Research Themes and Summaries of Dissertations for Academic Year 2022/23

STUDY PROGRAMME ARCHITECTURE AND URBANISM IN STUDY FIELDS:

ATT / Architecture, Theory and Creation
AST / Architecture, Building and Technology
DAPP / History of Architecture and Monument Conservation
UUP / Urban Design and Spatial Planning
KA / Landscape Architecture

Research Themes	Department	Form	Supervisor	Study Field	Summary
Industrial Heritage: new use	15113	Full-time	PhDr. Benjamin Fragner, (Mgr. Jan Zikmund, Ph.D.)	DAPP, ATT	Industrial heritage and its adaptive re-use: value criteria, methodology, strategies; Identity and authenticity of a historic built structure and its new function; Industrial architecture of the past, its origins and creators. The topic will be defined more accurately according to a personal focus and interests of the applicant.
Anticipation of Interactive Architecture	15116	P	Prof.dr.ir. Henri Achten	ATT	Interactive architecture establishes a fundamentally different relationship between building and inhabitant. We need a speculative and predictive model that can qualify future user experience, so that the architect can better design interactive environments. This research extends the paradigm of POE (Post Occupancy Evaluation) to AOE (Anticipative Occupancy Evaluation). It is based on experimental settings using various techniques, such as VR, AR, enquiries, storyboards.
User Experience of Interactive Architecture	15116	P	Prof.dr.ir. Henri Achten	ATT	Elements of interactive architecture that occupy and are active in the same space as the inhabitant create a new spatial experience for the inhabitant. In this research we build full-scale interactive prototypes that are tested against a range of experimental settings (fully virtual, mixed virtual-real, full real). The result will be a descriptive model of the relation between inhabitant and interactive space.
Physical models as Child Digital Twin technology for support of architectural design	15116	P	Prof.dr.ir. Henri Achten	ATT	As the architectural design process progresses from first concept to final documentation for the realization of the building, there is increasing insight and expectations how the future building will and should perform. Digital Twin (DT) technology relies on an immediate coupling between an existing building and digital counterpart - which in the design process is not available. Yet, in architectural practice physical scale models of increasing detail are being made. We propose that such models can stand in the place of the 'real' building and offer valuable insights for the design team during the design process. The purpose of the PhD research is to formulate the theoretical and practical framework how 'stand in' physical models can supplement the real building in the design process, and take advantage of concepts and principles of DT technology. It should be noted that the research, intermediate results, publications, and final thesis are to be in English language.
Digital Twin and Blockchain technology for architectural design	15116	P	Prof.dr.ir. Henri Achten	ATT	DT technology is conceived as a live dashboard/monitoring technique to connect a digital model with it's physical counterpart in the real world. In the department we are investigating so-called foetal and child DT that can assist the architectural design process, even though there is no full-fledged physical counterpart. DT technology allows the coupling of physical world and digital representation. BC technology are decentralised peer to peer networks that can run code automatically , in the form of smart contracts, that allow the creation of unique digital entities as non-fungible tokens, and peer-to-peer digital economies around these artefacts. In this research project, the aim is to extend DT and BT into the architectural design process. The implementation can include a combination of theoretical and hands-on digital tools to validate the questions developed. Expert supervisor on the part of BT will be dr. Theodore Dounas, dip.arch.eng, PhD, ARB, RIAS, RIBA, SFHEA of Robert Gordon University in Aberdeen, Scotland, who is a leading expert on BT. It should be noted that the research, intermediate results, publications, and final thesis are to be in English language. Together with dr. Dounas, we aim to secure research funding through bilateral programs between Scotland and CR.
The use of recycled polymers in architecture and design. Large scale 3D printing method	15116	prezenční	Ing. arch. Kateřina Nováková Ph.D	ATT	The research is focused on the use of recycled polymer materials in architecture and design with the use of additive technologies: either 3D printers or robotic arms in order to reach large formates of the resulting product. The research reacts on requests form companies to reuse their industrial waste with implementing creative industry. Thebresearch is focused on the principals of designing with computed design and smart softwares but also education and rational thinking.
