Delft University of Technology

General information about the Faculty of Architecture, Urbanism and Building Sciences in Delft

Introduction

The Faculty of Architecture, Urbanism and Building Sciences at Delft University of Technology, in Dutch also called 'Bouwkunde', was established in 1904 in the Netherlands. It focuses on research and design of the physical living environment – built and natural – on every conceivable scale. Advanced research is conducted into the technology of architectural design and scientific expertise is used to develop new design methodologies. The key competencies are design, research and research by design. Results enjoy a worldwide reputation.

With over 3,300 students and a staff of 40 professors and 300 associate and assistant professors, Architecture is the largest faculty at TU Delft and one of the largest in its field in Europe. Over 400 first years students enrol in the programme every year, of which over 30% are female students. Every year, some 150 exchange students study at the faculty. The educational program is based on the concept of the Network Faculty. Great importance is attached to the special relationships with a range of institutes at home and abroad, including the OTB Research Institute for Housing, Urban and Mobility Studies (also at Delft University), the Berlage Institute and the Netherlands Architecture Institute (both in Rotterdam), ETH-Zurich, RWTH Aachen, KU Leuven and MIT in Boston.

Mission

Delft University of Technology has the ambition to become one of the leading technical universities worldwide. TU Delft wants to achieve this through the development of research and experimental design of international stature and education based on this research. The Faculty of Architecture, Urbanism and Building Sciences shares this ambition. Design lies at the heart of the technical sciences offered at the faculty: the ability to transform a collection of mutually conflicting requirements into a manageable whole. Design forms an exceptionally practical method for bringing order to the multitude of developments in this world: if the future can't be predicted, it should be invented. The Netherlands has a solid reputation worldwide in the fields of urban development, architecture and spatial planning: it is a country that was created by people, with half of it below sea level – a world-renowned feat of hydraulic engineering, with a centuries-old tradition of preserving a fine balance between the forces of nature and the cultural forces of the human population. And with the Faculty of Architecture, TU Delft is solidly grounded in this tradition. Insofar as the designers of the Netherlands weren't actually trained in Delft, nearly each and every one of them is or was connected to this university. This gives Delft an international head start in design and the related technology. The Faculty of Architecture's fundamental contribution comprises advanced research into the technology that underlies engineering design and the further development of engineering design methods in a scientific context.

History and profile

The *Bouwkunde* faculty evolved in 1904 out of the Civil Engineering Department of the Technische Hogeschool Delft (TH-Delft), offering an architecture course programme under this name. In 1948, the Architecture degree programme was joined by the new Urban Development degree programme. This was followed in 1972 by the Public Housing programme. As of 1986, the (three) *Technische*

Hogescholen in the Netherlands are known as *Technische Universiteiten* (Universities of Technology). From then on, the Architecture Department was referred to as the Faculty of Architecture. In 1987, the Construction Management & Real Estate Management programme was added to the three existing degree programmes, followed in 1989 by the Building Technology degree programme. At present, the Faculty has four departments: Architecture, Urbanism, Building Technology and Real Estate and Housing.

Over the past few decades, the Faculty has developed into a renowned institute. Both at the national and international level, the Faculty works together with universities, private sector companies and public bodies – for the latter two it conducts contract research, for example. Furthermore, there is an extensive exchange of faculty members and students with other architecture departments, both in the Netherlands and abroad. Thanks to the increased public interest in architecture, engineering design, research-by-design and construction, the number of students who choose to attend the Faculty of Architecture in Delft has steadily increased over the past few years. The Faculty stands in the centre of such developments and has adapted its study programmes in response to them. Students are educated to become engineering designers who on the one hand contribute to the growth of scientific knowledge regarding architectural issues and on the other are able to design practical solutions for tackling these issues. Most of the Faculty's graduates are quick to find employment.

Architecture is closely connected to economic and social developments like:

- The structuring and quality of the built-up environment;
- The strong demand for housing;
- Urbanisation processes;
- The management of the building stock;
- Infrastructure and the accessibility of facilities;
- New insights regarding sustainable construction and the recycling of materials in relation to environmental management.

