



Institute of
Analytics

The Global Body for Analytics



Accreditation Criteria

IoA | Data Science & Analytics

Recognised Undergraduate Programmes



www.ioaglobal.org



INTRODUCTION

The rapid development of the field of Data Science & Analytics and the demand for these skills in the jobs market have created a need for recognition of professional education.

The Institute of Analytics (IoA) considers it appropriate to develop core training requirements for those seeking employment in the Data Science & Analytics field. Programmes which meet those requirements will be eligible to apply for IoA Recognised Undergraduate Programme status. Satisfactory completion of an IoA Recognised Undergraduate Programme automatically meets the educational requirements for IoA membership as an Associate Member of our professional Data Science & Analytics community (other conditions apply).

The criteria are intended to respect the independence and diversity of the field of Data Science & Analytics, while ensuring that employers can assume certain quality standards among students graduating from an accredited course of study. It is hoped that the opportunity to acquire IoA Recognised Undergraduate Programme status will encourage staff and Higher Education Providers to monitor, develop and enhance their performance in ways that lead to a global body of quality education providers.

Accreditation is valid for 3 years. To renew the accreditation of the course for a further 3 years, providers will need to contact our team to renew and discuss how many student memberships are required for the new accreditation period.

To ensure students benefit from accreditation, the education provider commits to promoting IoA student membership with their cohorts. Membership provides access to our vast learning resources in the IoA Learning Hub and other activities to support employability and career progression on graduation.

Applying for accreditation is free. On approval, accredited training providers will need to make an annual payment covering a minimum of 25 student memberships per course. Please see our website for current rates. We can also offer competitive prices for large volumes, please email us to discuss your individual needs hello@ioaglobal.org.

Programme accreditation is for specific programmes of study rather than institutions. If an institution runs two or more relevant programmes but with different content, an application for accreditation needs to be made for each programme.

Programmes which have completed the accreditation process and have received confirmation of their accredited status may include the words 'IoA Recognised Undergraduate Programme¹' and may use the IoA Recognised Undergraduate Programme logo on their publicity material for that specific accredited programme only after accreditation has been awarded and while accreditation is current.

¹It is the responsibility of the programme provider to communicate the full accreditation requirements. In the case where accreditation is awarded to programmes with optional modules, the requirements to complete all modules must be made clear.

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PART 1 - REQUIREMENTS FOR UNDERGRADUATE PROGRAMME ACCREDITATION

1.1 All students currently registered on IoA Recognised Undergraduate Programmes are expected to join as Student Members of the IoA.

1.2 Applications for accreditation for the undergraduate track will be welcomed from organisations which either provide their own Degree Awarding services, or those which have a partnership with Degree Awarding Institutions as per the local law. The programme needs to be a minimum ISCED Level 6 or above (or local equivalent). Not less than 20% of the course content must be on requirements specified in Section 6.

1.3 An IoA Recognised Undergraduate Programme must provide an appropriate mix of theoretical training in the field of Data Science & Analytics, and practical experience of applying data solutions to real world problems.

1.4 On application, any information, course specifications, leaflets, brochures, advertisements, etc. supplied to the public must be made available to the IoA.

1.5 The programme should be subject to moderation processes and have an external examiner, normally appointed by the institution or course provider. The external examiner needs to be independent and unbiased. The external examiner must be appropriately qualified and have experience assessing comparable courses. The external examiner should have no current association with, or current personal or business relationship with, the course staff or trainees.

1.6 There must be a clear written complaints procedure available to students, staff, and other training supporters, such as placement providers. The course provider has ultimate responsibility for complaints.

1.7 Programmes are subject to the IoA's Code of Ethics and Practice.

1.8 All programmes must have written policies in place for the duty of care to students in the eventuality that the programme ceases to be offered before completion of graduation requirements.

2. ADMISSION PROCESS

2.1 IoA requires a minimum of 25 student membership registrations for each accredited course annually.

2.2 Prospective students should be provided with detailed and accurate information about the programme, including its structure, aims, staffing, content, assessment requirements, fees, including any 'extras'. e.g. exam and certificate fees, and conditions of participation, e.g. time commitment or equipment requirements.

2.3 The procedure for selection should be clearly explained and be consistent with the programme rationale, design and methodology.

