Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

Higher Diploma in Science in Computer Science

2019 - 2020

Agenda for Induction Day

10:00		*Flexible Teaching Building: Room: FTG23*
	Eamonn de Leastar, Com Dunphy, Joan Mangan	**Programme Overview** Programme Structure & Assessment Online resources and modes of delivery
11:00		
11:00	**Coffee Break**	
11:30		*Flexible Teaching Building: Room: FTG23*
	Colm Dunphy, Patrick Felicia Johnathan Brazil Eamonn de Leastar Annetta Stack Frank Walsh Mary Lyng	**Curriculum Overviews** Programming Web Development Computer Systems Database
12:30	**Gallery** Lunch	
13:30	*Walton Building Room: IT101*	*Walton Building Room: IT102*
	Web Development A Eamonn de Leastar Annetta Stack	**Programming B** Colm Dunphy, Patrick Felicia Johnathan Brazil
15:00	**Coffee Break**	
	Walton Building Room: IT101	*Walton Building Room: IT102*
15:30	**Programming A** Colm Dunphy, Patrick Felicia Johnathan Brazil	**Web Development B** Eamonn de Leastar Annetta Stack
17:00		

Agenda

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

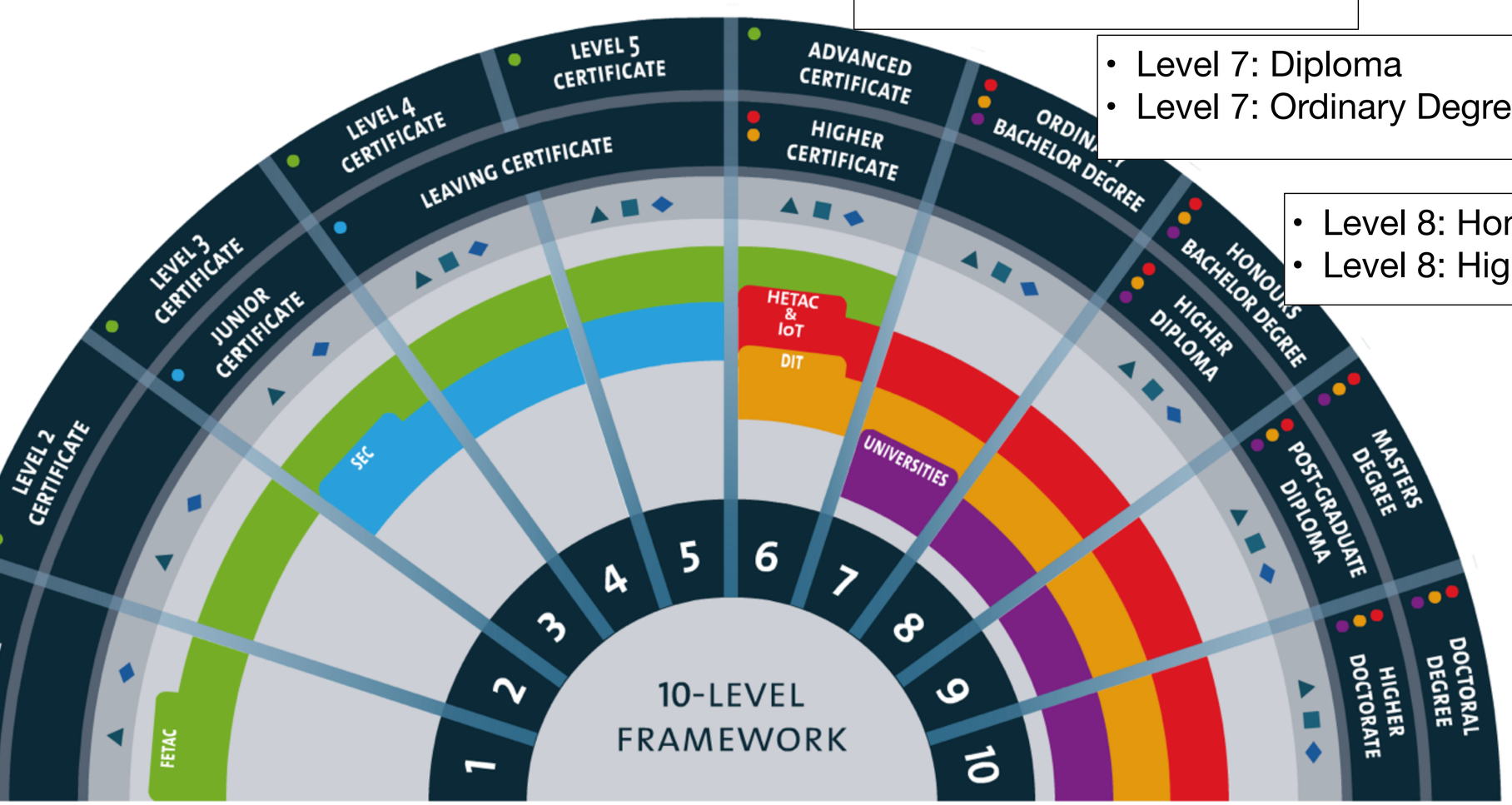
Context & Objectives

Qualification/Programme Levels....

- Level 6: Certificate
- Level 6: Higher Certificate

- Level 7: Diploma
- Level 7: Ordinary Degree

- Level 8: Honours Degree
- Level 8: Higher Diploma



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...”

*‘ICT and Software Development Skills Programme’ HEA Call for Proposals / Terms & Conditions, November 2012

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...”

*‘ICT and Software Development Skills Programme’ HEA Call for Proposals / Terms & Conditions, November 2012

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..."

**'ICT and Software Development Skills Programme' HEA Call for Proposals / Terms & Conditions, November 2012*

Semesters

Semester 1: Jan-June 2019