In the past decades, the 'building scope' has increasingly shifted from expansion of the building stock to its preservation, modification and replacement. This has its consequences for building practice, and one can see the development of various new specialisms. The increasing complexity forces the architectural engineer to make a close study of issues that involve multiple parties. What characterises this specific field is its relation to other disciplines and its integration and translation into the building specifications. Among other things, the building practice requires architectural engineers with management qualities who are able to lead and manage the process of initiative, design, realisation and management on the basis of scientific approaches. Complex elements are increasingly often made in advance and assembled at the building site. This changes the construction process and demands new skills of the architectural engineer. Other essential aspects of the construction process are cost control in the preliminary and execution stages of construction and the logistic organisation. All of these developments are reflected in the contents of the faculty programmes.

Organisation of the educational programme

The acquisition and application of knowledge go hand in hand: to this end, the degree programme works with learning track programmes, thematic exercises and project education. As is the case in any university programme, self-instruction plays an important role in the Faculty of Architecture. The academic year consists of two six-month terms. Based on 40 study weeks per academic year, the student spends an average of 28 hours per week on home study and attends an average of 14 hours of classes. This is a general figure. Usually, more contact hours are scheduled during the (fourteen) education weeks planned in each six-month term; and during the exam weeks halfway through and at the end of the term there are no classes at all and the student studies exclusively at home.
The work formats offered by the programme are intended to encourage and support private study. The schedule includes a number of varied work formats: design workshops, practical exercises, workgroups, lectures, thesis support, etc. A lot of teaching is done using small groups, in which students work collectively and individually on questions and assignments under the supervision of an instructor and critique each other's work. The department views this as an important stimulus for activating and challenging education. Examples include the studio setting, in which design assignments are supervised and jointly discussed in the design studio, and practical training, which

deals with technical specialisms or allows students to practice hand-drawing, theory of form and computer skills in relation to the design process.

Three kinds of work formats are offered: project education, thematic exercises and learning track programmes. Project education ('learning by doing') focuses on learning to design while applying the knowledge and skills acquired in the learning track programme and the thematic exercise. The student studies a design assignment and makes a design. Throughout the design process, the aim is to develop both a methodical and systematic approach and a creative and inventive attitude towards design. In project education, the student works both individually and in a group setting on the design process: the department supports this with design supervision in a studio setting.
In the thematic exercises, sub-problems of the architectural process are studied and treated in-depth (design and research cases) and students practise the application of knowledge (professional exercises). The most important work format in the thematic exercise is supervised self-instruction; students at the faculty work both independently and in small groups on questions, assignments, research cases and small design exercises. There are also theme lectures, in which experts deal with a subject and its relation to the design project or specific learning track programmes.
Learning track programmes primarily focus on acquiring knowledge in fields that have a layered structure, such as building technology, for instance. A learning track programme starts with fundamental knowledge (in the first or second term), to which more in-depth and specific knowledge is added in later stages. The key work formats of the learning track programme are self-instruction, supported by lectures and practical classes, instruction and practical training.

Besides offering a variety of work formats, the programme also works with a range of assessment and evaluation formats. The choice for a specific assessment format depends on what students have to be able to do at the end of a course unit (the learning targets) and which study product serves best to prove this. If a course unit primarily focuses on the acquisition of knowledge, the assessment is done via a written exam. If the main focus is learning how to design, the evaluation is based on the result of the design assignment (drawings and scale models) and its presentation. Other assessment formats include practical reports, essays and papers. A variety of assessment formats are used each half-year.

