

### COURSE DESCRIPTION CARD

Bialystok University of Technology									
Field of study	Electronics and Telecommunications						Degree level and programme type	Master's degree, full-time	
Specialization/ diploma path	Electronic Devices and Telecommunications						Study profile	General-academic	
Course name	Diploma seminar						Course code	TS2E300020	
							Course type	Obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
							30	No. of ECTS credits	2
Entry requirements	-								
Course objectives	Preparation of students for the effective elaboration of Master's thesis in aspects: substantive, editorial and legal								
Course content	<p>Choosing a thesis topic, planning the research scope and selection of the diploma promoter. A literature review, selection of basic and complementary sources, citation techniques and development of the thesis outline. The most important monograph components: introduction, source analysis, own contribution, powerful conclusion and attachments. Work schedule, systematic action and organization of long-term intellectual effort. The requirements of the academic diplomacy process. Proofreading and review of the thesis, printout of the monographs and registration it in the information system, preparation for defending the Master's thesis.</p> <p>Selected aspects of intellectual property protection. Non-ethical conduct in research and publications: plagiarism, ghost writing and guest authorship, conflict of interests, reproduction of research and production of scientific spam.</p> <p>Selected issues of presentation techniques: pronunciation and intonation, preparation of slides, visual elements and text fonts, start of presentations, thematic transitions, results and summary.</p>								
Teaching methods	Information seminar, presentation of work progress								
Assessment method	Seminar final (written) test, evaluation of presentations								
Symbol of learning outcome	Learning outcomes						Reference to the learning outcomes for the field of study		
LO1	The student obtains information from literature, data bases and other sources; can integrate the information and, performs its critical evaluation.						ET2_U01, ET_U05, ET2_U06		

LO2	The student is planning a research process individually, working systematically and according on the schedule.	ET2_U02	
LO3	The student elaborates a detailed documentation from project or research task and he/she prepares a paper containing a discussion of the results.	ET2_U03, ET2_K03	
LO4	The student prepares and performs oral presentation concerning his/her thesis and is able to carry out a discussion related to this presentation.	ET2_U04	
LO5	During the preparation of the diploma thesis, the student behaves ethically and lawfully.	ET2_W09, ET2U06, ET2_K02	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	evaluation of presentations	S	
LO2	evaluation of presentations	S	
LO3	a written test, evaluation of presentations	S	
LO4	evaluation of presentations	S	
LO5	written test	S	
Student workload (in hours)		No. of hours	
Calculation	Seminar attendance	30	
	Participation in the student-teacher sessions	5	
	Preparation to the final test and presentation	15	
	TOTAL:	50	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		35	1.4
Student workload – practical activities		50	2
Basic references	1.Turabian K.L.: A manual for writers of research papers, theses, and dissertations : Chicago Style for students and researchers, Chicago ; London, The University of Chicago Press, 2017 2.Żółtowski B., Żółtowski M.: Poradnik kreatywnego twórcy : seminarium dyplomowe, prace dyplomowe;Bydgoszcz, Wydaw. UT-P, 2016 3.Kozłowski R.:Praktyczny sposób pisania prac dyplomowych : z wykorzystaniem programu komputerowego i Internetu, Warszawa, Oficyna a Wolters Kluwer business, 2009 4.Wojciechowska R.:Przewodnik metodyczny pisania pracy dyplomowej, Warszawa, Difin, 2010 5.Zenderowski R.: Praca magisterska, licencjat : krótki przewodnik po metodologii pisania i obrony pracy dyplomowe; Warszawa, CeDeWu, 2011		

<b>Supplementary references</b>	<p>1. Wallwork A.: User Guides, Manuals, and Technical Writing - A Guide to Professional English, Springer, New York, <a href="http://www.springer.com/series/13345">http://www.springer.com/series/13345</a>, 2014</p> <p>2. Wallwork A.: English for Presentations at International Conferences, Springer, New York, <a href="http://www.springer.com">http://www.springer.com</a>, 2010</p> <p>3. Gambarelli G., Łucki Z.: Praca dyplomowa i doktorska : zdobycie promotora, pisanie na komputerze, opracowanie redakcyjne, prezentowanie, publikowanie; Warszawa, CeDeWu, 2017</p>	
<b>Organisational unit conducting the course</b>	Department of Control Engineering and Electronics	<b>Date of issuing the programme</b>
<b>Author of the programme</b>	Marian Gilewski, PhD Eng	23.04.2019

