Guidelines for the Implementation of the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (Preview PR)

Edition 2.1.0 – May 2019

IHO

International Hydrographic Organization

Contents

ABSTRACT

All components of the hydrographic surveying and nautical cartography professions face challenges as how best to ensure the continuance of high standards and how best to ensure the continuation of best practices world-wide based on minimum standards of competence. In order to achieve these objectives, three international organizations (FIG, IHO and ICA) have developed Standards of Competence that institutions or professional bodies may adopt for their educational/training programmes and competency schemes.

Standards indicate the minimum degree of knowledge considered necessary for hydrographic surveyors and nautical cartographers to meet national and international hydrographic and charting requirements and the diverse needs of industry.

The standards developed are known as S-5 describing the competencies for hydrographic surveyors and S-8 describing the competencies for nautical cartographers.

Both Standards recognize two levels of programme. Category "A" programmes introduce content and learning outcomes primarily from the underlying principles level. Category "B" programmes introduce them primarily from a practical level.

The intention is that a Category "A" qualified individual, with appropriate experience, would be a senior professional in their chosen area of activity (government, industry, academia). Category "B" qualified individuals, with appropriate experience, would be technical professionals preparing and delivering products and services to meet specifications and outcomes.

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ABBREVIATIONS AND ACRONYMS

B　　　Basic subjects

C　　　Cartographic science subjects

CCP　　Comprehensive Cartographic Project

CFCP　Complex Final Cartographic Project

CFFP　Comprehensive Final Field Project

CMFP　Complex Multi-disciplinary Field Project

CPD　　Continuing Professional Development/Education

CV　　　Curriculum Vitae

E　　　Essential subjects

F　　　Foundation science subjects

FIG　　International Federation of Surveyors

H　　　Hydrographic science subjects

IBSC　　International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers

ICA　　International Cartographic Association

IHO　　International Hydrographic Organization

ILO　　Intended Learning Outcome

NFP　　National Focal Point

P　　　Practicals (fieldwork and/or laboratories)

SG　　Self-guided exercises (or student's personal independent work)

T　　　Theoretical (theory through lectures)

WG　　Working Group

PREFACE

Historical development of the Standards: During the International Congress of Surveyors (FIG) at Wiesbaden in 1971, a Working Group (WG) was formed by Commission IV (Hydrography) to develop International Standards of Competence within the profession of surveying at sea. In 1972, during the International Hydrographic Conference in Monaco, the International Hydrographic Organization (IHO) set up a working group for the compilation of training programmes in Hydrography conducted by Member States. In 1974, at the XIV FIG Congress in Washington, it was resolved that the FIG and IHO working groups combine to study and modify the Report of the FIG working group on Educational Standards.

The Report of the joint FIG-IHO WG was accepted by the two parent bodies at their respective conferences in 1977. In consequence of similar resolutions passed at these conferences an FIG/IHO International Advisory Board on Standards of Competence for Hydrographic Surveyors (the Board) was formed.

The Board met annually and compiled and regularly updated "Standards of Competence for Hydrographic Surveyors" (the Standards). The intention of the Board in preparing these Standards was to provide guidance whereby individual surveyors may be trained and qualified in accordance with internationally accepted levels of competence.

Standards of Competence for Nautical Cartographers: At the IHO Second Extraordinary Conference in March 2000 the development of a set of Standards of Competence for Nautical Cartographers was approved. It was agreed that the Board would be the appropriate body to lead the preparation of these Standards, with the contribution of the International Cartographic Association (ICA).

The Board therefore changed its name to the FIG/IHO/ICA International Advisory Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers. The Board comprises ten (10) Members representing the three parent organizations: FIG (4); IHO (4); and ICA (2). The Secretariat is provided by the IHO Secretariat. In 2009 the name of the Board was changed to *FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC)*.

Standards Development: The Standards are known as S-5 describing the competencies for hydrographic surveyors and S-8 describing the competencies for nautical cartographers. They indicate the minimum degree of knowledge and experience considered necessary for hydrographic surveyors and nautical cartographers, and provide a set of programme outlines against which the Board may evaluate programmes submitted for recognition. In 2008 the recognition period of programmes which had been ten (10) years was reduced to six (6) years, with a transitional period for the existing programmes.

Both Standards recognize two levels of programme: Category "A" and Category "B". In the hydrographic community, Category "A" programmes offer levels of comprehensive and broad-based knowledge in all aspects of the theory and practice of hydrography and nautical cartography. Category "B" programmes provide a level of practical comprehension, along with the essential theoretical background, necessary for individuals to carry out the various hydrographic surveying and nautical cartography tasks.

Earlier editions of the Standards were structured so that Category "B" programmes provided technical education to support a set of fundamental and practical competencies. Initially, Category "A" educational programmes included all Category "B" competencies plus additional detailed-level competencies. This meant that Category "B" was a subset of Category "A".

Since its inception the Board has developed and published eleven (11) editions of the S-5 and three (3) editions of the S-8. These editions reflect the significant scientific and technological developments in the fields of hydrography and cartography, and include considerable improvements in the submission, delivery and review procedures of the programmes. In 2011, a fee was introduced for all submissions.

Separation of Category "A" and Category "B": It became evident to the IBSC that there were influencing factors that brought to the fore a number of imperatives for change in the way hydrographic surveyors and nautical cartographers are educated. To adapt to these new challenges, methodologies, equipment and software, the Board agreed on the separation of Category "A" and Category "B" requirements and a future separate path of development for each category. The motivation behind the separation of the Category "A" and Category "B" requirements and the intended outcome of Category "A" and Category "B" education/training is as follows:

A Category "A" programme will introduce subjects from the beginning at the underlying principles level. A Category "B" programme will introduce subjects from a practical level. According to the above

framework the Category "B" Standard is aimed at the *basic educational and training* requirements for hydrographic technicians and hydrographic surveyors (S-5), and nautical cartographers (S-8). The Category "A" Standard is aimed at the *theoretical educational and foundational background* necessary for hydrographic surveyors/nautical cartographers in-charge and hydrographic/cartographic managers who will develop specifications for surveys and charts, establish quality control and quality assurance systems and respond to the specific requirements of a full range of hydrographic and/or cartographic projects.

For both Category "A" and Category "B" Standards, the ability to conduct or operate hydrographic surveys in the field or utilize hydrographic and/or cartographic databases to compile and produce charts are essential competencies, and thus a key part of education and training through the necessity of field and applied work (practical exercises and final project).

The educational process itself is in turn influenced by changing technological and methodological imperatives. Connectivity and the introduction of so-called e-learning methods and blended learning techniques, have naturally attracted the attention of the professional community. Another relevant issue is the educational approach in the development of the standards relating to the principles of the style in which the requirements are presented. The IBSC adopted the concept and principles of *constructive alignment* that are used in most academic institutions and are documented in educational texts, for example Biggs and Tang, Teaching for Quality Learning at University, Open University Press (3rd Edition, 2007). The Standards describe *Intended Learning Outcomes* (ILO's) using verbs that are detailed under Bloom's taxonomy. In principle, an institution will evaluate students to ensure that they have achieved each learning outcome.

The separation of Category "A" and Category "B" Standards in addition to the adoption of constructive alignment approach was approved in 2012.

Options have been removed from the Standards. The philosophy of the Standards is to develop a hydrographer or nautical cartographer who can work with competence across the full spectrum of the profession. Therefore, the core content within the previous options is considered necessary for all hydrographers and nautical cartographers and can no longer be considered optional. In defining competencies in terms of ILO's, the opportunity exists for institutions to focus attention on specific issues while adhering to competencies and associated content as described in the Standards. Thus, while core competencies are retained, institutions can offer unique programmes within this framework, directed towards specific needs.

Synopsis: All components of the hydrographic surveying and nautical cartography professions face challenges as to how best to ensure the continuance of the high standards and how best to ensure the continuation of world-wide best practices based on minimum standards of competence. The IBSC believes that the present editions of the Standards will serve the purpose and will deliver authoritative guidance to the pertinent institutions around the world to prepare, submit and deliver programmes that will be to the benefit of the international hydrographic community.

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Foreword

These guidelines are to be used by educational and training organizations for the preparation of submissions of programmes in hydrographic surveying or nautical charting against the IHO Publications S-5A/B and S-8A/B Standards of Competence for Hydrographic Surveyors and Nautical Cartographers.

Comments arising from the experience gained in the application of the guidance are welcome. They should be addressed to the Chair of the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) at the above address. This document is published periodically. Please check with IHO for the latest edition, including current amendments.

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1   DEFINITIONS AND TERMINOLOGY

No terms and definitions are listed in this document.