The Bachelor Programme

The Bachelor's degree programme in Architecture lasts three years, comprises 180 credits that are given out according to the European Credit Transfer System (ECTS), and results in a Bachelor of Science degree. The Bachelor's is a broad design-oriented programme that has both a scientific and a technical component and pays attention to social and cultural aspects. In any case, the Bachelor of Architecture has acquired a range of elementary design skills. The Bachelor's scientific approach to conceptualisation and work is expressed in his/her ability to independently analyse research and design issues that involve the acquisition and application of scientific knowledge. The Bachelor of Architecture is familiar with the various phases and roles in the design and building process and can deal effectively with these issues. First and foremost, the Bachelor's is meant as a preparatory programme for the Master's in Architecture, Urbanism & Building Sciences. A Bachelor of Architecture who has graduated in Delft is unconditionally entitled to continue in any variant of the Master's programme in Architecture, Urbanism & Building Sciences at Delft University of Technology. For students with a Bachelor's degree who wish to transfer to a different Master's degree programme within or outside TU Delft, supplementary admission requirements may be in place.

The Bachelor's course is organised in term programmes (each comprising 30 credits). Each six-month term builds on the programmes of the preceding terms and prepares the student for the following terms. Each six-month term has a central theme and key learning targets. These derive from the attainment targets of the Bachelor's degree programme. Together, the themes deal with the current issues most likely to confront an architectural designer: they correspond with reality in the sense that most design and construction assignments for architectural designers are set in an urban context. The themes and learning targets gradually gain in complexity, breadth and depth: the themes connect to the acquisition of fundamental knowledge and basic skills in the course of the programme. The elaboration of the themes provides ample opportunity for the students to work according to their personal interests and imaginative power. The themes and learning targets of each six-month term have been elaborated in units of study.

In view of the fact that learning to design is the major objective of the degree programme, the design project occupies a prominent position within the course. Each six-month term is divided into a knowledge trimester and a design trimester. During the design trimester, students work almost fulltime in a studio setting on the design project. Study activities during the project include research, analysis, conceptualisation and design. The design project also pays attention to the development of the student's imaginative power, inventiveness and creativity. During the knowledge trimester, the student acquires knowledge that can be applied in the following design or contributes to his/her academic education.

The Master Programme

The four main themes of the research portfolio match the four tracks in the Master's programme: Architecture**,** Building Technology, Urbanism and Real Estate & Housing. The Master programme takes two years to complete. The first year comprises theory, assignments and studio work. The second is largely devoted to preparation for the thesis. The student will participate in one of the Faculty's advanced research projects. Alternatively, the student can do a placement or research assignment in a company, depending on the specialisation. The Master programme consists of 120 credits. Graduates will be awarded the title of Master of Science.

MSc track Architecture
Architects fulfil an important role in the creation of the built environment. It is principally their designs that determine the face of a city, from its residential areas, houses, offices, and shopping centres to its museums, town halls, airports, stadiums and theatres. Design is central to the MSc Architecture track. Students learn to conceive and draft building designs. In doing so they have to find the right balance between construction, form and function. They therefore encounter both technical and social issues. As the study of the design and construction of buildings, architecture is a scholarly field with its own tradition. The students acquire knowledge by studying both existing buildings and ones that are now gone or have yet to be built. In this track we make links between existing architectural knowledge and new developments in the field. Students also draw inspiration for design and planning from contemporary artistic and intellectual developments, from pop videos and computer programs to philosophy.

'Research by Design' is central to the MSc Architecture track. The research conducted in the faculty serves as a source of inspiration for the creation of the final design projects. The interaction between research and design provides a constant stimulus for innovation in the course. Within the MSc Architecture track students can choose from nine specialisations: Architecture and Modernity: Dwelling, Architecture and Modernity: Public Building, ®MIT (Restoration, Modification, Intervention, Transformation), Hybrid Building for the Dutch City, Interiors, Buildings and Cities, Hyperbody: Non-standard and Interactive Architecture, Materialisation, Architectural Engineering (offered by the Building Technology department) and DSD - Future Cities (offered by the Delft School of Design).

Most graduates of the Architecture track enter careers in design, interior design or urban planning. Some work as independent architects. After graduation the student will be able to seek employment not only with firms of architects, but also with government bodies, educational and research institutions, project developers, housing corporations or construction companies. A MSc of Architecture entitles one to enlist in the Dutch Architects Register or a comparable register in the country of residence.

