FACULTY OF APPLIED SCIENCES
UNIVERSITY
OF WEST BOHEMIA

General topics of doctoral theses and the supervisors for doctoral study in academic year 2022/2023

May 2022

Study programme: **Computer Science and Engineering**

N	Topic	Supervisor
A1	Software process analysis and modeling	Doc. Ing. Přemysl Brada, MSc., Ph.D.
A2	Effective model-based verification of modular software	Doc. Ing. Přemysl Brada, MSc., Ph.D.
A3	Architectures for adaptive space software with safety requirements	Doc. Ing. Přemysl Brada, MSc., Ph.D. *Consultant Specialist:* Doc. Ing. Jiří Masopust, CSc.
A4	Advanced information retrieval methods for image data	Doc. Ing. Dalibor Fiala, Ph.D.
A6	Text summarization and its use in the multilingual web environment	Prof. Ing. Karel Ježek, CSc.
A7	Metrics and methods for texts content comparison	Prof. Ing. Karel Ježek, CSc.
A8	Educational data mining	Prof. Ing. Karel Ježek, CSc. *Consultant Specialist:* Doc. RNDr. Mikuláš Gangur, Ph.D.
A9	Multi-model database management	Doc. Dr. Ing. Jana Klečková
A10	Data pump process optimization (big data, stream data)	Doc. Dr. Ing. Jana Klečková
A11	Surface reconstruction with constraints	Doc. Ing. Josef Kohout, Ph.D.
A12	Symmetry detection in geometric models	Prof. Dr. Ing. Ivana Kolingerová
A13	Processing of big data from terrain reliefs	Prof. Dr. Ing. Ivana Kolingerová
A14	Computation and use of neighbourhood graphs for geometric models	Prof. Dr. Ing. Ivana Kolingerová
A15	Development and application of computational models applicable to the diabetes treatment	Doc. Ing. Tomáš Koutný, Ph.D.
A16	Software architecture for a continuous glucose monitoring and regulation system	Doc. Ing. Tomáš Koutný, Ph.D.
A17	Distributed environment for computationally-intensive tasks	Doc. Ing. Tomáš Koutný, Ph.D.
A18	Heterogeneous environment for autonomous tasks	Doc. Ing. Tomáš Koutný, Ph.D.
A19	Historical document analysis	Doc. Ing. Pavel Král, Ph.D
A20	Multi-lingual natural language processing	Doc. Ing. Pavel Král, Ph.D.
A21	Neural networks for automatic natural language processing	Doc. Ing. Pavel Král, Ph.D.
A22	Image processing using neural networks	Doc. Ing. Pavel Král, Ph.D.
A23	Multi-modal methods for automatic natural language processing	Doc. Ing. Pavel Král, Ph.D.
A24	Optimization of new generations communication, broadcasting and IoT networks	Doc. Ing. Jiří Masopust, CSc.
A25	Communication and control technologies for small satellites	Doc. Ing. Jiří Masopust, CSc.
A26	Analysis and processing of heterogenous medical data	Prof. Ing. Václav Matoušek, CSc
A27	Effective system for meaning extraction from spontaneous speech recordings	Prof. Ing. Václav Matoušek, CSc
A28	Natural language processing and ontological knowledge management	Prof. Ing. Václav Matoušek, CSc.
A29	Analysis and processing of electrophysiological data	Doc. Ing. Roman Mouček, Ph.D.
A30	AI-based numerical synthesis of bioelectrical time signals with high accuracy	Doc. Ing. Roman Mouček, Ph.D. *Consultant Specialist* Ing. Kamil Ekštein, Ph.D.
A31	Methods for information visualization	Prof. |Ing. Václav Skala, CSc.
A32	Vector field approximation methods	Prof. |Ing. Václav Skala, CSc.
A33	Visualization methods for large multidimensional and t-varying data	Prof. Ing. Václav Skala, CSc.
A34	Visualization methods for technical and medical data	Prof. Ing. Václav Skala, CSc.
A35	Interpolation and approximation methods for large data	Prof. Ing. Václav Skala, CSc.
A36	Cross-lingual text clustering	Doc. Ing. Josef Steinberger, Ph.D.
A37	Multilingual text summarization	Doc. Ing. Josef Steinberger, Ph.D.
A38	Language-independent sentence meaning representation	Doc. Ing. Josef Steinberger, Ph.D.
A39	Representation, analysis and processing methods for time-varying surfaces with changing topology	Doc. Ing. Libor Váša, Ph.D.
A40	Neural networks for natural language processing	Doc. Ing. Roman Mouček, Ph.D. *Consultant Specialist* Ing. Miloslav Konopík, Ph.D.
A41	Using artificial intelligence to identify a complex medical models	Doc. Ing. Tomáš Koutný, Ph.D.