For purposes of recognition, a *programme* is a complete schedule of study, practical exercises and final project that leads to graduation, including all learning outcomes and content defined in the standards. For purposes of delivery and assessment, a programme will typically be broken down into modules. The term module will be used hereafter to describe a delivery component.

1.1   Categories of Programmes and Schemes

Categories of programmes and schemes for hydrographic and cartographic personnel are defined with respect to the theoretical background and working knowledge of those who successfully graduate from such programmes. The following programmes and schemes are eligible for international recognition by the FIG/IHO/ICA IBSC:

1.1.1   Category "A" Programmes:

A programme which provides a comprehensive and broad-based knowledge in all aspects of the theory and practice of hydrography, nautical cartography and allied disciplines for individuals who will practice analytical reasoning, decision making and development of solutions to non-routine problems.

1.1.2   Category "B" Programmes:

A programme which provides a practical comprehension of hydrographic surveying and nautical cartography for individuals with the skill to carry out the various hydrographic surveying and cartography tasks.

1.1.3   Schemes for Professional Certification:

A regional or national Scheme for the review, assessment and professional certification of an individual to ensure that they possess the relevant and up to date competencies to perform the role of a hydrographic surveyor or nautical cartographer at the appropriate level. The term "Scheme" will be used to differentiate professional certification from educational programmes.

1.2   Recognition of Programmes and Schemes

1.2.1   Recognition:

The Board may grant recognition for *programmes* meeting the S-5A/B or S-8A/B Standards of Competence. The Board may also grant recognition for *schemes*, which follow the guidelines described hereafter, and referring in their review assessment process to the S-5A/B and/or S-8A/B Standards of Competence.

1.2.2   Period of Recognition:

Programme or Scheme recognition remains valid for six (6) years, after which a new submission is required. The Board does not grant retrospective recognition to any Programme or Scheme.

1.2.3   Recognition of Individuals:

The Board does not grant recognition to individuals.

1.2.4   Professional certification:

The Board may grant recognition to National or Regional Schemes for professional/competency certification of individuals.

1.3   Classes of Subjects

1.3.1   *Basic* Subjects

These are the subjects underlying all aspects of hydrographic surveying and nautical cartography. They contain the knowledge necessary for understanding the general principles of hydrography and

cartography, including mathematics, statistics, information communication technologies, physics, earth sciences, nautical science and meteorology, as applicable.

1.3.2 *Essential* Subjects for S-5B and S-8B

These subjects are considered essential for all hydrographic surveyors and nautical cartographers and together with the basic subjects, form the core of the academic syllabus within the S-5B and S-8B Standards.

1.3.3 *Foundation Science* Subjects for S-5A and S-8A

These subjects provide a detailed knowledge of the underlying principles that support hydrography and nautical cartography. These are common to other science fields such as geomatics or marine science, and contribute to the core of hydrography and nautical cartography.

1.3.4 *Hydrographic Science and Cartography Science* Subjects for S-5A and S-8A

These subjects are considered essential for all hydrographic surveyors and nautical cartographers respectively at the Category "A" level. When combined with *Foundation Science* knowledge they constitute a comprehensive knowledge of hydrography or nautical cartography.

1.4   Exemptions

1.4.1

Within any submission, the Board will consider cases when an institution intends not to deliver a particular subject/topic/element within *Basic* or *Foundation Science* subjects to some or all of the students. No exemptions are permitted from Essential (S-5B/S-8B) or *Hydrographic Science* (S-5A) or *Cartography Science* (S-8A) subjects.

1.4.2

Exemptions may be granted from *Basic* or *Foundation Science* subjects, topics, or elements when entry requirements for a programme completely cover their content and learning outcomes. The list of elements, as indicated in the Standards, must be evidenced to have been completely covered by prior knowledge of students. Claims for exemptions must clearly describe how the student's prior learning is assessed and validated. If an entry examination process is employed to determine exemptions, it must demonstrate the student's competence in the *subjects/topics/elements* to be exempted.

1.5   Elective Modules

To be recognized against the Standards, a programme must demonstrate that, independently of the student choice of elective modules, all of the S-5A/B or S-8A/B elements are covered by the common programme syllabus.

1.6   Level of Knowledge

Bloom's taxonomy has been used as the basis to describe each intended learning outcome of the Standards and the associated verbs are an indication of the expected level of knowledge. One of the three following levels of knowledge is associated with each element of the S-5A/B and S-8A/B.

1.6.1

Basic — Basic knowledge of the subject provides familiarity with the concepts. Active verbs (indicating recall, recognition and comprehension of materials) associated with learning outcomes include: define, identify, describe, explain, differentiate, predict.

1.6.2

Intermediate — Knowledge of the subject as far as theory and principles are concerned, sufficient to enable their application in practice in all common hydrographic and nautical cartography tasks. Active verbs (indicating application and analysis) associated with learning outcomes include: apply, use, calculate, solve, classify, analyze.

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1.6.3

Advanced — Thorough knowledge of the subject in all its aspects to enable its application in all hydrographic and nautical cartography activities including the most difficult areas. Active verbs (indicating synthesis and evaluation) associated with learning outcomes include: evaluate, select, design, specify, plan, create.

> Category "B" programmes are intended to deliver Basic and Intermediate levels of knowledge and Category "A" programmes are intended to deliver Basic, Intermediate and Advanced levels of knowledge.

2   TIME FRAMES

2.1   Maximum Duration of Programmes

The time frame over which an individual studies towards a recognized programme cannot be more than five (5) years for a Category "B" Programme and no more than six (6) years for a Category "A" Programme.

2.2   Minimum Duration of Programmes

The minimum duration of Programmes must be sufficient to allow students to absorb the knowledge through the lectures, tutorials, self-study, practical exercises and the final project. In the experience of the Board, to achieve the above, for a programme (without exemptions sought) delivered full-time in a continuous manner an expected minimum time frame is:

2.2.1

At Category "B", twenty four (24) weeks, including the final project.

2.2.2

At Category "A", forty (40) weeks, including the final project.

3   PRACTICAL EXERCISES AND FINAL PROJECT

Because hydrography and nautical cartography are applied disciplines, every student undertaking a Category "A" or Category "B" Programme is expected to receive hands-on experience under direct supervision of the instructors. This experience should form an important part of the student's assessment, and should be considered in two parts, practical exercises and a final project.

3.1   Practical Exercises

Both Category "A" and Category "B" Programmes should contain practical hydrographic surveying or nautical charting exercises related to modules. These should include, for example: experiments, exercises, laboratory work and fieldwork designed to complement the theory component.

3.2   Final Project (CFFP, CCP, CMFP and CFCP)

Any qualifying programme should also include a minimum period of at least four (4) weeks devoted to a supervised comprehensive final project. These projects should reflect the level of the overall knowledge outlined in the programme, and a full report should be compiled by students. Assessment of intended learning outcomes associated to this project is an important factor and an evaluation scheme for the final project must consider alignment for individual students.

The *Comprehensive Final Field Project* (CFFP) for a Category "B" hydrographic surveying programme will exercise the skills of the students to carry out the various hydrographic surveying tasks.

The *Comprehensive Cartographic Project* (CCP) for a Category "B" nautical charting programme will exercise the skills of the students to carry out the various nautical charting tasks.

For students of a S-5 Category "A" Programme, a *Complex Multi-disciplinary Field Project* (CMFP) is required, which will include analytical reasoning, decision making and development of solutions to non-routine problems.

For students of a S-8 Category "A" Programme, a *Complex Final Cartographic Project* (CFCP) is required, which will include analytical reasoning, decision making and development of solutions to non-routine problems.

3.3 Guidelines for Practical Exercises and Final Project

The (educational) purpose of the practical exercises and field training project(s), for both Category "A" and Category "B", is to give every student experience in performing as many hydrographic and nautical charting tasks as possible. For example, levelling, tide gauge installation, shore lining, multi-beam surveying, spatial data acquisition, spatial data evaluation and processing, composition, generalization, chart production and reproduction, etc.

Practical exercises associated with the educational modules should occur throughout the programme of study.

The final project should occur at the end of the programme, so that knowledge gained in earlier work can be put into practice, and the practical limitations involved in field and office operations experienced by the student. Final projects must reflect the level of knowledge outlined in the programme syllabus.

Reference material should be available to students, including an archive of case study material, equipment and costing information in order to allow students to plan and design the survey/nautical chart. Consideration should be given to involving experienced hydrographers and nautical cartographers, and, when necessary, equipment provided by external agencies in the final project, in order to supplement the resources of the training institution.

Students should prepare a complete final project report and associated survey or nautical charting deliverables. The final project report must form part of the performance assessment for students.

