Chartered Marine Scientist (Hydrography)

Standards

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1 Introduction

The Institute of Marine Engineering, Science and Technology (IMarEST) is the international membership body and learned society for marine professionals, with 49 branches and over 22,000 members in over 128 countries around the world.

The Institute's role is to promote the scientific development and interdisciplinary understanding of marine engineering, marine science and marine technology and to uphold and advance the knowledge and status of professionals across the international marine community.

IMarEST is open to everyone associated with the marine, coastal and offshore world, across all scientific, engineering and technological disciplines and applications.

The IMarEST received its Royal Charter in 1933 and is a licensed body of both the Engineering Council and the Science Council.   In accordance with our Royal Charter, the IMarEST is able to award suitably qualified and experienced applicants the title of Chartered Marine Scientist (Hydrography) (CMarSci(Hydrography)). The IMarEST is the only professional body in the world able to award this title.

2 Marine Scientists and CMarSci(Hydrography)

Registered Marine Scientists are professionals, who harness, exploit, manage, use or apply marine science in the pursuit of knowledge, understanding of the marine environment, wealth creation and/or the provision of services in the marine sector. An individual wishing to pursue registration as CMarSci(Hydrography) will be a professional person with the academic qualifications and technical expertise to conduct one, or more, of the following activities;

- to determine, measure and represent the earth, three-dimensional objects, point-fields and trajectories underwater or from the water,
- to assemble and interpret seabed, water column and geographically related information,
- to use that information for the planning and efficient administration of the sea and any structures thereon/in; or,
- to conduct research into the above practices and to develop them.

3 The Benefits of CMarSci(Hydrography) Registration

The CMarSci(Hydrography) designation has many benefits for individuals, employers and the public as a whole. As a profession, society does not recognise Hydrographic Surveying as it does engineering or earth sciences; partly due to it being a small industry but also because it sits within larger, more recognised professions as part of large offshore projects. There has also been no one professional qualification which is globally recognised and encompasses all aspects of Hydrographic Survey. The definition of hydrography has not been updated to reflect how hydrographic survey skills are used in today's varied industries.

Individuals who aspire to be recognised as professional hydrographic surveyors (CMarSci(Hydrography)) require independent assessment of their competence and commitment, and this standard provides the means to achieve that.

Furthermore, CMarSci(Hydrography) registration provides employers with additional assurance of the quality of their workforce. It is of benefit to:

Society, which will be more confident in the competence of an individual and need no longer be confused by a platform of letters and descriptions.

Individual practitioners, by identification as a professional that sets them at the forefront of their profession and offers a passport to mobility.

Employers, with confirmation, through the designation, of the quality of a job applicant.

Government departments, seeking to appoint advisers or consultants would have an assurance about the level of an individual's expertise.

Professional bodies, with provision through the new designation of additional opportunities to benchmark their qualifications.

Higher education, which will be better able to set and monitor benchmarks for their courses, and to promote programmes of study to meet the high standards required of CMarSci(Hydrography).

Regulatory Authorities, who could be confident in specifying the designation in legislation and regulations.

Legal credibility, enabling expert witness participation at a defined standard.

Professional standing, recognising equality of excellence across the hydrographic surveying profession.

4   What is the required knowledge and competence?

CMarSci(Hydrography) is open to everyone, who can demonstrate the required high-level knowledge, understanding and professional competence. The exemplifying educational standard is a Masters level qualification in an approved subject. There are many routes that can be measured to meet this standard, including a combination of academic awards, vocational qualifications and experiential learning through work. Competence includes the knowledge, understanding and skills that underpin performance.

CMarSci(Hydrography) registrants are required to maintain their professional competence, working within professional codes of conduct and participate actively within their profession. There is also a requirement for continuing professional development.

5   Assessment of knowledge and competence

The IMarEST is the only organisation able to confer CMarSci(Hydrography) on individuals, who meet the criteria.

To become a CMarSci(Hydrography) registrant, applicants must have their competence assessed by the IMarEST. The assessment is made against standards rigorously applied by the IMarEST's Professional Affairs and Education Committee and Membership Committee.