### COURSE DESCRIPTION CARD

Bialystok University of Technology										
Field of study	Electronics and Telecommunications							Degree level and programme type	Master's degree, full-time	
Specialization/ diploma path	Electronic Devices and Telecommunications							Study profile	General-academic	
Course name	Master thesis							Course code	TS2E300021	
								Course type	Elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3	
								No. of ECTS credits	15	
Entry requirements	-									
Course objectives	<p>To familiarize with the methodology of solving research problems and complex issues in the field of electronics engineering. Deepening skills of proper selection and use of literature sources and the use of information in the scientific and technical databases. Training a literature materials analysis skills to identify new aspects to solve the problem posed in the thesis. Acquiring the ability to formulate a research problem, or technical and the selection of methodologies and tools to solve the problem (including computational tools/software). Strengthening the skills of planning and scheduling the implementation of the research or engineering task. Acquiring the ability to determine the proper plan and structure of the thesis as a report on the implementation of the research task or a complex engineering problem documentation. Deepening the skills of analyzing the results of research and experimentation and preparation of documentation for complex engineering problem. Consolidation of the skills of project assumptions or research hypothesis verification, drawing conclusions, critical analysis and evaluation of the results.</p>									
Course content	<p>Specialized knowledge and skills related to the subject of the thesis - obtaining information from literature sources. Formulation of technical problems or research hypotheses based on the assessment of the current state of knowledge in the area corresponding to a thesis. Knowing development trends in selected a research area that allows the formulation of a new solution of technical issue. The use of interdisciplinary knowledge to improve existing solutions to of selected scientific and technical problems. Planning and realization of complex engineering or research task. The use of advanced tools and computer techniques to the implementation of a technical problem or to support research. Verification of the solution of research task or complex engineering problem using the methods and tools of theoretical and experimental analysis. Methodology of the research task solutions analysis and drawing conclusions. Development of results and documentation of completed tasks.</p>									
Teaching methods	Evaluation of the work by the supervisor and reviewer and thesis defense									
Assessment method	Presentation of the issues considered in the thesis and discussion on its results									
Symbol of learning	Learning outcomes							Reference to the learning outcomes for		

outcome		the field of study	
LO1	The student obtains knowledge from literature sources (including publications gathered in scientific databases), and evaluates its usefulness to solve chosen technical problem.	ET2_U04	
LO2	The student individually plans the solution of research problem, specifying its manner and duration.	ET2_K01	
LO3	The student develops methodology of research, carries out research, prepares elaboration containing research documentation and verification of the results.	ET2_U03	
LO4	The student has the ability to raise qualifications required to introduce new elements to the solution presented in the thesis.	ET2_U11, ET2_U14	
LO5	The students understands his role in society and the need to promote the achievements in the field of technical sciences.	ET2_K02, ET2_K03	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	positive evaluation of the thesis and the positive result of defense		
LO2	positive evaluation of the thesis and the positive result of defense		
LO3	positive evaluation of the thesis and the positive result of defense		
LO4	positive evaluation of the thesis and the positive result of defense		
LO5	positive evaluation of the thesis and the positive result of defense		
Student workload (in hours)		No. of hours	
Calculation	Realization of the master thesis	360	
	Preparation to the presentations	15	
	Participation in the student-teacher sessions	24	
	Attending a master's exam	1	
	TOTAL:	400	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		25	1
Student workload – practical activities		375	15
Basic references	<ol style="list-style-type: none"> <li>Boć J.: Jak pisać pracę magisterską, Kolonia, Wrocław 2001.</li> <li>Lindsay D.: Dobre rady dla piszących teksty naukowe, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 1995.</li> <li>Specialist literature - individual related to the topic of the master thesis.</li> </ol>		
Supplementary references	<ol style="list-style-type: none"> <li>Pawluk K.: Jak pisać teksty techniczne poprawnie. Wydawnictwo SIGMA NOT, Warszawa, Wiadomości Elektrotechniczne, Rok LXIX, nr 12, 2001.</li> <li>Kolman R.: Zdobywanie wiedzy. Poradnik podnoszenia kwalifikacji (magisteria, doktoraty, habilitacje), Oficyna Wydawnicza Branta, Bydgoszcz-Gdańsk 2003.</li> </ol>		

