SLOVENSKO
OGRODJE
KVALIFIKACIJ

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Doktor znanosti/doktorica znanosti s področja tekstilstva, grafike in tekstilnega oblikovanja

Selected qualifications

Name of qualification	Doktor znanosti/doktorica znanosti s področja tekstilstva, grafike in tekstilnega oblikovanja
Translated title (no legal status)	Doctorate in the field of textiles, graphic design and textile design
Type of qualification	Doktorat
Category of qualification	Izobrazba
Type of education	Doctoral education
Duration	3 years
Credits	180 credits

Admission requirements

• A completed second-cycle study programme; or
• a completed former study programme leading to a specialisation, provided that candidates have already completed a professional higher education programme (adopted before 11 June 2004). Prior to enrolment, such candidates must complete course units totalling at least 60 credits from the second-cycle programme in Graphic and interactive communication; or
• a completed study programme leading to an academic higher education qualification (adopted before 11 June 2004); or
• a completed former study programme leading to a master's degree or specialisation following the completion of a study programme leading to an academic higher education qualification (adopted before 11 June 2004). Course units totalling 60 credits are recognised for candidates; or
• a completed study programme leading to professions regulated by EU directives, or another integrated master's degree programme consisting of 300 credits.

ISCED field

Field
Umetnost in humanistika

ISCED subfield

subfield interdisciplinarne izobraževalne aktivnosti/izidi, pretežno umetnost in humanistika

Qualification level

SQF 10
EQF 8
Third level

Learning outcomes

The qualification holder is be able to:
(general competences)

- demonstrate in-depth understanding of theoretical and methodological concepts in the field of textiles, graphic and interactive communications and the theory of textile design,
- autonomously develop new knowledge in the field of textiles, graphic and interactive communications and the theory of textile design,
- address the most complex problems by testing and improving known solutions and discovering new solutions in the field of textiles, graphic and interactivity negations and the theory of textile design,
- manage the most complex work systems in the field of textiles, graphic and interactive communications and the theory of textile design,
- lead research projects in the field of textiles, graphic and interactive communications and the theory of textile design from a broad technical or scientific field,
- carry out critical reflection in the field of textiles, graphic and interactive communications and the theory of textile design,
- lead teamwork, including in the field of projects based on the integration of scientific laws from different fields (social and communication abilities),
- demonstrate professional, ethical and environmental responsibility,

- use modern tools and skills, above all from the ICT field, in everyday professional work and research.

(subject-specific competences)
TEXTILES

- demonstrate proficiency in the use of mathematical tools for the study of technical mechanics, demonstrate understanding of mechanical laws and principles in the mechanics of materials and the functioning of equipment, build on basic models with specific models and develop the deductive resolution of problems in the field of textile technology,
- demonstrate mastery of knowledge from the field of physical organic chemistry that is essential for the study of chemistry-oriented subjects in the field of textile science and technology, show insight into modern analytical methods in organic chemistry, and use judgement in the selection of the most suitable method for the practical addressing of research problems in the field of chemical textile technology, which is a condition for autonomously addressing research problems in this field,
- demonstrate understanding of physical and mechanical laws relating to fibre-forming polymers, the connection of supramolecular and morphological structure to the properties of polymers, and the selection of fibre-forming polymers with regard to the required characteristics of the end product; demonstrate knowledge of the possible applications of fibre-forming polymers in various fields and understanding of the effect of factors in the production and use of fibres and end products,
- demonstrate proficient knowledge in the field of high-performance fibres for the needs of development and use in technologically highly developed products for technical purposes; use theoretical knowledge from the field of the structure, properties and use of polymer fibres for the needs of construction of high-performance technical textile products and fibrous composites; make an expert choice of high-performance fibres with regard to the required properties of the end product,
- demonstrate insight in the field of unconventional fibres and new synthetic fibres from biopolymers not derived from petroleum; demonstrate knowledge of modern technologies that lead to the synthesis of biopolymers from renewable raw materials, the characteristics and advantages of their use; make an expert choice of fibres for the development of environmentally friendly products; demonstrate knowledge of issues regarding their acquisition and use,
- demonstrate understanding of the connection between the structure and properties of fibre-forming polymers and their degradability and renewability; identify needs for the separation of waste textile materials; demonstrate knowledge of the processes of recycling polymer materials and the effect of recycling on their properties; seek optimal solutions in the manufacture of textile products, taking into account ecological design and the life cycle of the individual product,
- demonstrate proficiency in the latest analytical methods for investigation of the structure of molecules on a nanometric scale, supramolecular structures in solid aggregate state, anisotropy, thermal properties, diffusion phenomena, viscoelasticity and density of fibres and select suitable analytical methods for research into the chemical and physical properties of fibre-forming polymers and their changes during various processing procedures; apply knowledge in special areas of investigation such as archaeological and historical textiles, investigation of textiles in forensics,
- demonstrate proficient knowledge and skills in the field of programming and numerical methods, show insight into mathematical software packages that are important in the analysis of measured results, build on the statistical method of thinking and research approach, use modern statistical tools in research or professional work, demonstrate understanding of the basics and practical application of the methods covered in textile science,
- undertake in-depth study of the structure and properties of single, combined, double and cabled machine-produced textiles, single- and multi-layer woven fabrics, yarns and knitted fabrics, 3D textiles and extruded spunbond, melt-blown unwoven textiles, connect the effects of construction and production parameters to the final properties of a product, plan textiles for different purposes of final use with required physical, mechanical, permeability and other properties, demonstrate proficiency in the most complex advanced textile manufacture technologies, demonstrate understanding of the effects of individual phases on textile properties and demonstrate knowledge of advanced methods and apparatus for testing the mechanical properties of textile products.