3. STAFF

Programme providers are accountable for the work of all staff.

3.1 Course staff shall monitor all trainers and supervisors.

3.2 Core Staff members are members of course staff who have ultimate responsibility for the programme and for the experience, well-being, and advancement of students. Core Staff members are expected to liaise regularly with all course staff, visiting lecturers and external supervisors. Core Staff are also directly involved in admission, course management, assessment and content oversight.

3.3 There must be at least two staff team members nominated as Core Staff for each iteration of the course, e.g. one cohort of a BSc programme.

3.4 Core faculty staff and other relevant training personnel, e.g. technical assistants, on an accredited programme, will be provided with complimentary membership of the IoA at Affiliate grade.

3.5 Core Staff must be familiar with and agree to work within the current version of the IoA's Code of Ethics and Practice. Copies of the Code of Ethics and Practice are available from the IoA.

4. PROGRAMME RATIONALE AND DESIGN

4.1 Programmes should provide a clear statement of the programme rationale and design, including methods and practical exercises, which is consistent with the actual structure of the programme and closely related to the Core Accreditation Requirements listed in this document.

4.2 All programmes should provide detailed study of each Core Content Requirement listed in Section 6. The balance of time and attention given to each requirement may vary.

4.3 There should be a balance between theory and practice and between all elements of the programme.

PART 2 - PROGRAMME CONTENT

While the IoA acknowledges that Data Science & Analytics is a field defined by multiple areas of specialisation and dynamic change, it is fundamental to stakeholders that core training in the fundamentals of Data Science & Analytics be provided by all accredited programme providers. For that reason, all accredited programmes in the IoA Recognised Undergraduate Programme track must cover each of the 6 Core Requirements listed below.

5. PROGRAMME DEFINITION

5.1 Programme applications with compulsory analytics content

For undergraduate accreditation, a programme of study is taken to mean a programme that leads to a Bachelors' award, e.g. a BSc in Data Science & Analytics. This may include programmes where compulsory Data Science & Analytics content is embedded as part of a wider course of study, e.g. a BSc in Business Analytics, in addition to stand-alone, focused Data Science & Analytics programmes. A programme will be deemed to be qualifying provided that all students have completed substantial work (at least 20% of the programme) in the core requirements in Section 6.

5.2 Programme applications with optional analytics content

Where component parts that add upto completion of the core requirements are optional in a programme of study, e.g. a BSc in Computer Science, students will be eligible for IoA Student Membership provided that they are enrolled on or scheduled to complete the required options. In such circumstances, students may need to provide additional support in the form of study transcripts or a letter of confirmation from their programme providers. Components of a course will be deemed to be qualifying provided that they cover the Core Content Requirements below and that these core requirements account for no less than 20% of the programme.

6. THE CORE CONTENT REQUIREMENTS

While it is a requirement that students receive instruction in and practice of all of the individual components below during their programme of study, the IoA recognises that the balance of focus will vary between institutions. For example, it is expected modelling techniques may be covered in a range of modules, such as Machine Learning or Natural Language Processing, while aspects such as data cleaning and data integrity may be covered as subtopics within a broader module focus, such as an Introduction to Python. To qualify for IoA Recognised Undergraduate Programme status, the programme must cover all six of the requirements below.

6.1 Core Content Requirement 1 Data collection and database maintenance

Theory of database structures (e.g. relational, document or graph models)

Database schema design and use

Data collection and provenance

Basic initial exploratory data analysis

Data sampling theory and application

6.2 Core Content Requirement 2 Data cleaning

Theory of data cleaning, validation, data integrity (accuracy, consistency etc.) and ongoing

quality assurance

Handling duplicate data and missing data

Theory and practice of normalisation or the removal of outliers

Theory and practice of handling database joining

6.3 Core Content Requirement 3 Data modelling

Theory and practice of a range of models on large data sets

Theory of compromises and payoffs of data models²

6.4 Core Content Requirement 4 Data Visualisation

Theory of data visualisation and avoiding visual deception

Practice of data visualisation design

² Examples could include theories such as CAP theorem, or the payoff between recall and precision in categorization algorithms.

