Linking Education and Licensure: Norway's Framework for Cadastral Surveyor Qualification

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Key words: cadastral surveying, professional licensing, qualification, higher education

1. SUMMARY

Norway introduced a national licensing scheme for cadastral surveyors in 2021, with full effect from 1 January 2026, when only licensed professionals became permitted to carry out and administer cadastral work under the Cadastre Act. To support a clear and predictable pathway from higher education to licensure, the Norwegian Mapping Authority (Kartverket) developed the *Guidelines for Approval of Study Programmes in Cadastral Surveying*, operationalising the Norwegian Qualifications Framework for Lifelong Learning for the cadastral profession.

The guidelines define required competence through three integrated domains—legal, cadastral, and geomatics—linked to learning outcomes in knowledge, skills, and general competence. The framework was developed through legal analysis, structured dialogue with higher-education institutions, and labour-market insight from municipal recruitment, confirming demand for surveyors with integrated legal, technical, and administrative capability.

Study programmes may be approved either as complete degrees or through defined course combinations that meet the minimum outcome and credit requirements. Approval is outcome-based and proportionate, relying on published learning outcomes, concise alignment with the competence domains, and documented academic progression. The first approval, granted in October 2025 to the Norwegian University of Life Sciences (NMBU) for its Master in Property and Land Law, established the first formally recognised educational pathway to cadastral licensure. Continued dialogue with higher education and employers supports ongoing relevance, consistency, and public trust in professional competence.

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2. INTRODUCTION

Cadastral surveying in Norway operates at the intersection of property law, public administration, and geodetic measurement. It integrates legal, institutional, and technical dimensions in professional practice and plays a central role in safeguarding land rights and public interests. Cadastral surveying underpins the national property register, supports spatial planning and land management, and provides legal certainty in matters relating to property boundaries and rights.

Recognising the importance of this role, Norway introduced a formal licensing system for cadastral surveyors in 2021. The system came fully into force on 1 January 2026, after which cadastral work under the Cadastre Act may be carried out and administered only by licensed professionals. This reform represents a significant shift from earlier arrangements and created a need for a clear, predictable, and transparent pathway from higher education to professional licensure. In Norwegian legislation, the licensing scheme is formally termed an *authorisation* scheme; in this paper, the terms *licensing* and *licensure* are used for consistency with international usage.

To ensure competence, accountability, and public trust, it became necessary to define explicitly what a cadastral surveyor must know, be able to do, and demonstrate in professional practice. This includes legal understanding, administrative capability, technical surveying competence, and the ability to exercise sound professional judgement in situations with legal and societal consequences.

The Norwegian Mapping Authority (Kartverket), as the national authority responsible for the cadastre, was therefore mandated to design both the licensing procedure and a framework for approving study programmes that qualify graduates for licensure. The resulting *Guidelines for Approval of Study Programmes in Cadastral Surveying* interpret the Norwegian Qualifications Framework for Lifelong Learning in a cadastral context and provide higher-education institutions with a structured way to demonstrate how their programmes meet the educational requirements for licensure.

The framework is illustrated through the approval of the Master in Property and Land Law at the Norwegian University of Life Sciences (NMBU), the first study programme formally recognised as qualifying for cadastral licensure through approved educational pathways.

The paper aims to:

- explain how national qualification descriptors were translated into concrete competence requirements for the cadastral profession while preserving academic autonomy; and

- discuss how the framework clarifies the pathway from education to licensure, supports employers in recruitment, and reinforces public confidence in cadastral work.

3. LEGAL AND INSTITUTIONAL CONTEXT

3.1 Legal basis

The legal basis for cadastral licensure in Norway is established in the Cadastre Act (Matrikkellova) and the Cadastre Regulations (Matrikkelforskriften). Together, they define the statutory requirements for licensure as a cadastral surveyor, including the requirement for approved education.

