## Ejemplo de buenas prácticas en el diseño de titulaciones

**Criterios comunes para el diseño de Grados y Másteres en 3 universidades Holandesas**

TU/e technische universiteit eindhoven

TU Delft

University of Twente



## ¿Por qué es una "buena práctica"?

1. Es **un paso más hacia el EEES**, después del establecimiento de las estructura de 3 ciclos. Constituye una propuesta global y sistemática que recoge las principales áreas de competencia que han de tenerse en cuenta en el diseño de los títulos universitarios.
2. **Proceso de elaboración de la propuesta**: consulta publicaciones internacionales (Descriptores de Dublín), análisis de las materias obligatorias, consulta a los profesores, proyecto piloto en dos programas de TUe.
3. **Centrada en el aprendizaje de los alumnos**: utilización de resultados de aprendizaje basados en competencias.



4. Utilidad para **garantizar la coherencia vertical y horizontal** de los resultados de aprendizaje en el diseño de los programas.

Nivel 1: ¿Cuáles son los resultados de aprendizaje comunes para todas las titulaciones universitarias?

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Nivel 2: ¿Cuáles son los resultados de aprendizaje de esta titulación particular?

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Nivel 3: ¿Cuáles son los resultados de aprendizaje de una materia particular?



## Areas of competence that characterise a university graduate (I)

TU/e TU Delft University of Twente

1. **Is competent in one or more scientific disciplines.** A university graduate is familiar with existing scientific knowledge, and has the competence to increase and develop this through study.
2. **Is competent in doing research.** A university graduate has the competence to acquire new scientific knowledge through research. For this purpose, research means: the development of new knowledge and new insights in a purposeful and methodological way.

## Areas of competence that characterise a university graduate (II)

**3. Is competent in designing.** As well as carrying out research, many university graduates will also design. Designing is a synthetic activity aimed at the realisation of new or modified artifacts or systems, with the intention of creating value in accordance with predefined requirements and desires (e.g. mobility, health).

**4. Has a scientific approach.** A university graduate has a systematic approach characterised the development and use of theories, models and coherent interpretations, has a critical attitude, and has insight into the nature of science and technology.



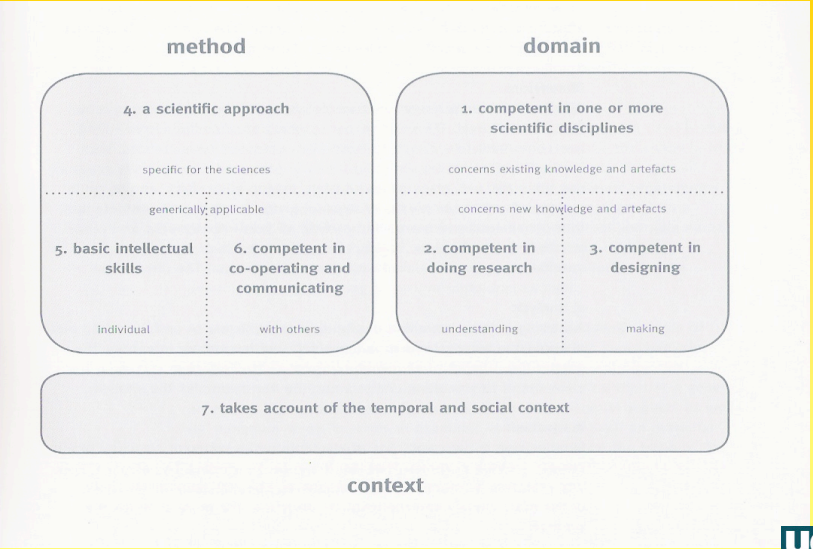
## Areas of competence that characterise a university graduate (III)

**5. Possesses basic intellectual skills**. A university graduate is competent in reasoning, reflecting and forming a judgment. These are skills wich are learned or sharpened in the context of a discipline and wich are generically applicable from then on.