6.5 Core Content Requirement 5 Working with data output

Theory of correlation and causality

Validation, analysis and interpretation of key output from modelling processes

Practical description of modelling processes for a non-technically trained audience

6.6 Core Content Requirement 6 Data Ethics

Theory of relevant privacy laws and / or privacy regulatory environment³

Theory of intellectual property laws

Theory and / or practice of analysing integrity constraints on data modelling⁴

Theory of trust, reputation and unanticipated outcomes⁵

Practice completing a data ethics report

6.7 It is not anticipated that the Core Requirements for IoA accreditation will change in the short term. However, given the rapid development of new technologies relevant to the field, and the large number of research technologies currently close to maturity, the IoA reserves the right to update the Core Requirements as needed in response to emerging technologies and legislative environments. An 18-month period of notification and support will be given to all accredited suppliers in the unlikely event of a change, to allow course providers to adjust to the new requirements. Support can be agreed with the IoA on a case-by-case basis.

³ NB This may be regionally and sector dependent. E.g. Those working in the European Union will require training on the main points of the General Data Protection Regulation (GDPR). Those on accredited courses within the FinTech industry will be required to be trained on regulations within financial markets.

⁴ An example of an integrity constraint on data modelling might be the ethical constraints when applying the output of deep learning algorithms with poor transparency on decisions that have a significant impact on real life, such as school leaving exam results.

⁵ An example of a relevant theoretical approach could be IoA 10 steps model

7. CODING AND SOFTWARE REQUIREMENTS

The IoA is software agnostic and will accept any relevant software or programming tool for Data Science & Analytics.

7.1 Course providers are required to submit details of the software and languages used for practical work during the application process. We maintain a list of the most used analytics tools. We will not require details at the level of library packages etc.

7.2 In the unlikely event of a rapid degradation of the base code or other tool, the tool will be deemed not relevant, and the IoA will take the decision to remove this from our list of approved 3rd party tools. The IoA will endeavour to provide an 18-month warning of this, but in the exceptional circumstance of a major and immediate platform failure, the IoA reserves the right to update the list at any time. An example of currently recognized languages and software is available from the IoA, but this is not an exhaustive list. If a course provider wishes to use a tool not currently on the list, please inform the IoA Accreditation Team.

8. METHODS

8.1 Course staff are required to take responsibility for providing a range of learning experiences congruent with the topic of instruction. The programme should include:

- (i) Opportunities for individual work
- (ii) Opportunities for group work
- (iii) Theoretical instruction
- (iv) Research skills
- (v) Practical application of technologies
- (vi) Report writing
- (vii) Access for each student to staff for
support

8.2 In addition, course providers must offer ongoing opportunities for staff and students to meet to reflect on all aspects of the programme.

9. THE EMERGING LANDSCAPE IN DATA SCIENCE & ANALYTICS AND POST-GRADUATE PREPARATION

It is important that students are given support to identify forms of ongoing professional development after they graduate.

9.1 Students should be introduced to crowd sourced support such as discussion forum support, as a major tool of the data analyst.⁶

9.2 Students must be given the opportunity to discuss post-completion options to stay up to date in the field of Data Science & Analytics.

9.3 Core Staff are expected to review the relevance of their content on a regular basis to ensure that the contents reflect current best practice, introduce novel tools as and when appropriate, and if necessary, retire outdated tools.

9.4 IoA Membership and Progression

Students currently studying on an IoA Recognised undergraduate programme automatically qualify for Student membership grade. On successful completion of an undergraduate IoA Recognised programme, student members will be eligible for a fast track progression to Associate grade.



Please see the IoA Analyst Competency Framework for full details of the competencies we expect members to be developing at each stage and for the criteria for relevant work experience.

⁶ An example of this might be Github, Stackoverflow or similar in local language.

10. ASSESSMENT

10.1 A course must adopt a method of assessment that is congruent with the aims and objectives of the course.

10.2 Students must be fully informed of the assessment procedures and the criteria used. They should also be given progress reports at various stages during the programme for accredited programmes or accredited component modules of a duration in excess of 12 weeks.

10.3 There must be a substantive emphasis on the assessment of competence in applying Data Science & Analytics to real-world data sets and data problems. This may be achieved, for example, by making use of open data sets.

10.4 External supervisors' reports must form an integral part of ongoing assessment practices.

10.5 All assessments must be in line with academic standards appropriate to the level of study, and be clear and consistent with the learning intentions, which must be made available to students.