The Cadastre Regulations further specify the minimum conditions that a study programme must fulfil to be approved as qualifying education:

1. The programme must lead to the award of a bachelor's or master's degree upon successful completion.
2. The programme must include at least 120 ECTS credits in legal, cadastral, and geomatics subjects. While no fixed distribution is prescribed, the three subject areas are regarded as equally important. In practice, this is interpreted as a reasonably balanced distribution, with a minimum of 30 ECTS credits in each area.
3. The programme must qualify graduates to administer and carry out all types of cadastral work under the Cadastre Act.
4. The programme must meet minimum learning-outcome requirements defined by Kartverket.

Kartverket is the competent authority for both the licensing system and the approval of qualifying study programmes. This dual responsibility ensures coherence between legal requirements, academic learning outcomes, and the competence needs of employers.

3.2 Purpose of the guidelines

The *Guidelines for Approval of Study Programmes in Cadastral Surveying* were developed to establish a transparent and operational link between statutory licensing requirements and higher-education learning outcomes. Specifically, the guidelines aim to:

- provide a clear and evidence-based connection between education and professional competence;

- offer a consistent structure for higher-education institutions to document compliance with the approval requirements; and
- serve as a reference for employers and students regarding the competencies expected of licensed cadastral surveyors.

The overarching objective is to create a shared understanding between higher-education institutions, municipalities, and Kartverket of what constitutes adequate educational preparation for cadastral work. This ensures that graduates are prepared to carry out all types of cadastral work in accordance with the Cadastre Act.

Prior to the introduction of the guidelines, students and employers faced uncertainty as to which educational routes fulfilled the licensing requirements. The approval procedure addresses this by recognising defined educational pathways whose learning outcomes demonstrably cover three professional domains—legal, cadastral, and geomatics—while allowing institutions autonomy in curriculum design.

For municipalities, as the authorities responsible for cadastral services, the guidelines provide a common reference for assessing graduate competence. Kartverket acts as a facilitator by maintaining a transparent, outcome-based link between municipal practice and higher education.

3.3 Licensing requirements and study programme approval

The Norwegian framework for licensing of cadastral surveyors distinguishes clearly between requirements that apply to individual applicants for licensure and requirements that apply to higher-education study programmes seeking approval as qualifying education. While closely connected, these requirements operate at different levels and serve distinct functions within the regulatory framework.

Licensing requirements define the conditions an individual applicant must fulfil to be licensed as a cadastral surveyor. Education constitutes a central component of these requirements, alongside other statutory conditions set out in the Cadastre Act and related regulations, including the successful completion of a licensing examination.

Study programme approval requirements, by contrast, specify how higher-education institutions must structure, document, and demonstrate that their programmes provide the learning outcomes necessary to meet the educational requirement for licensure. These requirements concern programme level, subject coverage, minimum credit volumes, and progression, and they form the basis for Kartverket's approval decisions.

The two tracks are linked through an outcome-based approach. Approved study programmes and approved course combinations provide a predictable route for candidates to meet the educational requirement for licensure, while candidates with other educational backgrounds may be assessed individually against the same competence requirements.

3.4 Educational requirement for licensure

Approved education is one of the statutory requirements for licensure as a cadastral surveyor. This requirement may be fulfilled through two alternative routes.

First, candidates may complete a bachelor's or master's degree awarded by a study programme that has been formally approved by Kartverket under the guidelines.

Second, candidates may qualify through another bachelor's or master's degree, provided that the degree—either alone or in combination with supplementary or continuing education—includes at least 120 ECTS credits in legal, cadastral, and geomatics subjects. These subjects, as defined by Kartverket, must provide the learning outcomes sufficient to administer and carry out cadastral work in accordance with the Cadastre Act.

This dual approach provides flexibility while maintaining consistent competence requirements. It enables higher-education institutions to design diverse academic programmes and allows individual candidates to supplement their education where necessary, while ensuring that all licensed cadastral surveyors meet the same statutory requirements.

