

KARTA OPISU MODUŁU KSZTAŁCENIA		
Nazwa modułu/przedmiotu Data Transmission in Digital Subscriber Loops		Kod 1010802121010812899
Kierunek studiów Electronics and Telecommunications	Profil kształcenia (ogólnoakademicki, praktyczny) ogólnoakademicki	Rok / Semestr 1 / 2
Ścieżka obieralności/specjalność Information and Communication	Przedmiot oferowany w języku: polski	Kurs (obligatoryjny/obieralny) obieralny
Stopień studiów: II stopień	Forma studiów (stacjonarna/niestacjonarna) stacjonarna	
Godziny Wykłady: 2 Ćwiczenia: - Laboratoria: 2 Projekty/seminaria: -		Liczba punktów 5
Status przedmiotu w programie studiów (podstawowy, kierunkowy, inny) kierunkowy		(ogólnouczelniany, z innego kierunku) z danego kierunku
Obszar(y) kształcenia i dziedzina(y) nauki i sztuki nauki techniczne nauki techniczne		Podział ECTS (liczba i %) 5 100% 5 100%
Odpowiedzialny za przedmiot / wykładowca:		
prof. dr hab. inż. Krzysztof Wesołowski email: wesolows@et.put.poznan.pl tel. 0616653812 Faculty of Electronics and Telecommunications ul. Piotrowo 3A 60-965 Poznań		prof. dr hab. inż. Krzysztof Wesołowski email: wesolows@et.put.poznan.pl tel. 0616653812 Faculty of Electronics and Telecommunications ul. Piotrowo 3A 60-965 Poznań
Wymagania wstępne w zakresie wiedzy, umiejętności, kompetencji społecznych:		
1	Wiedza:	Knows the principle of operation of digital transmission systems, including baseband transmission, digital modulations, signal transmission in channels, signal reception, forming the spectral properties of signals, countering channel distortions [K1_W15] Has a detailed, systematic knowledge, together with necessary mathematical background, of the fundamentals of the telecommunication theory, which is necessary to understand, analyze and evaluate the operation of analogue and digital telecommunications systems. [K1_W17] Knows about development trends in electronics and telecommunication. [K1_W24]
2	Umiejętności:	Is able to determine basic parameters and properties of signals and telecommunication systems, under predefined constraints. [K1_U15] Is able to evaluate the parameters describing digital signals transmission quality in various communication channels. Is able to match digital signal reception methods to transmission parameters and distortions introduced by the channel. [K1_U19]
3	Kompetencje społeczne	Is aware of the main challenges facing electronics and telecommunication in the 21st century. Is aware of the impact electronics and ICT systems and networks will have on the development of the information society. [K1_K04]
Cel przedmiotu:		
Learning methods and standards of digital transmission in fixed links, especially technologie of wireline access to fixed networks.		
Efekty kształcenia i odniesienie do kierunkowych efektów kształcenia		
Wiedza:		
1. Has a systematic, detailed knowledge, together with necessary mathematical background, of advanced methods of digital signal processing in transmission systems used in fixed networks. - [K2_W09] 2. Has a wide, systematic knowledge, with necessary mathematical background, of ICT networks and signal transmission methods used in fixed access systems. - [K2_W13] 3. Has a systematic knowledge, together with necessary theoretical background, of optoelectronics and fiber optics technology; understands the operation of advanced fiber optic telecommunication systems used in FTTH systems. - [K2_W08]		
Umiejętności:		
1. Knows the rules of operation of Polish and international standardization bodies in the area of access systems and networks - [K2_W08] 2. Is able to design, construct, program and test complex, technologically advanced electronic circuits and systems, especially for needs of devices and systems operating for fixed access to communication networks - [K2_U15]		

Kompetencje społeczne:
1. Understands the legal framework of Polish and international standards in wireline access systems to fixed networks - [K2_K03]
2. Demonstrates responsibility for designed wireline access systems. Is aware of the hazards they pose for individuals and communities if they are improperly designed or produced. - [K2_K06]

Sposoby sprawdzenia efektów kształcenia
Examination from the contents of the course, reports on the performed lab experiments, credits from the exercise classes

Treści programowe
Recalling the rules of baseband and passband digital transmission, including multitone transmission. Symmetric transmission links. Wireline subscriber loops. Duplex transmission methods (TDD, FDD, EC - Echo cancellation). Operation of echo canceller. Digital transmission in a subscriber loop: basic access ISDN, HDSL loop, ADSL and VDSL technologies and their variations. Information on FTTH technology - subscriber loop based on optical fiber technology

Literatura podstawowa:
1. W. Y. Chen, DSL Simulation Techniques and Standards. Development for Digital Subscriber Line Systems, Macmillan, 1998

Literatura uzupełniająca:
1. J. Griffiths, ISDN Explained, Wiley, Chichester, 1990

Bilans nakładu pracy przeciętnego studenta

Czynność	Czas (godz.)
1. Participation in lectures	30
2. Participation in laboratory exercises	30
3. Studies of ETSI standards on ADSL and VDSL	15
4. Preparation to problem exercises	15
5. Preparation to the examination	20
6. Preparation to credits in exercises	10
7. Participation in examination	2
8. Consulting with teachers	3

Obciążenie pracą studenta

forma aktywności	godzin	ECTS
Łączny nakład pracy	125	5
Zajęcia wymagające bezpośredniego kontaktu z nauczycielem	65	3
Zajęcia o charakterze praktycznym	60	2