Degree Program Documentation Master's Program Landscape Architecture

Part A
TUM School of Engineering and Design
Technical University of Munich

General information:

- Administrative responsibility: TUM School of Engineering and Design
- Name of degree program: Master's degree programme in Landscape Architecture
- Degree: Master of Arts (M.A.)
- Standard duration of study and credits:
  3 semesters and 90 credit points (CP)
- Form of study: full-time
- Admission: Aptitude assessment (EV - Master)
- Start: Winter semester (WiSe) 2010/2011
- Language(s) of Instruction: German/English
- Main Location: Weihenstephan (Freising)
- Academic administrator (program design):
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- Status as of: 24.05.2023

Table of contents

1 Degree Programme Objectives

1.1 Purpose

Landscape architecture is an interdisciplinary design and planning discipline in which aesthetic-artistic and scientific-technical methods are applied to the sustainable design of open spaces and landscapes. Its roots lie in the cultural history of the landscape, the garden and the park. Significant historical examples include the park and gardens of Versailles, the English Garden in Munich, Central Park in New York and the Parc de La Villette in Paris, which reflect the social and natural ideals that prevailed at the time of their creation. These open spaces are regarded as central building blocks of urban green infrastructure. With the construction of Central Park in New York in the mid-19th century, the term landscape architecture became established internationally for this field of activity.

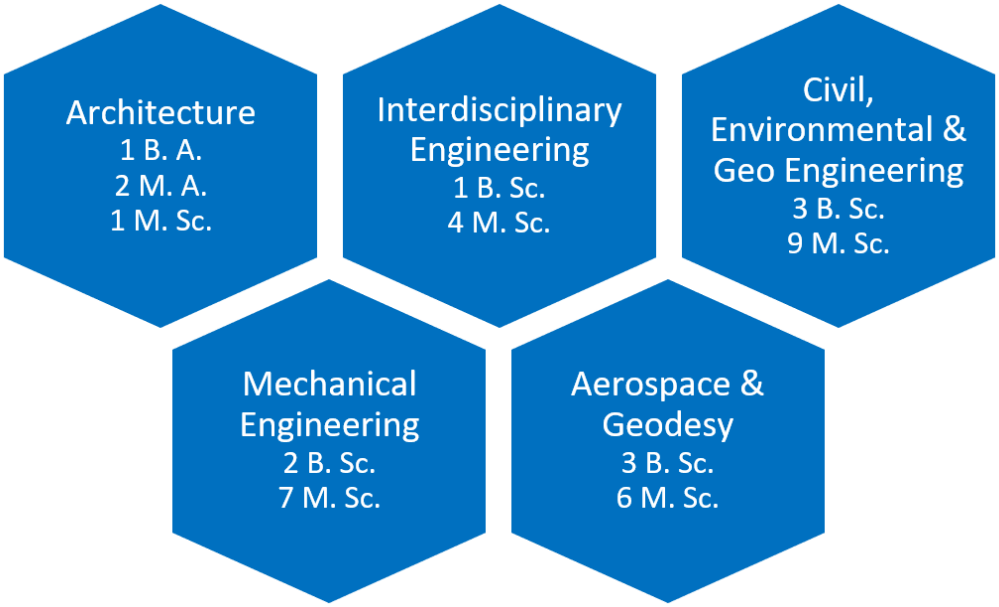
Landscape forms the natural basis of all spatially related and effective development processes. Landscape architecture is therefore closely linked to architectural and urban spatial complexes in its preoccupation with complex systems, from the theoretical concept and its cultural background through allocating and dimensioning technical and natural components to the usability and aesthetic quality of the dynamic landscape and open space structures.

Industrialisation, urbanisation, and the associated social and ecological problems (e.g. climate change) have profoundly changed the understanding of open space and landscape worldwide and enormously increased the complexity of design requirements. Landscape architecture is one of the key disciplines in the environmental sector that is needed today more than ever to develop sustainable solution strategies and methods for the climate and socially appropriate transformation of artificial and natural living spaces in cities and landscapes. With their skills and knowledge, graduates of the degree programme make a socially highly valued contribution to overcoming global environmental problems while at the same time qualifying to design open spaces.

1.2 Strategic Significance

"The Technical University of Munich (TUM) is committed to advancing innovation for people, nature and society. With a pioneering spirit, creativity and a sense of responsibility, we combine our diverse expertise in engineering, natural sciences and medicine with that of economics, humanities, social and political sciences to strengthen our impact on the sustainable development of society" is one of TUM's guiding principles, which is reflected in the newly founded School of Engineering and Design (ED) with its current almost 40-degree programmes. The following figure provides an overview of the number of degree programmes offered in the ED's fields of study.

Illustration 1Bachelor's/Master's degree programmes at the TUM School of Engineering and Design by field of study



The Master of Arts in Landscape Architecture at TUM School of Engineering and Design is a unique programme that deepens and broadens the academic scope of the degree. It builds on a relevant Bachelor's degree programme, whether from TUM or another university in Germany or abroad. It corresponds as a second academic degree to the former Diploma degree, entitling the holder to a doctorate. This unique Master's degree qualifies students for professional roles and equips them for research, making it a versatile and comprehensive programme.

The degree programme is closely linked to the Professional Profile Architecture and Design at the ED. The central aim of this Master's programme is to promote interdisciplinarity and a complex understanding of the environment in line with the ED's guiding principle. The degree programme, designed as a project-based course, deals with central aspects of the natural and built environment and touches on energy landscape development, building botany, urban space design and cultural landscape transformation embedded in the respective ecological, economic and social context. Natural science and engineering tasks always deal with spatial planning, and in line with the TUM Sustainable Futures Strategy 2030, they consider their significance for future-proof landscape and urban development. The aim is to sustainably shape the transformation of societies and answer complex questions about the future.