4   FIELD AND OFFICE EXPERIENCE

The Board acknowledges that work experience in the field or office is an essential component of individual competence. The Board encourages the development of professional certification or individual recognition schemes by regional or national authorities such as Hydrographic Offices and/or professional societies and provides a process described in Section 5 below, for the international recognition of these schemes.

5   PROFESSIONAL CERTIFICATION OR INDIVIDUAL RECOGNITION SCHEMES

The Board *does not provide recognition to individuals* directly. It does however seek to recognize formal systems and schemes that review and assess individuals' experience in order to provide them with professional certification or individual recognition of their Competency. These Schemes offer to monitor and assess individuals at regular intervals and to register them in a formal system so that an individual may gain professional certification or individual recognition at a defined level of competency which may include Category "A" and Category "B".

5.1 Background, Board Philosophy and Process Concerning Schemes for Professional Certification of Individual Recognition

5.1.1

In issuing the guidelines the IBSC fully recognizes and anticipates dialogue with national bodies seeking such recognition as the guidelines are developed to a level of maturity acceptable internationally. In this

sense, the guidelines are issued in this document without prejudice. The IBSC encourages schemes to adopt common requirements and levels of competency based on the IBSC standards which will facilitate mutual recognition.

5.1.2

The underpinning philosophy of the work of the Board in recognizing professional certification schemes for individuals is that competence equals knowledge plus experience, and must be demonstrated. Thus, upon successful achievement by any individual of a Category "A" or a Category "B" Programme, a competency certification within any Scheme consists of *both* successful completion of a programme of study which addresses the topics within the relevant Standard *and* a satisfactory period of relevant experience during which competence has been demonstrated. In addition, the IBSC notes that hydrographic technology is constantly advancing and that, in order to maintain competence, an individual must pursue continuing professional training and education to ensure that they maintain currency. Consequently national organizations and academic institutions may decide to recognize and/or certify individuals in order to monitor competency and currency. The IBSC requires that professional certification of individual competency should be based on completion of:

1) A programme of formal education or training, normally as outlined in Clause 1.1;
2) Experience, as outlined in Section 4;
3) A methodology to demonstrate and document competencies;
4) Continuing professional education and training.

The IBSC will consider recognizing schemes that, in addition to a pathway including completion of a Category "A" or Category "B" program, contain alternative pathways to certification, provided the above conditions are met.

5.1.3

Submissions to the Board must be written in the English language and as a minimum must demonstrate the ability to monitor and assess individuals at the Category "A" and/or Category "B" specified competency level.

5.1.4

The Board shall approve the final wording on the Certificate awarded by the Scheme to individuals.

5.1.5

The Board declares that in publishing these Guidelines it is not its intention to override or challenge any legal or procedural processes imposed upon the Scheme by government or law.

5.1.6

The Board shall expect the following elements in a national or regional Scheme submitted for recognition.

5.2   Guidelines for National and Regional Schemes Submitted for Recognition

5.2.1

The Board shall normally recognize only one Scheme per country or identifiable region for the Standards and thus, a submission must clearly describe its authority and geographic area. It may include endorsements from the appropriate NFP of the Scheme submitted. It may also include, where appropriate, the endorsement of academic institutions, government bodies and professional associations. The Board shall not arbitrate between Schemes within one jurisdiction.

5.2.2

An individual certified by the submitting Scheme as having met the levels of Category "A" or "B" must have completed a recognized Category "A" or "B" Programme. It is required that the submitted Scheme shall describe in detail how the professional certification or individual recognition process functions. Where prior learning and experience are taken into account within a Scheme the processes undertaken by the accrediting body must be fully described and justified.

5.2.3

The Board shall expect adherence to its currently issued Standard(s) and shall expect that a Scheme will take into account the currency (or validity) of an individual's experience. Currency will be clearer if the individual has recently satisfied a programme recognized by the Board and has also satisfied the experience minima. Where the certification or process includes vocational training, a full detailed description is required by the Board.

5.2.4

The Scheme should clearly articulate processes and sub-Schemes of Continuing Professional Development/Education (CPD) and show where and how these build relevant units for professional certification or individual recognition. Clear reference shall be made to the current content of the Standards to enable the Board to assess that the processes of CPD adopted provide relevant currency between Editions of the Standards for those individuals who originally certified or accredited against earlier Editions of the Standards.

5.2.5

The process whereby an individual can enter the Scheme should be described in detail. Processes for application should be detailed, including all examples of documentation used. The Board considers that a Scheme should include a degree of examination for entry which might include all or some of the following: interview, oral or written examination with recording of the process being retained to ensure objectivity. Examples of the process using an individual's work and the records of the reviewers are to be submitted as part of the application process.

5.2.6

It is essential that an individual has recourse to an independent process of appeal to any decision taken by the Panel which administers the entry process into a Scheme. This process of appeal will not be to the IBSC. Appeals must be resolved satisfactorily at the national or regional level in accordance with standards of due process and objectivity. The Board's interest is in assessing the efficiency of such a process. Thus, the Board will expect the submitting Scheme to fully describe its adopted appeals process.

5.2.7

The Board shall expect to be able to assess from the documentation provided by a Scheme that peer certification forms part of its system supervision. It follows that a Scheme shall be administered by a panel comprising of members who represent the wider hydrographic surveying and nautical cartography communities including, but not necessarily limited to, members representing its constituent organizations (government, professional, academic, National Focal Point as well as Offshore Industry and Ports where appropriate).

5.2.8

The processes of the Scheme shall include clear record-keeping that details all processes adopted: records of decision, timing, appeals, reasoning, forms and register, follow up processes for assessing currency (validity) etc. These should be comprehensively detailed in the submission.

5.2.9

The Scheme should advise the Board if there are other Schemes within its area of jurisdiction (or elsewhere if there is mutual recognition) and detail how its own status has been defined and agreed in regard to those Schemes. It should also detail its communication processes with such Schemes with particular detail on the method it adopts to communicate and share its findings, and how any differences or ambiguities are resolved. In particular it should describe how it deals with individuals making multiple applications, and whether there is a degree of harmonization, standardization of processes and reciprocity.

5.2.10

The Scheme should publish its Rules and Processes together with its critical dates. This shall be kept current and may be achieved by way of a website. Currency will ensure publication of relevant Rules and Processes before critical dates on which they impact.

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5.2.11

A Scheme can operate in the national language but see Clause 5.1.3 above for the Board's language requirement for submission documentation.

5.2.12

The Board reserves the right to inspect specific Scheme documents, such as the Register of Individuals, where it feels this is necessary to aid it in its own recognition assessment process.

5.2.13

A Scheme might, within its own processes, distinguish different levels of competency. Where these exist they should be fully described; the Board will look for detailed cross-referencing to the IBSC Standards, and an explanation as to how such processes contribute to the overall system and ongoing recognition of an individual's competence.

5.2.14

A Scheme might include an overall set of competencies as well as subsets based on topics such as port surveying, bathymetry, shore-lining etc. Where these exist they should be fully described, and the Board will look for detailed cross-referencing to the Standards and an explanation as to how such processes contribute to the overall system of professional certification or individual recognition.

5.2.15

Where a submission considers it cannot meet the Guidelines of the Board due to government imposed procedures or legal requirements, the Board will expect a fully detailed explanation sufficient for the Board to take them into account during its deliberations.

5.2.16

The Board shall look to the comprehensiveness of submitted Schemes and completeness of documentation including, where relevant, documents which authenticate claims made in the submission and reserves the right to seek any clarifying documentation or explanation it needs to assist in its process of review.

5.3   Statement to be Included in the Scheme's Certificate

5.3.1

Schemes providing a professional certification or individual recognition process, which has been recognized as outlined in Clause 5.2, shall be required to issue successful candidates with a certificate of the successful assessment of their professional competencies. Such a certificate may acknowledge that the Scheme has received the Board's recognition, specifying the level of that recognition. The certificate issued by the Scheme shall include text similar to the following example:

> "This Assessment Scheme has been recognized as meeting the requirements for professional certification or individual recognition in the FIG/IHO/ICA Standards of Competence for Hydrographic Surveyors or Nautical Cartographers".

5.3.2

The submitted Scheme should include examples of its certificates for all levels awarded by the Scheme. There must be clear, unambiguous discrimination between the certificates awarded for pathways that include completion of Category A or B programmes and those that do not. An example of the type of text used by a Scheme on its certificate to an individual who has completed an IBSC recognized programme follows:

> **"Having completed a Category "A"("B") programme recognized by the IBSC against the S-5A/B or S-8A/B Edition NN.N.N of the Standards of Competence for Category "A/B" Hydrographic Surveyors or Nautical Cartographers and, having been successfully assessed by the Scheme recognized by the IBSC, the … institution …… grants …(name)…………the Hydrographic Surveyor or Nautical Cartographer Category "A"("B") certificate of professional recognition"**

5.3.3

Documentation and Submission. The procedure for recognition of schemes will generally follow that described for programmes at Section 6 below. The documentation required for schemes will vary depending on the scope of each scheme but as a minimum must comply with the requirements of Section 5 and include other relevant general information such as that described in Clause 6.1.1, 1) and Clause 6.1.1, 2).