4. DEVELOPMENT OF THE FRAMEWORK

The guidelines were developed through a structured and collaborative process combining legal analysis, dialogue with higher education institutions, and labour-market analysis. The aim was to establish a competence framework that is firmly grounded in statutory requirements and professional practice, while remaining adaptable within an academic context.

4.1 From legal requirements to learning outcomes

The development process began with an analysis of the Cadastre Act and the Cadastre Regulations to identify the competence requirements implied by the licensing provisions. These requirements were then aligned with the Norwegian Qualifications Framework for Lifelong Learning to determine the appropriate levels of knowledge, skills, and general competence for professional practice as a licensed cadastral surveyor.

Under the guidelines, approved study programmes must define an overall programme-level learning outcome structured in terms of knowledge, skills, and general competence. At a minimum:

- Knowledge entails understanding of theories, facts, concepts, principles, and procedures within legal, cadastral, and geomatics subject areas.

- Skills involve the ability to apply knowledge in practice to carry out cadastral work in accordance with the Cadastre Act and to produce the documentation required for registration in the cadastre and, where relevant, land registration.
- General competence refers to independent professional practice, including responsibility, cooperation, reflection, and critical judgement, with particular emphasis on safeguarding legal certainty and due process.

Together, these learning outcomes define the competence profile required for licensure.

To make the requirements operational for education providers, they were structured into three professional competence domains: a legal domain covering property and boundary law, administrative procedure, professional reasoning, and communication of decisions; a cadastral domain addressing governance and administration of the cadastre, including the complete cadastral work process under the Cadastre Act; and a geomatics domain encompassing cadastral surveying and measurement, computation and accuracy, positioning, and geodata management.

For each domain, the guidelines specify learning outcomes and provide examples of desirable subject content. The focus remains on programme-level alignment: institutions must demonstrate that their published learning outcomes cover all three domains at an appropriate level and that students advance from foundational knowledge to integrated professional competence.

4.2 Labour-market analysis

To ensure that the guidelines are grounded in professional practice, Kartverket conducted a labour-market analysis in 2024 based on municipal job advertisements for cadastral surveyors. The purpose of the analysis was not to define formal qualification requirements, but to assess whether the proposed competence framework and learning-outcome structure reflected how cadastral competence is described and demanded by employers.

The analysis examined typical professional responsibilities, qualification expectations, and professional, personal, and ethical attributes highlighted in recruitment. The material provided a representative picture of municipal practice and employer expectations, and the findings were systematically compared with the draft framework to assess coverage across the learning-outcome categories of knowledge, skills, and general competence.

Overall, the analysis confirmed strong demand for surveyors with integrated legal, technical, and administrative competence, particularly in municipalities where roles are broad and multifunctional. This reinforced the need for educational pathways that prepare graduates for the full scope of professional responsibilities defined by the Cadastre Act.

4.2.1 Professional responsibilities in municipal practice

The job advertisements showed clear variation in role profiles depending on municipal size and organisation. In smaller municipalities, cadastral surveyors typically combine a wide range of responsibilities, including field surveying, administrative case handling, registration in the cadastre, guidance to property owners, and coordination with planning and building authorities. In larger municipalities, roles tend to be more specialised, often divided between cadastral surveying and cadastral registration.

Across the analysed advertisements, the most frequently described responsibilities included conducting cadastral surveys, administrative processing, public-facing guidance and stakeholder contact, registration in the national property register, and management of spatial data and planning registers. These responsibilities illustrate that cadastral practice requires the integration of measurement, legal assessment, administrative decision-making, and communication.

These findings were reflected directly in the learning-outcome framework, supporting the expectation that approved study programmes should prepare graduates to carry out all types of cadastral work rather than focusing narrowly on individual technical or legal components.

4.2.2 Qualification expectations

All analysed advertisements required relevant higher education, typically a bachelor's or master's degree in property and land law, geomatics, or related fields. Several explicitly referred to the licensing requirement for cadastral surveyors, while others highlighted supplementary training in cadastral registration.