The use of additive technology in architecture focused on environmentally sustainable materials. (Mycelium, Mud, Earth, recycled plaster, PLA, biomaterials.	15116	prezenční	Ing. arch. Kateřina Nováková Ph.D	ATT	The research is focused on the use of additive techniology in architecture and design with the focus on circular economy and sustainability. The materials researched will be Mycelium, Earth and mud, biomaterials and PLA. The machines used will be normal and large formate 3D porinters and robotic arms. Designing methods will be researched with the focus on computative technology and smart softwares.
Gamification methods in architecture and urbanism	15116	P	Ing. arch. Lukáš Kurilla, Ph.D.	ATT	We are encountering gamification methods more and more. We find them, for example, in internet banking, in companies (HR) or in e-shops. The goals of gamification are different. Some try to teach users to use the full potential of the user interface, others try to build a stronger relationship between the customer and the company, for example in the form of a loyalty program. The main use is to gain the user's attention, attract him and educate him. This doctoral topic focuses on the design and development of gamification methods in architecture or urbanism with an emphasis on the doctoral student's focus. It can therefore be the use of gamification in the issue of participation with the aim of educating the population or the involvement of gamification in the process of architectural design using objective evaluation criteria of the design.
Innovative building concepts	15128	P/K	doc. Ing. arch. Dalibor Hlaváček, Ph.D., prof. Ing. arch. ir. Zdeněk Zavřel, dr. h. c.	ATT	With rapidly growing urbanization (54% of the world's population now lives in urban areas and this ratio is expected to grow to 66% by 2050), new building concepts need to be sought – energy-active buildings, use of environmentally friendly materials, constructions with low consumption of resources, reducing the impact of buildings on the creation of a heat island in the city, increasing local biodiversity or building life cycle. The research topic will be specified according to the applicant's focus.
Adaptive reuse	15128	P/K	doc. Ing. arch. Dalibor Hlaváček, Ph.D., prof. Ing. arch. ir. Zdeněk Zavřel, dr. h. c.	ATT	"Adaptive reuse" refers to the process of reusing existing buildings for a purpose other than that which they were originally built for. It can be an alternative to new construction in terms of sustainability and circular economy. The aim is to explore different approaches that activate the hidden potential of buildings and give them new energy. Research can take the form of theoretical research in combination with research-by-design method. The research topic will be specified according to the applicant's focus.
Architecture of sub-saharan Africa	15128	P/K	doc. Ing. arch. Dalibor Hlaváček, Ph.D.	ATT	African architecture is exceptionally diverse and has been influenced by foreign cultures for centuries. The traditional architecture is characterized by the use of local materials and passive principles of indoor environment control. The research topic will be the connection of traditional and modern architecture of sub-Saharan Africa with an emphasis on sustainable construction.
Architectural discipline and its instruments	15128	P/K	doc. Ing. arch. Dalibor Hlaváček, Ph.D.	ATT	The architect's practice has changed dramatically in recent years thanks to digital technologies, advances in materials, construction and technology, and the evolution of construction requirements in the context of sustainable development. Increasing and changing demands on the architect must be reflected in practice and within the framework of architectural education. The subject of research is the profession of architect and the role of architectural schools in relation to this profession. The research topic will be specified according to the applicant's focus.

The legacy of medieval architecture in Baroque and in the 19th century	15113	P/K	prof. PhDr. Pavel Kalina, CSc.	DAPP	The research will be focused on the changes of medieval legacy in baroque era and in the 19th-century architecture. The project can be either focus on one region (Bohemia) or on the wider area of Central Europe. It should include both formal aspects of architecture and its social context. The project can be realized as a monograph of one architect.
„Dynamic Baroque" in Italy and in Central Europe	15113	P/K	prof. PhDr. Pavel Kalina, CSc.	DAPP	The research will be focused on the changes in the language of architecture in 17th-century Italy and their transformation in Central Europe. The project can be either focus on one region (Bohemia) or on the wider area of Central Europe. It should include both formal aspects of architecture and its social context. The project can be realized as a monograph of one architect.
