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## Report of the Programme Evaluation Panel

<b>Provider's Name:</b>	National College of Ireland
<b>Address:</b>	Mayor Square
	IFSC
	Dublin 1
<b>QA procedures agreed on:</b>	2006
<b>QA procedures reviewed on:</b>	2010
<b>Programme submitted for approval*:</b>	<b>Leading to the award of:</b>
1. Higher Diploma in Science in Data Analytics	Higher Diploma in Science
2. Certificate in Data Analytics	Certificate in Data Analytics
3.	
4.	
5.	
<b>Date submitted to QQI:</b>	11 <sup>th</sup> April 2016
<b>Date of Evaluation:</b>	16 May 2016
<b>Date of Report:</b>	16 May 2016

### Membership of the Programme Evaluation Panel:

Role	Name	Area of Expertise	QQI Peer Review Reference Listing
<b>Chairperson</b>	Dr Joseph Ryan	Registrar, Athlone Institute of Technology	
<b>External Specialist</b>	Prof Christian Horn	Dundalk Institute of Technology	
<b>External Specialist</b>	Dr Liam Noonan	Limerick Institute of Technology	
<b>Industry/Employer Perspective</b>	Mr Derek Harnett	Intel	
<b>Rapporteur</b>	Dr Maurice FitzGerald	National College of Ireland	

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## 1 Profile of provider:

The National College of Ireland (NCI) has an immensely proud history as a third level educational institution. Established by the Jesuit order in 1951 as the Catholic Workers College it quickly gained recognition for excellence in its subject fields, particularly human resource management and industrial relations, and for the provision of high quality educational opportunities for employees entering third level education. In the late 1990's the College became the National College of Ireland and entered a new phase of its development expanding its part-time provision to a number of off-campus locations throughout the country and extending its full-time undergraduate programmes to include accountancy, finance and informatics. In 2002 the College moved from its original site in Ranelagh to a new 'State of the Art' purpose built premises in Dublin's International Financial Services Centre.

NCI's educational philosophy and operational structure embody participation, collaboration and applied problem solving strategies. These are enabled by a faculty whose qualifications and professional experience help integrate academic theory with current practical application. The College assesses both the quality of its academic programmes and the academic achievement of its students and utilises the results of these assessments to improve academic and institutional quality.

The primary focus of NCI is on maintaining a centre of excellence that is centered on the changing needs of today's learner. National College of Ireland provides a broad range of high-quality education programmes for today's knowledge-based society.

In line with its mission of widening access to education, the College places a strong emphasis on the needs of the learner, bringing a unique student-centered approach to all aspects of its teaching and research. National College of Ireland provides a range of learning options that extend beyond traditional classroom dynamics, including distance learning and internet-based learning programmes.


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## 2 Context of validation

National College of Ireland aims to alter the existing programme schedule, introduce some elective modules, and modify some existing modules associated with its validated Higher Diploma in Science in Data Analytics programme. This proposal details the proposed amendments and provides the rationale behind these proposed amendments.

The existing Higher Diploma in Data Analytics has been continuously provided by the National College of Ireland since 2013 and has been extremely successful in preparing learners in the basics of Data Analytics through building a foundation based on strong statistical knowledge, developing problem-solving skills for business analysis, and to be able to understand and use business data to deliver better decision-making. The programme team believes that the proposed amendments will enhance the potential of learners to develop relevant and required skillsets in the area of Data Analytics. The enhancements proposed is the addition of a new module Data Visualisation

In addition, as a result of the most recent Springboard call for tenders, an additional elective module – Domain Skills – has been included in the schedule. This module has been designed to accommodate localised requirements of specific companies or sectors who may wish to offer the programme in-house or to recruit candidates with a specific skillset.

This programme will continue to be delivered using industry relevant practical problems and case-studies. This approach has been successful in naturally fostering a deeper knowledge of subject areas and creating transferable skills for work such as critical thinking, problem solving, creative thinking and communication.

In accordance with QQI Criteria and Policy for Validation, these amendments have been proposed to be considered under differential validation. The report below therefore reflects the consideration of the panel on those elements of the programme that have been amended.

## 3 Planning:

*Programme development since agreement of QA procedures / the last review*

The College has developed a significant number of programmes since its last institutional review culminating in 2015 with a complete programmatic review of its portfolio across the Business, Computing and Education subject areas.

