



## Subject card

Subject name and code	Selected Topics in Information Visualization, PG_00047870						
Field of study	Informatics						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	4	Language of instruction			Polish		
Semester of study	7	ECTS credits			8.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Metrology and Optoelectronics -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Adam Mazikowski					
	Teachers	dr inż. Adam Mazikowski dr inż. Katarzyna Karpienko					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		8.0		162.0	200
Subject objectives	The purpose of the course is to familiarize students with the basic physical phenomena and technology used in systems of visualization information. Classification of displays and a set of parameters of qualitative and quantitative describing of displays are introduced. To familiarize students with the basic methods of display metrology displays some of them are introduced and practiced. This will allow students to gain the skills to use the measurement equipment.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	uses advanced software to model display characteristics	[SW1] Assessment of factual knowledge
	[K6_W42] Knows and understands, to an advanced extent, architecture, design principles and methods of hardware and software support for local and distributed information systems, including computing systems, databases, computer networks and information applications, as well as the principles of human cooperation with computers and computer-aided teamwork	uses advanced software to model display characteristics	[SW1] Assessment of factual knowledge
	[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions	measure selected display characteristics and interpret the results correctly	[SU1] Assessment of task fulfilment
	[K6_U02] can perform tasks related to the field of study in an innovative way as well as solve complex and nontypical problems, applying knowledge of physics, in changing and not fully predictable conditions	determines the characteristics of information visualization systems, selects information visualization modules to suit the user's requirements	[SU1] Assessment of task fulfilment
[K6_W01] Knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	knows methods of calculating colorimetric coordinates in different color spaces	[SW1] Assessment of factual knowledge	
Subject contents	1. Information Visualisation Systems; Elements, Functions, Properties 2. Displays; Classification, Characteristics, Properties 3. Human Visual System; Photopic, Scotopic Vision, Color Sensation, Colorimetry 4. Colorimetric Systems 5. Photometric and Colorimetric Characteristics of Displays 6. Liquid Crystals; Classification, Mechanical, Optical, Electrical Parameters 7. Electro-optical Phenomena in LC 8. Liquid Crystal Cell Construction 9. Operation of TN 10. Operation of ECB, VAN 11. Operation of PDLC, Guest-Host 12. Operation of STN, DSTN 13. LCD- ferroelectric, antiferroelectric 14. LCD Construction, transmissive, reflective, transfective Modes 15. Optimization of Color LCD 16. Passive Displays static and MUX (multiplexed) Driving 17. Active Matrix TFT LCD - general Considerations 18. Displays AM TFT LCD - addressing, performances, technology 19. LCD Backlights 20. Displays VFD, EL/LED, OLED- Construction, Properties, Applications 21. PDP 22. CRT, FED 23. DMD- DLP 24. Projection Displays, picoprojectors 25. Displays 3D (projection, FPD-3D) 26. Mikro-displays, SLM, Night Vision Systems 27. Jumbo Displays, Digital Cinema 28. Special Displays: HUD, VR, AR, Touch-screen 29. Future Trends of the Information Visualisation 30. Examination		
Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Execution of the all laboratory exercises	50.0%	40.0%
	Exams	50.0%	60.0%
Recommended reading	Basic literature	E. Lueder: Liquid Crystal Displays, Wiley 2001	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczenie: Problemy wizualizacji informacji -2023_2024 - Moodle ID: 32175 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=32175">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=32175</a>	

Example issues/ example questions/ tasks being completed	Basic properties of Human Visual System  Principle of operation of TN Cell  Comparison of properties of LCD and PDP displays  Colorimetric system CIE 1931 Yxy: advantages and limitations
Work placement	Not applicable