The Master's degree programme in Landscape Architecture benefits from its close links with the Department of Architecture at the ED and numerous course contents contributed by the TUM School of Life Sciences and the TUM School of Management. Within the Urban and Landscape Transformation (ULTRA) teaching and research complex, landscape architecture is a central design discipline centred around the "carrier medium of landscape". In the teaching strategy of the Department of Architecture at ED, the design project is the central methodological building block in examining highly complex and always interdisciplinary problems. At the Master's level, current landscape architecture and environmental planning issues are addressed closely to the current state of international research to develop forward-looking solution strategies.

The teaching strategy of the Department of Architecture was first set out in the mission statement following the faculty evaluation in 2013 as an integral part of the overall strategy and has been continuously developed to become the current mission of the Department of Architecture at ED.

Furthermore, the TUM mission statement, "Good Teaching and Learning", is an essential guideline. [1]

Illustration 2Mission of the Department of Architecture; as of November 2022[2]

Mission des Departments
We are design driven!
We shape our environment and create livable spaces,

Unsere zentrale Aufgabe ist es, Lehre und Forschung in unserer professionellen und akademischen Disziplin Architektur nachhaltig zu verbessern und konzeptionelle, wie auch technologische Strategien für die Transformation unserer gebauten Umwelt zu entwickeln. **Ausgehend von der Kerntätigkeit des Entwerfens synthetisieren, kontextualisieren und gestalten wir komplexe räumliche Lösungen.**

Unsere Vision ist es, räumliche Design- und Planungspraxis erfolgreich in die Forschung zu integrieren. Künstlerische und praxisbezogene Arbeitsmethoden und Ergebnisse erhalten von uns eine hohe Wertschätzung.

Wir suchen verstärkt interdisziplinäre Entwicklungspotentiale - vor allem innerhalb der TUM School of Engineering and Design und in Projekten mit dem Munich Design Institute. Die gesellschaftlichen Schlüsselthemen Klimawandel, Ressourcenknappheit, Digitalisierung und soziale Ungleichheit prägen unsere Lehr- und Forschungsagenda.

Wir intensivieren bestehende Allianzen mit internationalen Partnern und streben mehr Vielfalt in allen Bereichen unseres Departments an. Zur Qualitätssicherung orientieren wir uns an den fachlichen Standards der besten Architekturschulen weltweit.

Four core professorships support the degree programme. The Chair of Landscape Architecture and Public Space (LAO) is concerned with the moderation and design of urban and landscape development processes. The focus here is on carefully designing urban spaces that meet the current coexistence requirements. The Chair of Landscape Architecture and Transformation (LAT) is dedicated to analysing and designing the historical, current and future relationship between society and nature in the city, garden and landscape. Reflective design and research into transforming complex landscape (spatial) structures take centre stage. The Chair of Landscape Architecture of Regional Open Spaces (LAREG) works on developing larger spatial contexts, cities and cultural landscapes and thus at the interface of open space theory, open space planning and landscape development. The Chair of Green Technologies in Landscape Architecture (GTLA) develops innovative concepts and biological-technical solutions, especially in blue-green infrastructure, (blue-)green architecture and building botany. The aim is to create new open-space architectural typologies and design approaches and to analyse their spatial-aesthetic impact and technical performance. In the Master's degree programme, the four core professorships cooperate in teaching and research, network with numerous neighbouring disciplines and train highly qualified, interdisciplinary young academics.

[1] TU Munich, www.lehren.tum.de/themen/lehre-gestalten-didaktik/grundprinzipien/leitbild/, last accessed: 03/05/2023
[2] TUM ED, https://wiki.tum.de/pages/viewpage.action?pageId=1068270128, last accessed: 03/05/2023

2 Qualification Profile

The content of the following qualification profile corresponds to the specifications of the Qualifications Framework for German Higher Education Qualifications (Hochschulqualifikationsrahmen - HQR) and the requirements contained therein [1] Knowledge and understanding, [2] Use, application and generation of knowledge, [3] Communication and cooperation and [4] Academic self-conception/professionalism. The formal aspects according to the HQF (admission requirements, duration, degree options) are detailed in chapters 3 and 6 and in the corresponding subject examination and study regulations.

Graduates of the project-oriented degree programme can responsibly formulate objectives of spatial planning and design about the design of open spaces and the development of landscapes and select, apply and further develop suitable methods of analysis, evaluation, design and planning [1]. At the Department of Architecture at ED, design and project work is an appropriate format for producing complex solutions (see chapters 1 and 6) with the help of creative thinking structures. Through the project mentioned above studies, they have undergone an artistic maturation process necessary for the profession of landscape architect - as described in Chapter 6 - and are familiar with design.

They can formulate hypotheses through design concepts and develop and critically reflect on viable solutions for complex spatial issues [2]. Graduates can create design solutions for the most challenging problems ("wicked problems") to detail their structural feasibility and explore new fields of landscape architecture [4]. In particular, they can practise planning against the background of social, economic and ecological contexts and have an extended understanding of natural and cultural science issues and the ability to develop critical reflection, communication and cooperation in the open space and landscape [3].

Graduates are qualified both for an academic career and for assuming managerial responsibility in professional practice [4]. They can adapt to a constantly evolving field of landscape architecture with the changes in society and landscape, react competently to the increasing internationalisation of fields of activity, and adapt to changing tasks and (in management positions) areas of responsibility in their careers.

Depending on the chosen specialisations in the design projects and elective subjects, graduates have advanced knowledge in construction technology and plant use, ecology, garden art and the history of landscape ideas, design and CAD, planning theory, instruments and law [1]. This allows them to gain a broad overview of the existing knowledge in such an area of specialisation and to formulate further research and development topics [2]. By dealing with relevant issues of international landscape architecture and urban and environmental development in interdisciplinary project studies, students (international teams) acquire the ability to develop forward-looking solutions for complex problems in a strategically consistent and conceptually focused manner [4]. The combination of design and current research projects at TUM dramatically benefits students regarding their future qualifications.

3 Target Groups

3.1 Target Audience

The Master's degree programme is aimed at graduates of relevant Bachelor's degree programmes who have achieved a qualification equivalent to the corresponding degree programme at the Technical University of Munich.

