.
- Deploy a network monitoring solution.
- Develop scripts to assist in the management and automation of modern network services.
- Configure appropriate security mechanisms, including firewall rules, encrypted services, and authentication.



cloud computing · scripting · scaling · automation · monitoring

5 Credits



Year 2 - Semesters 4

Choose one of

Choose one of

Semester 4

Mobile App Development



layouts · activities · resources ·
lifecycle · widgets · ux

10 Credits

Front End Development



frameworks · events · mv* ·
responsive · esnext · less/sass

10 Credits

Project Implementation



releases · iterations ·
implementation · report · demo

25 Credits

Work Placement



industry partner · mentor ·
developer · experience · project

25 Credits

35 Credits

Calendar

Calendar - Semester 1

Semester 1	S	M	T	W	T	F	S	Modules
January	Week							
	0	14	15	16	17	18	19	20
	1	21	22	23	24	25	26	27
February	2	28	29	30	31	1	2	3
	3	4	5	6	7	8	9	10
	4	11	12	13	14	15	16	17
reading-week		18	19	20	21	22	23	24
March	5	25	26	27	28	1	2	3
	6	4	5	6	7	8	9	10
	7	11	12	13	14	15	16	17
	8	18	19	20	21	22	23	24
easter-break		25	26	27	28	29	30	31
April		1	2	3	4	5	6	7
	9	8	9	10	11	12	13	14
	10	15	16	17	18	19	20	21
	11	22	23	24	25	26	27	28
May	12	29	30	1	2	3	4	5
reading-weeks		6	7	8	9	10	11	12
		13	14	15	16	17	18	19
	1	20	21	22	23	24	25	26
June	2	27	28	29	30	31	1	2
	3	3	4	5	6	7	8	9
	4	10	11	12	13	14	15	16
	5	17	18	19	20	21	22	23

2018	Onsite Sessions
18	January
15-16	June

Programming Fundamentals	
	
algorithms · data structures · processing · java · classes · libraries	
10 Credits	5 Credits

ICT Skills Studio	
	
Javascript · node · express · git · github · glitch	
5 Credits	

Calendar - Semester 2

Semester 2	S	M	T	W	T	F	S	Modules
September	2	3	4	5	6	7	8	
	1	9	10	11	12	13	14	comp sys & database
	2	16	17	18	19	20	21	comp sys & database
	3	23	24	25	26	27	28	comp sys & database
October	4	30	1	2	3	4	5	comp sys & database
	5	7	8	9	10	11	12	comp sys & database
	6	14	15	16	17	18	19	comp sys & database
	7	21	22	23	24	25	26	comp sys & database
November	reading-week	28	29	30	31	1	2	3
	8	4	5	6	7	8	9	comp sys & database
	9	11	12	13	14	15	16	comp sys & database
	10	18	19	20	21	22	23	comp sys & database
December	11	25	26	27	28	29	30	1 comp sys & database
	12	2	3	4	5	6	7	comp sys & database
		9	10	11	12	13	14	15
		16	17	18	19	20	21	22
		23	24	25	26	27	28	29

2018 | Onsite Sessions

21 September

22 December
(written examination)

Computer Systems & Networks



logic · computer organisation · os · networks · interfaces · sensors

10 Credits

Databases



entities · tables · rows · sql · er · nosql

5 Credits

Timetable

Weekly Webinar Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:45				10:45
12:15 Programming <i>Webinar</i> 12:15-2:00 A&B		12:15 Programming <i>Webinar</i> 12:15-2:00 A&B		12:15 Web Development <i>Webinar</i> 12:15-2:00 A&B
2:00				13:45
15:15				15:15

'Live' Lab Support Availability - Group A

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:45				10:45
			Programming Lab Support <i>Slack</i> 10:45-12:15 A	
12:15	Programming Lab Support <i>Slack</i> 12:15-13:45 A			12:15
			Web Development Lab Support <i>Slack</i> 12:15-13:45 A	
13:45				13:45
				15:15
15:15				

'Live' Lab Support Availability - Group B

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:45				10:45
				12:15
12:15				12:15
				13:45
13:45				13:45
14:15	<p>Programming Lab Support <i>Slack</i> 14:15-15:45 B</p>		<p>Programming Lab Support <i>Slack</i> 14:15-15:45 B</p>	<p>Web Development Lab Support <i>Slack</i> 13:45-15:15 B</p>
15:45				15:15

Weekly Timetable: Summary

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:45			Programming Lab Support <i>Slack</i> 10:45-12:15 A	10:45
12:15	Programming <i>Webinar</i> 12:15-2:00 A&B	Programming Lab Support <i>Slack</i> 12:15-13:45 A	Programming <i>Webinar</i> 12:15-2:00 A&B	Web Development <i>Webinar</i> 12:15-2:00 A&B
13:45				12:15
14:15	Programming Lab Support <i>Slack</i> 14:15-15:45 B		Programming Lab Support <i>Slack</i> 14:15-15:45 B	Web Development Lab Support <i>Slack</i> 13:45-15:15 B
15:45				15:15

Assessment Sequencing

Semester 1 Assessment Schedule

	Jan	February				March				April				May				June					September
week no.	1	2	3	4	rd.	5	6	7	8	easter	9	10	11	12	rd.	1	2	3	4	5			
Programming								A1				A2											
Web Development																							
ICT Skills																							A

- All assessments for this semester:
 - individual projects
 - specifications released & projects submitted on Sundays
 - 3 project for programming
 - 2 for web development
 - 1 for Skills Studio

Programming	A1	spec:	18-Feb
		submit:	10-Mar
	A2	spec:	18 Mar
		submit:	8 Apr
	A3	spec:	18 Apr
		submit:	21 May
Web Development	A1	spec:	4-Feb
		submit:	25 Mar
	A2	spec:	18 Apr
		submit:	21 May
ICT Skills	A	spec:	11-Jun
		submit:	2-Sep

Questions?