**6. Is competent in co-operating and communicating**. A university graduate has the competence of being able to work with and for others. This requires not only adequate interaction, a sense of responsibility and leadership, but also good communication with colleagues and non-colleagues. He or she is also able to participate in a scientific or public debate.

**7. Takes account of the temporal and social context.** Science and technology are not isolated and always have a temporal and social context. Beliefs and methods have their origins; decisions have social consequences in time. A university graduate is aware of this and has the competence to integrate these insights into his or her scientific work.








**1. Is competent in one or more scientific disciplines**. A university graduate is familiar with existing scientific knowledge, and has the competence to increase and develop this through study.

| Bachelor | Master |
|---|---|
| Understands the knowledge base of the relevant field (theories, methods, techniques) | Has a thorough mastery of parts of the relevant fields extending to the forefront of knowledge (latest theories, methods, techniques and topical questions) |
| Has knowledge of and some skill in the way in which interpretations (texts, data, problems, results) take place in relevant fields. | Has the skill and the attitude to apply these methods independently in the context of more advanced ideas or applications |
| Is able (with supervision) to spot gaps in his/her own knowledge and to revise and extend it through study. (…) | Idem, independently (…) |

**3. Is competent in designing**. As well as carrying out research, many university graduates will also design. Designing is a synthetic activity aimed at the realisation of new or modified artifacts or systems, with the intention of creating value in accordance with predefined requirements and desires (e.g. mobility, health).

| Bachelor | Master |
|---|---|
| Is able (with supervision) to produce and execute a design plan. | Is able to produce and execute a design plan independently. |
| Understands, where necessary, the importance of other disciplines (interdisciplinary). | Is able, and has the attitude, where necessary, to draw upon other disciplines in his or her own design. |
| Is able to integrate existing knowledge in a design. (…) | Is able to formulate new research questions on the basis of a design problem.(…) |



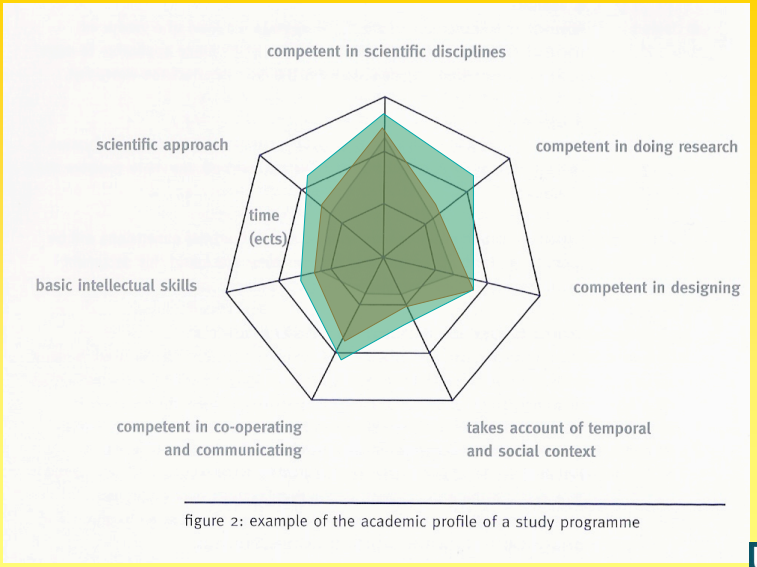



figure 2: example of the academic profile of a study programme



## Nivel 2: Algunas titulaciones diseñadas con el modelo de competencias

**Master "Construction Management and Engineering"**
(3TUs Master)

**Master: "Coastal and Marine Engineering and Management"**
(5 universities) Erasmus Mundus master

**Master: "Geographical Information Management and Applications"** (2 Dutch universities + 2 Dutch institutes)



## "Construction Management and Engineering"

### Learning outcomes of the Master programme:

Generic Learning outcomes:

Upon completion of the programme, a student will be able to:

1. **work independently, reflect, critically analyse and evaluate, generate novel ideas** etcetera, without restricting him/herself to the specific boundaries of the construction management and engineering domain;
2. **contribute to or conduct research**;
3. understand the importance of **oral and written communication skills, particularly in English,** and effectively use these skills;
4. **operate in the context of a team** and act as a project leader. (…)

## "Construction Management and Engineering"

Domain/specific Learning outcomes:

Upon completion of the programme, a student will be able to:

1. work methodically, invent his own tools, adapt scientific theories and techniques, work in a multidisciplinary environment and be application-oriented;
2. guarantee quality in processes and products and monitor the cohesion in complex processes and construction works;
3. translate technological concepts and developments into appropriate process innovations for construction. This ability covers the understanding of technical developments and of their implications for process characteristics such as risks, costs, time, quality, stakeholders' participation, value creation, legislation;
4. evaluate processes with respect to above mentioned process
5. characteristics. present and document research results and design projects.



## "Coastal and Marine Engineering and Management"

Learning outcomes

**Intellectual skills**

Upon completion of the programme, a student will be able to:

1. Develop, model and analyse complex coastal and marine engineering and management systems, processes and products using scientific principles;
2. Understand the capabilities of computer based and experimental methods for problem solving;
3. Integrate knowledge of mathematics, science, information technology, design, business context and engineering practice to solve a wide range of problems in the subject applying understanding to novel and challenging solutions;
4. Evaluate technical and financial risks, through an understanding of the basis of such risks;
5. Have an extensive knowledge and understanding of management and business practices and their limitations;
6. Have an understanding of the ethical issues in coastal and marine engineering and management.



## "Coastal and Marine Engineering and Management"

Learning outcomes

**Discipline-specific skills**

Upon completion of the scheme, a student will be able to:

1. Use appropriate mathematical and computational techniques (supplemented by hydraulic models if required) for simulating and analysing coastal and marine specific problems;
2. Design sustainable coastal or marine systems, components or processes, with technical analysis and critical evaluation of results;
3. Effectively use learning resources for independent research;
4. Conduct independent analysis of the economic, technical, environmental and managerial factors influencing the decision making process surrounding a coastal or marine problem.

Note: The depth to which these skills will be developed depends on the itinerary taken.



## "Coastal and Marine Engineering and Management"

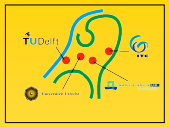
Learning outcomes

**Transferable skills**

Upon completion of the scheme a student will be able to:

1. Communicate confidently and effectively in oral and written forms with the aid of standard information technology systems;
2. Manage their time and resources;
3. Work effectively as an individual, as a group member and undertake leadership roles;
4. Employ a systematic approach to gathering, analysing and communicating knowledge;
5. Undertake lifelong learning, particularly for continuing professional development;
6. Generate new ideas and develop and evaluate a range of new solutions;
7. Acquire an EU dimension in approach, scope and education (including additional linguistic capabilities).

## "Geographical Information Management and Applications"



### Learning outcomes

Upon successful completion of the programme students should have:

1. Up-to-date knowledge of geo-information technologies (e. g. GIS, remote sensing, photogrammetry, GPS, and cartographic visualisation), their scientific development and their fields of application.
2. Skills in geo-data handling processes like acquisition, structuring, storing, retrieving, processing, analysing, modelling and visualizing geo-information.
3. Ability to gain insight into the role of geo-data and geo-information within organisations (e. g. geo-data infrastructure) and outside organisations (e. g. geo-information clearinghouses) and manage geo-information departments, units, and projects.
4. Ability to recognise, describe, analyse, and synthesise geo-information handling relevant for research, policy, and business problems, and to develop and execute geo-information-based projects and prototypes.



## Referencias

**Criteria for academia bachelor's and master's curricula:**
http://w3.tm.tue.nl/uploads/media/AC_ENG_web.pdf

Universidad de Eindhoven:
http://w3.tue.nl/en/

Universidad de Delft:
http://www.tudelft.nl/

Universidad de Twente:
http://www.utwente.nl/en/