In recent years, the range of applicants has developed beyond the predicted demand. The consecutive in-depth degree programme is beautiful for graduates of the bachelor's degree programme at TUM. Graduates from other universities and universities of applied sciences, particularly international students from China, India, Canada, Northern and Eastern Europe, and the USA, are increasingly enquiring about the programme. Of the applicants admitted to the programme, around 80% generally accept a place at TUM. According to applicants, rejections are mainly due to the high cost of living at the place of study. As a result of the excellent labour market situation, many applicants start their professional careers immediately after completing their Bachelor's degree at TUM. According to skilled and environmental organisations in German-speaking countries, the shortage of university-qualified landscape architects is now reaching a level that is considered highly problematic for the environment and society, particularly given the rapid increase in complex environmental problems (climate change, scarcity of resources, demographic change, etc.).

3.2 Prerequisites

Applicants who have gained sufficient design experience in project studies as part of their preliminary studies can be admitted to the aptitude test. For this purpose, at least four semesters of design projects should have been completed, in which both group work and individual work have prepared a particular design approach. The design and planning projects should not only have been worked on using predefined solutions based on models but should have generated innovative ideas and concepts. In the Master's programme, students should independently develop complex solution strategies and targeted design concepts.

Suitability criteria are

- The ability to carry out scientific or essential and method-orientated work,
- existing specialised knowledge from the first-degree course in landscape architecture:
  - especially in conceptual design at all scales,
  - in the theory and practice of landscape architecture, open space planning and garden design,
  - in architecture, urban development and spatial planning,
  - in ecology, environmental protection, nature conservation and planning,
  - in plant utilisation and ecological engineering processes,
- as well as proof of a professional internship of at least six months, corresponding in type and scope to the compulsory stay abroad on the eight-semester Bachelor's degree programme in Landscape Architecture and Planning at the Technical University of Munich.

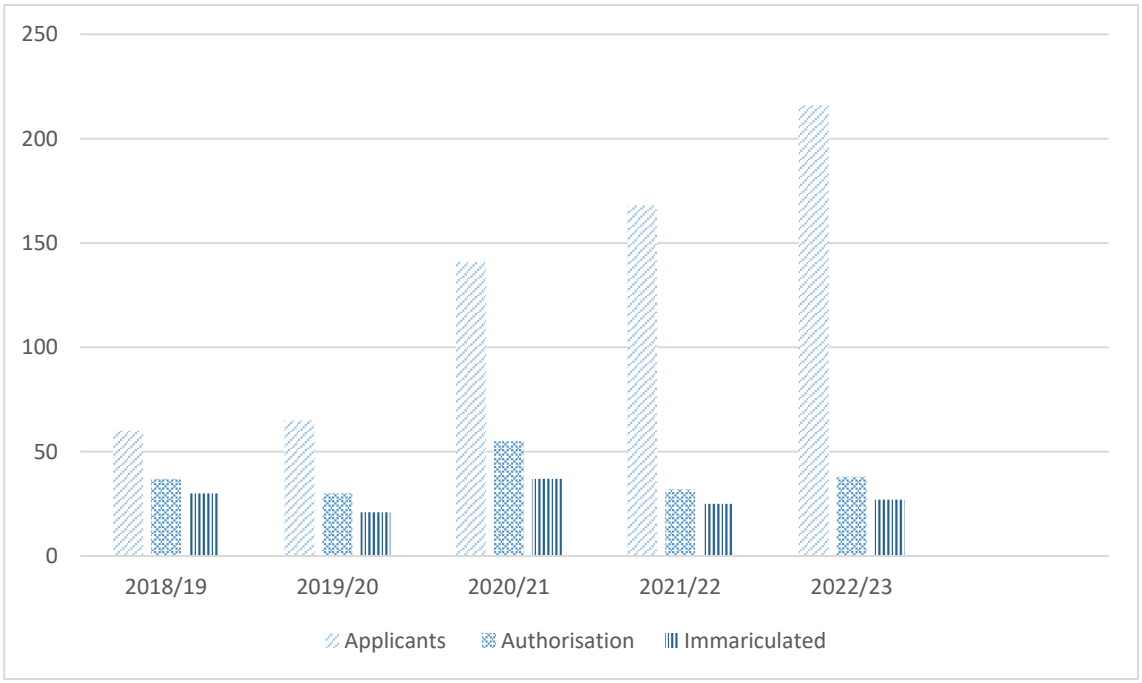
During the internship, specific professional qualifications should be identified. Personal interests clarified so that the freedom of choice given in the Master's programme (project topics and electives) can be targeted to develop a possible specialisation, e.g. in public open space planning, regional landscape design, landscape transformation or building botany.

3.3 Target Numbers

After completing the aptitude test, all suitable applicants are admitted. Fixed admission numbers are, therefore, not set. Nevertheless, based on the available teaching capacities and the spatial and infrastructural resources (classrooms, workstations, workshop capacities), capacity limits can be determined for the Department of Landscape Architecture, within which the desired excellent quality of teaching can still be achieved. Limiting factors are also the high capacity utilisation of the supporting professorships in the Bachelor's degree courses in Architecture, Landscape Architecture and Landscape Planning, and the high supervision requirements in the project studies. As a result, the maximum number of students per project group is set at 15.

Therefore, the School of Engineering and Design can offer a maximum capacity of 30 first-year students per year for the Master's programme in Landscape Architecture. The number of applications, particularly from international applicants, is increasing rapidly.

Illustration 3Development of applicant numbers, admissions and enrolments by academic year



4 Demand Analysis

There has been a high demand for TUM Landscape Architecture graduates in Germany and abroad for years. The profession (chambers of architects, the Association of German Landscape Architects bdla, international networks such as IFLA or ECLAS) is currently experiencing a severe shortage of university-trained landscape architects and recommends a full Bachelor's and Master's degree programme as a qualification. As the only university training programme for landscape architects south of the River Main, TUM cannot meet the current demand for skilled workers with the number of graduates it produces.