### 2.1. Purpose of the award

Does the proposed programme address a clear market demand?      Yes✓      No

### 2.2. Avoidance of duplication

Has the Programme Development Team identified the availability of similar programmes locally, regionally, nationally?

Yes✓      No

Comment: None

### 2.3. Stakeholder consultation


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Was the level of stakeholder engagement satisfactory? Yes✓ No

Comment: None

Support for the programme (industry/business/community) Yes✓ No

The programme is satisfied that the rationale for the amendments made have included appropriate consultation.

## 2.4 Efficient and effective use of resources

Does the proposed programme represent both efficient and effective use of the provider's resources?

Yes✓ No

Comment: None

## 2.5. Resource development over last 5 years (or in direct support of this programme)

*Specific Comments:*

*Staff:* The panel is satisfied that there are appropriate staff employed to deliver this programme.

*Accommodation:* The panel is satisfied that the College's accommodation is appropriate to this programme.

*Information technology:* The panel is satisfied that the College's ICT infrastructure is appropriate to this programme.

*Library:* The panel is satisfied that the College's Library & Information Service is appropriate to this programme.

*Administration:* The panel is satisfied that there are appropriate administrative and programme administration structures appropriate to this programme.

*Publicity/public information:* The panel is satisfied that appropriate marketing and public information materials are available

## 2.6. Planned development over the coming 5 years?

Have the QQI award standards been explicitly referred to in the programme and does the programme meet those standards at the specified level?

Yes✓ No

Comment: None

Has the Provider complied with Protection for Enrolled Learner requirements?

Yes✓ No

The panel understands that PEL requirements for any learners recruited under HEA labour activation schemes will be provided by the HEA. Otherwise PEL will be provided under an arrangement with HECA which is currently being finalised and will be made available to QQI prior to the enrolment of any learner.


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## 2.7. Access

*Is the expected minimum and maximum number of all learners entering the programme explicitly stated?*

Comment: None

Yes✓

No

*Have any/all prerequisite knowledge, skills or competence or any other specific entry requirement been articulated?*

Comment: None

Yes✓

No


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## 4 Quality Assurance

### 4.1 Application of agreed quality assurance procedures for development of programmes

*Were the agreed quality assurance procedures for programme development followed?*

Comment: None	Yes✓	No
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*Has the programme team demonstrated how programme delivery will be monitored in accordance with agreed QA procedures?*

Comment: None	Yes✓	No
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*Are programme management arrangements adequate and coherent?*

Comment: None	Yes✓	No
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## 2 Programme structure and content

*Is the programme structure well designed, coherent and fit for its stated purpose?*

Yes✓ No

The panel is satisfied that the programme structure has not been affected by the amendments proposed for the programme.

### 2.1 Programme learning outcomes

*Do the programme learning outcomes comply with national standards for the level of award proposed?*

Yes✓ No

While the programme learning outcomes have been previously reviewed, the panel requires that the programme learning outcomes are extracted from the mapping table. An exercise should be undertaken to ensure that the taxonomy used is consistently appropriate to the level of the programme and that they can be appropriately assessed at a modular level

*Are module descriptions adequate and relevant?*

Yes✓ No

Comment: None

*Are modules relevant and current?*

Yes✓ No

Comment: None

*Does the combination of modules chosen have the coherence to support the proposed award?*

Yes✓ No

The panel is satisfied that the coherence of the programme has not been affected by the amendments proposed.

### 2.2 Learning modes

*Can the teaching and learning strategies proposed support achievement of the required learning outcomes?*

Yes✓ No

Comment: None

*Are the delivery mechanisms proposed adequate to the needs of the programme and the proposed learner cohorts?*

Yes✓ No

Comment: None

### 2.2 Assessment strategies

*Are assessment processes and methods adequately described?*

Yes✓ No

*Are these strategies appropriate to this type of award, in terms of type, frequency and volume?*

Yes✓ No






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## 5.7 Programme titles and award

*Is the title consistent with national policy, is it informative and is it fit for purpose?*

Comment: None Yes✓ No

## 5.8 Transfer and Progression

*Has the Programme Development Team identified realistic transfer and progression opportunities/possibilities that learners may avail of following achievement of this award?*

Comment: None Yes✓ No


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## 2.2 Module Titles, Content and Assessment Strategy

### 2.2.1 Domain Skills

Is the title informative and is it fit for purpose? Yes✓ No

The panel recommends that as this concept is being introduced across a number of programmes, the title of the module should related at minimum to the subject area e.g. Domain Skills for Web Technologies.