<b>Organisational unit conducting the course</b>	<b>Department of Electrical Power Engineering, Photonics and Lighting Technology</b>	<b>Date of issuing the programme</b>
<b>Author of the programme</b>	<b>Urszula Błaszczak, PhD Eng</b>	<b>23.04.2019</b>

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

S – seminar

## COURSE DESCRIPTION CARD

Bialystok University of Technology										
Field of study	Electronics and Telecommunications							Degree level and programme type	Master's degree Full time	
Specialization/ diploma path	Electronic Devices and Telecommunications							Study profile	General-academic	
Course name	Building of telecommunication infrastructure							Course code	TS2E300022	
								Course type	Obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3	
	15			15				No. of ECTS credits	2	
Entry requirements	-									
Course objectives	<p>To acquaint students with the rights and obligations of people taking part in the design and construction of telecommunication objects. To develop students' skills to determine the requirements that should be fulfilled by objects, rooms and containers in which telecommunication systems are installed, including lowvoltage installations and problems of safety in the operation and maintenance of telecommunication equipment. To acquaint students with the requirements for grounding, equipotential bonding and lightning protection systems, as well as low voltage installations in telecommunication objects, and coordinatingthe information cabling to other installations. To acquaint students with the requirements concerning the principles of designing grounding and equipotential bonding systems and cable routing in building objects.</p>									
Course content	<p><u>Lecture:</u>Rights and obligations of the designer, the construction director and the investor's supervision inspector during the construction of a telecommunication object. Environmental qualifications for the construction of telecommunication networks and equipment. Rules of safety and hygiene of work during the implementation of telecommunication objects. Coincidences of the designed telecommunication infrastructure with other media networks. Lightning protection, grounding and equipotential bonding systems in telecommunication objects. Technical qualifications for electrical installations. Power supply of telecommunication objects. Intelligent building systems. Construction of stations for mobile communication systems.</p> <p><u>Project:</u>Rules and basic requirements concerning the design of telecommunication infrastructure (electrical installations, lightning protection, grounding and equipotential bonding, cable routing).</p>									
Teaching methods	Information lecture, project tasks.									
Assessment method	<u>Lecture:</u> written or oral test; <u>Project:</u> technical documentation and presentation of project tasks with discussion.									

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study	
LO1	The student knows the rights and obligations of the designer, the construction director and the investor's supervision inspector during the construction of a telecommunication object; Has detailed knowledge of the safety of operation and maintenance of telecommunications equipment and systems.	ET2_W05	
LO2	The student is able to define the requirements that should be fulfilled by objects, rooms and containers in which telecommunication systems are installed, including low voltage installations, equipment and cabling, as well as problems of safety in the operation and maintenance of these systems.	ET2_U14	
LO3	The student knows the principles of design and can design grounding and equipotential bonding systems in telecommunication objects; Is able to develop technical documentation and prepare a presentation on the implementation of project tasks.	ET2_U14	
LO4	The student is ready to solve technical problems in the field of telecommunications construction, applying a critical assessment of the existing state with built-in expert knowledge.	ET2_K01	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	written or oral test	L	
LO2	technical documentation and presentation of project tasks with discussion	P	
LO3	technical documentation and presentation of project tasks with discussion	P	
LO4	presentation of project tasks with discussion	P	
Student workload (in hours)		No. of hours	
Calculation	Lecture attendance	15	
	Participation in project	15	
	Preparation of technical documentation and presentation of the project tasks, and preparation for the discussion	10	
	Preparation for the final test related to lecture	5	
	Participation in student-teacher sessions related to the class	5	
	TOTAL:	50	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		35	1.4
Student workload – practical activities		20	0.8
Basic references	1. Ott H. W., <i>Electromagnetic compatibility engineering</i> , NJ: Wiley, Hoboken, 2009. 2. Kodali V. P. <i>Engineering electromagnetic compatibility: principles, measurements, technologies and computer models</i> , The Institute of Electrical and Electronics		