Typical fields of employment for Master's graduates include

- Senior collaboration in landscape architecture offices (mainly project management, in larger offices also department management) in all service phases (mostly smaller offices) or with a focus on competition and concept development (mostly larger offices)
- Employment as a consultant and project engineer in property, consulting or project development companies, especially in innovative business areas (new products and services)
- Management of a landscape architecture office (mainly freelance and as a partner company after several years of professional experience) in traditional fields of activity as well as in innovative fields of activity, mainly due to current challenges such as climate adaptation, demographic change and digitalisation
- Leading positions in state administrations (head of department or office) in nature conservation and green space offices, ministries (legal clerkship usually required)
- Further academic careers, e.g. as research assistants for doctorates at universities and colleges, research institutions, etc. According to a recent internal survey, the proportion of graduates who embark on this career is around 10% of each year group.

The requirements of the labour market are regularly discussed in professional discussion groups and scientific symposia (e.g. the annual Weihenstephan Forum and Contact Day with participants from research and professional practice; discussions with chamber representatives and bdla; exchange in the *Alumni Club Landschaft der TU München e.V.).* [3]) were discussed. Both the requirements from professional practice and current research fields are at the centre of interest. The insights gained usually lead to corresponding tasks for study projects and master's theses, which are often linked to current research projects and frequently carried out in cooperation with representatives of the profession and researchers.

[3] The more than 500 members of the 'Alumni-Club Landschaft der TU München e.V.' also ensure continuous communication with experts in landscape architecture and planning from around the world. The orientation and quality of the degree programme are regularly discussed in open discussion groups. The magazine 'nodium', which is published once a year, also provides a basis for these discussions, with over 120 pages of information on current teaching and research in the subject area. The magazine (print edition) is sent to members of the Alumni Club as well as to colleagues at other colleges and universities worldwide.

The graduate survey from 2021 provides further information on the career prospects of graduates of the Master's programme in Landscape Architecture at the Technical University of Munich:

100% of respondents stated that they were employed. The overwhelming majority were in paid employment (76.2%), 9.5% were self-employed or freelance, and 14.3% worked on a doctorate. According to the survey, 71.4% of the employed graduates took up employment in the architecture and urban planning sector after completing their studies, with all others also working in related professions. All respondents work in a field of activity specific to their degree programme (landscape architecture). A maximum of 3 years after completing their Master's degree in architecture, 43.8% of employees stated they were already in a managerial position. The relevant criteria for recruitment were, in particular, the qualification from the degree programme and the degree from TUM, as well as practical experience (e.g., through internships), which were some of the most important aspects that led to job offers.

85.7 % stated that their current job was appropriate for their degree; over 80 % said that their studies at TUM adequately prepared them for their job. [4]

[4] Data from the graduate survey, TUM Department of Architecture, 2021

5 Competition Analysis

5.1 External Competition Analysis

The Master of Arts in Landscape Architecture deepens and broadens the degree programme's academic scope. The Master's degree qualifies students for both professional and research purposes. In the Master's degree programme in Landscape Architecture, problems in the professional field for which no standard solutions are dealt with in research-based teaching.

All university degree programmes in landscape architecture today focus on the complex challenges posed by global transformation processes in the social (e.g. migration), ecological (e.g. climate change) and economic (e.g. scarcity of resources) sectors. The Master's programme at the Technical University of Munich also deals with the abovementioned issues. Still, it focuses on the structural transformation of existing cultural landscapes (e.g. industrial wastelands) and the development of new open spaces and landscapes, preferably in an urban context.

Illustration 4List of comparable degree programmes in German-speaking countries

Vergleichbare Studiengänge im deutschsprachigen Raum:

TU Berlin	M.Sc. Landschaftsarchitektur
Leibniz-Universität Hannover	M.Sc. Landschaftsarchitektur
Universität Kassel	M.Sc. Landschaftsarchitektur und Landschaftsplanung
TU Dresden	Master Landschaftsarchitektur
ETH Zürich	M.Sc. ETH Landschaftsarchitektur
Boku Wien	Dipl.-Ing. Landschaftsarchitektur und Landschaftsplanung

The Master's program focuses on theory-based design as an artistic and creative activity and an argumentative, structuring and reflective method of environmental design and knowledge acquisition (cf. Research through Design). Artistic and scientific work are combined as closely as possible during the degree programme. The openness to different theories and methods beyond standardised, economised norms, e.g. of a design-experimental nature, characterises the attitude of TUM Landscape Architecture in the German-speaking educational landscape. This is also regarded as outstanding by international applicants and colleagues and explains the constantly increasing interest in international cooperation in teaching and research with TUM Landscape Architecture. As early as 2001, external experts from ETH Zurich recognised the outstanding importance of TUM Landscape Architecture in the European educational landscape. Since then, this assessment has been regularly confirmed, most recently in 2022, by the excellent assessment of the BDLA education committee. In the international evaluation of the Faculty of Architecture in 2012, independent experts emphasised that TUM Landscape Architecture had successfully maintained and even expanded its outstanding status during the generational change from 2005 to 2009. The report states:

"The present team, Landscape Transformation, continues the well-known tradition of its predecessors on a high level. It has succeeded in consolidating landscape architecture as an independent academic and scientific discipline and ensuring a strong reputation in its BA and MA courses, award-winning student works and publications."

Illustration 5: Ratings of comparable degree programmes compared to the Master's in Landscape Architecture at TUM [5]

University	TUM	Leibniz University Hanover	TU Dresden	TU Berlin	University of Kassel	BOKU Vienna
Overall rating	4,5	3,8	4,1	3,5	3,8	3,9
Valuations	39	5	6	1	9	4
Recommendation	100%	100%	100%	100%	78%	75%
Courses	4,6	3,4	4,3	4,0	3,9	4,0
Lecturers	4,7	4,2	3,8	4,0	3,8	4,0
Programme content	4,6	4,4	4,5	4,0	4,3	4,5
Organisation	4,5	4,2	3,7	3,0	2,9	3,3
Equipment	4,3	2,4	3,3	2,0	3,8	3,3
Library	4,8	3,8	4,8	4,0	4,3	3,8
Digital studying	4,3	4	3,8	-	3,6	4,3

The excellent assessment of the TUM Master's degree programme in Landscape Architecture by the BDLA and the 2012 evaluation is also reflected in the ratings on studycheck.de, which students of comparable degree programmes submit. It stands out that the TUM Master's in Landscape Architecture has the best overall rating and takes the top spot in all sub-categories. In addition, the Master of Landscape Architecture has the best rating of all TUM degree programmes on studycheck.de.