The process of assessment starts with a written application to the IMarEST's Membership Services Department. Claims to qualifications, experience and training will require formal documented evidence. In giving details of experience, applicants will need to show how this relates to the required competencies for CMarSci(Hydrography).

Following a review of the documented evidence, the Membership Committee will require the applicant to undertake a professional review interview (PRI)[1]. The Membership Services Department will inform the candidate of the necessary procedures. If deficiencies in the application emerge, the Membership Committee will usually be able to suggest ways in which they can be addressed (this may involve further learning, training or additional experience). If a candidate receives a positive decision on their application for CMarSci(Hydrography), they will become registered and their details will be included on the Register. Retention of the designation will require continued membership of the IMarEST and payment of the required subscription.

6   What needs to be demonstrated?

6.1   Competence
The following table details the generic competences that have to be demonstrated in order to achieve registration as for CMarSci(Hydrography). Given the diverse nature of scientific and technological practice, achieving the required level for these professional competencies will involve a broad range of activities. Candidates who believe they meet these or who wish to work towards them, should approach the IMarEST's Membership Services Department to obtain further details on how to apply for registration.

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[1] Any interviews will be conducted in English, subject only to the provisions of the Welsh Language Act 1993 and any Regulations, which may be made in implementation of European Union directives on free movement of labour.

The Competence and Commitment Standard for CMarSci(Hydrography) registrants.	Guidance
CMarSci(Hydrography) registrants must be competent throughout their working life, by virtue of their education, training and experience, to:	These are examples of activities which could demonstrate that you have achieved the CMarSci(Hydrography) criteria.
A Use a combination of general and specialist Hydrographic Survey knowledge and understanding to optimise the application of existing and emerging technology.	
A1 Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology. This could include an ability to: • Identify the limits of own personal knowledge and skills • Strive to extend own technological capability • Broaden and deepen own knowledge base through research and experimentation.	Engage in formal post-graduate academic study. Learn and develop new Hydrographic Survey theories and techniques in the workplace. Broaden your knowledge of Hydrographic Survey standards and specifications.
A2 Engage in the creative and innovative development of Hydrographic Survey technology and continuous improvement systems. This could include an ability to: • Assess market needs and contribute to marketing strategies • Identify constraints and exploit opportunities for the development and transfer of technology within own chosen field • Promote new applications when appropriate • Secure the necessary intellectual property (IP) rights • Develop and evaluate continuous improvement systems.	Lead/manage market research, and product and process research and development. Cross-disciplinary working involving complex projects. Conduct statistically sound appraisal of data. Use evidence from best practice to improve effectiveness.

B Apply appropriate theoretical and practical methods to the analysis and solution of Hydrographic Survey problems.	
B1 Identify potential projects and opportunities. This could include an ability to: • Establish and help develop solutions to meet users' requirements • Consider and implement new and emerging technologies • Enhance Hydrographic Survey practices, products, processes, systems and services • Use own knowledge of the employer's position to assess the viability of opportunities.	Involvement in the marketing of and tendering for new Hydrographic Survey contracts, products, processes and systems. Involvement in the specification and procurement of new Hydrographic Survey contracts, products, processes and systems. Set targets, and draft programmes and action plans. Schedule activities.
B2 Conduct appropriate research, and undertake design and development of Hydrographic Survey solutions**.** This could include an ability to: • Identify and agree appropriate research methodologies • Allocate and manage resources • Develop the necessary tests • Collect, analyse and evaluate the relevant data • Undertake Hydrographic Survey design • Prepare, present and agree design recommendations, with appropriate analysis of risk, and taking account of cost, quality, safety, reliability, appearance, fitness for purpose, security, intellectual property (IP) constraints and opportunities, and environmental impact.	Carry out formal theoretical research. Evaluate numerical and analytical tools. Carry out applied research on the job. Lead/manage value Hydrographic Survey and whole life costing. Lead project survey teams. Draft specifications. Develop and test options. Identify resources and costs of options. Produce concept designs, and develop these into detailed designs. Be aware of IP constraints and opportunities.
B3 Manage implementation of design solutions, and evaluate their effectiveness. This could include an ability to: • Ensure that the application of the design results in the appropriate practical outcome • Implement survey solutions, taking account of critical constraints, including due concern for safety and sustainability • Determine the criteria for evaluating the survey solutions • Evaluate the outcome against the original specification • Actively learn from feedback on results to improve future design solutions and build best practice.	Follow the design process through into product or service realisation and its evaluation. Prepare and present reports on the evaluation of the effectiveness of the designs, including risk, safety and life cycle considerations. Manage product improvement. Interpret and analyse performance. Determine critical success factors.