timetables · semester calendars · assessment schedules

Semester 2: Sep-Dec 2019

timetables · semester calendars · assessment schedules

Semester 3: Jan-Jun 2020

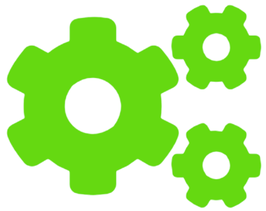
timetables · semester calendars · assessment schedules

Semester 4: Sep-Dec 2020

timetables · semester calendars · assessment schedules

9 Modules, 3 On Sites + Project/Placement

Programming



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

10 Credits

Web Development

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

5 Credits

Skills Studio 1

javascript · node · express · git · github · glitch

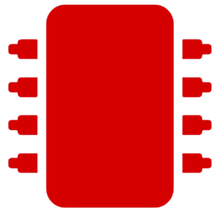
2.5 Credits

June Onsite

industry partners · semester 4 preview

0 Credits

Computer Systems & Networks



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

10 Credits

Databases

entities · tables · rows · sql · er · nosql

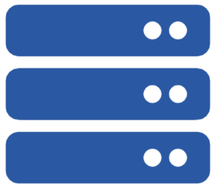
5 Credits

January Onsite

industry partners · agile workshop · semester 3 previews

0 Credits

Enterprise Web Development



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

10 Credits

Developer Operations

mvc · node · security · apis · tdd · frameworks

5 Credits

June Onsite

industry partners · git workshop · semester 2 previews

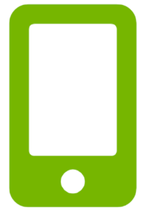
0 Credits

Skills Studio 2

javascript · client-side · react · apis · routing · testing

2.5 Credits

Mobile App Development



layouts · activities · resources · lifecycle · widgits · ux

10 Credits

Project

proposal · specification · plan · iterations · implementation · report · demo

25 Credits

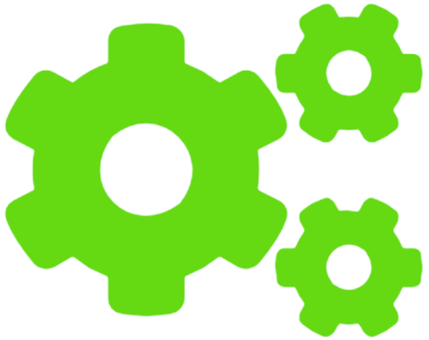
Work Placement

industry partner · mentor · developer · experience · project

25 Credits

Semester 1: January - June, 2019

Programming



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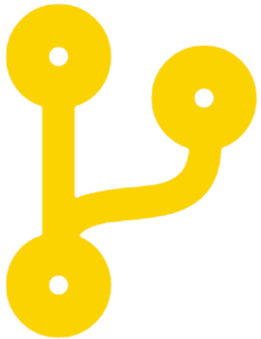
Skills Studio 1