The Origins of Renaissance in Central Europe	15113	P/K	prof. PhDr. Pavel Kalina, CSc.	DAPP	The research may be focused on one region (e.g., Bohemia) or more genrally on the beginnings of Renaissance in wider Central European context. The research may be focused either on formal changes iin the language of architecture, or on their social context,
Renaissance Revival architecture as a global and regional phenomenon	15113	P/K	prof. PhDr. Pavel Kalina, CSc.	DAPP	The research will be focused on the changes in the language of 19th-century architecture in relationship to the discovery of 16th-century Renaissance as a matrix of modern architecture. The project can be either focus on one region (Bohemia) or on the wider area of Europe. It should include both formal aspects of architecture and its social context. The project can be realized as a monograph of one architect.
Industrial heritage: new use	15113	P/K	PhDr. Benjamin Fragner, (Mgr. Jan Zikmund, Ph.D.)	DAPP, ATT	Industrial heritage and its adaptive re-use: value criteria, methodology, strategies; Identity and authenticity of a historic built structure and its new function; Industrial architecture of the past, its origins and creators. The topic will be defined more accurately according to a personal focus and interests of the applicant.
The architecture of World Expositions in the 19th century	15113	P/K	prof. PhDr. Pavel Kalina, CSc.	DAPP	The research will be focused on architecture of World fairs and of similar actions organized at regional level. The research will include not only the architecture itself, e. g., its typology and constructions, but also its media image and wider social contexts.
Architects and structural engineers - extraordinary post-war architecture as a result of cooperation	15113	P	prof. Ing. arch. Petr Vorlík, Ph.D.	DAPP	Post-war architecture and extraordinary results of the cooperation between architects and structural engineers Significant, experimental design and innovative spatial solutions represent an unmissable phenomenon in Czech post-war architecture. Cooperation with experienced structural engineers brought not only advanced structural solutions and technologies, but also new attractive architectural forms. Key personalities include F. Lederer, G. Kuchař, Z. Patrman or J. Kozák. Nevertheless, the remarkable phenomenon of cooperation between architects and structural engineers has not yet received sufficient attention. The announced topic aims to fill this overlooked research gap.
Industrialists and industrial enterprises as patrons of architecture	15113	P/K	mgr Hubert Guzik, Ph.D.	DAPP	Apart from the activities of the Baťa Company and several Ostrava potentates, the history of architecture only occasionally dealt with the role that the owners of capitalist industrial enterprises and nationalized industrial enterprises played in the general architectural development of the Czech regions in the 20th century. The dissertation should, preferably based on a case study, contribute to the definition of the forms of architectural patronage in the Czech lands and Czechoslovakia. The advantage would be an interdisciplinary approach that combines factual knowledge and methodological approaches of both the history of architecture and general history. It is possible to shift the research topic according to the preferences of the applicant.
Postmodernism in Czechoslovak architecture: intentions, reality, memories	15113	P/K	PhDr. Benjami Fragner; prof. Ing. arch. Matúš Dulla, DrSc.; resp. prof. PhDr. Petr Kratochvíl, CSc.	DAPP	Postmodernism was an exciting new current in the 1980s. It offered a way out of the schemes of late socialist architecture. There were not many realized architectural works left. Today, research using the oral history method or research of documentation in private archives is still possible. The aim of the dissertation will be a theoretical analysis of this period, identification of architectural works, processing of archival materials, obtaining memories of the main characters, or preparation of an exhibition with a catalog.
History of Czech (Czechoslovak) Architecture of the 20th Century from the Perspective of Feminist Critiques	15113		Ing. arch. Mgr. Klára Brůhová, Ph.D.	DAPP	The traditional interpretation of architectural history focuses mainly on the stories of "great works of architecture" and "great personalities". The canon is based on the ideal of the architect as a genius and sole creator of his work. However, if we look at the historiography through the prism of feminist critiques, we can argue that this (and other) principles of canon formation are de facto (androcentric) constructs that reflect only a part of the spectrum of lived experiences of architects, preferring a certain modus operandi at the expense of others - and leaving certain works and personalities out of historical interpretation. The doctoral research will be based primarily on feminist critiques aiming to deconstructi the canonical narrative. It may take the form of monographic research on a specific personality (e.g. female architect), a phenomenon (in an adequate context), or it may be aimed at answering more theoretical questions about the topic. It should be linked to the field of Czech (Czechoslovak) architecture of the 20th century. The exact specification of the assignment will be made according to the preferences of the candidate.
