School/Department: Computing
Date: 20 March 2020
Title of the Programme: BSc Hons in Computer Science Level 8 - 180 ECTS Credits
Chairperson: Dr Michele Glacken, Registrar, IT Sligo
Members of the Panel: Dr Michele Glacken, Registrar, IT Sligo; Fiona Lawless, Head of Department of Computing, Dundalk IT; Aisling Bonner, Research Masters, Letterkenny IT; David McVeigh, Senior Director Technology, Optum; Professor Tomas Ward, DCU
Secretary: Dr Anne Burke
LYIT Staff: Dr Gertie Taggart, Thomas Dowling, John Conaghan, Dr Gary Cullen, Dr Nigel McKelvey, Dr James Connolly

Criteria for the Validation of a New Programme

1. The Programme Aims and Objectives are clear and consistent with the Award sought.
2. The Programme concept, implementation strategy are well informed and soundly based.
3. The Programme's Access, Transfer and Progression arrangements are satisfactory.
4. The Programme's written curriculum is well structured and fit for purpose.
5. There are sufficient qualified and capable programme staff.
6. There are sufficient physical resources to implement the programme as planned.
7. The learning environment is consistent with the needs of the programme learners.
8. There are sound Teaching, Learning and Assessment Strategies.
9. Learners enrolled on the Programme will be well informed, guided and cared for.
10. The Programme will be well managed.

For the attention of the Academic Council)

Note: It is Institute policy to publish the Final Reports of the Panel of Assessors

The Panel of Assessors wishes to commend the programme team on developing a novel well-researched programme that clearly meets market demands.

The Panel of Assessors advises the Academic Council that the Institute and the

School/Department should take cognisance of following recommendations:

- Reflect on the appropriateness of the entry requirement and keep under review
- Formalise the workshops
- Budget for computing resources
- Review all modules in terms of: prerequisites (if none clearly state this), that all learning outcomes are numbered correctly, learning outcomes are assessed as appropriate, assessment breakdown matches programme schedule

The Panel of Assessors advises the Academic Council that approval of the programmes subject to general conditions of approval together with the following additional conditions:

None

Response to the Recommendations from the Department of Computing

· Reflect on the appropriateness of the entry requirement and keep under review

The development team feels that, at this time, the entry requirements are appropriate. However, we undertake to monitor student performance and if students who are close to the threshold for entry to the programme are struggling then additional supports will be put in place to assist them. Also, the entry requirements will be reviewed during the first year and will be raised if it appears that student who are close to the threshold for entry to the programme are struggling.

· Formalise the workshops

We are committed to providing extra support for incoming students as and when they need it. All students on the BSc (Hons) in Computer Science (Year 1) will be surveyed at registration to determine topics covered during their Leaving Certificate curriculum. The survey will seek to gauge knowledge as it pertains to:

- Computer Architecture
- Programming fundamentals
- Web Development and HCI
- Database Technology
- Computer Ethics
- Maths for Computing (e.g. binary, hexadecimal etc)

The survey results will enable the Computing Department to organise any required workshops and make them available accordingly. As the Computing Department currently run a HDip in

Computing for Educators as well as a Masters in Computer Science Education Research, there already exists a suite of online content and practical workshops in these key areas. The workshops will not be credit bearing.

Computer Labs will be blocked booked for Friday afternoon workshops in the college with key staff available to contribute. These drop-in sessions will be based around the needs of students. Online support via our Virtual Learning Environment can also be provided.

In addition, each student on the course will be able to participate in our successful peer-mentoring program. This program pairs first year students up with more experienced students from later years of computing courses. These peer mentors provide support for first year students as and when they need it.

Note the Teaching and Learning Strategy has been updated to reflect this information.

· Budget for computing resources

The Department of Computing has built up a significant teaching infrastructure over the past eight years. The Letterkenny I.T. Computing Data Center established in 2012 has grown over the years. In its current setup which resembles a production data center, products and technologies are showcased, and real world demonstrations are held for students showing common configurations found in any data center. The Department has invested heavily in this infrastructure with, for example, an investment of €100,000 in 2018/19. The department will continue to invest with a new modernised and expanded room dedicated to the infrastructure coming online in 2020.

For server configuration we have two Dell M1000e blade servers hosting multiple half height blade servers with virtual interfaces 10G interfaces with separate fibre channel cards, combined with a selection of twenty older style 1u HP servers. In 2018/19 there was a capital investment which purchased an additional cluster of 16 modern dell 1u servers, with two 10G ethernet interfaces for demonstration of VSAN technology from VMWare. Presently the CDC employs a mixed architecture of Microsoft Hyper-V and VMWare ESXi to showcase virtualisation within a modern data center, and to be vendor agile.