6   PROCEDURES FOR RECOGNITION OF PROGRAMMES

6.1 Documentation to be submitted

See Appendix 1: **S-5A/B and S-8A/B** Checklist for Submitting Institutions. The checklist will assist the submitting institution in ensuring all documentation is included.

It is the experience of the Board that a well-prepared submission is one of clarity with detailed cross-referencing of the submitted programme syllabus to the content and learning outcomes provided in the standards.

See ANNEX for process diagrams. Giving an overview of both the timeline for submission and recognition process of the Board, the following flow diagrams have also been included in the ANNEX:

- Application Process Flow Diagram
- Procedure for Recognition of Programmes Flow Diagram

THE AIM AND SCOPE OF THE PROGRAMME SHOULD BE CLEARLY STATED AND THE PROGRAMME STRUCTURE DEFINED IN THIS CONTEXT.

It is important that the submission is comprehensive and adequately documented to reflect the purpose of the programme and is not simply a copy of the programme texts.

In summary, the preferred submissions to review are those that are clear, completely cross-related to the Standards, include relevant photographs, and are submitted with explanations of any deviations. The Board recognizes that model pedagogical theory and practice supports a variety of blended innovations of teaching techniques. The Board will expect that a submission should demonstrate how the required learning outcomes are achieved by the teaching methods and assessment strategy.

[Comment: While the IBSC appreciates that many submitting organizations do not use English as a first language and many do not teach using English, it is nevertheless essential that submitting organizations strive to make the submitted documentation as clear as possible. Submitting organizations will need to submit a digital submission only. It should be confined to a single searchable PDF (Portable Document Format) document file digitally indexed with hypertext links that is clearly and accurately numbered and cross-referenced.]

THE FOLLOWING INFORMATION MUST BE INCLUDED IN ALL SUBMISSIONS:

6.1.1 CHAPTER 1: General Information on the Programme.

Chapter 1 of the submission must include the following sections:

1) **Programme Identification**

Name of the Programme
Institution submitting the Programme for recognition
Previous recognition year (if any)
Standard and Edition against which recognition is sought
Level of recognition sought (Category "A" or Category "B")
Duration of the Programme relevant to the Standards in weeks
Total study hours and the breakdown for Theory, Practical and Self-Guided (excluding the final project hours)
Duration of the final project (CFFP, CCP, CMFP or CFCP) in weeks

Country of submitting institution
Language(s) in which the Programme is delivered
Programme coordinator name and full contact details
Submitting institution primary full contact details for IBSC correspondence
Programme capacity (expected/actual number of students taking the programme each year. For multi-year programmes, the expected total number of students progressing through the programme)
Geographical position of the institution (latitude/longitude)

2) **Aims of the Programme**

The submission should, in this section, provide a clear narrative outline of the programme, with details of the target audience and intended outcome and where it fits within the institution and national/ international hydrographic/cartographic community. The section should describe the academic elements of the programme and the objectives set for each student and their general learning outcomes.

[Comment: The Board is interested in the underlying rationale for the programme to the extent this assists its review process. It is necessary for the Board to know as much of the background detail as necessary to comprehend why the programme is designed the way it is, especially if there is some specific or even unique local learning outcome required.]

3) **Entry Requirements and Exemptions**

Identify normal qualifications required for entry and alternative qualification routes that may be acceptable for entry.

For Programmes seeking exemption of some or all the *Basic* or *Foundation Science* subjects, provide a clear indication of where students would previously have attained that knowledge, and a clear description of the formal procedures used to evaluate claims for such exemptions. ***No exemptions are permitted for Essential, Hydrographic and Cartographic Science subjects***.

[Comment: The Board will examine in detail the entry processes of the submitting organization. It will be focused on ensuring the entry requirements are properly and adequately met. Where an entry examination or test is employed the Board requires an outline of how the examination or test addresses the entry standards required.]

6.1.2 CHAPTER 2: Information About the Programme Infrastructure

Chapter 2 of the submission must include the following sections:

1) Staff List:

For each instructor contributing to the programme, provide a Curriculum Vitae (CV) which will include:
— Module taught;
— Academic qualifications;
— Hydrographic or cartographic experience; and
— Recent publications.

[Comment: The Board will look closely at staff CVs, in particular at the specific experience brought to teaching of the programme.]

2) **Facilities Available to Students:**
— Equipment: Provide a list of relevant equipment/systems that will be used in the delivery of practical work and in the final project;
— Software: List specific software (with emphasis on hydrographic and cartographic software);
— List of training aids (including any e-learning components and associated platforms for their delivery);
— Laboratories (description);
— Training vessels (description, photographs);

— Library List:
  o   total number of volumes held;
  o   approximate number of volumes relevant to Hydrography and Cartography;
  o   other media available (e.g. charts, maps, audio-visual resources); and
  o   availability and access policies to online digital resources.

6.1.3 CHAPTER 3: Programme Description

Chapter 3 of the submission must include the following sections:

1) **Programme Structure**

   The Programme may involve a series of modules and formal training sessions that must include practicals, tutorials and field experience to reinforce and complement theoretical material. It is important that the programme structure is clearly described within the submission and that sufficient details of the components are provided. As a minimum the submission should include:

   — Table of programme modules;
   — Schedule of programme modules identifying where in the sequence each module it taken by students (programme timetable); and
   — The duration (in weeks) of each module
   — Timeline of the complete programme (see 4) below)

2) **Information About Each Module in the Programme**

   This section should be easily understood and contain a full and detailed description of each programme module, including a reference to *elements* of the Standards for each course module item. This enables the institution to describe fully the programme in relation to the Standards and aids greatly in the Board's review. Each module of the programme being submitted should be described in more detail than the Standards, with a tabulation of theory, practical exercises and self-guidance hours devoted to the elements of the Standards. This will allow the Board to relate the module and lectures to the cross-reference table (see Clause 6.1.7) and tabulated programme description.

   A schedule should be provided that shows all delivered items (lectures, tutorials, assignments and practicals) within the module and relates them to *elements* of the Standards. This must include for each delivered item: means of delivery; hours allocated; reference to *elements* of the Standards. For the purpose of these Guidelines the nominal duration of a teaching hour is 50 minutes. If less, then this must be stated in the submission. An example of a Module Schedule that might be delivered in an S-5B programme is provided in Table 6-1 where the teaching scheme shows the first five lectures and associated practical/tutorial work. Coverage in the example is aligned with a student intake directly from high school with passes in mathematics and physics where no previous knowledge or experience in spatial science exists, hence the extended introduction offering familiarisation with relevant fundamentals. Time allocated is indicative of the entry level.

Table 6-1 — Example of a Module Schedule

Geodesy				
Learning Activities	Lectures	Tutorials	Practical	Self-Guided Study
Hours	36	8	20	27
Assessment type	Theory Exams/Tests	Practical Exams/Tests	Written Assignments	Presentations
Hours	2	4	7	

Module Outline:

A first course in geodesy that provides students with foundations in reference frames and surfaces used in surveying. Knowledge and skills acquired in this module are essential in underpinning further module content within the programme. Through the combination of theory and practical work with computer software the module offers an applied approach to the subject. Geodesy concerns the dimensions and shape of the Earth and reference frames used in data collection and computations for position. From geophysical data used to

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determine the figure of the Earth as a surface, mathematical approximations that are used in surveying are presented and realization of reference systems for practical applications defined. A contrast is drawn between traditional methods employed for control of surveys using terrestrial data and the use of modern satellite methods adopted for real-time mapping applications as well as techniques for precise geodetic control used in national mapping and geodynamics.

Learning Outcomes

1) Identify properties and needs for different surfaces used to represent the Earth for different applications and undertake geodetic computations in relation to such surfaces.

2) Describe the reference frames used in geodesy with appreciating their applications, compare methods for moving positional data between them and perform associated computations.

3) Explain traditional methods used in the establishment and realisation of traditional datums for horizontal and vertical control and reasons why this approach has changed with development of satellite technology.

4) Through the use of international examples, explain how modern horizontal and vertical datums for surveying and mapping at national level are established and realised to accommodate temporal components and perform associated computations.

5) Distinguish between broadcast and precise satellite ephemerides, identifying the parameters involved in each case and perform computations to determine satellite location at a particular time in a standard reference frame and relative to the location of a receiver on the surface of the Earth.