- Demonstrate proficient knowledge of the theoretical basics of refining processes and the procedures of chemical and physical modification of textiles, show insight into the mechanisms of processes, demonstrate understanding of the effect of factors on the quality of implementation of procedures and, consequently, the properties of the end products, integrate theoretical and applied knowledge from the fields of structural, constructional, mechanical, physical and chemical properties of textiles and textile refinement and care procedures, demonstrate knowledge of state-of-the-art chemical textile procedures and means for their implementation, and make an expert choice of procedure with regard to the required functional properties of the product,
- introduce new technologies for the modification of textiles, including nanotechnology procedures such as sol-gel technology, plasma technology, the microcapsule method and biotechnology; show insight into the mechanisms of modification of textile surfaces and methods for their characterisation; demonstrate knowledge of the environmental and economic advantages of procedures and their weaknesses,
- show insight into the structure, properties and use of dyes and pigments in the field of chemical textile technology; show detailed knowledge of the characteristics of dyes and pigments, which enables objective evaluation of textile products and the achievement of greater competitiveness; acquire suitable knowledge in the field of the theory and practice of measuring colour; demonstrate good familiarity with colour as a sensory perception phenomenon; demonstrate understanding of problems relating to the perception and depiction of colour in various media,
- show insight into the structural properties of chemical means for refining and caring for textiles, make expert use of the appropriate means, including their concentrations and combinations, and think ecologically when using the most state-of-the-art means and methods of functionalisation of textile fibres and textile fabric care,
- developed special technical two-dimensional and three-dimensional textiles with high added value for new applications in various fields such as medicine, pharmacy, sport, civil engineering, agriculture, aviation; demonstrate knowledge of requirements for functional properties, individual structures and methods of manufacture, special aspects of use, specific investigations and standards,
- undertake in-depth study of the environmental impact of individual processes of the textile industry, waste caused by these processes and textile products; show ecological awareness and demonstrate knowledge of environmental protection legislation and environmental standards relating to the profession; assess and address concrete environmental problems in the industry; demonstrate knowledge of environmental monitoring and industrial waste water and air treatment technologies; use ICT in communicating and processing data and keeping track of new developments in the field of environmental protection,
- demonstrate knowledge in the field of production management, which includes understanding of the development of production, productivity and improvements, planning of work processes using network planning methods, understanding of the need for investments, perception and evaluation of costs incurred during the work process, understanding and addressing of concrete work problems using technical methods such as SWOT analysis, value analysis, systemisation and evaluation of the complexity of work, development of skills in planning and calculating the technological requirements of products and services,