MSc track Urbanism
With rising population densities, increasing need for mobility, and declining space availability, the subject of urbanism is becoming ever more relevant and important across the world today. Urbanism in The Netherlands is an engineering rather than a social discipline and has a unique pedigree due to the history of Dutch towns and landscapes. Here land was always scarce and indeed, always threatened by water. So the 'low countries' have been systematically protected and developed since long before the Middle Ages. In this way The Netherlands have built up a unique tradition of urban development in which the limited and waterlogged land area had to be protected and used sparingly and creatively. Delft University's Urbanism track addresses the changes in urban design, landscape

architecture and spatial planning this process of urbanisation requires at all scales. This Master track gives extensive attention to the many technological and spatial opportunities and restrictions in urban areas, as well as all the social processes of change impacting land use.

The Urbanism Master track is subdivided into four semesters and lasts two year in total. The first year focuses on the most important sub-disciplines an urbanist has to master: urban history, urban and regional analysis and design, spatial planning, landscape architecture, design and planning techniques, and methodology. All explicitly address societal and scientific approaches to and debate on our future role in the urbanisation process. The second year of the programme focuses on the final project. This is closely related to the research of academic staff of the department of Urbanism and the Delft School of Design. Emphasis is laid on design-oriented research, such as study by design and evaluations of designs.

A Master in Urbanism provides the student with the qualification of urban designer and planner, and the capabilities to approach even complex urban issues independently, critically and systematically. The field is dominated by private urban design and planning consultancies, municipal urban planning departments, and regional planning departments. As an urban designer and planner one may also choose to work in other public or private domains, for organisations as disparate as architectural firms, project developers and ministries. A MSc of Urbanism entitles one to enlist in the Dutch Architects Register or a comparable register in the country of residence.

MSc track Building Technology

The MSc track Building Technology focuses on the design of elements, components, systems and subsystems of engineering constructions. The track examines both the interrelations between these features and their relationship to the architecture of the building in which they are incorporated. This comprises the design side of the track. At the same time, the track puts a strong focus on architectural research, geared towards investigating the technological preconditions required for the proper functioning of engineering constructions. This comprises the engineering side. This combination, together with a previous study in, for example, BSc Architecture, is what gives the Building Technology track its unique angle. The students learn how to incorporate technological elements of a building into the design and development process and to make value estimates. This track equips the student – more so than specialists trained elsewhere – to match technology to architectural considerations and user objectives. Graduates will be equally qualified to work in general or more specialised areas, and have the option to further develop skills in either direction, whether in design or engineering.

Within the Building Technology track students can choose between two specialisations:
Research & Design and Façade Design. Instruction is closely linked to the Building Technology department's research programme, and graduation projects are consequently related to one of the following research themes: Free-form building, Industrial building, Climate design, Innovating materials and Design informatics. Graduates work in a range of settings and capacities, including: engineering agencies (including TNO), architectural agencies, subcontracting industry, contracting companies, project developers, universities (e.g. as a PhD student).

MSc track Real Estate and Housing

In the Master track Real Estate & Housing students learn to manage the entire life cycle of the built environment. After obtaining a RE&H Master's degree certificate, students have the comprehensive architectural knowledge required to control these processes with an eye on the needs of the end user and other stakeholders. The Master track is subdivided into four semesters and lasts two years in total. After a general introduction to our overall curriculum in the first semester, the student chooses one of the following three specialisations as the focus in the second semester: Design & Construction Management, Real Estate Management and Housing. The third semester provides an introduction to the graduation programme with some obligatory subjects plus free choices. The fourth and final semester is fully devoted to graduation project, centring on an assignment that is usually formulated together with a company. The course is provided in close cooperation with the hands-on world of construction and property.