Module Reference Material and Bibliography:

Meyer, T.H. Introduction to Geometrical and Physical Geodesy: Foundations of Geomatics, ESRI Press, March 2018.
Hofman-Wellenhof, B. and Moritz, H. Physical Geodesy. Springer, September 2006.
National Imagery and Mapping Agency, Department of Defense World Geodetic System 1984. Technical Report Technical Report NIMA 8350.2, January 2000.
ICSM ANZLIC Committee on Surveying and Mapping. Geocentric Datum of Australia, Technical manual Version 2.4, December 2014.
IERS. Terrestrial reference systems and frames. IERS Technical Note No. 36.
Dawson, J. and Woods, A. ITRF to GDA94 coordinate transformations, Journal of Applied Geodesy No. 4, 2010
Thomas, C.M., and Featherstone, W.E. Validation of Vincenty's Formulas for the Geodesic Using a New Fourth-Order Extension of Kivioja's Formula. Journal of Surveying Engineering, February 2005.
Amos, M. New Zealand Vertical Datum 2009. New Zealand Surveyor, No. 300, 2010.

Module Activity Breakdown

Activity — Lecture, Practical, Assignment	Contents	T	P	SG	S5B Topic
Lecture 1 Introduction to Geodesy	An overview of the course as a whole to place material covered into context. The development of geodesy from measurements to determine the shape of the Earth from 200 years BC through early geodetic surveys to modern reference frames used with GNSS data.	2.0			E1.2
Tutorial 1	Determine formula and undertake computations using historical data obtained by Eratosthenes, Poseidonius, al-Ma'Mun, Abu Rayan al-Biruni and results from early baseline observations to determine the size of the Earth.		1.0		E1.1

Lecture 2	The Earth as a sphere, defining points in 3D by latitude, longitude and radius, Defining great circles, small circles rhumb lines and azimuth. Spherical trigonometry and its application. Use of solar observations to determine azimuth.	3.0			B1.3, E4.3a
Tutorial 2	Solution of problems using spherical trigonometry		2.0	1.0	B1.3
Assignment 1	The Equatorial Sundial

Working in pairs, use 4 rounds of observations to the Sun to determine azimuth of an RO and hence align a sundial to North.

Write a report with (i) Introduction; (ii) Principles detailing how the Sun can be used to determine both direction and time to explain corrections required to data for both components and computations required for solutions; (iii) Field booking sheet and computations for azimuth performed in the field; (iv) a discussion on precision of the azimuth using results from 4 rounds and accuracy from corrected time read from the sundial with true local time; and, (v) conclusions. | | 2.0 | 5.0 | B1.3, E4.3a |
Lecture 3	Gravity, Newtons laws. Gravity and potential due to mass and centrifugal force. Gravity measurement and normal gravity (GRS80). Gravity anomalies. Geopotential models (EGM2008)	3.0			B3.2, E4.1a
Practical 1 (computer lab)	Use locally acquired gravity data to produce maps of gravity anomalies and compare with a similar maps from EGM2008. Consider results in alignment with geological structures.		2.0	2.0	E4.1a, B4.1
Lecture 4	The Earth as a spheroid. Latitude, longitude, radius of curvature and meridional distance. Lines of sight and geodesic on the spheroid. Computations on the spheroid by Normal Section, Vincenty's formula and Kivioja's algorithm. Deflection of the vertical,	3.0			E4.1d

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	geoid/spheroid separation and their relationship.				
Practical 2 (computer lab)	Use of scripts, spreadsheets and on-line resources to perform spheroidal computations and reverse computations on lines of different length. Use software for visualization of lines of sight and the geodesic.		2.0	2.0	E4.1d
Lecture 5	Vertical control. Approximating the geoid from Sea level data. Use of levelling to transfer control and influences of Earth potential. The geopotential number and orthometric heights. Review of alternative heighting methods (Helmert heights and dynamic heights). Determining a reference surface for normal-orthometric heights with benefits and applications in surveying.	3.0			E4.4a E4.1c
Practical test 1 (computer lab)	Computations relation to; (i) Comparing traditional bench mark data with heights obtained from GNSS corrected with global and local geoidal models; (ii) Use of normal-orthometric heights. Discussion of methods and results in both parts.		2.0		E4.4a E4.1c
⋮	⋮	⋮	⋮	⋮	⋮

Each assessment component (through exams, assignments, etc.) must be clearly defined and related to learning outcomes from the Standards. It must be supported with assignment specifications and assessment criteria (i.e. the way each assignment and exam is graded).

Where e-learning components are used, the expected student total working time for each component, the estimated number of tutor-student interaction hours, e-lecture schedule, tests, exercises, and the way the student study time is monitored should be provided.

The IBSC does not intend to be prescriptive in how the modules or sub-components of a Programme are structured, but it requires that they be properly and fully related to the cross-reference table.

3) **Texts and Reference Material**

A list of texts and reference material used for each subject area, with an indication of the editorial house/publisher, and year of publication should be provided. Where e-learning components are included, then a description of the e-learning materials, including their source, year of publication and a description of the material access method, should be submitted.

[Comment: The Board will look to the adequacy and relevance of texts and reference materials. The section also serves as important feedback to the Board itself as to the availability of adequate and up to date teaching material. The IBSC wishes to ensure that students are adequately supported in terms of access and availability to required texts and reference material.]

4) **Timeline**

Provide a graphical representation (e.g. Gantt chart) of the complete programme schedule detailing the sequence in which all modules are delivered and assessed in chronological order.

6.1.4 CHAPTER 4: Student Assessment

Chapter 4 of the submission must include the following sections:

1) **Student Assessment and Grading:**
   — Describe how a mark in each module is determined on the basis of assessment components within that module together with requirements for obtaining a pass.
   — Describe how grades awarded within the Programme are combined to give an overall grade and the requirement for award of recognition.
   — Provide details of mechanisms to support students who fail a particular component of a Programme.
   — Describe how individuals are assessed in the final project

   [Comment: The expectation of the IBSC is that all learning outcomes of the Standards will be assessed in some form for example by examination, quiz, assignments, practical tasks, field-work, office-work or project tasks.]

2) **Examination Papers**

   Representative examination papers, sample writing or self-guided assignments, and e-learning assessment components from each *Subject* area, taken by students during the programme (i.e. not only the final examination), must be submitted. For new programmes a prospective sample set must be provided.

   [Comment: In reviewing a submission the Board will check that the format and level of the examinations and tests employed are appropriate to the learning outcomes required and the category of recognition sought. New submissions will be expected to have developed as a minimum an examining or testing strategy appropriate to the planned course.]

6.1.5 CHAPTER 5: Practical Exercises

Chapter 5 of the submission must include a list and details of all practical exercises, listed by *Essential* subject (S-5B/S-8B), *Foundation Science* subjects and *Hydrographic Science* subjects (S-5A) or *Cartographic* Science (S-8A) as described in Clause 3.1 must be provided. An example is provided in Table 6-2.

Table 6-2 — Example of the List of Practical Exercises

Practical Exercise	Programme module	Hours	S-5/S-8 (B or A) topic/ element
Fire Extinguishers Types and operation of fire extinguishers. Demonstration and hands-on practice using various types of fire extinguishers, led by university fire department.	**OE 677 Class 4**	3.0	B4.6
…	…		
Oceanographic Mooring and Instrument Deployment Exercise Guided exercise rigging, deploying and recovering an oceanographic instrument mooring and buoy from R/V *Gulf Surveyor*	**OE 677 Class 28**	2.0	B4.7, B4.8, B4.9, B4.11
…	…		
Surveyors Notebook The do's and don'ts of note keeping	**OE 771 Lab 1**	1.0	H8.1a
Leveling Observing and calculating a leveling loop, calculate heights, distribute errors, Kukkamaki method, Proper note keeping	**OE 771 Lab 2**	10.0	F1.4a, F1.4b

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Practical Exercise	Programme module	Hours	S-5/S-8 (B or A) topic/ element
…	…		
ADCP In Lab: With instructor supervision, install/deploy and recover an acoustic Doppler current profiler at the waterfront. Collect and download current observation data. On own: Prepare and submit a report describing the sensor, the installation/deployment procedure and any possible difficulties encountered, and assessing sources of uncertainty in current measurements.	**OE 775 Lab 2C**	9.5	H5.5b
…	…		

6.1.6 CHAPTER 6: Final Project

A detailed and comprehensive narrative description of the Final Project (CFFP, CCP. CMFP or CFCP) is to be provided. Describe the timescale and schedule. Explain student participation as groups or individuals, the assessment criteria for groups and individuals and who will conduct the assessment. Include the project specification (hydrographic or cartographic instruction) as provided to the students and a sample of submitted student deliverables and reports.

