Warsaw University of Technology

COURSE OFFERED IN THE DOCTORAL SCHOOL

Code of the course	4606-ES-00000CF-0217	Name of the course	Polish	**Jakość informacji w systemach teleinformatycznych**	
			English	**Information Quality in ICT Systems**	
Type of the course	specialized				
Course coordinator	Dr hab. inż. Marek Stawowy		Course teacher	Dr hab. inż. Marek Stawowy	
Implementing unit	Faculty of Transport	Scientific discipline / disciplines*	Information and Communication Technology / Civil Engineering, Geodesy and Transport		
Level of education	Doctoral studies	Semester	Winter		
Language of the course	English				
Type of assessment	Hybrid assessment (test and student's work assessment)	Number of hours in a semester	45	ECTS credits	4
Minimum number of participants	10	Maximum number of participants	12	Available for students (BSc, MSc)	~~Yes/~~No

Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week	1	1		1	
	in a semester	15	15		15	

* does not apply to the Researcher's Workshop

1. Prerequisites

Systems modeling, the basis of information theory, a programming course

2. Course objectives

The course aims to familiarize candidates with the modern approach to assessing the quality of information, in particular in ICT systems. Information quality assessment is the basis for the overall assessment of any information-based systems.

3. Course content (separate for each type of classes)

Lecture

Historical outline of quality assessment. Essential Information Quality (IQ) information. International Organization for Standardization (ISO) standards for IQ and IQ assessment. Multilayer model of IQ - dimensions & features. Fundamental relationships between IQ and other parameters of ICT systems. Ways of estimating IQ. Uncertainty modelling for IQ assessment. Fuzzy logic, certainty factor (CF) of hypothesis, mathematical evidence theory, and rough sets as uncertainty ways for IQ calculation. ICT systems models for IQ assessment. General qualitative-IT model.

Auditory classes

Presentations prepared by students about quality dimensions and ways of assessing IQ. Sixteen quality dimensions and an attempt to determine their characteristics will be discussed. It will be describe the relationship between dimension features and IQ dimensions.

Laboratory

It will be five experiments with IQ assessment. Four exercises will be about calculation-independent objects with CF of hypothesis, mathematical theory of evidence, rough sets, and fuzzy rough sets (the coordinator's author's method). The last exercise will be about dependent objects IQ assessment.

4. Learning outcomes

Type of learning outcomes	Learning outcomes description	Reference to the learning outcomes of the WUT DS	Learning outcomes verification methods*
Knowledge			
K01	Has theoretical knowledge of methods for assessing the quality of information for ICT systems.	SD_W2	Two or three task/question on the test. Over 50% proper answer gives positive assessment.
K02	Knows the latest method of assessing the quality of information.	SD_W2	Two or three task/question on the test. Over 50% proper answer gives positive assessment.
K03	He knows the main development trends and the methodology used to assess IQ in ICT systems	SD_W3	Two or three task/question on the test. Over 50% proper answer gives positive assessment.
Skills			
S01	He can observe experiments and draw conclusions based on these observations. Can assess the usefulness of the experiments performed.	SD_U2	Individual assessment of lab class reports. Over 50% of earned points give a positive evaluation.
S02	Can discuss specialized issues related to IQ assessment within technical international research groups.	SD_U4	Individual assessment of presented problems and discussion. Over 50% of earned points give a positive evaluation.
Social competences			
SC01			

*Allowed learning outcomes verification methods: exam; oral exam; written test; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests

5. Assessment criteria

Average: test grades, student presentation assessment, lab class work & reports assessment.

6. Literature

Primary references:

[1] International Organization for Standardization ISO/IEC 8000-8. Information and Data Quality: Concepts and measuring.

[2] Stawowy, M. Method of Multilayer Modeling of Uncertainty in Estimating the Information Quality of ICT Systems in Transport; Publishing House Warsaw University of Technology: Warsaw, Poland, 2019 (published in polish – will be translated).

[3] Fisher C., Lauria E., Chengalur-Smith S., Wang R., (2011) Introduction to Information Quality. Bloomington: Authorhouse.

[4] Pawlak Z., (1981), Rough Sets. Research Report PAS, nr 431. Warsaw: Institute of Computer Science, Polish Academy of Sciences.

Secondary references:

[1] Massachusetts Institute of Technology Information Quality (MITIQ) Program. https://mitiq.mit.edu.

[2] International Organization for Standardization ISO/IEC 2382-28 2121272, 2121271 & 2123204.

[3] Heckerman D., (1992), The Certainty-Factor Model. W: (red.) S. Shapiro, Encyclopedia of Artificial Intelligence, Second Edition, s .131-138. New York: Wiley.

[4] Pawlak, Z. Rough Sets—A New Mathematical Method of Data Analysis; Institute of Computer Science, Polish Academy of Sci-ences: Warsaw, Poland, 1995.

[5] Stawowy M., Duer S., Perlicki K., Mrozek T., Harničárová M. Supporting Information Quality Management in Information and Communications Technology Systems with Uncertainty Modelling, Energies, vol. 16, nr 6, 2023, 2531, s. 1-18, DOI:10.3390/en16062531

[6] Stawowy M., Duer S., Paś J., Wawrzyński W. Determining Information Quality in ICT Systems, Energies, vol. 14, nr 17, 2021, s. 5549, DOI:10.3390/en14175549

[7] Stawowy M., Olchowik W., Rosiński A., Dąbrowski T. The Analysis and Modelling of the Quality of Information Acquired from Weather Station Sensors, Remote Sensing, vol. 13, nr 4, 2021, s. 1-18, DOI:10.3390/rs13040693

7. PhD student's workload necessary to achieve the learning outcomes**		
No.	Description	Number of hours
1	Hours of scheduled instruction given by the academic teacher in the classroom	45
2	Hours of consultations with the academic teacher, exams, tests, etc.	10
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	25
4	Amount of time devoted to the preparation for exams, test, assessments	30
	Total number of hours	**110**
	ECTS credits	**4**

** 1 ECTS = 25-30 hours of the PhD students work (2 ECTS = 60 hours; 4 ECTS = 110 hours, etc.)

8. Additional information	
Number of ECTS credits for classes requiring direct participation of academic teachers	2
Number of ECTS credits earned by a student in a practical course	2.5