10.6 Programmes must provide details of the procedure for deferrals, late submissions, extensions and absences.

10.7 A complaints procedure must be in place and be made available to the students and members of staff.

10.8 An appeals procedure must be available for students.

PART 3 - THE ACCREDITATION PROCESS

Before applying for accreditation, programme providers should familiarise themselves with the programme accreditation procedures above.

11.1 Application

A programme provider wishing to apply for Accreditation should supply the following in the first instance:

- (i) A completed application form.
- (ii) Copies of any explanatory or promotional material such as programme specification documentation to be used with the programme to be accredited.
- (iii) Confirmation that the terms and conditions of accreditation have been read and agreed by the applying body.
- (iv) Guidance can be found on how to complete the online application form on the Accreditation page of the website.

11.2 Accreditation

The information submitted will be considered by our review panel and the outcome of the review will be communicated to you within 4 to 6 weeks.

The IoA reserves the right, as deemed necessary, to refuse accreditation or require amendments to the course for accreditation to be approved. In such circumstances, we will communicate this to the programme provider at the earliest opportunity and agree the terms for re-submission should the course providers wish to do so.

Once a formal decision is taken, confirmation will be sent to the programme provider.

Accreditation by the IoA will last for 3 years, after which accreditation must be renewed following the process described in section 4.

Students currently studying on an IoA Recognised undergraduate programme automatically qualify for Student membership grade of the IoA. On successful completion of an undergraduate IoA Recognised programme, student members will be eligible for a fast track progression to Associate grade. See section 14 below regarding withdrawal of accreditation.

Programmes which have completed the accreditation process and have received confirmation of their accredited status may include the words 'IoA Recognised Undergraduate

Programme⁷ and may use the IoA Recognised Undergraduate Programme logo on their publicity material for that specific accredited course only after accreditation has been awarded and while accreditation is current. In the case of the intention to apply for IoA accredited status, a lapse of accreditation, or the former existence of IoA accredited status, statements may not appear in any publicity material around the course. Programme accreditation status is non-transferable.

12. Accreditation not Awarded

In the case of accreditation not being awarded, a final report and letter will be sent to the programme provider notifying of this outcome.

The IoA reserves the right not to award accreditation in relation to a programme where there exist circumstances which lead the IoA to believe that the programme content or delivery are incompatible with the standards and ethos promoted by the IoA. This is a discretionary right of the IoA.

13. Sanctions and withdrawal of accreditation

Failure to meet the criteria will result in the suspension or complete withdrawal of IoA accreditation. Accreditation of a course may be completely withdrawn or suspended by the IoA at any time if:

- (i) Programme criteria are not met
- (ii) Standards are not maintained
- (iii) If a requirement for an annual minimum student membership registrations is not fulfilled

Any misleading or inaccurate information that is given to the IoA will result in a programme being withdrawn from the Programme Accreditation Process.

⁷ It is the responsibility of the programme provider to communicate the full accreditation requirements. In the case where accreditation is awarded to programmes with optional modules, the requirements to complete all modules must be made clear.

In the event that accreditation is withdrawn from a programme halfway through studies, existing student members on the programme will be contacted by the IoA, and we will endeavor to find a mutually satisfactory resolution.

In addition, the IoA reserves the right to consider any unusual behaviour by those providing the programme or any of its employers or agents, as a breach of the standard expected by the IoA.

In the event that the Approved Programme owner has an Approved Learning Partnership agreement with another learning provider, it will be the responsibility of the course owner, not the IoA, to discuss the withdrawal of accreditation.

PART 4 - RENEWAL OF COURSE ACCREDITATION

IoA accreditation is valid for 3 years at which time, the course provider is required to seek its renewal. An IoA accredited course which is coming up for renewal, has two routes, depending on the circumstances:

(i) If nothing has changed in the content, duration, delivery or name of the course, then a provider may seek to reaccredit by arranging a discussion with us to confirm that nothing in the course has changed, how many student memberships are required for the new period, if there are any minimum requirements to maintain the accreditation and to complete a renewal form.

(ii) If there have been any changes to the course it will be necessary to arrange a discussion with our team to review how many student memberships are required for the new period.

A new submission of the course will be required for review, which is usually completed within 3 - 6 weeks.



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