The great demand in research and planning practice for TUM Landscape Architecture graduates throughout Germany and other German-speaking countries, especially Switzerland, repeatedly confirms the positive evaluation results. The professional associations also attest to the graduates' excellent education level. However, the stagnation in the necessary expansion of the degree programme at TUM, which has persisted for decades, continues to be viewed critically.

5.2 Internal Competition Analysis

At TUM, the degree programme sits alongside three other spatial planning degree programmes, which differ significantly in their qualification objectives and course content. Landscape Architecture (LA) always aims at structural interventions through green and open space structures based on planning and design concepts. The specific importance of the programme in the TUM

[5] Ratings on studycheck.de of comparable degree programmes compared to the Master's degree in Landscape Architecture at TUM (as of 17.03.2023)

teaching portfolio results from the fact that no other interdisciplinary environmental studies programme combines aesthetic-artistic and scientific-technical methods in project studies in a comparable way to develop sustainable solution strategies for currently urgently required landscape transformation and adaptation processes.

Unlike the design-oriented programmes, the Master's degree programme in Nature Conservation and Landscape Planning (NuL) at the TUM School of Life Sciences is distinctly focused on protecting nature and managing natural environmental resources. It is not a design degree programme. The programme's unique focus on nature conservation and resource management sets it apart from other spatial planning programmes, offering a different set of study content and forms of learning.

The Master's in Engineering Ecology (IÖ) at the TUM School of Life Sciences is another non-design programme. Its spatial reference is derived from the functional analysis of individual environmental media and technical aspects rather than landscape architecture's holistic conceptual and formal spatial reference. This unique focus on ecological management's technical and functional elements sets it apart from other spatial planning programmes.

The Master's degree in Urbanism, Landscape and City (ULS) offers the opportunity to supplement the professionally qualifying Bachelor's degree in Landscape Architecture and Landscape Planning at TUM with an interdisciplinary programme with urban development and urban planning content. The qualification objectives of the ULS differ significantly from those of the LA because they are characterised by spatial or real estate economics and analytical and strategic skills. Since this degree program also addresses non-designers such as geographers, sociologists, etc., empirical-analytical methods are more the focus of design training.

Illustration 6: Spatial planning master's degree programmes at TUM, winter semester 2022/23

Study programme	***consecutive to***	***Type***	***Scientific method and objectives***
Landscape Architecture MA.	B.Sc. Landscape Architecture and Landscape Planning	deepening	design - structural concepts
Urbanism - Landscape and City M.Sc.	BA. Architecture B .Sc. Landscape Architecture B.Sc. Urban, Spatial and Regional Planning Etc.	interdisciplinary	multi-method - strategic concepts
Nature Conservation and Landscape Planning M.Sc.	B.Sc. Landscape Architecture and Landscape Planning	deepening	scientific and planning - nature conservation concepts
Engineering Ecology M.Sc.	B.Sc. Landscape Architecture and Landscape Planning	free	ecological - technical concepts

The degree programmes mentioned, like the Master's degree programme in Landscape Architecture, are consecutive to the Bachelor's degree programme in Landscape Architecture and Landscape Planning. They differ qualitatively in their academic and professional qualification

orientation (see table). Of those graduates of the Bachelor of Landscape Architecture and Landscape Planning who apply for other Master's degree programmes, around a quarter choose the Master of Urbanism - Landscape and City and only in isolated cases the Master of Engineering Ecology.

6 Programme Structure

The program consists of three components: design projects (15 CPs each), modules in the elective area and the Master's thesis (30 CPs). As critical components of the university landscape architecture degree programme, the projects comprise at least half of the curricular study workload. Lecturers and guest critics from relevant neighbouring disciplines accompany the design process through lectures, seminars, individual corrections and group discussions. Depending on the problem, further learning methods are used, such as modelling at various scales, photo and video work, experimental analysis methods, presentations, excursions and construction experiments at a scale of 1:1. The project studies reflect the increasing complexity of spatially relevant planning or research tasks with each project stage and teach complex problem-solving strategies in dealing with current tasks in environmental design.

In design projects, planning, drawing, theory-based textual analysis, and design work are supervised independent study in group work, always about relevant, real problems. As a rule, the groups are interdisciplinary. They are supervised on a multidisciplinary basis to specifically train students in dealing with landscape complexity, for example, in an urban planning context. As part of the group work on real problem cases (e.g. conversion or reuse of brownfield sites, climate adaptation of urban open spaces, planning of energy landscapes, etc.), students develop the necessary communication skills, their knowledge of the cultural and social conditionality of landscape as well as their reflective and synthesising design skills in discourse with each other, with lecturers and with external guest critics - who are often also involved in planning. In the projects, they deepen their ability to integrate many primarily divergent demands from society on the landscape into a coherent, ecologically, socially and economically sustainable and creatively appealing overall design. This is synthesised using aesthetic-artistic and scientific-technical methods based on the findings from excursions to the respective planning areas and the interdisciplinary discourse in the analysis phase of the project. In accompanying seminars and lectures, the necessary skills and theoretical knowledge for solving complex problems in space are also taught in close relation to the project tasks. Modelling plays a vital role in teaching skills in the construction of landscape structures and in dealing with structural volumes and landscape topography. The skills required to use digital design and planning tools (e.g. CAD, GIS, etc.) are also taught in corresponding accompanying subjects, as are the necessary research skills (e.g. mapping, scientific writing, complex theories, etc.), usually closely linked to the tasks in the design projects.

In iterative processes, the students develop scientifically sound argumentation of the design theses and suitable design and planning approaches to solve the tasks set and the necessary means of presentation (plans, models, graphics, videos, etc.) in the project work and the Master's thesis. In this process, they reflect on the methods used and regularly discuss their work in meetings and interim presentations. In the repetition of this process, a circular learning process takes place in which a creative level of maturity develops. In the reflective and discursive project work, students acquire the necessary skills and knowledge (ecology, economy, social issues) to practise successfully as landscape architects in practice and science later on.