Are the specific learning outcomes a) properly stated, b) sufficient and c) achievable?

Yes✓ No

The taxonomy used for the module learning outcomes should be reviewed to ensure that they are appropriate to the level and can be appropriately assessed

Is the content sufficiently informative and is it fit for purpose? Yes✓ No

Comment: None

Does the Assessment Strategy align sufficiently with the intended learning outcomes?

Yes✓ No

The parameters for the assessment of this module should be reviewed to ensure that it is scalable and that consistency can be achieved.

Is the required reading and supplementary reading appropriate, current and realistic?

Yes✓ No

Comment: None

### 2.2.2 Programming for Big Data

**The panel accepts the amendments made to the indicative content**

Is the title informative and is it fit for purpose? Yes✓ No

Comment: None

Are the specific learning outcomes a) properly stated, b) sufficient and c) achievable?

Yes✓ No

Comment: None

Is the content sufficiently informative and is it fit for purpose? Yes✓ No

The panel would like to see the indicative curriculum fleshed out further to make the content explicit. .

Does the Assessment Strategy align sufficiently with the intended learning outcomes?

Yes✓ No

Comment: None


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*Is the required reading and supplementary reading appropriate, current and realistic?*

Comment: None Yes✓ No

### 6.3 Data Visualisation

**The panel accepts the inclusion of this module as an elective module.**

*Is the title informative and is it fit for purpose?* Yes✓ No

*Are the specific learning outcomes a) properly stated, b) sufficient and c) achievable?*

Yes✓ No  
 The taxonomy used for the module learning outcomes should be reviewed to ensure that they are appropriate to the level and can be appropriately assessed

*Is the content sufficiently informative and is it fit for purpose?* Yes✓ No

Comment: None

*Does the Assessment Strategy align sufficiently with the intended learning outcomes?*

Yes✓ No  
 The parameters for the assessment of this module should be reviewed to ensure that it is scalable and that consistency can be achieved.

*Is the required reading and supplementary reading appropriate, current and realistic?*

Comment: None Yes✓ No

### 6.4 Data and Web Mining

**The panel accepts the amendments made to this module**

*Is the title informative and is it fit for purpose?* Yes✓ No

*Are the specific learning outcomes a) properly stated, b) sufficient and c) achievable?*

Yes✓ No  
 The taxonomy used for the module learning outcomes should be reviewed to ensure that they are appropriate to the level and can be appropriately assessed

*Is the content sufficiently informative and is it fit for purpose?* Yes✓ No

Comment: None

*Does the Assessment Strategy align sufficiently with the intended learning outcomes?*

Yes✓ No  
*Is the required reading and supplementary reading appropriate, current and realistic?*

Yes✓ No



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## 7.2 Recommendations:

- R1. Various typos occur throughout the paperwork but, given the fact that these documents constitute a public record, the many uses to which this paperwork can be used beyond this evaluation panel, etc., these should be eliminated as a matter of course.
  
- R2. Consider the titling of the Domain Skills module so that it accurately reflects its intent when applied across multiple programmes and/or subject domains.


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## Recommendation of the Evaluation Panel:

The Programme is recommended to the Programmes and Awards Executive Committee for approval subject to the provision to QQI of a revised submission document including programme schedule(s), which addresses the conditions and recommendations required in the report and which has been signed off by the Panel Chair if necessary.

This report has been agreed by the Evaluation Panel and is signed on their behalf by the Chair.

Panel Chairperson:

Dr Joseph Ryan

 Date: 1<sup>st</sup> June 2016

Signed \_

Date \_

*The Report of the External Review Panel contains no assurances, warranties or representations express or implied, regarding the aforesaid issues, or any other issues outside the Terms of Reference.*

*While QQI has endeavoured to ensure that the information contained in the Report is correct, complete and up-to-date, any reliance placed on such information is strictly at the reader's own risk, and in no event will QQI be liable for any loss or damage (including without limitation, indirect or consequential loss or damage) arising from, or in connection with, the use of the information contained in the Report of the External Evaluation Panel.*



## Higher Diploma in Science in Data Analytics/Certificate in Data Analytics Differential Validation

QQI Programme Code: PG20006/ PG20029

### Programme Team Response

The programme team for the Higher Diploma in Science/Certificate in Data Analytics programme would like to express their appreciation of the Expert Panel's deliberations and feedback.