Autonomous lighting in architecture and its influence on user comfort.	15115	P	prof.akad.arch. Vladimír soukenka	AKT	The current pandemic situation has changed the pace of society and forced the population to stay in their homes for a long time. This also changes the image of our housing and changes the ratio of individual factors of the useful qualities of this environment. The Institute of Interior expects significant changes in the area of housing quality requirements and wants to anticipate new trends through this research.
Benefits of integrative building design for their sustainable construction and operation using the BIM method.	15123	P/K	Ing. Aleš Marek, Ph.D.	AKT	Analysis, evaluation and recommendations for modification of study documents for integrated approach in architectural design of buildings using the BIM method with a focus on sustainable construction, including a comprehensive evaluation of buildings and their economic optimization within their life cycle.
Coordination methods of architecture / engineering design with building services by BIM method.	15123	P/K	Ing. Aleš Marek, Ph.D.	AKT	Analysis, evaluation and recommendations for modification of study documents for coordination of BIM method using collaborative / multidisciplinary design of buildings with a focus on sustainable way of construction and economic optimization of building costs in the life cycle.
	15123	P/K	Ing. arch. Jan Hlavín, Ph.D	AKT	Design and evaluation of variants of the architectural and construction solution of a specific apartment building in a selected location with regard to the energy balance of operation during the year. Influence of individual parameters - location of the building, shape, glazing, building envelope materials / etc. The achievable effect on heat losses / gains of the building will be monitored. The theoretical part of the work will deal with the methodology of energy performance assessment and recapitulation of experience with the design and implementation of energy efficient buildings - presentation of implemented buildings and comparison of technical solutions and achieved parameters.
The relationship between the architectural and structural design of the building and the energy requirements for its operation. A case study.	15123	P/K	Ing. arch. Jan Hlavín, Ph.D	AKT	Analysis of the material and technical solution of contact, sandwich and ventilated building envelopes for housing and services in relation to architectural and structural detail. The thermal - technical regime, fire safety and air permeability of the formation will be evaluated on the set of examples. The work will also include the behavior of connection joints of hole fillings and basic price relations in relation to the service life of the structure and maintenance requirements. Finally, there will be recommendations for the design of material and technical solutions of individual types of facades with regard to the parameters of the indoor and outdoor environment.

Timber architecture - limits and possibilities, the way to sustainability and efficient architecture	15123	P	Ing. arch. Marek Pavlas, Ph.D.	AKT	Legislative limits of maximum height of timber buildings in Czech republic are slowly getting less and less strict. However, this trend is not reflected in today's architecture. The idea that it is not possible to realize wooden buildings with more than two floors is still deeply rooted. Unfortunately, this idea runs across professionals who are involved in the entire building process - from the investor to the architects, civil engineers and authorities. Objectives and main points: To show real limits of wooden construction in the Czech Republic and abroad. To point out the importance and benefits of using wood for larger buildings in the areas of: Environment, Speed and efficiency of construction, possibilities of prefabrication, Saving of human resources, Construction accuracy, Link to the use of BIM tools. Documenting hypotheses based on examples of buildings realized abroad. The purpose of the work will be to contribute to a change in thinking about the possibilities and limits of wooden architecture.
Architectural design of elements of public space from high-strength material realized using 3D printing	15124	P/K	Ing. Lenka Prokopová, Ph.D. (Ing. Michaela Kostelecká, Ph.D. školitel specialista)	AKT	The dissertation is focused on designing various elements of public space from modern UHPC concrete. The elements will be designed so that tehy can be realized using 3D printing. This technologu, which pushes the bondaries, increases efficiency, accuracy and cost reduction. The task of this work is to analyze the individual elements of public space designed according to various historical design regulations in terms of today's requirements and to map at least approximmately their properties. Based on the shortcomings identfied, new compliant elements will be forther proposed. As part of the dissertation, there will be an actual production of a public space element on a 3D printer.