In the Master's degree programme, students should take two projects from the following subject areas, which correspond to the teaching and research fields of the four core professorships of the degree programme:

- Public space (e.g. spaces characterised by infrastructure urban spatial structures)
- Regional open spaces (e.g. large-scale open space structures, energy landscapes, etc.)
- Green technologies (e.g. building botanical constructions, blue-green architecture/infrastructure, etc.)
- Landscape transformation (e.g. conversion of post-industrial areas, urban transformation)

Each semester, new project tasks (problem definition, location, etc.) are set from the subject areas mentioned above, which allows students to achieve a high degree of individual specialisation. The design projects are set in national and international contexts and always exhibit high spatial-structural and thematic complexity. This methodological approach is regarded as best practice in landscape architecture design teaching at all renowned universities worldwide.

- The *Master's Project 1 - Basic* teaches the structural complexity of the subject mentioned above areas as well as a wide range of advanced design and planning methods at the Master's level
- The *Master's Project 2 - Comparison* deepens the complex design and planning methods taught at a higher difficulty level, compares different landscape architecture subject areas, and conveys currently relevant research approaches in this subject.

The same competence objective is involved in both cases: the comparative examination of methodology. In each design project, all levels of knowledge are addressed and the complexity of the problem to be worked on increases continuously. This intensification promotes the students' artistic maturation process and is at the same time aligned with their increasing experience in scientific work (circular learning process).

The work steps in the design process are based to a certain extent on professional references (best practice) and professional normative guidelines, but do not follow standardised procedures, but are always open, artistic-scientific processes to generate new knowledge and complex problem-solving approaches. The student's effort to acquire knowledge in theory, in interdisciplinary and public discourse, in dealing with actual planning tasks, and in developing an individual approach to the design task is correspondingly high.

Intermediate and final presentations are essential learning components in project studies because they specifically train professional communication and argumentation skills. Presentations can take place as part of public events or exhibitions. As a rule, all presentations and defences of the project results are accompanied and commented on by external guest critics.

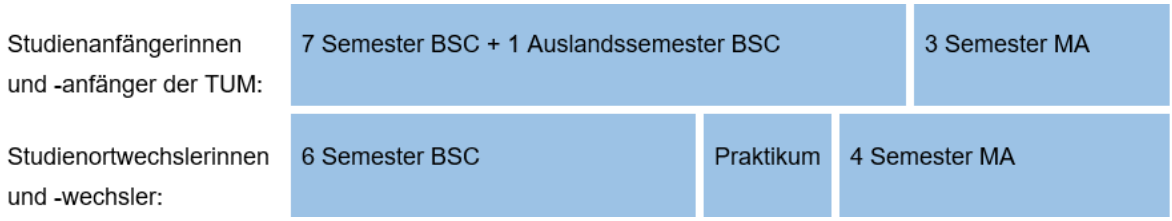
While all of the qualifications mentioned above objectives are achieved in the design projects and the core competencies mentioned are taught, students can extend their knowledge to other areas of specialisation of their choice in the elective area. They can choose from the research topics represented by the core professorships or topics from neighbouring disciplines. The elective catalogue offers a wide range of specialist modules, particularly in architecture and urban planning, as well as land use and ecology. In this way, those neighbouring disciplines are integrated into the

course, with which students will later work closely in professional practice and landscape architectural research.

In addition to the mainly landscape architecture elective modules, the offer is supplemented by an elective module catalogue "Related subject areas". This enables students to take up to 9 credit points of interdisciplinary modules from neighbouring and related subject areas and other faculties/schools. The breadth of topics reflects the interdisciplinary everyday work of landscape architects. The elective modules provide students with methodology and specialised knowledge from related disciplines. This can be used to support project work or to create an individual profile. The skills acquired here can, for example, serve as tools or decision-making aids for dealing with landscape architectural issues. Interdisciplinary modules also give students the necessary understanding of the specialist planners involved in coordinating planning processes.

For students from an eight-semester Bachelor's programme, the standard study duration for the Master's programme is three semesters. To ensure that students from TUM's own Bachelor's programme and students from other universities have the same level of education and the same conditions, graduates of a six-semester Bachelor's programme are required to complete a four-semester standard period of study in the Master's programme, as well as a preceding internship semester, a stay abroad or a further semester of study. This means all students' study duration is five years plus a one-semester abroad.

Illustration 7Course of study for a 6- or 8-semester Bachelor's programme



Except for the Master's thesis, credits can also be earned in all semesters at other recognised universities in Germany and abroad, whereby the majority of credits must be earned at TUM. External credits to be recognised can but do not have to correspond to the subject mentioned above and focus areas.