The programme presented to the External Panel has undergone a set of considered amendments based on the panel's feedback and the conditions and recommendations relating to the proposed programme as outlined below.

### Conditions

Conditions	Response
Programme learning outcomes should be separately listed in the documentation. An exercise should be undertaken to ensure that the taxonomy used for these outcomes is consistently appropriate to the level of the programme and their articulation allows the module to be appropriately assessed.	<p>New section (4.1.2) added listing MIPLOs.</p> <p>"Taxonomy" of MIPLOs reviewed for all programmes undergoing Differential Validation. For the HSDA programme the MIPLOs are considered appropriate for level 8.</p>
C2. Module learning outcomes need to be written using a suitable taxonomy (i.e. the verbs employed must be appropriate to their level)	<p>"Taxonomy" of MLOs reviewed for all programmes undergoing Differential Validation.</p> <p>For the HSDA programme some MLOs have been changed as follows:</p> <p><u>Programming for Big Data:</u>            LO3 now reads: <i>Formulate and compose data flow and software documentation including flowchart, commenting and use-case diagram generation</i>            LO4 now reads: <i>Develop practical skills using a professional tool/language of data analytics (e.g. Python, R)</i></p> <p><u>Data Visualization:</u>            LO1 now reads: <i>Analyse the theory and concepts relating to visualization design and data representation</i>            LO2 now reads: <i>Analyse and distinguish between visualization techniques for specific problems to enable effective communication of data analysis</i></p> <p><u>Data and Web Mining:</u>            LO1 now reads: <i>Analyse the characteristics of a data sets and their attributes, investigate what transformations and statistical operations can be carried out on each and identify factors that impact on data quality</i>            LO2 now reads: <i>Investigate a variety of data mining techniques, and identifying their practical applicability to various problem domains</i></p>



	<p>LO4 now reads: <i>Investigate how web search engines crawl, index, rank web content, how the web is structured</i></p> <p>LO5 now reads: <i>Develop an in-depth knowledge of the fundamental web data mining concepts and techniques, and how previously acquired knowledge of data mining applies to the web</i></p> <p><u>Business Analysis and Communication:</u></p> <p>LO2 now reads: <i>Examine techniques for requirements elicitation and analysis to drive business change, and to improve business processes</i></p> <p>LO3 now reads: <i>Compare techniques to collect data to analyse for trends and patterns</i></p>
<p>C3. In turn, there needs to be real alignment and clarity on the one hand regarding how module learning outcomes are assessed and, on the other, that there is appropriately detailed and varied assessment (and reassessment) strategies at module level (as well as across programmes as a whole).</p>	<p>Each module owner has carefully reviewed the assessment of Learning Outcomes with a view to aligning assessment to LOs.</p> <p>Some assessment breakdowns have been changed (eg Data and Web Mining). In other cases sample assessments have been altered (eg Business Analysis &amp; Communication) and added (eg Data Visualization).</p> <p>In the Business Analysis and Communication module, the weekly formative and summative assessments have been changed to formative only – these will be in-class tutorial exercises. Summative assessment for this module is now in the form two assignments worth 25% each.</p>
<p>C4. The assessment approach for the Domain Skills module should be reviewed to ensure that it is scalable and standards are consistent</p>	<p>The assessment breakdown has been changed as follows:</p> <p><i>80% - ePortfolio</i> This will comprise a number of suitable content items such as evidence of industry certification, a reflective journal, practical project submission.</p> <p><i>20% - Facilitator Review</i> This assessment component is a combined review of student participation by all involved facilitators.</p>

## Recommendations

Recommendation	Response
<p>Various typos occur throughout the paperwork but, given the fact that these documents constitute a public record, the many uses to which this paperwork can be used beyond this evaluation panel, etc., these should be eliminated as a matter of course</p>	<p>The document has been proof read and corrections made where appropriate.</p> <p>Formatting and layout also updated.</p>
<p>Consider the titling of the Domain Skills module so that it accurately reflects its intent when applied across multiple programmes and/or subject domains.</p>	<p>The title of the module has been changed to “Domain Skills for Data Analytics”.</p>

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**Other updates:**

Proposed Programme Schedule hours of contact and allocation of marks re-checked against module equivalents

One (new) textbook added to the Data Visualization module:

Kirk, A. (2016) *Data Visualization*. Sage Publishing. [978-1473912144]

Table of Contents updated to include sub-sections

Reading lists re-written to Harvard Referencing Style format

Typos and grammatical errors corrected where noted.