javascript · node · express · git · github · glitch

2.5 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..**"*

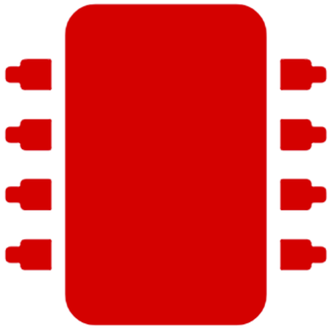
Semester 2: June-December 2019

June Onsite

industry partners · git workshop · semester 2 previews

0 Credits

Computer Systems & Networks



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

10 Credits

Databases

entities · tables · rows · sql · er · nosql

5 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.."*

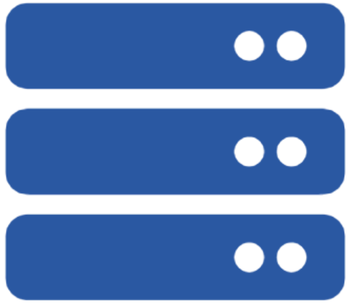
Semester 3: January-June 2020

January Onsite

industry partners · agile workshop · semester 3 previews

0 Credits

Enterprise Web Development



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

10 Credits

Developer Operations

mvc · node · security · apis · tdd · frameworks

5 Credits

Skills Studio 2

javascript · client-side · react · apis · routing · testing

2.5 Credits

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

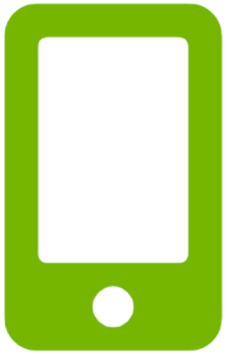
Semester 4: June-December 2020