GRAPHIC AND INTERACTIVE COMMUNICATIONS

- demonstrate knowledge of the latest printing technologies; demonstrate proficiency in the knowledge necessary for the constant effective monitoring of new developments in this rapidly developing field of modern technology,
- demonstrate familiarity with the importance of innovation and uniqueness in devising new ideas for the printing of products with high added value,
- demonstrate proficiency in the knowledge necessary for an understanding of the basics and a systematic overview of the direction of development of interactive communication in new media; demonstrate understanding of the basics of preparation and processing of multimedia content and have an overview and understanding of the basics of user interfaces, enabling the implementation

of user-centred interactive services,
- demonstrate proficiency in and build on statistical methods of thinking and research approaches; demonstrate familiarity with modern statistical tools and absorb knowledge for the practical application of statistical methods in the field of graphic technology,
- undertake in-depth study of basic and more complex methods for the generation and processing of information in various graphic media; demonstrate familiarity with the theoretical basics of the functioning of various media and their possibilities of application,
- demonstrate detailed knowledge of the environmental impact of individual processes of the graphic industry; demonstrate knowledge of modern environmental protection legislation and environmental standards relating to the profession,
- demonstrate proficiency in knowledge relating to the use of mathematical models (matrices, CLUT) and methods for conversion between different colour spaces characteristic of graphic and media communication technology,
- show insight into the physical and chemical basics of modern measuring methods for the needs of analysis and design of modern applications in graphic technology; address any concrete complex problem, review the results that can be provided by individual research methods, synthesise partial results obtained and provide a critical overview of the completeness and applicability of the overall solution,
- find new innovative solutions in work with various modern materials, creating ideas to enable the transfer of theoretical knowledge into practice; create new efficient work processes or increase the efficiency of those that are already in use,
- communicate and participate actively in teamwork and seek new solutions; supply the practical knowledge needed by an autonomous innovative worker in the field of graphic techniques in order to plan new functional products with high added value,
- demonstrate proficiency in the knowledge necessary to understand and address the basic problems of time-variable electromagnetic fields and transitional phenomena that are important for understanding the functioning of simple printed electronics systems,
- undertake in-depth study of the influence of technological development and historical and artistic styles on typography; study the effect of text content and information medium on typographic selection, and requirements and methods of checking visibility, legibility and readability,
- demonstrate familiarity with, understanding of and a critical assessment of the visible and invisible constitutional, compositional, aesthetic and communicative characteristics of a graphic product, deriving from analytical artistic judgement,
- demonstrate proficiency in knowledge from the field of intellectual property and the protection of innovations in the fields of science and technology, and its application in the selected field,
- demonstrate understanding of theoretical problems relating to the perception, depiction and measurement of colours in various media; work with the latest theoretical approaches and models in this field,
- address concrete work problems on the basis of knowledge of the structure and properties of graphic and packaging materials,
- demonstrate knowledge and understanding of interactions between product and packaging and develop skills in the control and analysis of modern requirements in the manufacture of graphic and packaging products,
- demonstrate in-depth knowledge of image processing and image analysis methods for the objective evaluation of print quality; demonstrate proficiency in the basics of software for designing macros and plug-ins that enable automatic, objective evaluation or analysis,
- obtain the basic experience in the field of printed electronics that is urgently necessary in the use of these systems in practice; seek new innovative solutions both in the field of printing simple printed electronics systems and in their final application,
- demonstrate mastery of instrumental methods enabling the objective evaluation of those interactions in printing that are of decisive importance in achieving prints of the highest degree of repeatability and quality,
- demonstrate proficiency in the functional use of basic artistic parameters and fractal, proportional,

rhythmic and other harmonic relationships, particularly between photography and typography and their distribution, and between various combinations of colour values and contrasts and other harmonic relationships in the analytical verification of the quality of graphic design,
- demonstrate familiarity with processes in the design, manufacture and distribution of products and services, and with production management,
- demonstrate proficient knowledge of programming and numerical methods with an emphasis on graphic problems; undertake autonomous research using mathematical software packages that are important in the analysis of measured results, the processing of digital images, etc.,
- show insight into the selection and quality of materials and manufacturing techniques used in the past in graphic workshops, manufacturing and industry,