C	Provide technical and commercial leadership.	
C1 Plan for effective project implementation. This could include an ability to: • Systematically review the factors affecting the project implementation including safety and sustainability considerations • Define a holistic and systematic approach to risk identification, assessment and management • Lead on preparing and agreeing implementation plans and method statements • Ensure that the necessary resources are secured and brief the project team • Negotiate the necessary contractual arrangements with other stakeholders (client, subcontractors, suppliers, etc).		Lead/manage project planning activities. Produce and implement procurement plans. Carry out project risk assessments. Collaborate with key stakeholders, and negotiate agreement to the plans. Plan programmes and delivery of tasks. Identify resources and costs. Negotiate and agree contracts/work orders.
C2 Plan, budget, organise, direct and control tasks, people and resources. This could include an ability to: • Set up appropriate management systems • Define quality standards, programme and budget within legal and statutory requirements • Organise and lead work teams, coordinating project activities • Ensure that variations from quality standards, programme and budgets are identified, and that corrective action is taken • Gather and evaluate feedback, and recommend improvements.		Take responsibility for and control project operations. Manage the balance between quality, cost and time. Manage risk register and contingency systems. Manage project funding, payments and recovery. Satisfy legal and statutory obligations. Lead/manage tasks within identified financial, commercial and regulatory constraints.
C3 Lead teams and develop staff to meet changing technical and managerial needs. This could include an ability to: • Agree objectives and work plans with teams and individuals • Identify team and individual needs, and plan for their development • Reinforce team commitment to professional standards • Lead and support team and individual development • Assess team and individual performance, and provide feedback.		Follow the design process through into product or service realisation and its evaluation. Prepare and present reports on the evaluation of the effectiveness of the designs, including risk, safety and life cycle considerations. Manage product improvement. Interpret and analyse performance. Determine critical success factors.

D	Demonstrate effective interpersonal skills.	
D1 Communicate in English with others at all levels. This could include an ability to: • Lead, chair, contribute to and record meetings and discussions • Prepare communications, documents and reports on complex matters • Exchange information and provide advice to technical and non-technical colleagues.	Reports, letters, emails, drawings, specifications and working papers (e.g. meeting minutes, planning documents, correspondence) in a variety of formats. Engaging or interacting with professional networks.
D2 Present and discuss proposals. This could include an ability to: • Prepare and deliver presentations on strategic matters • Lead and sustain debates with audiences • Feed the results back to improve the proposals • Raise the awareness of risk.	Presentations, records of discussions and their outcomes.
D3 Demonstrate personal and social skills. This could include an ability to: • Know and manage own emotions, strengths and weaknesses • Be aware of the needs and concerns of others, especially where related to diversity and equality • Be confident and flexible in dealing with new and changing interpersonal situations • Identify, agree and lead work towards collective goals • Create, maintain and enhance productive working relationships, and resolve conflicts.	Records of meetings. Evidence from colleagues of your personal and social skills. Take responsibility for productive working relationships. Apply diversity and anti-discrimination legislation.

E Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment.	
E1 Comply with relevant codes of conduct. This could include an ability to: • Comply with the rules of professional conduct of own institution • Lead work within all relevant legislation and regulatory frameworks, including social and employment legislation.	Work with a variety of conditions of contract. Demonstrate initiative in and commitment to the affairs of your institution.
E2 Manage and apply safe systems of work. This could include an ability to: • Identify and take responsibility for own obligations for health, safety and welfare issues • Ensure that systems satisfy health, safety and welfare requirements • Develop and implement appropriate hazard identification and risk management systems and culture • Manage, evaluate and improve these systems • Apply a sound knowledge of health and safety legislation.	Undertake formal health and safety training. Work with health and safety legislation and best practice. In the UK, examples include HASAW 1974, CDM regulations, OHSAS 18001:2007 and company safety policies. Carry out safety audits. Identify and minimise hazards. Assess and control risks. Evaluate the costs and benefits of safe working. Deliver strategic health and safety briefings and inductions
E3 Undertake Hydrographic Survey activities in a way that contributes to sustainable development. This could include an ability to: • Operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously • Use imagination, creativity and innovation to provide products and services which maintain and enhance the quality of the environment and community, and meet financial objectives • Understand and secure stakeholder involvement in sustainable development • Use resources efficiently and effectively.	Carry out environmental impact assessments. Carry out environmental risk assessments. Plan and implement best practice environmental management systems, eg ISO 14000. Manage best practice risk management systems eg ISO 31000. Work within environmental legislation. Adopt sustainable practices. Achieve social, economic and environmental outcomes.
E4 Carry out and record CPD necessary to maintain and enhance competence in own area of practice including: This could include an ability to: • Undertake reviews of own development needs • Plan how to meet personal and organisational objectives • Carry out planned (and unplanned) CPD activities • Maintain evidence of competence development • Evaluate CPD outcomes against any plans made • Assist others with their own CPD.	Keep up to date with national and international Hydrographic Survey issues. Maintain CPD plans and records. Involvement with the affairs of your institution. Evidence of your development through on-the-job learning, private study, in-house courses, external courses and conferences.

6.2   Education

Knowledge and understanding are important components of professional competence. Formal education is the usual, though not the only, way of demonstrating the necessary knowledge and understanding, and the following qualifications exemplify the required knowledge and understanding for CMarSci(Hydrography):

- an IMarEST accredited Masters degree in Hydrographic Survey,
- an IHO Category A qualification,
- a Higher National Diploma, a Foundation Degree or Bachelors Degree in Hydrographic Survey or technology, plus appropriate further learning to Masters level, or
- an approved degree apprenticeship programme.

Applicants who do not have exemplifying qualifications may demonstrate the required knowledge and understanding in other ways, but must clearly demonstrate they have achieved the same level of knowledge and understanding as those with exemplifying qualifications.

Ways to demonstrate this include:

- taking further qualifications, in whole or in part, to demonstrate Masters level knowledge,
- completing appropriate work-based or experiential learning, or
- writing a technical report, based on their experience, and demonstrating their knowledge and understanding of Hydrographic Survey principles to Masters level.

7   Professional Development

Professional development is a key part of developing the competence required to achieve the standard for CMarSci(Hydrography) registration. Aspiring registrants learn to apply their knowledge and understanding and apply professional judgement through professional development. Many larger employers run well-established graduate training and development schemes, some of which are accredited by the IMarEST for the purposes of registration.

Accredited professional development schemes, however, are not the only route to achieving the professional development necessary for CMarSci(Hydrography) registration. In the absence of an accredited scheme, aspiring registrants will need to develop profiles of competence and professional activity in accordance with the competence and commitment statements mentioned earlier. The IMarEST Learning and Development Team will be able to provide the information and guidance necessary; and may be able to put them in touch with a mentor to assist them through the process and help to identify any skills gaps in their development.

Anyone seeking registration should maintain a detailed record of their development, responsibilities and experience, verified by referees, in order to be best prepared to provide the evidence of professional competence commensurate for CMarSci(Hydrography) registration

7.1   Maintaining competence and demonstrating a commitment to CPD

Once CMarSci(Hydrography) registration has been achieved, individuals have an obligation to maintain professional competence. Guidance on CPD (including a downloadable CPD record) can be found on the IMarEST website (www.imarest.org).

7.2   The IMarEST's rules of Professional Conduct

All Corporate Members of the Institute are required to make a personal commitment to live by the appropriate codes of professional conduct, recognising their obligations to society, the marine professions and the environment (www.imarest.org/membership/conduct).