June Onsite

industry partners · semester 4 preview

0 Credits

Mobile App Development



layouts · activities · resources · lifecycle · widgits · ux

10 Credits

Project

proposal · specification · plan · iterations · implementation · report · demo

25 Credits

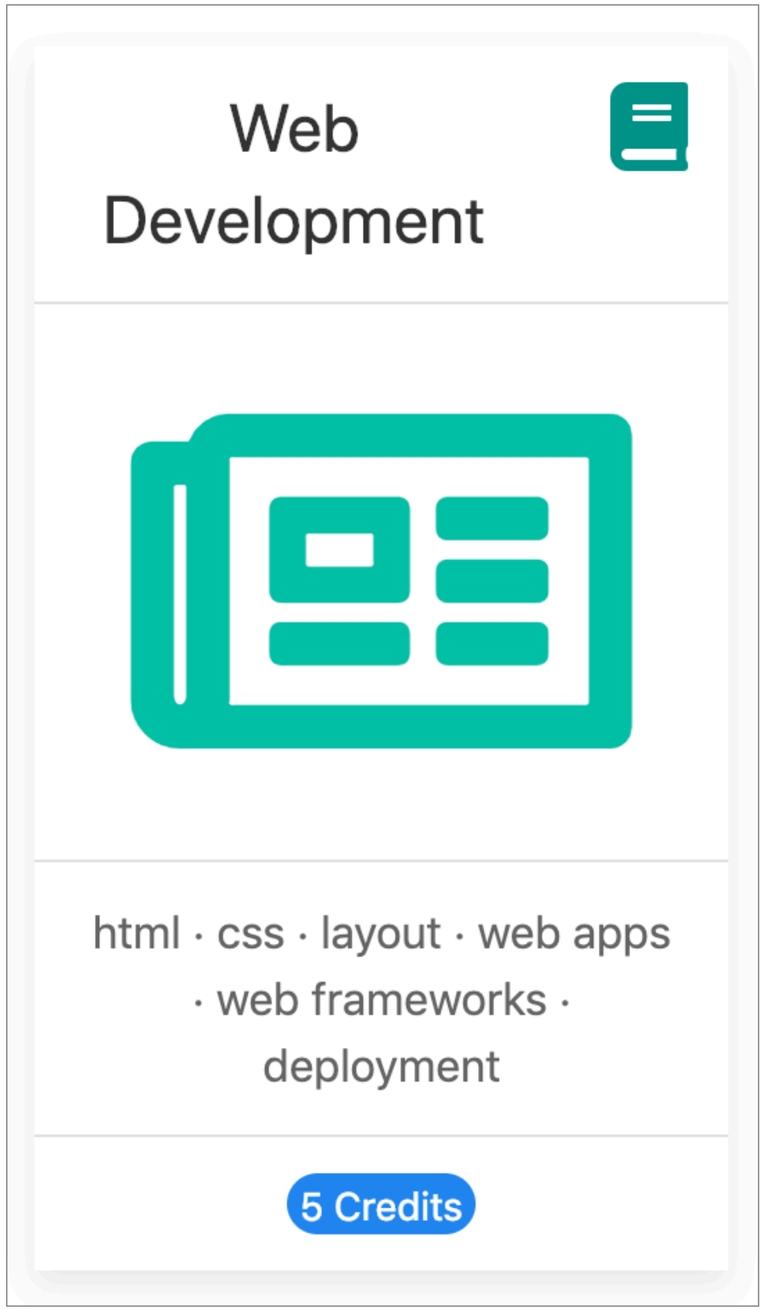
Work Placement

industry partner · mentor · developer · experience · project

25 Credits

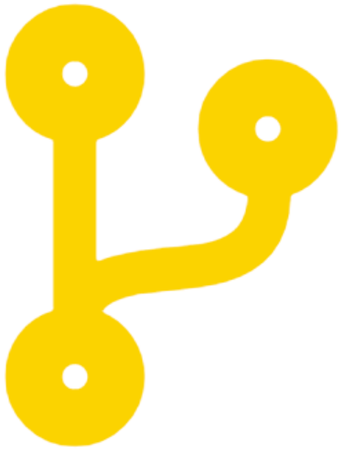
"… students are expected to take a specialisation which reflects their own strengths as demonstrated on the programme to date..."

- 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



- 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
- Understand the difference between a web site and a web app. Be able to design and implement a simple web app.
- Implement a simple Model View Controller application pattern for a web app.

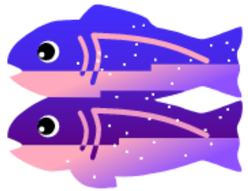
Skills Studio 1



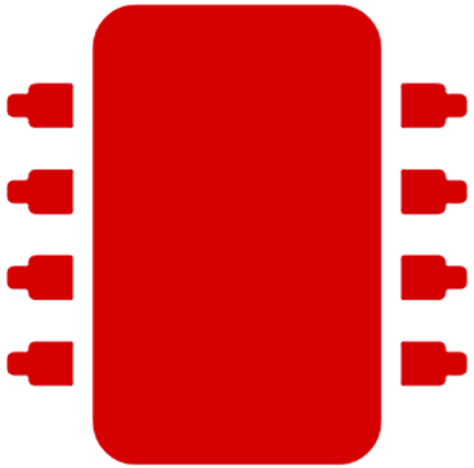
javascript · node · express · git · github · glitch