TEXTILE DESIGN

- undertake in-depth study of the theory of fashion and specific methods of clothing design that are tied to the sociological, psychological and historical starting point of the basic functions and motives of fashion,
- demonstrate understanding of and address important questions from the fields of productive artistic thinking, conceptualisation, articulation, materialisation and public presentation, and from the fields of the structure of artistic language and models of verbalisation that lead to the realisation of an idea and its message,
- place the phenomena of fashion and clothing culture in broader social contexts and critical/explanatory frameworks and understand, read and interpret clothes as texts (the semiotics of clothes),
- express themselves individually in accordance with the level of technological innovation of industrial production and integrate socio-psychological parameters and theoretical thinking in the artistic sense with a specific time and place from the social sciences and humanities point of view,
- show insight into theoretical, practical and analytical ways to enhance prevalent fashion design (of clothing and other accessories) in connection with technological research in the textile field,
- identify the needs of potential users, use tools to promote creativity and verify own ideas and their selection,
- design and plan textiles for interior and exterior use through understanding and evaluation of architectural laws and meanings in the historical and broader cultural context,
- undertake in-depth analysis of stylistic trends and their influence both in the past and present while demonstrating understanding of the relationship between clothes and body and of visual language in relation to clothing,
- demonstrate knowledge from the field of the incorporation of technological knowledge into the actual process of designing a textile product with added quality or creating its logical and formally perfect virtual presentation while investigating the possibilities of use of the more complex tools offered by various types of computer graphics software for the development of the visual image of a textile product,
- demonstrate understanding of artistic movements within European modernism and historical avant-gardes, including their alliances with radical political parties through the prism of the conflict between nationalism and cosmopolitanism,
- make functional use of basic artistic parameters and fractal, proportional, rhythmic and other harmonic relationships using various combinations of colour values and contrasts in the analytical verification of the quality of textile design or textile products,
- demonstrate in-depth theoretical and practical knowledge in the field of the 2D/3D development of cuts in tailoring and, with it, the possibility of a new approach to the design of the functional and structural relationship between clothes (textiles) and body,
- demonstrate understanding of and critically assess and describe the visible and invisible constitutional, aesthetic, communicative and other characteristics of fashion photography on the basis of evaluation from the point of view of artistic analysis, photography and fashion design, in relation to the distribution of fashion photography and other visual communications in the cultural space,

- demonstrate proficient knowledge in the field of the differentiated understanding of the role of costume design and its laws within a theatrical, operatic or dance production, film, television and video, and in the field of integration of costume design in the dramaturgical, directorial and scenographic concepts of productions,
- demonstrate proficient knowledge in the field of the functioning of media culture in connection with fashion, the fashion industry and the role of the media in promoting and structuring fashion in the present age,
- demonstrate proficient knowledge in the field of active textiles, the development of which is connected to biotechnology, information technology, microelectronics, microelectromechanical devices, the development of wearable computers and nanotechnology, and their application in modern textile and clothing design,
- think conceptually from an interdisciplinary perspective that creates a connection between different disciplines and media and frees them from thematic standards.

Assessment and completion

Examination performance is graded as follows: 10 (excellent); 9 (very good: above-average knowledge but with some mistakes); 8 (very good: solid results); 7 (good); 6 (adequate: knowledge satisfies minimum criteria); 5–1 (inadequate). In order to pass an examination, a candidate must achieve a grade between adequate (6) and excellent (10).

Progression

In order to progress from the first year to the second year, doctoral candidates must have completed course units amounting to at least 45 credits. At least 20 of these credits must be from core subjects. Candidates who have completed all course units pertaining to all taught course units in the first and second years and whose doctoral dissertation topic has been approved by the Senate of the University of Ljubljana may enrol in the third year.

Condition for obtaining certificate

Candidates must successfully complete all requirements of the study programme and successfully defend their doctoral dissertation. Doctoral candidates must publish at least one scholarly article in the field of their doctorate in a journal indexed by SCI, SSCI or A&HCI. The doctoral candidate must be the lead author of the article. The scholarly article must be published or accepted for publication before the defence of the doctoral dissertation.

Awarding body

University of Ljubljana, Faculty of Natural Sciences and Engineering

URL

https://www.ntf.uni-lj.si/oto/en/study/doctoral-degree/