From a networking aspect, we have secured with the same capital investment four Cisco Nexus switches, with a combined density of 2.56 Terabits of switching capacity, which added to the existing Cisco chassis-based switches and centralised wireless LAN controller. Fortinet are a longstanding partner for firewalled solutions and for edge protection and VPN capability, with various Fortinet FortiGate devices used for teaching and demonstration purposes.

At an infrastructure level electrical power is managed by APC typically, using APC Zero PDU for server management and power monitoring and isolation, combined with multivendor UPS solutions with varying levels of management and power resilience.

The entire solution is integrated with the main campus allowing for access from both the campus and remote access to the data center for students to carry out routine or project-based work. The entire CDC is managed using its own independent Microsoft Active Directory domain, and multiple subdomains for demonstration present.

The CDC created a unique learning environment for students to be exposed to every aspect of a modern business infrastructure found from SME to large enterprise, it fosters enthusiasm and combines a number of products and technology to provide a wholistic picture of what server rooms, cloud instances and production IT is really comprised of.

The Department of Computing also has learning agreements with 15 industry leading companies including the following:

Microsoft

LYIT's Computing Department has been a member of the Microsoft Azure educator grants programme since early 2016. LYIT students can access some of their popular cloud services such as Machine Learning, DBMS, and developer tools for free. Students can also implement other services using free credits through these options:

- Azure for Students – students can use $100 of Azure credits for 12 months with their free tier of services
- Azure for Students Starter – students can use select Azure products such as App Services for free
- Azure Free Account – students can access $200 of Azure credits for one month with free tier of services. This option requires a credit card and is the best fit for evaluating Azure services.

Amazon

LYIT have been part of the Amazon Web Services (AWS) Educate programme since 2015. This entitles all students and staff to credits for use of Amazon AWS services.

Google Cloud

LYIT is a member of the Google Cloud Platform (GCP) teaching credits programme. Academic staff can avail of $5000 free credits that are controlled through a centralised GCP dashboard, and credits can be individually assigned and controlled to each student, or groups of students.

Students can also access free tier services such as firestore, cloud run, Vision AI and cloud storage through the standard GCP free credit option. Students can receive $300 free GCP credits to allow them to access other services that are not provided under free tier services.

· Review all modules in terms of: prerequisites (if none clearly state this), that all learning outcomes are numbered correctly, learning outcomes are assessed as appropriate, assessment breakdown matches programme schedule

The policy of the Academic Council in LYIT is to discourage prerequisites in as far as is possible. Very few of the modules on this course have formal prerequisites. The document has been updated to reflect this.

PART 4 PROPOSED PROGRAMME SCHEDULE(S) please attach final schedule to bottom of the report.

Programme Schedule – Year 1 Semester 1

Name Of Provider:	Letterkenny Institute of Technology
Title Of Award:	BSc Honours in Computer Science
Area Of Specialisation:	Data Science
Learning Mode Offered:	Full-time
Stage:	1
Semester:	1
Date Effective:	September 2020

Semester	Title of examination subject	Subject status	ECTS credits		Contact hours (per week over 13 weeks)				Allocation of marks				
			Level	Number	L/T	P	Independent Learning	Total	CA	Project	Practical	Final	Max
1	Operating Systems	M	6	5	2	2	4	8	50			50	100
1	Object Oriented Programming	M	6	10	2	6	9	17	60			40	100
1	Social and Digital Communication	M	6	10		6	11	17	100				100
1	Mathematics for Computing 1	M	6	5	2	2	4	8	30			70	100

Total ECTS credits required for stage: **30**

Special Regulations:

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Programme Schedule – Year 1 Semester 2

Name Of Provider: Letterkenny Institute of Technology

Title Of Award: BSc Honours in Computer Science

Area Of Specialisation: Data Science

Learning Mode Offered: Full-time

Stage: 1

Semester: 2

Date Effective: September 2020

Semester	Title of examination subject	Subject status	ECTS credits		Contact hours (per week over 13 weeks)				Allocation of marks				
			Level	Number	L/T	P	Independent Learning	Total	CA	Project	Practical	Final	Max
2	IT Infrastructure	M	6	5	2	2	4	8	50			50	100
2	Algorithmic Programming	M	6	10	2	6	9	17	50			50	100
	Database Technology	M	6	5	2	2	4	8	100				100
2	Introduction to Cloud and Mobile Technologies	M	6	5	2	2	4	8	60			40	100
2	Mathematics for Computing 2	M	6	5	2	2	4	8	30			70	100