2.5 Credits

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



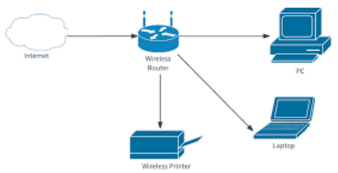
Computer Systems & Networks

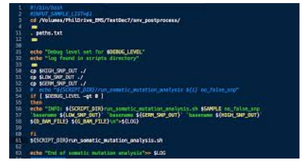


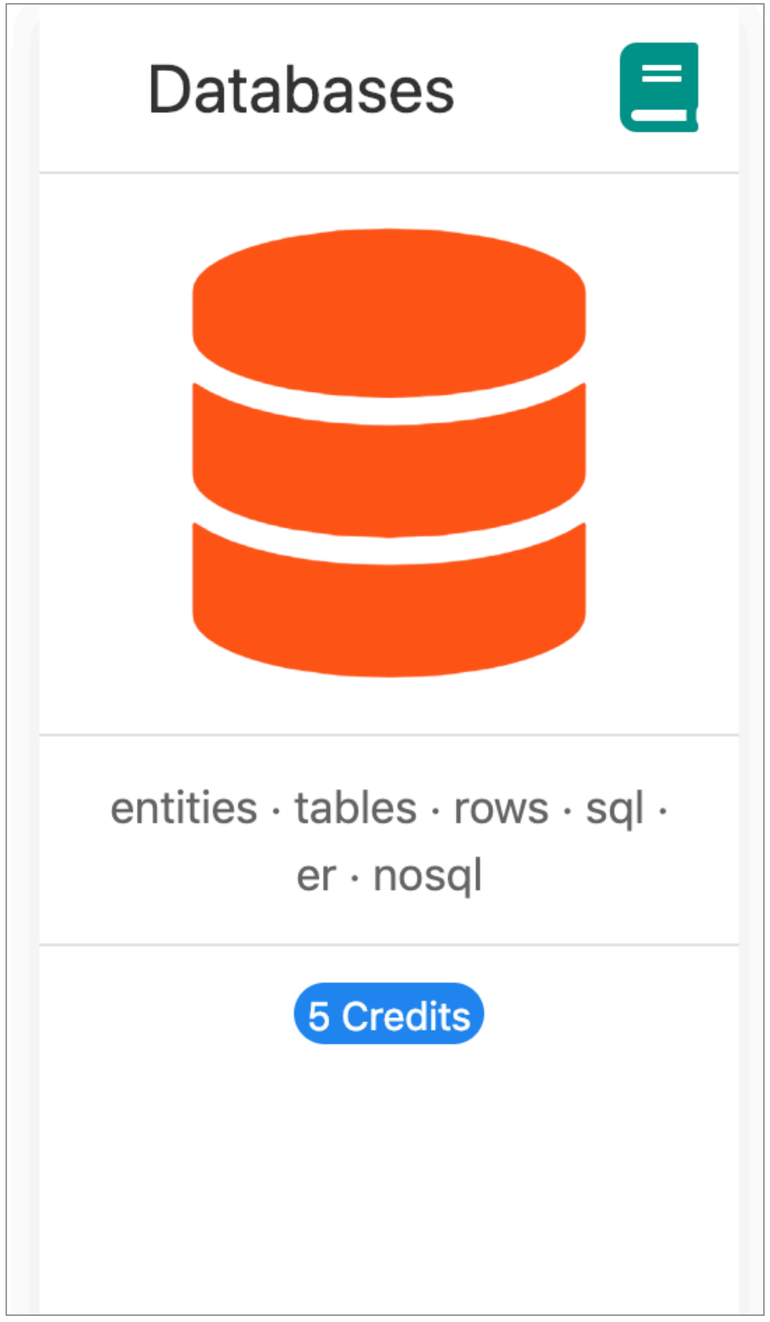
logic · computer organisation · os · networks · interfaces · sensors

10 Credits

- 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.







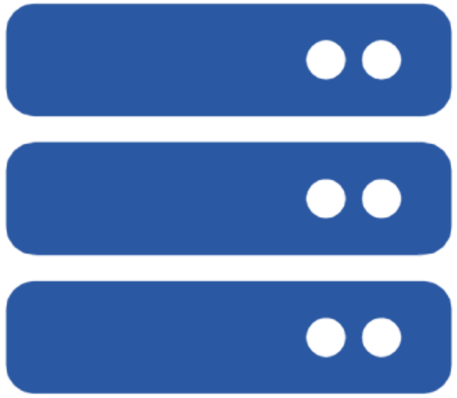
- Discuss the role of a database and its management system.
- Draw Entity Relationship (ER) diagram from an application problem and reproduce this diagram into a set of normalised relations, which are ready for database implementation.
- Design a NoSQL database suitable for a distributed environment 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

MySQL™

ORACLE

mongoDB®

Enterprise Web Development



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

10 Credits

- 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

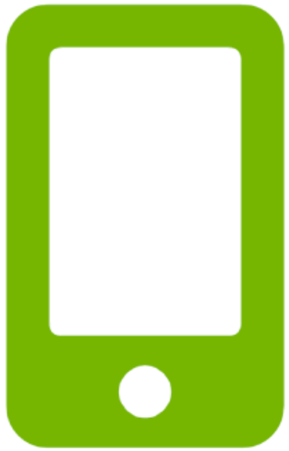
Developer Operations

mvc · node · security · apis · tdd · frameworks

5 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.

Mobile App Development



layouts · activities · resources · lifecycle · widgits · ux

10 Credits

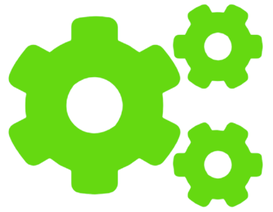
- Decompose an application into its constituent parts, including but not limited to: core application components, user experience resources, packaging.
- Design a coherent User Experience - using appropriate tools, practices and guidelines - for a moderately sized application. Produce a medium sized application, based on a limited set of design patterns.
- Manage the application lifecycle. Structure persistent storage on a device and reliably save and restore application state.
- Select the appropriate design patterns and tools in the development of complex mobile apps.
- Comment on the chosen mobile app framework and the underlying hardware components.
- Design and develop complex multi-screen mobile apps from concept through to completion using best practices and guidelines.
- Set up the interaction of an application with internal sensors and physical subsystems.
- Integrate a remote service API within an application, perhaps based on REST principles, to deliver aspects of its core features set.