In addition, a table MUST BE COMPLETED IN THE SPECIFIED TEMPLATE PROVIDED, as prescribed below. In this table the Final Project, whether CFFP, CCP. CMFP or CFCP, should be described in terms of Task Outcomes. Tasks defined by the institution, must ensure that the programme content is covered in an integrated manner. These tasks are to be cross-referenced to the **Essential, Foundation or Hydrographic/Cartographic Science** *subjects*.

1) **Guidance to Complete the Final Project Description Table**

The project should be described as a series of phases and associated tasks (project activities) each itemized as separate rows of the table (example in Table 6-3). Each task should be identified in the first column and the other columns populated with attributes of that task.

The Task Outcome describes the intended result of the completed task. The required resources, equipment, software, data sources, etc. for each task are to be itemized. The number of hours devoted by the student to a particular task is to be itemized.

Each task should refer to the module identifier for the project and related (S-5 or S-8) subjects from the Standards.

Table 6-3 — Final Project Descriptive Tables

Final Project (Hydrographic) Description Table (CFFP or CMFP)					
Phase & Task	**Task Outcome**	**Resources: equipment, software, data sources etc.**	**Hours**	**Programme Module(s)**	**Related S-5 Elements**
Planning					
Task 1					
Task 2					
Task…					
Preparation					
Task 1					
Acquisition					

Final Project (Hydrographic) Description Table (CFFP or CMFP)					
Task 1					
Task 2					
Task 3					
Processing					
Task 1					
Task…					
Deliverables					
Reports					
Final Project (Cartographic) Description Table (CCP or CFCP)					
Phase & Task	**Task Outcome**	**Resources: equipment, software, data sources etc.**	**Hours**	**Programme Module(s)**	**Related S-5 Elements**
Planning					
Task 1					
Task…					
Preparation					
Task 1					
Task…					
Acquisition & Processing					
Task 1					
Task…					
Composition					
Task 1					
Task…					
Deliverables — Paper					
Deliverables — ENC					
Reports					

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Final Project (Hydrographic) Description Table (CFFP or CMFP)					

6.1.7   CHAPTER 7: Programme Cross-Reference Table

This table is the most important information used by the Board to assess submitted programmes and MUST BE COMPLETED IN THE SPECIFIED TEMPLATE PROVIDED, as prescribed below. This table contains a mapping of the hours for theory (T), practicals (P), self-guided (SG) devoted to each *element* and learning outcomes of the Standards and classified by *subject*. The information provided is required to demonstrate that every element's contents and learning outcomes are covered by the programme modules.

[Comment: Particular care should be taken in ensuring the cross-referencing is completed accurately and comprehensively. The Board needs to reference the learning outcomes sought against the content delivered.]

1) **Guidance to Complete the Cross-Reference Table**

   Submitting institutions MUST complete the Module and content and the Hours columns of the table shown below for each *Basic, Essential, Foundation, Hydrographic or Cartographic Science subject*:
   — T/P/SG (Theory/Practicals or Labs/Self-guided):
     o   Theory through lectures;
     o   Practicals (fieldwork and/or laboratories);
     o   Self-guided exercises (or student's personal independent work).

   For each element, the combined means of delivery should be clearly and uniquely identified.
   — Hours: Indicate the number of teaching hours for the different categories of delivery;
   — Module and content: For each relevant course module to a S-5 element, indicate its name and the list of content it is addressing.

   The following Table 6-4 provides a generic example for an element <c> of an essential subject topic Ex.y

Table 6-4 — Generic Example

Ex (subject)						
Ex.y (topic)						
Element	**Content**	**Learning outcomes**	**Module and content**	**Hours**		
				T	**P**	**SG**
Ex.y<c> *(B/I)*	Core content which are required to achieve the learning outcomes. These may apply to multiple elements and learning outcomes.	Students should be able to meet these outcomes at the completion of the programme. All *learning outcomes* should be evaluated either by, or a combination of, assessment, examination, laboratory work or final project	Course module reference and associated content	N	N'	N"
Total						

Each *Basic, Essential, Foundation, Hydrographic or Cartographic Science subject* is comprised of a list of topics which are denoted by Bx.y, Ex.y, Fx.y, Hx.y or Cx.y. Each topic contains elements which are denoted by <c>.

All modules of a programme submission MUST include a detailed breakdown of content and associated hours. The cross-reference should refer to those modules as provided in the following example (Table 6-5):

Table 6-5 — Detailed Breakdown of Content and Associated Hours

Ex (subject)						
Ex.y (topic)						
Element	**Content**	**Learning outcomes**	**Module and content**	**Hours**		
				T	**P**	**SG**
Ex.y<c1>	1) Content 1	Learning outcome Ex.y<c1>	GEOM302 (i)(iii)(iv)	5	3	3
	2) Content 2		HYDRO304 (i)(vi)	3	2	5
	3) Content 3		Total	**8**	**5**	**8**
Ex.y<c2>		Learning outcome Ex.y<c2>	HYDRO501 (ii)(iv)(v)	8	4	
	4) Content 4		Total	**8**	**4**	
	5) Content 5					
	6) Content 6					
Total						

6.1.8   CHAPTER 8: Student Feedback

The IBSC strives to ensure that quality control measures are in place and a part of this process involves consultation with the student body. It is important that students enrolled in the Programme are able to contribute to development and change. Mechanisms such as student liaison meetings help in dealing with issues that arise during delivery. On completion of the Programme a questionnaire should be circulated to solicit opinions on matters such as accessibility to resources and delivery of each course. Summary results from questionnaires should be included in the submission.

6.1.9   CHAPTER 9: Internal Review

Institutions are required to have in place an internal review process for the Programme. It is recommended that any Programme will also undergo a comprehensive internal review every 3-5 years, to address any issues that may arise and to update course content.

The methodology adopted by the institution for the internal review will need to be furnished in detail. The summary of any recent internal review undertaken for a programme submitted for recognition will need to be included in the submission. This should not be taken as precluding newly developed programmes not yet able to satisfy these items.

The Board wishes to see how feedback from all sources, including students, is formally taken into account within and by the Programme.

7   IBSC PROCEDURE FOR RECOGNITION OF PROGRAMMES

7.1   IBSC Review and Evaluation

See Appendix 2 for the Application Process Flow Diagram.

The Board meets annually during March/April to review and evaluate programmes. The deadline of 31 December each prior year is chosen in order that submissions reach all Board members and the Secretary by mid-January. It is helpful for the IBSC in setting its work program to know as early as possible that a submission is being made.

The completeness of each submission will be checked to determine if it is eligible for Board review. A submission is declared eligible for review if:

• fees have been paid;

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- the structure of the submission is in accordance with Chapter 7 of the Guidelines;
- information about each module in the programme is provided;
- the final project description and the final project cross-reference table is provided; and
- the programme cross-reference table is provided.

[Comment: the above check is conducted by the Secretary and is restricted to reviewing the format and structure of the submission. It is not a qualitative assessment of the content, which is the responsibility of the Board.]

If the submission is not eligible, the institution will have to update the documentation by 31 January. If the updated documentation is not provided by this deadline or if it does not meet the eligibility criterion for Board Review, the submission will not be reviewed. *Only eligible submissions will be reviewed*.

Since the Board is charged with reviewing a significant number of submissions each year as well as maintaining the Standards themselves, it is essential that submitting organizations assist with the Board's timing requirement. In the experience of the Board, the better submissions are those which are most straightforward for it to review and these are typically those prepared well ahead of the submission date and which have been thoroughly reviewed internally by the submitting organization.

7.2 Review Process

See Appendix 3 for the **Procedure for Recognition of Programmes and Schemes** *Flow Diagram*.

Once a submission is declared eligible for Review, the Chair of the Board assigns it to a primary Review Team who are responsible for leading the detailed review. Between the 31 January and the IBSC meeting Board Members have the opportunity to review submissions individually. All Members of the Board will review all submissions in plenary at the annual meeting.

Should there be any contact between institutions and Board Members prior to the annual IBSC meeting, please note that any advice given is in good faith with the best intention of assisting the institution in preparing its submission. It should not be construed as formal feedback from the IBSC. The institution should not expect that compliance with any requests or recommendations will necessarily result in recognition of the programme. The formal consideration and any decision relating to any programme can only be undertaken by the full IBSC.

While not mandatory, **in the experience of the Board it is beneficial for a submitting organization to send a representative (a maximum of 2 persons) to the meeting where its submission will be reviewed**. The representative(s) should be prepared to make a presentation to the Board of no longer than 20 minutes, and be qualified to respond authoritatively to questions posed or clarifications sought by the IBSC in plenary.