Total ECTS credits required for stage: **30**

Special Regulations:

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Programme Schedule – Year 2 Semester 3

Name Of Provider:	Letterkenny Institute of Technology
Title Of Award:	BSc Honours in Computer Science
Area Of Specialisation:	Data Science
Learning Mode Offered:	Full-time
Stage:	2
Semester:	3
Date Effective:	September 2020

Semester	Title of examination subject	Subject status	ECTS credits		Contact hours (per week over 13 weeks)				Allocation of marks				
			Level	Number	L/T	P	Independent Learning	Total	CA	Project	Practical	Final	Max
3	Advance IT Infrastructure	M	7	5	2	2	4	8	50			50	100
3	Academic and Technical Writing Skills	M	7	5	1	2	5	8	100				100
3	Software Implementation	M	7	10	2	2	4	8	60			40	100
3	Object Oriented Analysis and Design	M	7	5	1	2	5	8	50			50	100
3	AI and Machine Learning	M	7	5	1	2	5	8	100				100
3	Scripting	M	7	5	1	2	5	8	50			50	100

Total ECTS credits required for stage: **30**

Special Regulations:

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Programme Schedule – Year 2 Semester 4

Name Of Provider:	Letterkenny Institute of Technology
Title Of Award:	BSc Honours in Computer Science
Area Of Specialisation:	Data Science
Learning Mode Offered:	Full-time
Stage:	2
Semester:	4
Date Effective:	September 2020

Semester	Title of examination subject	Subject status	ECTS credits		Contact hours (per week over 13 weeks)				Allocation of marks				
			Level	Number	L/T	P	Independent Learning	Total	CA	Project	Practical	Final	Max
4	Cybersecurity	M	7	5	1	2	5	8	100				100
4	Team Project	M	7	5		4	4	8		100			100
4	Secure Programming	M	7	5	1	2	5	8	40			60	100
4	Project Management	M	7	5	2	2	4	8	40			60	100
4	Data Analytics	M	7	5	2	2	4	8	100				100
4	Server-Side Scripting	M	7	5		4	4	8	100				100

Total ECTS credits required for stage: **30**

Special Regulations:

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Programme Schedule – Year 3 Semester 5

Name Of Provider:	Letterkenny Institute of Technology
Title Of Award:	BSc Honours in Computer Science
Area Of Specialisation:	Data Science
Learning Mode Offered:	Full-time
Stage:	4
Semester:	5
Date Effective:	September 2020

Semester	Title of examination subject	Subject status	ECTS credits		Contact hours (per week over 13 weeks)				Allocation of marks				
			Level	Number	L/T	P	Independent Learning	Total	CA	Project	Practical	Final	Max
5	DevOps	M	8	5	1	2	5	8	50			50	100
5	Research in Computing with Emerging Technologies	M	8	10	2	4	11	17	100				100
5	Software Engineering	M	8	5	2	1	5	8	40			60	100
5	Data Science 1	M	8	5	1	2	5	8	100				100
5	Client-Side Scripting	M	8	5		3	5	8	100				100

Total ECTS credits required for stage: 30

Special Regulations:

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Programme Schedule – Year 3 Semester 5

Name Of Provider:	Letterkenny Institute of Technology
Title Of Award:	BSc Honours in Computer Science
Area Of Specialisation:	Data Science
Learning Mode Offered:	Full-time
Stage:	4
Semester:	6
Date Effective:	September 2020

Semester	Title of examination subject	Subject status	ECTS credits		Contact hours (per week over 13 weeks)				Allocation of marks				
			Level	Number	L/T	P	Independent Learning	Total	CA	Project	Practical	Final	Max
6	Legal, Ethical and Social Issues in Computing	M	8	5	1	2	5	8	30			70	100
6	Project Development	M	8	10		6	11	17		100			100
6	UX Design	M	8	5	1	2	5	8	100				100
6	Data Science 2	M	8	5	1	2	5	8	100				100
6	Computer Science	M	8	5	1	2	5	8	30			70	100

Total ECTS credits required for stage: **30**

Special Regulations:

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Programme Evaluation Report Approved by:

Michèle Glacken

Dr. Michele Glacken

Chair to Panel

(Registrar IT Sligo)

Date 16.12.2020

Billy Bennett

(VP for Academic Affairs and Registrar, Letterkenny IT)

Date 16/12/20.

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