Guest lecturers from commerce and industry are regularly involved in cases, games, workshops and

lectures, so there's plenty of room for the students creativity and imagination in the learning mix. The education is closely tailored to the research programme of the Real Estate & Housing Department. The subjects of the graduation projects are also related to one of the research themes: Real Estate Management, Design & Construction Management, Housing, Computational Design, Building Law, Building Economics.

After graduation the world at your feet... As a designer with wide-ranging knowledge of the construction industry, graduates can play a variety of roles at all parties involved in the building process – including as a manager (at e.g. a large construction company, architectural firm or construction management agency) or policy adviser (at e.g. a public housing association).

Postgraduate programmes

Besides the regular MSc programme, the Faculty of Architecture, Urbanism and Building Sciences offers various postgraduate programmes; PhD research, Master of City Developers and the European postgraduate masters in urbanism (EMU).

The Faculty of Architecture, Urbanism and Building Sciences at Delft University offers opportunities for doing PhD research in four research disciplines, these being related to the themes represented in the research portfolio of the faculty: Architecture, Urbanism, Building Technology and Real Estate & Housing. These disciplines address the totality of life cycles involved in the natural environment, the urban environment, architecture, communities, buildings, building materials (together with building systems and components), and communications systems. Design, research and 'research by design' are the core competencies of the Faculty's researchers and teaching staff. In addition, the PhD research programme maintains important links with other scientific resources, natural sciences, social sciences, architecture theory and philosophy, computer science, communication, city and regional planning and engineering.

The Delft School of Design (DSD) is a PhD School at the faculty of Architecture. The DSD runs a PhD program and is a platform for discussion. Two research programs - Architecture and Urbanism - are related to one common research object. The common research object is the "condition" of architectural knowledge in the academic context and in professional practice, in relation to the various social (sub) systems in their historical genesis. The research field's centre of gravity is in the twentieth and twenty-first century. In order to explain the genesis of modernism and postmodernism occasional extensions of this field of research will be necessary. The term postmodernism refers to the present "condition" of our cultural and social systems. The terms architecture and city are both symbolic expression and the physical manifestation of this "condition". The research subject is related to, and is a more critical development of Tafuri's critique of the concept of "operative criticism". The relation between the historical sciences, the social sciences and the projective practices of architecture and urbanism are to be re-addressed in our contemporary society. The Faculty of Architecture maintains close collaboration with this institute at PhD level via the Berlage chair, which is linked to the Faculty. Just like the research programmes, the DSD's educational programme has ties with the MSc programme, which is a breeding ground for future PhD candidates.

The Master of City Developer is a top-level degree course focuses on employing an integrated approach in the development of urban areas. The course is organised by Erasmus University Rotterdam (EUR), Delft University of Technology (Real Estate & Housing) and OBR (the 'Development Company') Rotterdam. It is a Masters degree which combines theory and practice but which also addresses content and methodology. The course responds to the need for professionals who are able to use a variety of disciplines when directing the process of urban development and revitalization at a strategic level. It is meant for those who wish to enhance their own development in this type of work.

Four leading European universities – UPC Barcelona, TU Delft, KU Leuven and Universitá IUAV di Venezia have designed a joint European Postgraduate Master of Urbanism: Strategies and Design for Cities and Territories. All four of the universities subscribe to the specifically European tradition that considers urbanism as socially responsible disciplines which intend to improve the living conditions of all citizens. They moreover embody different approaches, which were developed in interaction with

their different geographical, historical and cultural context. This specificity means that the students acquire valuable experiences in different cultural, disciplinary and physical landscapes.

Research at the Faculty of Architecture, Urbanism and Building Sciences

The main goal of the Faculty of Architecture, Urbanism and Building Sciences is to deliver scientific technical and innovative research in the fields of architecture, urbanism, building technology, and real estate and housing. The research portfolio is conducted from the perspective of a strong relevance, meaning and impact on society, a high degree of experimentation, and special attention to sustainability. Reflecting keen social and cultural awareness, this research is fully applicable to (re)development, design and management of the built environment, policy issues, tools to support complex decision-making, technology of architectural design, new design methodologies and methods of Research by Design. We adopt an integrated approach of spatial transformations on various scales, i.e. at the level of country, region, landscape, town, neighbourhood, building and detail.