Strong Industry Support

Mr Eamonn De Leastar,
Waterford Institute of Technology,
Cork Road,
Waterford.
18th December 2012.

Dear Eamonn,

On behalf of FUSE I would like to express our support for this program. We believe that this program offers a unique opportunity to bring academic and industry expertise together.



Local Procurement Project



amazing experiences!

Eamonn de Leastar
Waterford Institute of Technology
Cork Road,
Waterford,
Ireland

Dear Mr de Leastar,



info@cernam.com

www.cerna

elfield, Dublin 4

ppard,
Computing, Maths & Physics,
ence,
nstitute of Technology

n that Cernam would like to support WIT
course.

ME specialising in digital evidence and in
operate with WIT on this programme and

Zolk C Limited,
Carriganore,
Co. Waterford



Online
Betapond.com
info@Betapond.com
Facebook/Betapond
@Betapond

Eamonn de Leastar,
WIT,
Cork Road,
Waterford.

Commitment to sup

To whom it concerns,
Betapond is an SME that employs
Waterford and London. Betapond



Arclabs Research & Innovation Centre
WIT West Campus, Carriganore, Waterford

17 December, 2012

Dear Eamonn,

Arclabs Research & Innovation Centre is the South technology companies. Since its inception in 2005 many of which are spin-outs from research at WIT incubator provides a base for the New Frontiers Enterprise Platform Programme) and many of the centre. Arclabs is also the focal point for helping In the past five years, more than 280 innovation projects in the region and beyond.

The biggest challenge facing high-growth technology resources, such as developers and early-stage companies recognise an aptitude for software development.

OSS Sof

RE: HEA Skills Shortage, WIT one-year Higher Diploma in Computing

Eamonn de Leastar
Department of Computing, Mathematics & Physics
Waterford Institute of Technology
Cork Road
Waterford
IRELAND

Dear Eamonn,

FEEDHENRY™

FeedHenry Ltd.
Arclabs Research & Innovation Building
WIT West Campus
Carriganore
Co. Waterford
Ireland

Micheal.OFoghlua@feedhenry.com
+353 51 302963 (office)
+353 86 8044640 (mobile)

12th December 2012

nearForm

Exceptional Web & Mobile Development
Waterford, Ireland
Phone: +353 01 5143545
Email: contact@nearform.com

14 Dec 2012



Waterford Institute of Technology
Cork Rd

Dear Sir/Madam,

nearForm Ltd is a technology business is internationally Romania. The company to operate at an international

The company principals education, graduate place relationship by supportin

Telecommunications Software & Systems Group
Arclabs Research & Innovation Building,
WIT, West Campus,
Carriganore,
Co. Waterford,
Ireland.

15th December, 2012

To Whom it may Concern,

TSSG is an internationally recognised center of excellence for ICT research and innovation. We carry out a wide spectrum of industry-informed research in Information and Communications Technologies (ICT), particularly technologies enabling communications and information services. We create economic impact by translating our knowledge base and innovation into leading edge products and services by continuing our engagement with industry in collaborative R&D, knowledge generation and transfer. Over the past five years, TSSG has delivered innovative solutions to over 110 Irish companies, and has created 11 spin out companies in the South East.

The proposed programme represents an outstanding opportunity for the TSSG to continue its mission to the region. From our perspective, the curriculum aligns closely with the needs of ICT industry nationally, the applied research conducted within the group and specifically the needs of the cluster of enterprises that are co-located with the TSSG at Carriganore and Killaloe, South East Ireland.

ALPHAWAVE
COMMUNICATIONS

Unit 57
Westside Business Park
Old Kilmeaden Road
Waterford

t: 051 - 344107
f: 051 - 341107
e: info@alphawave.ie
vat: IE 9563539U

Friday, 14 December 2012

Re: Expression of Interest -



Arclabs, WIT West Campus
Carriganore, Waterford.

t: + 353 51 306 286
e: waterford@emagine.ie
w: www.emagine.ie



t: +353 51 302920
f: +353 51 341100
e: info@tssg.org
w: www.tssg.org

design an
thing from
it.

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jects as our

Laptop

Recommendations

- It is strongly recommended you have a laptop for this programme

- Recommended Minimum Specification:

- Intel Core i5, 8Gb RAM or mac equivalent, + 200gb HD (SSD preferable)

Macbook
Pro



Lenovo
Thinkpad
T440S



premium developer laptops

Opportunities for Further Study

- The development team are closely involved in the delivery of two potential follow-on graduate programmes:
 - MSc in Communications Software
 - MSc in Enterprise Software Systems
- These are mature courses, closely aligned with research at TSSG, with substantial enrolments in part-time mode from industry practitioners in the region.
- Successful candidates could continue their academic development in part-time or full-time capacity.