The Board's decision will be one of the following:
1) **RECOGNISED**: no further requirements or changes are necessary;
2) **RECOGNISED WITH CONDITIONS**: further requirements or changes are necessary in response to identified issues. The required information is to be submitted within a period specified by the Board;
3) **NOT RECOGNISED**: a full resubmission is required, including all documentation (In exceptional circumstances the Board may consider an inter-sessional resubmission).

The Board will inform the submitting organization of its decision during the meeting and will follow up with a formal letter explaining its decision and requirements.

7.3 Certificate of Programme Completion

Institutions providing a programme which has been recognized as outlined in Clause 1.2, are encouraged to issue successful students with a certificate of programme completion. Such certificate may acknowledge that the Programme has received the Board's recognition, specifying the category of that recognition, as in the following example:

"This Programme has been recognized as meeting the requirements of the FIG/IHO/ICA S-5A/B or S-8A/B Standards of Competence for Category "A" (or "B") Hydrographic Surveyors or Standards of Competence for Category "A" (or "B") Nautical Cartographers"

Institutions cannot include any FIG, IHO, ICA or IBSC logos in their certificates.

8 FOLLOW-UP OF RECOGNIZED PROGRAMMES BY THE IBSC

8.1 Programme Reviews and On-Site Visits

Institutions with recognized Programmes should be prepared to allow an IBSC visit, to view the facilities and to meet staff and students involved. The guidelines for the IBSC visit are:

8.1.1 Scope

A Programme review is a process for evaluating and continuously enhancing the quality and currency of Programmes. The evaluation is conducted through a combination of self-assessment, followed by peer on-site consultation by the IBSC, for the mutual benefit of all parties. In addition, a visit serves to raise the profile of hydrography and nautical cartography with other in-country agencies and regionally.

8.1.2 Purpose of Programme Review

The purpose of the on-site review is to confirm the internal review document presented by the host institution, in accordance with the Standards of Competence for Hydrographic Surveyors (S-5A/B) and the Standards of Competence for Nautical Cartographers (S-8A/B). This is designed to assess institutions' alignment of their Programmes with the Standards and to review educational processes.

8.1.3 Internal Review Document

A prerequisite for the on-site review is the submission of an internal review document prepared by the hosting institution covering a period of up to 5 years, from either: the last on-site review visit; or, commencement of the current Programme. This should be submitted in English at least one month prior to the on-site visit with content as indicated below:

- The Annual Review Document(s) as detailed in Clause 8.3.
- If requested, the final submission from the current recognized programme as presented to the Board for recognition
- Any changes to the course content, staff, delivery, facilities, field training, equipment and other resources
- Programme statistics relating to students including, entry, progression, completion and destinations (employment)
- Relevant institutional research

The Review Team will comprise two or three reviewers and the duration of the on-site review is typically two to three days.

Further documentation to be made available during the visit includes:

- A full set of programme documentation
- Exam papers and sample scripts
- Assignment specifications and sample submissions
- Specifications for practical exercises and field training with sample submissions
- Final project submissions
- Internal course assessment procedures and sample results
- Programme review documentation

8.1.4 The On-Site Visit

During the on-site visit the Review Team will undertake the following activities in accordance with a schedule that is agreed in advance with the hosting institution:

- Preliminary discussion:
  — Clarify the information provided in the Internal Review document
  — Outline the schedule and objectives for the on-site visit
- Meet current students, faculty members, administrators, and staff

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- Meet former students and employers
- Visit classrooms, labs, survey vessels and other key facilities
- Provide oral feedback to the institution

8.1.5 On-Site Visit Outcomes

Within one month of the visit a written report detailing the findings and recommendations of the Review Team for the programme will be provided to the hosting institution for response and sent to the Board. Recommendations made by the Review Team will be considered by the Board with possible outcomes as follows:

- Programme is satisfactory;
- There is a need for minor modifications that can be rectified internally by the hosting institution;
- The findings of the Review Team refer to major issues requiring significant changes to the documentation and/or practices as detailed in the report. Modifications are to be implemented within an agreed timeframe indicated by the Board and documentary evidence of the modifications will be required;
- The findings of the Review Team refer to major issues and therefore a new submission is required at a time to be agreed with the Board.

8.2 Register of Recognized Programs and Schemes

Recognition is granted on the understanding that institutions undertake to update their programme/ scheme content according to changes in technology as reflected in the latest edition of the Standards. The IBSC reserves the right to monitor programme syllabi in conformity with the current published Standards. The Board annually updates its Register of Recognized Programmes and Schemes, which is published in the Board Annual Meeting report. Programmes that have been recognized within the previous six (6) years are listed in this Register. To remain on the Register beyond six (6) years, programmes and schemes will need to be re-submitted against the then current Standards.

8.3 Annual Report for Recognized Programmes

All institutions hosting a recognized Programme/Scheme must send a short annual report to the Board's Secretariat. A template is available from the IHO website.

The annual report should be provided by the end of January each calendar year and contain the following information:

Name of Programme: _
Name of Contact Person: _
Contact information: _
Period Covered: _ _ _ _ _ _ _ _ _ _ _ _ _ **to** _ _ _ _ _ _ _ _ _ _ _ _

Programme Changes
- Describe any changes made to the programme such as structure, sequence or timing with a rationale.
- Describe any changes made to modules within a programme such as content and assessment strategy.
- Identify significant changes to key staff involved in delivery.

Programme Statistics

The minimum statistical information/data concerning courses within the programme are required as follows:

- Number of students entering the programme and their nationality.
- Number of students completing the programme.

Internal Assessment

Internal assessment is the appraisal process performed by the institution responsible for the Programme. Please provide a summary of feedback from students and staff and any action taken as a result.

Deadline for Annual Reports for Recognized Programmes

Annual reports are to be submitted to the IBSC by 31 January, independent of the programme timeline.

8.4 Annual Reports for Recognized Schemes

All entities operating a recognized Scheme must submit a concise annual report summarizing the operation and any administrative changes to the Scheme over the previous calendar year.

The annual report should contain the following header information:

Name of Scheme: _
Name of Contact Person: _
Contact information: _
Period Covered: _ _ _ _ _ _ _ _ _ _ _ _ _ **to** _ _ _ _ _ _ _ _ _ _ _ _

The content of the report should include:

* a general description of the operation of the scheme, initiatives in promotion, relationships with other schemes or authorities, recognition by other parties, other relevant observations;
* any changes that are being considered, proposed or implemented;
* a table of the board/panel members, showing changes/dates of service;
* the number of meeting held, dates, number of board/panel members in attendance and whether they were face to face or remotely;
* the number of applications considered, the status of these applications, and details of pathways to certification applied for;
* cumulative statistics summarizing applications since inception/recognition;
* any planned future initiatives; and
* any other information that they scheme considers may be of interest to the IBSC.

Deadline for Annual Reports for Schemes

Annual reports for Schemes are to be submitted to the IBSC by 31 January.

Appendix 1
S-5A/B and S-8A/B Checklist for Submitting Institutions

- Inform Chair and Secretary of intention to submit a programme for recognition (starting the dialogue)
- Prepare an internal project plan to meet 31 December deadline for submission (focus on deadline)
- Receive the invoice for payment of fees from the IHO Secretariat
- Pay fee and deliver submission (pay fees)
- Assemble the programme documentation into a single coherent submission in the English language with unique page numbers, a contents page and a version control table (focus on documentation requirements), following the structure below (ref. Chapter 7 of the Guidelines):

Ref: GUIDELINES FOR THE IMPLEMENTATION OF THE STANDARDS OF COMPETENCE FOR HYDROGRAPHIC SURVEYORS AND NAUTICAL CARTOGRAPHERS		
ITEM	TITLE	
1	General information on the programme	•
1.1	Programme Identification	•
1.2	Aims of the programme	•
1.3	Entry requirements	•
2.1	Staff list	•
2.2	Facilities available to students	•
3.1	Programme structure	•
3.2	Information about each module in the programme	•
3.3	Texts and reference material	•
4.1	Student assessment and grading	•
4.2	Examination papers	•
5	Practical Exercises	•
6	Final Project (CFFP, CCP, CMFP or CFCP)) Cross-reference table – MUST BE COMPLETED IN THE SPECIFIED TEMPLATE PROVIDED	•
	Project specification (hydrographic or cartographic instruction) as provided to students for the final project	•
	Sample of deliverables and reports submitted by students for the final project	•
7	Programme Cross-reference table – MUST BE COMPLETED IN THE SPECIFIED TEMPLATE PROVIDED	•
8	Student Feedback	•
9	Internal Review	•

- Submit the programme documentation to the Secretary by the deadline (focus on final submission)
- Inform Chair and Secretary of attendance at the IBSC meeting (focus on meeting and presentation)