Firebase

Calendar

Semester 1		S	M	T	W	T	F	S	Modules
January	Week	6	7	8	9	10	11	12	
	1	13	14	15	16	17	18	19	programming & web dev
	2	20	21	22	23	24	25	26	programming & web dev
	3	27	28	29	30	31	1	2	programming & web dev
February	*4*	3	4	5	6	7	8	9	programming & web dev
	5	10	11	12	13	14	15	16	programming & web dev
	reading-week	17	18	19	20	21	22	23	
	6	24	25	26	27	28	1	2	programming & web dev
March	*7*	3	4	5	6	7	8	9	programming & web dev
	8	10	11	12	13	14	15	16	programming & web dev
	reading-week	17	18	19	20	21	22	23	
	9	24	25	26	27	28	29	30	programming & web dev
April	*10*	31	1	2	3	4	5	6	programming & web dev
	11	7	8	9	10	11	12	13	programming & web dev
	Easter-break	14	15	16	17	18	19	20	
	Easter-break	21	22	23	24	25	26	27	
	12	28	29	30	1	2	3	4	programming & web dev
May	*reading-week*	5	6	7	8	9	10	11	
	reading-week	12	13	14	15	16	17	18	
	13	19	20	21	22	23	24	25	skills studio 1
	14	26	27	28	29	30	31	1	skills studio 1
June	*15*	2	3	4	5	6	7	8	skills studio 1
	16	9	10	11	12	13	14	15	skills studio 1 & on site
	17	16	17	18	19	20	21	22	skills studio 1
	18	23	24	25	26	27	28	29	skills studio 1

Programming



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

10 Credits

Web Development

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

5 Credits

Skills Studio 1

javascript · node · express · git · github · glitch

2.5 Credits

June Onsite

industry partners · semester 4 preview

0 Credits

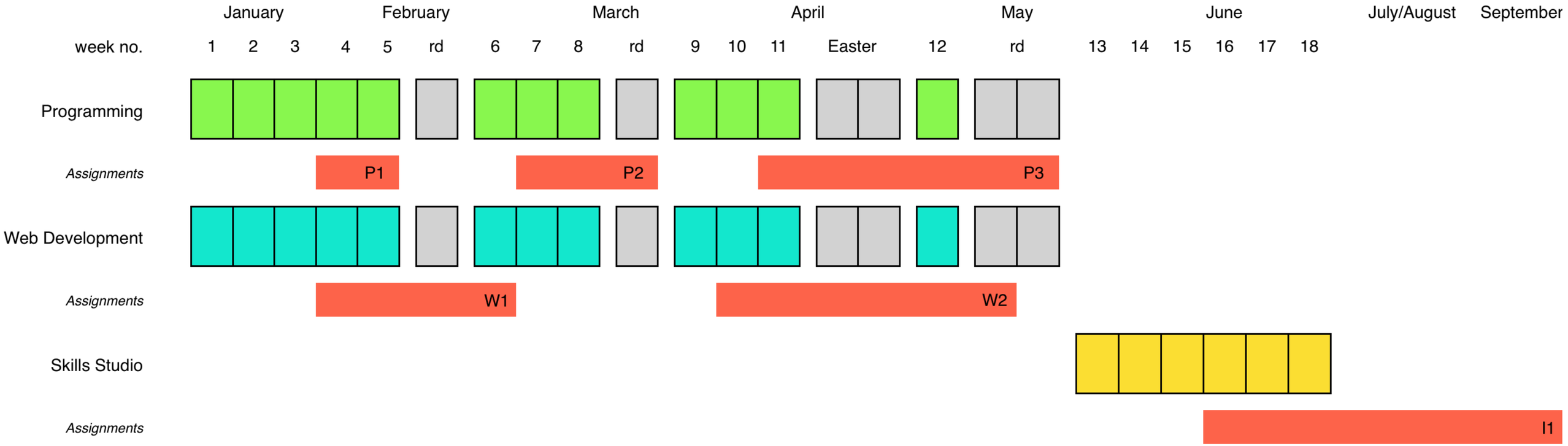
Timetable

Weekly Webinar Schedule

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

Assessment Sequencing

Semester 1 Assessment Schedule



- individual projects
- 3 project for programming
- 2 for web development
- 1 for Skills Studio

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.