Variants of architectural design of repairs and sustainable management of historic buildings	15124	P/K	doc. Ing. Daniela Bošová, Ph.D. (Ing. Michaela Kostelecká, Ph.D. školitel specialista)	AKT	The dissertation is focused on the design of repairs and sustainability of historic buildings. From the point of view of monument care, the most important thing is to preserve the historical building of its original condition. However, restoration is often quite complicated. A fundamental problem of all repairs is the need to replace dilapidated structures, where old and new materials are joined. The task is to map and compare historic buildings and propose their repair and sustainability.
Architectural design of utility elements made from recycled textile waste	15124	P/K	doc. Ing. Daniela Bošová, Ph.D. (Ing. Michaela Kostelecká, Ph.D. školitel specialista)	AKT	Waste management is an area where the market is currently failing. The overall social need, which is already legislatively included in the requirements of Research and development for innovation within the EC and the Czech legislative framework, is a fundamental increase in recycling and ensuring the new use of raw materials in waste management, which seems to be a fundamental necessity for the future. The dissertation will focus on the design of both the mixture and the architectural design of utility elements made from recycled textile waste. The student will have the opportunity to participate in the solution of the planned grant project and will have the technical background to prepare the proposed mixture.
Current trends and theories of urbanism: New significant and successful European urban interventions	15119	P/K	doc. Ing. arch. Irena Fialová	UUP	What are the current trends and theories used in the design and implementation of successful large European urban projects? The research aims to find new significant and successful urban interventions that help significantly regenerate or revitalize the entire city. Document, analyze and present them both at the level of physical structure and typology, as well as at the level of motives and intentions of their origin, so that it is possible to compare, generalize and interpret them.
Walkable City: habitability, permeability and legibility of public space	15119	P/K	doc. Ing. arch. Irena Fialová	UUP	Pedestrian traffic has been neglected as a mode of transport since we began to adapt cities to mass motorization. Traffic congestion, pollution, urban fragmentation, obesity, safety and health risks are a consequence of this approach. Current trends in response to this unfortunate development - smart cities, active transport, micromobility, multimodal diversification of transport use, new pedestrian transport infrastructure - are technological solutions to these problems. Research can focus on understanding these incentives and infrastructure to create a Walkable City, but it can also address the fundamental human right to free movement through the city, housing, permeability and readability of public spaces.
City and Mobility: Development of the relation between transport and public space	15119	P/K	doc. Ing. arch. Irena Fialová	UUP	For more than 100 years, transport and especially car traffic have been a major factor influencing the layout of cities. It significantly and insensitively affected their structure and disrupted the habitability, permeability and legibility of public space. The research aims to map, name and understand the development of the approach and problems of urban public space in the vicinity of large transport structures based on a comparison of development and projects abroad and in the Czech Republic. A possible alternative to research is the research by design method with the participation of tutor-specialist to design solutions for selected localities affected by dominant transport, leading to the improvement of the quality of public space, to compare and evaluate them.
Development projects analysis	15119	P/ K	doc. Ing. arch. Radek Kolařík	UUP	Analysis, organization and categorization of projects implemented by the developer. Evaluation of the causes of the most applied procedures. Disclosure of alleged discrepancies between the public and development interests. Formulation of rules that should harmonize both interests for possible incorporation into general regulations.
The development of the urban structure of the capital city of Prague analysis	15119	P/ K	doc. Ing. arch. Radek Kolařík	UUP	Methodical analysis of the elaboration of the methods of development of Prague in the past twenty years. Setting in relevant socio-economic contexts, revealing causes and consequences. Comparison in European and global context. Basis for discussion within the modeling of hypotheses of the following development of Prague.
Public spaces in the Czech Republic until 1990 and after 1990	15119	P/ K	doc. Ing. arch. Radek Kolařík	UUP	Evaluation of the quality of public spaces built before 1990 and after 1990 on the basis of selected characteristic case studies. Finding parameters that have a verifiable impact on the quality of public spaces, the causes of their functionality and dysfunction. Relationships between the previous state and the state after regeneration, between the set parameters and the quality of the space.