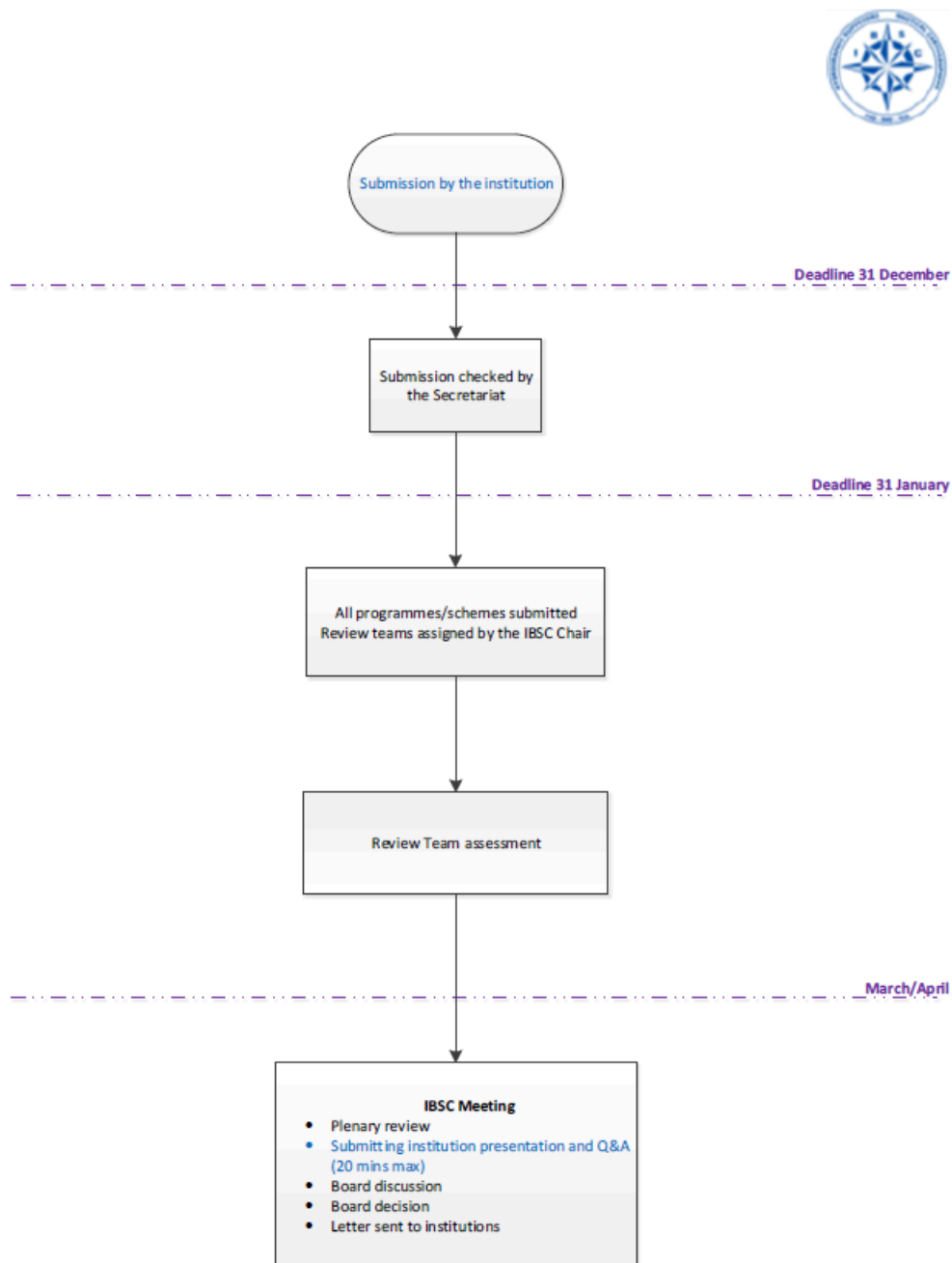Page intentionally left blank

Appendix 2
Application Process Flow Diagram
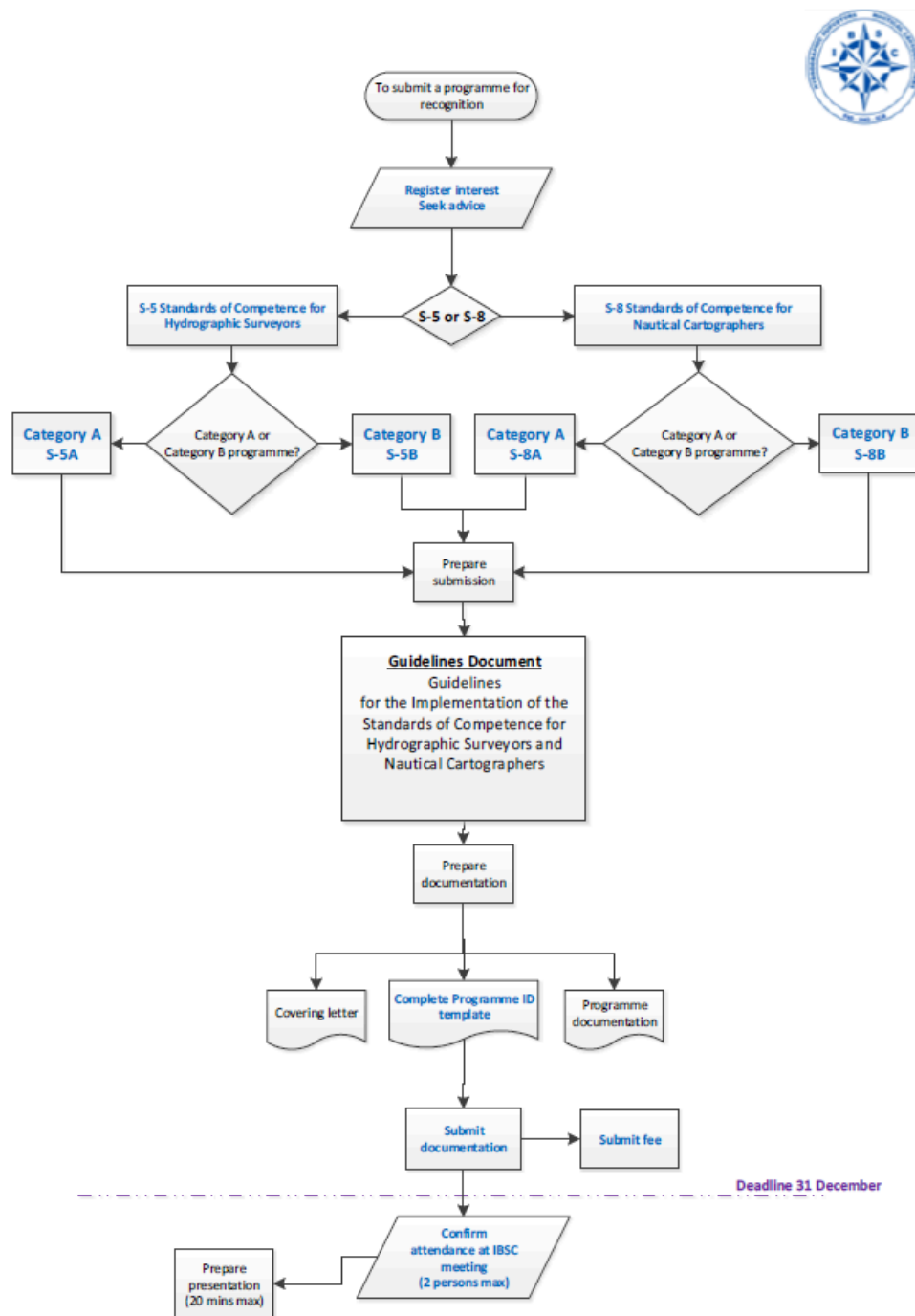
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Appendix 3
Procedure for Recognition of Programmes and Schemes Flow Diagram

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**Appendix 4
Revision history**

Date	Edition	Description and changes
May 2019	2.1.0	• General editing and formatting • Section 6. Professional Certification or Recognition Schemes clarified • Section 7.1 a single PDF digital submission only • Section 7.1.3. Inserted an example of a Module Schedule Table • Section 7.1.3 Requirement for a Timeline of the programme • Section 7.2.3. Inserted an example of the Practical Exercises Table • Section 8.1 & 8.2. Clarified IBSC review and Evaluation Process • Section 9.3 & 9.4. Requirements for Annual Report modified • Annex A. Checklist and flow diagrams modified
March 2017	2.0.0	• Covers both S-5 and S-8
July 2016	1.1.0	• General editing and formatting • Section 3.2 on time frames modified • Modification of section 8.2. Define eligible submission, split review process between individual evaluation and IBSC review process. • Inserted checklist and flow diagrams to Annex A
January 2016	1.0.0	First edition

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