Study programme: **Cybernetics**

N.	Topic	Supervisor
A1	Retrofit control in power systems	Prof.Ing.Miloš Schlegel, CSc.
A2	Active damping of vibration	Prof.Ing.Miloš Schlegel, CSc.
A3	Robust modal control of LTI systems	Prof.Ing.Miloš Schlegel, CSc.
A4	Model predictive control with constraints	Prof.Ing.Miloš Schlegel, CSc.
A5	Motion control systems	Prof.Ing.Miloš Schlegel, CSc.
A6	Speech Recognition and Understanding	Prof.Ing.Josef Psutka, CSc. Prof..Ing.Luděk Műller, Ph.D.
A7	Technical Diagnostics	Prof.Ing.Josef Psutka, CSc. Prof..Ing.Luděk Műller, Ph.D.
A8	Voice Dialog Systems with speech synthesis, recognition, and understanding	Prof.Ing.Josef Psutka, CSc. Prof..Ing.Luděk Műller, Ph.D.
A9	Audiovisual Speech Recognition	Prof..Ing.Luděk Műller, Ph.D.
A10	Speech Signal Processing and Recognition	Doc.Ing.Dr.Vlasta Radová
A11	State estimation of nonlinear or non-Gaussion stochastic systems	Doc.Ing.Ondřej Straka, Ph.D.
A12	Information fusion	Doc.Ing.Ondřej Straka, Ph.D.
A13	Intelligent adaptive systems	Doc.Ing.Ondřej Straka, Ph.D.
A14	Computer Speech Synthesis	Doc.Ing.Jindřich Matoušek,Ph.D
A15	Multimodal processing of speech and sign language	Doc.Ing.Miloš Železný,Ph.D.
A16	Computer vision for medical and technical diagnostics	Doc.Ing.Miloš Železný,Ph.D.
A17	Motion analysis and 3D scanning	Doc.Ing.Miloš Železný,Ph.D.
A18	Machine processing of speech and language data	Doc.Ing.Pavel Ircing, Ph.D.
A19	Methods of complex engineered systems with applications in energy and biological technologies	Doc.M.Sc.et M.Sc.Daniel Georgiev,Ph.D.
A20	Applied design theory for complex systems	Doc.M.Sc.et M.Sc.Daniel Georgiev,Ph.D.
A21	Biotechnologies for synthetic biology	Doc.M.Sc.et M.Sc.Daniel Georgiev,Ph.D.
A22	Navigation Systems	Doc.Ing.Jindřich Duník, Ph.D.
A23	Identification and Estimation Methods	Doc.Ing.Jindřich Duník, Ph.D.