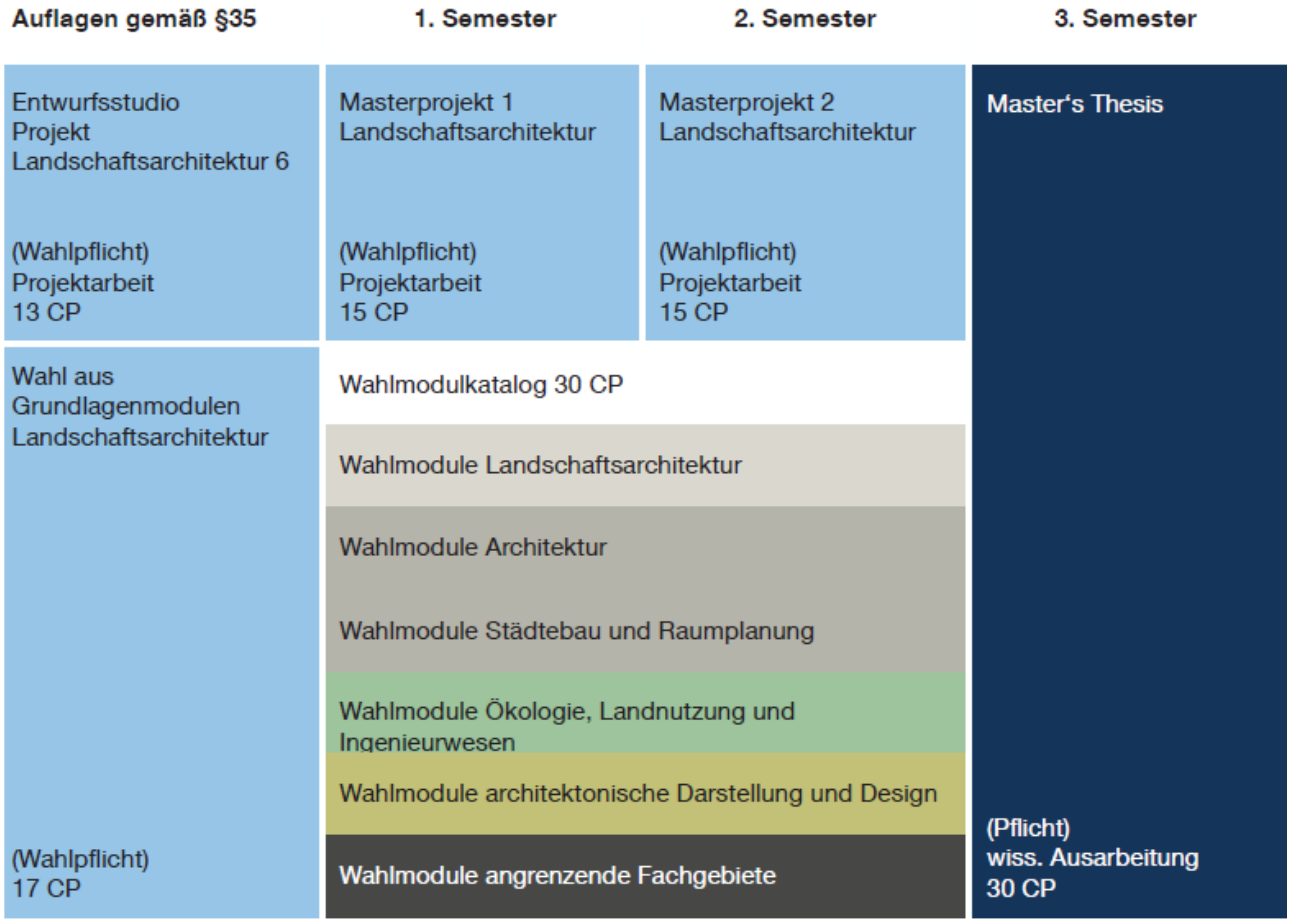
The study duration mentioned above is regarded internationally in professional organisations and academic circles as the minimum standard for training to become a leading and researching landscape architect. The currently valid law governing the Bavarian Chamber of Architects and the Bavarian Chamber of Engineers (Baukammerngesetz - BauKaG) stipulates a standard period of study of at least six semesters full-time and subsequent practical work in the relevant discipline of at least two years to fulfil the requirements for registration as a landscape architect. However, in Bavaria and other federal states, an increase in the minimum duration of study to eight semesters - as is already the architecture case

- is being considered.

While the Bachelor's degree fulfils the formal professional qualification according to the chamber laws of the federal states, only the Master's degree offers de facto access to all potential fields of employment because only after at least five years of study can an artistic maturity process be achieved in conjunction with systematic, scientific competence.

Programme structure

Illustration 8Study programme structure



Sample study plan

Illustration 9Exemplary structure for a curriculum of the three-semester Master's programme (first-year students at TUM)

Semester	Module				Credit Points / Prüfungsanzahl
1.	Masterprojekt 1 Landschaftsarchitektur (Wahlpflicht) Projektarbeit 15 CP	s. Wahlmodulkatalog z.B.: Theorie und Kritik der Landschaftsarchitektur (Wahl) Übungsleistung 6 CP	s. Wahlmodulkatalog z.B.: Erneuerbare Energien und Landschaftsästhetik (Wahl) wiss. Ausarbeitung 6 CP	s. Wahlmodulk. z.B.: Geschichte der Gartenkunst (Wahl) wiss. Ausarb. 6 CP	30 / 4
2.	Masterprojekt 2 Landschaftsarchitektur (Wahlpflicht) Projektarbeit 15 CP	s. Wahlmodulkatalog z.B.: Green Typologies (Wahl) wiss. Ausarbeitung 6 CP	s. Wahlmodulkatalog z.B.: Green Technologies (Wahl) wiss. Ausarbeitung 6 CP		30 / 4
3.	Master's Thesis (Pflicht) wiss. Ausarbeitung 30 CP				30 / 1

Illustration 10Exemplary structure for a curriculum of the four-semester Master's programme according to §35 FPSO (transfer students)

Semester	Module				Credit Points / Prüfungsanzahl
1.	Entwurfsstudio nach §35 Projekt Landschaftsarchitektur 6 (Wahlpflicht) Projektarbeit 13 CP	s. Wahlmodulkatalog Bachelor Landschaftsarchitektur nach §35, z.B.: Praxis der Landschaftsarchitektur (Wahlpflicht) Lernportfolio 6 CP	s. Wahlmodulkatalog Bachelor Landschaftsarchitektur nach §35, z.B.: Entwurf und Wissenschaft (Wahlpflicht) wiss. Ausarbeitung 6 CP	s. Wahlmodulkatalog Bachelor Landschaftsarchitektur nach §35, z.B.: Kurzentwurf (Wahlpflicht) Übungsleistung 5 CP	30 / 4
2.	Masterprojekt 1 Landschaftsarchitektur (Wahlpflicht) Projektarbeit 15 CP	s. Wahlmodulkatalog z.B.: Research Methods in Landscape Architecture and Urbansim (Wahl) Projektarbeit + Klausur 6 CP	s. Wahlmodulkatalog z.B.: Green Technologies (Wahl) wiss. Ausarbeitung 6 CP	s. Wahlmodulkatalog z.B.: Public Space in Theory and Practice (Wahl) wiss. Ausarbeitung 3 CP	30 / 4
3.	Masterprojekt 2 Landschaftsarchitektur (Wahlpflicht) Projektarbeit 15 CP	s. Wahlmodulkatalog z.B.: Green Typologies (Wahl) wiss. Ausarbeitung 6 CP	s. Wahlmodulkatalog z.B.: Landscape Architecture Theory and Criticism (Wahl) Übungsleistung 6 CP	s. Wahlmodulkatalog z.B.: Praktizierte Technik der Landschaftsarchitektur (Wahl) Projektarbeit 3 CP	30 / 4
4.	Master's Thesis (Pflicht) wiss. Ausarbeitung 30 CP				30 / 1