Walter Balfe  
Programme Validation Unit  
QQI  
Denzille Lane Dublin 2

7 July 2016

Dear Walter,

This is to confirm that I have received and reviewed the amended documentation from National College of Ireland submitted in response to a recent panel for the programmes

HDip in Web Technologies  
HDip in Data Analytics  
HDip in Computing  
Cert in Computing  
Cert in Digital Multimedia  
BSc (Hons) in Computing

I confirm that in my opinion the amendments made address all the conditions set by the panel and would recommend these programmes to QQI for validation.

The panel report for the BSc (Hons) in Computing contained an error in that Condition 4 and Recommendation 2 did not apply to the programme. The Programme Team has noted this in their response.

Please note that this reflects my personal opinion, the ultimate decision rests with the chair of the panel.

Best regards

Christian

Christian Horn  
Head of Department of Computing Science & Mathematics  
Dundalk Institute of Technology  
direct: +353 42 9270283  
office: +353 42 9370280  
email: [Christian.Horn@dkit.ie](mailto:Christian.Horn@dkit.ie)  
Skype: Christian.Horn

Walter. Apologies for missing your call.

As you probably gather, I'm away at the moment and without access to these papers. From what I can read, I am satisfied that the college both understands and has set out the intention to meet the significant conditions attaching to this recommendation.

In the absence of any ability to attach an electronic signature to the cover, I trust you can utilise this to affirm my support.

Regards,

Dr Joseph Ryan  
Academic Registrar



# CERTIFICATE OF VALIDATION

<b>Provider name</b>	National College of Ireland
<b>Date of validation</b>	20 July 2016

	<b>First Intake</b>	<b>Last Intake</b>
<b>Enrolment interval</b>	September 2016	September 2020

	<b>Code</b>	<b>Title</b>	<b>Award</b>
<b>Principal programme</b>		Higher Diploma in Science in Data Analytics	Higher Diploma
<b>Embedded programme</b>		Certificate in Data Analytics	Certificate in Data Analytics
<b>Embedded programme</b>			

	<b>Name</b>	<b>Maximum number of learners</b>	<b>Minimum number of learners</b>
<b>Approved centre</b>	National College of Ireland	As per the validated programmes	As per the validated programmes

<b>Target learner groups</b>	As per the validated programmes
<b>Approved countries for provision</b>	Ireland
<b>The teaching and learning modalities</b>	As per the validated programmes
<b>Brief synopsis of the programme (e.g. who it is for, what is it for, what is involved for learners, what it leads to.)</b>	As per the validated programmes
<b>Specifications for teaching staff</b>	As per the validated programmes
<b>Specifications for the ratio of learners to teaching-staff</b>	As per the validated programmes

<b>Programmes being replaced</b>		
<b>Code</b>	<b>Title</b>	<b>Comment</b>
		N/A



### Conditions of validation

The statutory ([section 45\(3\) of the 2012 Act](#)) conditions of validation are that the provider of the programme shall:

- a) co-operate with and assist QQI in the performance of QQI's functions in so far as those functions relate to the functions of the provider,
- b) establish procedures which are fair and consistent for the assessment of enrolled learners to ensure the standards of knowledge, skill or competence determined by QQI under section 49 (1) are acquired, and where appropriate, demonstrated, by enrolled learners,
- c) continue to comply with [section 65 of the 2012 Act](#) in respect of arrangements for the protection of enrolled learners, if applicable, and
- d) provide to QQI such information as QQI may from time to time require for the purposes of the performance of its functions, including information in respect of completion rates.

### Conditions from HET Core Validation Policy and Criteria 2010, Revised 2013

The provider of the programme shall (for each programme):

1. Maintain the status of the programme(s) recognition;
2. Establish, having regard to existing quality assurance procedures, procedures for quality assurance for the purpose of further improving and maintaining the quality of education and training which is provided, organised or procured by that provider as part of the programme(s) concerned, and agree those procedures with QQI;
3. Operate quality assurance procedures agreed with QQI;
4. Implement procedures for the assessment of learners which are consistent with Assessment and Standards, Revised 2013;
5. Implement the procedures described in the document Policies, Actions and Procedures for Access, Transfer and Progression for Learners;
6. Implement any special conditions of validation attached to the relevant awards standards.