Study programme: **Geomatics** *Study field*: **Geomatics**

No.	Topic	Supervisor
A1	Application of potential theory for description of the Earth's gravity field	RNDr. Ing. Petr Holota, DrSc. prof. Ing. Pavel Novák, PhD.
A2	Determination of a precise local gravity field model for height transformation in the Czech Republic	prof. Ing. Pavel Novák, PhD.
A3	Determination of temporal variations of the Earth's gravity field from in-situ gravity data and global gravitational models	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Vojtech Pálinkáš, PhD.)
A4	Forward modelling in geodesy	prof. Ing. Pavel Novák, PhD.
A5	GNSS in the process of creation, management and maintenance of cadastral records	doc. Ing. Václav Čada, CSc. Prof. Ing. Jan Kostelecký, DrSc.
A6	Gravity field mapping through combination of heterogeneous gravity field data	RNDr. Ing. Petr Holota, DrSc. prof. Ing. Pavel Novák, PhD.
A7	Information systems of public administration in information society	doc. Ing. Václav Čada, CSc.
A8	Troposphere models for GNSS precise positioning	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Jan Douša, Ph.D.)
A9	Ionosphere modelling for GNSS analyses	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Jan Douša, Ph.D.)
A10	Site environment effects monitored by GNSS	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Jan Douša, Ph.D.)
A11	GNSS data analysis for troposphere monitoring	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Jan Douša, Ph.D.)
A12	Development of multi-GNSS data analysis and products	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Jan Douša, Ph.D.)
A13	Advanced methods of real-time precise point positioning	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Jan Douša, Ph.D.)
A14	Parametrization of the Earth's gravity field based on the combination of heterogeneous gravimetric and gradiometric data	RNDr. Ing. Petr Holota, DrSc. prof. Ing. Pavel Novák, PhD.
A15	Variational methods for solving problems of potential theory in physical geodesy	RNDr. Ing. Petr Holota, DrSc.
A16	Using strain analysis for analysis of deformation of the Earth's surface	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Milan Talich, Ph.D.)
A17	Using ground based radar interferometry for deformation and stability monitoring of constructions	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Milan Talich, Ph.D.)
A18	Methods for georeferencing old cartographic works by elastic transformations	prof. Ing. Pavel Novák, PhD. (konzultant specialista: Ing. Milan Talich, Ph.D.)
A19	Optimization of geometric models for GIS	prof. Dr. Ing. Ivana Kolingerová
A20	Compression of 3D geodata	doc. Ing. Libor Váša, Ph.D.
A21	Computer Science Technologies and Methods in Geomatics	doc. Ing. Libor Váša, Ph.D.
A22	Spatial data modelling for the information society	doc. Ing. Karel Janečka, Ph.D.
A23	Geomatic perspectives of transport planning including smart mobility	doc. Ing. Mgr. Otakar Čerba, Ph.D.
A24	Modelling of gravitational fields generated by planetary bodies	doc. Ing. Michal Šprlák, PhD.

Study programme: **Mathematics**

	Topíc	Supervisor

A1	Nonlinear boundary value problems for differential and difference equations	Prof. RNDr. Pavel Drábek , DrSc. Doc. RNDr. Jiří Benedikt, Ph.D. Doc. Ing. Petr Girg, Ph.D. Doc. Ing. Gabriela Holubová , Ph.D. Doc. RNDr. Petr Stehlík, Ph.D. Prof. RNDr. Milan Kučera, DrSc.
A2	Mathematical models of theoretical ecology	Doc. RNDr. Petr Stehlík, Ph.D.
A3	Variational inequalities	Prof. RNDr. Milan Kučera, DrSc.
A4	Advanced symbo lic-numerical computations in geometry and geometrie modelling	Doc. Ing. Bohumír Bastl, Ph.D. Doc. RNDr. Miroslav Lávička, Ph.D.
A5	Numerical models, methods and algorithms: design and analysis	Doc. Ing. Marek Brandner, Ph.D. Doc. Ing. Josef Daněk, Ph.D.
A6	Structural graph theory	Doc. Ing. Roman Čada, Ph.D. Doc.RNDr. Přemysl Holub, Ph.D. Prof. RNDr. Tomáš Kaiser , DSc. Prof. RNDr. Zdeněk Ryjáček, DrSc.
A7	Algorithms for hard problems in combinatorial optimization	Doc. Ing. Roman Čada, Ph.D.
A8	Mathematical Models of Fluid Dynamics	Prof. RNDr Eduard Feireisl, DrSc. RNDr. Šárka Nečasová, CSc.,DSc.

Study programme: **Plasma Physics and Physics of Thin Films**

N.	**Topic**	**Supervisor**
A1	Thermochromic coatings prepared using reactive pulsed plasma	Prof. RNDr. Jaroslav Vlček, CSc.
A2	Magnetron sputtering of multielement thin-film materials	Prof. Ing. Petr Zeman, Ph.D.
A3	Non-contact characterization of photo-thermal properties of material surfaces	Prof. Ing. Milan Honner, Ph.D.
A4	Studies of electronic properties and photoemission response of topological 2D materials	Prof. Dr. Ing. Ján Minár
A5	Preparation and characterization of nanostructured oxide films	Doc. Ing. Pavel Baroch, Ph.D.
A6	Preparation and characterization of sensorial and photocatalytic thin film materials	Doc. Ing. Jiří Čapek, Ph.D.
A7	Design of thin-film materials and pathways for their preparation by atomic-scale simulations	Doc. Ing. Jiří Houška, Ph.D.