These expectations align closely with the guideline's emphasis on balanced competence across the legal, cadastral, and geomatics domains. In addition, communication skills, service orientation, and proficiency in Norwegian were consistently highlighted, underscoring the public-administration and client-facing character of cadastral work.

4.2.3 Professional, personal, and ethical competence

Employers consistently emphasised professional conduct, communication skills, teamwork, independence, initiative, and ethical responsibility. These attributes are particularly critical in cadastral practice, where surveyors handle legal evidence and implement decisions that directly affect property rights and legal certainty.

In response, such attributes are explicitly embedded within the general competence category of the learning-outcome framework. This ensures that professional behaviour and ethical judgement are articulated as learning outcomes rather than treated as implicit expectations. The guidelines reflect this through competence requirements relating to integrity and professional responsibility in situations involving legal, technical, and ethical considerations.

By formalising these aspects, the framework prepares graduates not only for technical tasks but also for decision-making, communication, and interaction with property owners, public authorities, and colleagues.

4.2.4 From labour-market analysis to learning outcomes and programme content

The labour-market analysis informed both the structure of the competence framework and the formulation of examples of desirable subject content in the guidelines. The findings were mapped to the three learning-outcome categories of the Norwegian Qualifications Framework for Lifelong Learning:

- Knowledge: understanding of legal frameworks governing property rights and cadastral processes, as well as knowledge of measurement standards, cadastral systems, and administrative procedures.
- Skills: ability to carry out cadastral work, document results in accordance with legal and technical standards, and communicate findings clearly to affected parties.
- General competence: ethical practice, professional judgement, independent decision-making, teamwork, and effective communication in a public-administration context.

This mapping provided an evidence-based foundation for the guidance offered to higher-education institutions, while preserving flexibility in curriculum design.

Overall, the labour-market analysis demonstrated strong coherence between employer expectations and the competence structure adopted in the guidelines, reinforcing the relevance and practical orientation of the framework.

4.3 Competence domains and subject areas

The competence requirements for licensed cadastral surveyors are structured around three professional domains: legal, cadastral, and geomatics. Together, they reflect the integrated nature of cadastral work in Norway, where legal judgement, administrative responsibility, and technical surveying competence are applied within a single professional workflow.

The domains are not isolated subject areas, but complementary perspectives on the same professional tasks. The guidelines therefore emphasise balanced competence across all three domains.

4.3.1 Legal subjects

Legal subjects underpin understanding of property rights, legal relationships, and public decision-making in land administration. Cadastral surveyors operate within a legal framework that directly affects ownership, use rights, and legal certainty; legal competence is therefore

essential for correct application of legislation and for the exercise of professional judgement, safeguarding due process, and ensuring the legal security of affected parties.

Legal subjects include the historical development of land tenure and property institutions, static property law (established rights and legal relationships), and dynamic property law (creation, transfer, and modification of rights through transactions, subdivision, and land lease arrangements). Administrative law is also central, including procedural requirements, documentation, transparency, and the obligations applying to public authorities when making legally binding decisions.

Additional areas include spatial planning and building regulation, environmental law, land consolidation law, neighbour law (rights and obligations between adjoining landowners), easements and other limited property rights, co-ownership arrangements, mediation and negotiation, and land registration. Together, these subjects enable surveyors to assess and communicate the legal implications of cadastral cases in accordance with principles of good professional practice.

4.3.2 Cadastral subjects

Cadastral subjects concern the governance and operation of the cadastre as Norway's official property register. This domain links legal decisions and technical measurements to administrative processes and public records.

It includes cadastral theory, register systems, cadastral units' formation, and the complete workflow for cadastral work as defined by the Cadastre Act. This includes preparation, stakeholder interaction, documentation, registration, and quality assurance. Principles of professional conduct and "good surveying practice" are central elements, ensuring consistency, neutrality, and reliability in cadastral work.