7 Organisation and Coordination

The Master's programme in Landscape Architecture at the TUM School of Engineering and Design is taught by lecturers from the Department of Architecture—the Academic Programme Director of the course, currently Prof. Dr.-Ing. Alexander von Kienlin is responsible for the content. Supervision at the School is the responsibility of the Vice Dean of Studies and Teaching at the TUM School of Engineering and Design, currently Prof. Dipl. Arch. ETH Mark Michaeli.

The central departments of the TUM Center for Study and Teaching (TUM CST) are responsible for administrative aspects of study organisation, as are some ED institutions (see overview below):

- Student Advising:
  Student Advising and Information Services (TUM CST)
  Email: studium@tum.de
  Phone: +49 (0)89 289 22245
  Provides information and advising for prospective and current students (via hotline/service desk)
- Departmental Student Advising:
  Prof. Dr Sören Schöbel-Rutschmann
- Academic Programs Office:
  Julie Strickland
  E-mail address: julie.strickland@tum.de
  Telephone number: +49 (0)89 289 28463
- Study Abroad Advising/Internationalization:
  TUM-widel: TUM Global & Alumni Office
  E-mail address: internationalcenter@tum.de
  Departmental: Joanna Ruchtz
  Telephone number: +49 (0)89 289 28463
  E-mail address:outgoing.ad@ed.tum.de
- Gender Equality Officer:
  Dr Annette Spengler (MAE)
  E-mail address: annette.spengler@tum.de
  Telephone number: +49 (0)89 289 27102
- Advising – Barrier-Free Education: chronically
  TUM-wide: Service centre for disabled and ill students and prospective students (TUM CST)
  E-mail address: Handicap@zv.tum.de
  Telephone number: +49 (0)89 289 22737
  Departmental: Sabine Selzle
  Telephone number: +49 (0)89 289 22902
  E-mail address: sabine.selzle@tum.de
- Admissions and Enrollment:
  TUM-Wide: Admissions and Enrollment (TUM CST)
  Email: studium@tum.de
  Phone: +49 (0)89 289 22245
  Admissions, enrollment, Student Card, leaves of absence, student fees payment, withdrawal

	Departmental: Prof. Dr. Sören Schöbel-Rutschman Telephone number: +49 (0)8161 71 3248 E-mail address: landschaft.ad@ed.tum.de Online application. Information about the online application
• Semester Fees and Scholarships:	Fees and Scholarships (TUM CST), Email: beitragsmanagement@zv.tum.de
• Examination Office:	Graduation Office and Academic Records (TUM CST) Campus Munich/Garching/Weihenstephan/ Klinikum rechts der Isar Graduation documents, notifications of examination results, preliminary degree certificates
• Departmental Examination Office:	Julie Strickland Telephone number: +49 (0)89 289 28463 E-mail address: julie.strickland@tum.de
• Examination Board:	Prof. Dr Sören Schöbel-Rutschmann (Chairman) Julie Strickland (Secretary)
• Quality management:	TUM-wide: Quality Management (TUM CST), https://www.tum.de/studium/tumcst/teams-cst/ Departmental: Academic Program Director Prof. Uta Graff

8 Enhancement Measures

The degree programme was founded in 1956 under the name "Garden and Landscape Design" and was primarily dedicated to the design of private gardens. In 1966, a second Chair of Landscape Ecology was added, significantly expanding the artistic and creative range of subjects taught to include scientific components with an interest in landscape as a complex overall system. This led to corresponding modernisations and adjustments in teaching, most recently through establishing the TT Professorship for Green Technologies in Landscape Architecture in 2017. The consequences of this development can be seen not only in project work and Master's theses but also in the research results of recent years, which have been developed and published by the four landscape architecture professorships. More and more qualitative research methods are now being used (e.g. research through design) to solve the increased complexity of problems ('wicked problems') in holistic design concepts. Landscape architecture's relevance in climate change adaptation about water, soil, biodiversity and urban climate, especially in design and synergy issues, is continuously increasing.

Despite increasing student numbers and a significant expansion of the range of topics in the field of "Landscape", no further chairs were established for two decades, which was commented on in a report by ETH Zurich in 2001: "It must be noted that the Landscape Architecture and Landscape Planning degree programme is not viable and competitive in the long term with the resources currently available." In 2004, the programme was threatened with closure. In addition to the four existing professorships, eight more were urgently recommended. The closure was averted, but in the meantime, only two additional professorships have been established in landscape architecture. This underfunding by national and international standards - a total of four professorships today - is vastly disproportionate to the growing social importance of the subject and the worsening environmental crises. As a result of the Bologna reform in 1999 (introduction of Bachelor's and Master's degrees), the teaching load has increased, the shortage of skilled workers is now severe, and the national and international demand for attractive degree programmes continues to rise, while the expansion of the degree programme is stagnating, which continues to acutely endanger its viability and competitiveness.

The fact that the TUM degree programme is still at the top of relevant study rankings (cf. study check, de) and that TUM graduates of Landscape Architecture enjoy an excellent reputation is due to the extraordinary commitment of all teaching staff and the consistent use of synergy effects in cooperation with neighbouring teaching and research areas at TUM. Given the above-mentioned global development and the constantly rising numbers and without a rapid expansion of teaching and research capacities, it won't be easy to guarantee this top quality in teaching in the future.