### Other conditions from HET Core Validation Policy and Criteria 2010, Revised 2013

7. Notify QQI of any change in circumstances affecting the provider which could affect or be perceived to affect the provision of the programme(s). This includes significant changes in corporate or academic governance, ownership, legal status, profile of teaching staff, profile of learners, numbers enrolled, facilities, or resources;
8. Maintain learner data records (personal identification, progression, module marks, stage classification etc.) in order to assist QQI in the performance of its functions;
9. Provide the information required by QQI's award making and monitoring functions, including information in respect of completion rates;
10. Implement the programme in accordance with the **approved programme schedule(s)** (appended) and current assessment strategies;
11. Subject to Section 4.6.1 of *HET Core Validation Policy and Criteria 2010, Revised 2013*, obtain QQI's approval prior to substantially amending the programme's minimum intended learning outcomes, save in the case of incremental enhancements arising from the implementation of findings of the provider's agreed quality assurance procedures;
12. Notify QQI of any information concerning the programme(s), or circumstances that may reasonably be expected to give QQI cause to consider reviewing the programme. Explicitly this includes where another awarding body withdraws or seeks to withdraw validation from the programme(s) and /or any alterations to accreditations (additions or withdrawals) by a professional or regulatory body;
13. Implement the programme(s) as agreed with the resources indicated;
14. Adhere to, and implement the Provider Lifecycle of Engagements.



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**Approved Programme Schedule(s)**

Name of Provider		National College of Ireland											
Programme Title (i.e. named award)		Higher Diploma in Science in Data Analytics											
Award Title (QQI named award)		Higher Diploma in Science in Data Analytics											
Stage Exit Award Title		Certificate in Data Analytics											
Modes of Delivery (FT/PT/ACCS/BLENDED/OC etc)		FT, PT, OC, Blended, Block											
Award Class	Award NOF Level	Award EQF Level	Stage	Stage NOF Level	Stage EQF Level	Stage Credit (ECTS)	Date Effective	ISCED Subject Code					
	8	6	Award	8	6	60	September 2013	345					
Major	Allocation of Marks												
Ref	Module Title	Semester	Module Status (M/E)	NOF Level	ECTS Credit Number	Total Hours	Contact Hours	Independent Learning	CA %	Project %	Final %	Total %	
	Introduction to Data Analytics	1	M	8	10	250	48	202	50		50	100	
	Business Analysis and Communication	1	M	8	10	250	48	202	50		50	100	
	Business Data Analysis	1	M	8	5	125	36	89	50		50	100	
	Programming For Big Data	1	M	8	5	125	36	89	50	50		100	
	Data and Web Mining	2	M	8	10	250	48	202		50	50	100	
	Advanced Business Data Analysis	2	M	8	5	125	36	89	50		50	100	
	Data Visualization	2	E	8	5	125	36	89	60	40		100	
	Domain Skills for Data Analytics	2	E	8	5	125	24	101	100			100	
	Project	3	M	8	10	250	36	214		100		100	

**Special Regulations:** The Project module cannot be used for compensation.



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Name of Provider		National College of Ireland										
Programme Title (i.e. named award)		Certificate in Data Analytics										
Award Title (QQI named award)												
Stage Exit Award Title												
Modes of Delivery (FT/PT/ACCS/BLENDED/OC etc)		FT, PT, OC, Blended, Block										
Award Class	Award NOF Level	Award EQF Level	Stage	Stage NOF Level	Stage EQF Level	Stage Credit (ECTS)	Date Effective	ISCED Subject Code				
Special Purpose	8	6	Award	8	6	60	September 2016	345				
Ref	Module Title	Semester	Module Status (M/E)	NQF Level		ECTS Credit Number	Total Student Effort			Allocation of Marks		
				8	8		Total Hours	Contact Hours	Independent Learning	CA %	Project %	Final %
	Introduction to Data Analytics	1	M	8	8	10	250	48	201	50	50	100
	Business Analysis and Communication	1	M	8	8	10	250	48	202	50	50	100
	Business Data Analysis	1	M	8	5	5	125	36	89	50	50	100
	Programming For Big Data	1	M	8	5	5	125	36	89	50	50	100
<b>Special Regulations:</b> .												