Depicting the urban environment methods	15119	P/ K	doc. Ing. arch. Radek Kolařík	UUP	Examination of hitherto used methods of depicting a complex urban environment, evaluation of their ability to tell. Taking into account the customs in the international professional environment. Proposal for the creation of a widely valid and user-friendly graphic language.
Urban structure as a tool for urban resilience	15119	P	Ing. arch. Jana Zdráhalová, Ph.D.	UPP	Urban morphometric as a tool for assessing resilient urban tissues. Comparison of different parts of cities.
The transformation of public space after 1989	15119	P	Ing. arch. Jana Zdráhalová, Ph.D.	UPP	Analysis of governance, use and ownership of exterior places in comparison with the design of such places. The focus is on residential and office developments realised after 1989.
The organisation of the large transportation hubs and its urban neighbourhood	15119	P	Ing. arch. Jana Zdráhalová, Ph.D.	UUP	Large transport hubs are complex buildings that do not provide only transport services, but are gradually adding more facilities and opportunities to spend time. At the same time, they affect the environment of the surrounding city. The topic of the doctoral study offers the question of solving the internal arrangement of these buildings, main spaces and locations of commercial and relaxation places. The way people use individual places, the choice of places for appropriate activities, orientation in space. The surroundings of the city provide additional areas for transport hubs, such as shopping centers, restaurants, administration, parking, etc. Key words: ontology of space, use of space, orientation in space, user experience, possibilities of processing camera recordings, work with data.
Socio-economic aspects of spatial development.	15121	P	doc. Ing. arch. Jakub Vorel, Ph.D.	UUP	Subject of scientific research activity: analysis and experimental verification of economic instruments of spatial development as a possible supplement to standard administrative-regulatory instruments. Research will focus on one or more aspects of development: the management of the demand and / or supply side of territorial development, the regulatory and proactive role of the public sector, private-public cooperation and tools regulating the distribution of costs and benefits among actors. Remarks: possibility of involvement in research projects, especially the project "Valuation models of public goods for spatial planning" (TAČR ÉTA), publication of results and dissertation in English, the applicant should contact the supervisor at least one week before the deadline for submission of applications.

Sustainable development of suburbs	15121	P	Ing. arch. Veronika Šindlerová, Ph.D.	UUP	Subject of scientific research: research of current trends and tendencies of suburbanization in the Czech Republic, both in the metropolitan area of Prague, in the hinterland of large cities, as well as in peripheral regions in the Czech Republic. Focus on identifying and systematizing the characteristic problems and deficits of sustainable development of suburban localities, including tools and procedures for their elimination. Investigation and systematization of possible scenarios of future suburban development in the Czech Republic, including identification of key potentials for their sustainable development. Remarks: the applicant should contact the supervisor at least one week before the deadline for submission of applications and agree on details. Remarks: publication of results and dissertation in English, the applicant should contact the supervisor at least one week before the deadline for submission of the application and agree on details.
Pedestrian transport in territorial development planning	15121	P	Ing. arch. Veronika Šindlerová, Ph.D.	UUP	Subject of scientific research: research into gradual changes in the role and importance of pedestrian transport as part of the transport system and transport routes within cities and regions. Investigation of factors influencing and limiting the use of pedestrian transport in everyday and recreational transport work. Exploring trends and approaches in sustainable and safe pedestrian transport planning in cities and regions. Comments: the candidate should contact the trainer at least one week before the application deadline and agree on the details.Remarks: publication of results and dissertation in English, the applicant should contact the supervisor at least one week before the deadline for submission of the application and agree on details.
The agriculture landscape architecture in the framework of the climate and social changes	15120	P,K	Ing. Klára Salzmann, Ph.D.	KA	Challanges linked to the climate change and social responsibilities to landscape form the necessary perequisites in search for biodiversity and a new landscape policy. This policy involves landscape water management, landscape structure changes, definition of new farming facilities and functional integration of human settlements.
A new relationship between urban planning and urban nature: changes in the urban-landscape approach.	15120	P,K	Ing. Klára Salzmann, Ph.D.	KA	Typology of urban ecosystems from the perspective of landscape architecture. Assessing the potential of urban environment regarding biodiversity and ecosystem services. Possibilities of incorporating new approaches in urban planning.