The domain also encompasses aspects of territorial planning implementation, real property valuation, and relevant economics and resource management, providing context for informed decision-making in public administration.

4.3.3 Geomatics subjects

Geomatics subjects provide the technical foundation for measurement, positioning, and spatial data management. Accurate and reliable measurements are essential for defining property boundaries and ensuring consistency between legal descriptions and geographic representations.

This domain includes surveying standards and methods, modern surveying technologies, positioning and measurement of property boundaries and buildings, geodesy, photogrammetry, and cartography. It also covers geographic information systems (GIS),

geoinformation technology, and geoinformation infrastructure, supporting integration of cadastral data with other spatial datasets.

In addition, geomatics subjects address error theory, adjustment methods, and coordinate transformations, enabling surveyors to assess uncertainty and ensure data quality. Together, these competencies allow cadastral surveyors to produce measurements and spatial information that meet both technical standards and legal requirements.

5. STUDY PROGRAMME APPROVAL PROCESS

The approval process for qualifying study programmes is designed to be transparent, proportionate, and compatible with academic autonomy. It combines structured dialogue with higher-education institutions, outcome-based documentation, and formal administrative decisions to ensure that educational pathways meet the competence requirements for cadastral licensure.

5.1 Dialogue with higher-education institutions

During the development and early implementation of the guidelines, Kartverket engaged in structured dialogue with higher-education institutions offering programmes in geomatics, cadastral surveying, and property and land law. The dialogue focused on how existing and planned programmes could be assessed against the requirements while preserving institutional autonomy and academic design.

Discussions addressed programme coherence, the relationship between individual courses and programme-level learning outcomes, and how progression from foundational knowledge to integrated professional competence could be demonstrated. Attention was given to identifying what forms of documentation—such as published learning outcomes and course descriptions and structure—could provide sufficient and proportionate evidence of compliance.

This dialogue informed the design of a flexible approval model with two submission routes: approval of an entire study programme or approval of defined combinations of courses (approved pathways) within a programme. The model allows institutions to meet the competence requirements through different curricular structures while ensuring transparency and consistency in relation to licensure.

5.2 Application and approval procedure

Higher-education institutions seeking recognition of a study programme as qualifying education for cadastral licensure submit a formal application to Kartverket. The application includes a description of the study programme and documentation demonstrating how it meets the minimum requirements set out in the guidelines.

Approval may be granted either for a complete study programme or for specific combinations of courses within an existing or new programme. Where approval applies to a defined course combination rather than the full programme, this must be clearly stated in the diploma. The requirements in the guidelines apply equally to both forms of approval.

The approval dossier is deliberately concise. Institutions present their published programme-level learning outcomes, demonstrate alignment with the three professional domains—legal, cadastral, and geomatics—and provide a brief account of progression across the programme. Where relevant, the composition and credit scope of approved pathways are specified.

Kartverket assesses each application as an administrative decision and issues a formal approval or rejection. The assessment focuses on whether the documented learning outcomes and programme structure ensure that graduates acquire the knowledge, skills, and general competence required to practise as licensed cadastral surveyors.

5.3 Minimum learning outcomes and assessment criteria

Assessment of study programmes is based on overall learning outcomes structured in terms of knowledge, skills, and general competence, in accordance with the Norwegian Qualifications Framework.

- Knowledge covers understanding of theories, concepts, principles, and procedures within legal, cadastral, and geomatics subject areas.
- Skills refer to the ability to apply this knowledge in practice, including conducting cadastral work in accordance with the Cadastre Act and producing the documentation required for registration and, where relevant, land registration.
- General competence relates to independent professional practice, including responsibility, collaboration, reflection, and critical judgement, with particular emphasis on legal certainty and ethical conduct.

In its evaluation, Kartverket places particular weight on:

1. The content and structure of the programme, including coherence and progression; and
2. The clarity, level, and coverage of programme-level learning outcomes.