Research at the faculty is an integral part of the TU Delft (2001) research portfolio, and is thus directly related to the university's mission: 'As an international university of technology, TU Delft wants to be a leader in teaching and research. In engaging in the most important societal, technical and scientific questions and challenges, and in contributing to their solutions, the university intends to be fully accountable.' The faculty is actively engaged in close relationships with a large number of institutes at home and abroad, for instance with government organizations and the building industry, and with a range of national and international bodies representing teaching, scientific and architectural practice (e.g. the OTB Research Institute for Housing, Urban and Mobility Studies, the Berlage Institute, Rotterdam, The Technical Universities of Eindhoven and Twente, ETH-Zurich and MIT Boston). The Faculty is represented in the council of the EAAE, a non-profit organization of 100 important architectural schools in Europe, aiming to exchange ideas, staff and students.

The Faculty of Architecture, Urbanism and Building Sciences constantly considers social, educational and scientific relevance of its research. As such, social issues are being studied that are still in the early processes of the cycle of policy and product development, such as new concepts for offices, education and health care, public/private form of collaboration, and complex decision-making processes. Also studies are executed into the spatial implications of social problems, such as exclusion, vulnerability, deprivation and poverty. The concept of the Dutch Delta Metropool, which originated in the Faculty in the years around 1998, is an example of the faculty's response to societal and academic questions. Other examples are studies into new building materials and its implications for design, exploring technological innovations, exploring and testing of innovative design methods and design products using modern computer technology, and so on. The faculty intends to achieve its ambition by reinforcing, developing and implementing the high-grade research programme laid down in its research portfolio, and by providing a forum for a wide variety of national and international contacts in its field. In this regard, the faculty aims to establish productive partnerships and networks, to make its specific research environment and research results available to students at BSc level, and particularly at MSc level.

Design, construction and management of the built environment are the three cornerstones of the faculty. The faculty's research focuses particularly on the physical, spatial and functional living environment, whether built or natural. Addressing every conceivable scale and the entire cycle of life and use, it also has a direct bearing on societal questions. For this reason the research portfolio is devoted to four themes; Architecture, Urbanism, Building Technology and Real Estate & Housing, each with direct links with the faculty's overall education programme, and more specifically with its MSc programme. Design plays an important role in all four themes. In Architecture and Urbanism, it lies at the heart of its activities, being expressed in research into precedents, typological research, design research and Research by Design. Building Technology is characterized by a combination of application in design with classic technological and fundamental scientific disciplines, such as building physics, mechanics and material science. The focus of Real Estate & Housing is on pre-design and post-design research – exploring, at various levels, new concepts, functional analyses, performance indicators and performance criteria, design and construction management, real estate management and user value assessments i.e. the fit or misfit between supply and demand.

The faculty aims at a forward projection of the best knowledge and insight ('Delft Architectural Design') from its research to practice of development, design, construction and management of the built environment and to building industry. The mission of the faculty has been built on the missions of the four research themes.

Theme Architecture
Architectural research concerns the theory, practice and principles of design, materialisation and engineering of modern and contemporary architecture in urban environments in view of sustainability, social quality and cost/value relations that will keep the Dutch architecture at world level.

Theme Urbanism
Urbanism focuses on the radical changes in world societies (due to technology, informatics, transportation, mobilization, intensification) and– using the long experience of Dutch city planning - aims to deduct general theories, rules and regulations for the planning of complex cities and extensions as well as new mega cities.

Theme Building Technology
Building Technology strives to provide the international research and practice with new knowledge and insight of building technology, both in theory, in designs, and in executed prototypes as in one-offs in the building practice.

Theme Real Estate & Housing
RE & H aims to deliver theories, insight, tools and practical examples for the best match between dynamic demand and fixed supply of real estate, to improve the complex processes of design and construction management and to contribute to housing policy and strategies for management and maintenance of housing.