5.4 Desirable subject content as guidance

To support consistent interpretation of the requirements, the guidelines include examples of desirable subject content within each professional domain. These examples are intended to clarify expectations rather than to prescribe curricula.

Within the legal domain, guidance includes property and land law, administrative procedure, and legal reasoning in professional decision-making.

Within the cadastral domain, guidance includes case handling, the full cadastral survey process, and professional responsibility in cadastral administration.

Within the geomatics domain, guidance includes surveying methods, GNSS/RTK, computation and uncertainty, and integration of geodata with the cadastral register.

Programmes may address these areas in different ways. The guidance supports programme design and review by making expectations explicit while allowing flexibility in academic content and structure.

5.5 Master in Property and Land Law

The first programme approved under the guidelines was the Master in Property and Land Law at the Norwegian University of Life Sciences (NMBU). Kartverket granted approval in October 2025 after verifying that defined combinations of courses within the programme fulfil the competence requirements for cadastral licensure.

The approval makes NMBU the first institution in Norway with a pre-approved educational pathway to cadastral licensure. It provides students with a clear and predictable route from study to professional qualification and offers municipalities greater certainty in recruitment. The decision also applies retroactively to eligible alumni who meet the same academic conditions.

In its application, NMBU presented published programme-level learning outcomes, a structured alignment with the three professional domains, and a description of progression from foundational legal and measurement studies to applied cadastral administration. The approval decision specifies the course combinations that satisfy the educational requirement and establishes a licence-oriented study pathway from the outset of the programme.

6. CONCLUSIONS AND LESSONS LEARNED

The introduction of a national licensing scheme for cadastral surveyors in Norway has required a clear and credible connection between higher education, professional competence, and statutory responsibility. *The Guidelines for Approval of Study Programmes in Cadastral Surveying* represent a central element in meeting this need. By translating legal and professional requirements into outcome-based educational criteria, the framework provides a transparent and predictable route from education to licensure while respecting institutional autonomy.

Experience from the first approved study programme demonstrates that competence assurance can be achieved without prescribing curricula. Outcome-based alignment across the legal, cadastral, and geomatics domains has proven sufficient to ensure that graduates are prepared

to undertake all types of cadastral work under the Cadastre Act, while allowing universities flexibility in academic design.

Several lessons emerge from the initial implementation. First, defining competence through learning outcomes rather than detailed content requirements allows diverse educational pathways to lead to the same professional qualification. Secondly, proportionate documentation reduces administrative burden for both higher-education institutions and the licensing authority. Thirdly, explicit reference to professional responsibilities helps anchor educational requirements in practice, particularly in municipal contexts where cadastral surveyors combine legal, technical, and administrative roles.

The framework is intentionally dynamic. Continued dialogue with higher-education institutions and employers, supported by labour-market insight, enables ongoing refinement as technology, regulation, and professional practice evolve. Individual assessment remains available for candidates with alternative educational backgrounds, ensuring flexibility without compromising competence requirements.

While developed within a Norwegian legal and institutional context, the framework offers a transferable model for jurisdictions seeking to strengthen the link between education, licensure, and professional accountability in cadastral surveying. By operationalising national qualification descriptors for professional licensing, the Norwegian approach demonstrates how public trust, recruitment predictability, and academic autonomy can be maintained within a coherent and adaptable regulatory system.

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BIOGRAPHICAL NOTES

Elena Busch is a project leader at the Norwegian Mapping Authority (Kartverket) with 35 years of professional experience, including extensive development cooperation in property rights, land registration, and cadastral systems in both Norwegian and international contexts. She is a surveyor by education and holds an MSc in Land Administration. She led the development of Norway's *Guidelines for Approval of Study Programs in Cadastral Surveying*, supporting the national cadastral licensing scheme, and coordinated the first program approval for NMBU's Master in Property and Land Law. Her work focuses on aligning program learning outcomes with professional requirements across the legal, cadastral, and geomatics domains, in close collaboration with universities and employers in both the public and private sectors.

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