	<p>Engineers, New York, 2000.</p> <p>3. Williams T., <i>EMC for systems and installations</i>, Newnes, Oxford, 2000.</p> <p>4. Joffe E. B., Lock K. S., <i>Grounds for Grounding. A Circuit-to-System Handbook</i>, IEEE Press, Wiley, 2010.</p> <p>5. Zalecenia dla instalacji elektrycznych w obiektach telekomunikacyjnych TP S.A. z punktu widzenia kompatybilności elektromagnetycznej. Wprowadzone Zarządzeniem Nr 56 Prezesa Zarządu TP S.A. z dnia 18.12.1997.</p>	
Supplementary references	<p>1. Praca zbiorowa: <i>Vademecum teleinformatyka. Tomy 1-3</i>, IDG Poland, Warszawa, 2004.</p> <p>2. Sowa A., <i>Ochrona urządzeń oraz systemów elektronicznych przed narażeniami piorunowymi</i>, Oficyna Wydawnicza Politechniki Białostockiej, Białystok, 2011.</p> <p>3. Włodarczyk J., Podosek Z., <i>Systemy teletechniczne budynków inteligentnych</i>, Cyber, Warszawa, 2002.</p> <p>4. Markiewicz H., <i>Instalacje elektryczne</i>, WNT, Warszawa, 2007.</p> <p>5. Charoy A.: <i>Zakłóceń w urządzeniach elektronicznych: zasady i porady instalacyjne. Tomy 1, 2, 3, 4</i>, Wydawnictwa Naukowo-Techniczne, Warszawa, 1999/2000.</p>	
Organisational unit conducting the course	Department of Telecommunications and Electronic Equipment	Date of issuing the programme
Author of the programme	Renata Markowska, DScPhDEng	26.04.2019

## COURSE DESCRIPTION CARD

Bialystok University of Technology									
Field of study	Electronics and Telecommunications						Degree level and programme type	Master's degree Full time	
Specialization/ diploma path	Electronic Devices and Telecommunications						Study profile	General-academic	
Course name	Security of information systems						Course code	TS2E300023	
							Course type	Obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	30		15					No. of ECTS credits	3
Entry requirements	-								
Course objectives	<p>Obtaining knowledge of the threats to the security of information systems and the contemporary methods of protection of these systems.</p> <p>Acquisition of practical skills related to the choice and implementation of modern means to ensure the security of information systems.</p>								
Course content	<p><u>Lecture</u> The essence of information security. A comprehensive approach to defining an information security policy. Sources of threats to information security. Basics of cryptographic data protection. Types and properties of ciphers. Architecture of public key infrastructure (PKI). Electronic signature systems and secure authentication. Selected technologies used in protection of information systems. Security policies and audits of IT systems. Standards and recommendations related to the security of information systems.</p> <p><u>Laboratory classes</u> Performing the basic cryptanalysis of selected cryptographic algorithms. Configuration and testing of secure authentication systems. Configuration and testing of VPN systems. Configuration and testing of selected technologies used to secure information systems.</p>								
Teaching methods	Lecture, laboratory experiments, problem solving.								
Assessment method	<p>Lecture: written exam</p> <p>Laboratory classes: evaluation of reports, written short tests, final oral test</p>								
Symbol of learning outcome	Learning outcomes						Reference to the learning outcomes for the field of study		

LO1	The student describes the operation and properties of specific cryptographic algorithms and their applications in systems and technologies of ensuring the security of information systems.	ET2_W05	
LO2	The student explains the application of certain standards and recommendations related to the technical and organizational aspects of ensuring the security of information systems.	ET2_W05	
LO3	The student performs basic cryptanalysis of selected cryptographic algorithms using specialized computer software.	ET2_U14	
LO4	The student plans the test methods and performs a practical analysis of the operation of the given technologies of ensuring the security of information systems.	ET2_U14	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	written exam	L	
LO2	written exam	L	
LO3	evaluation of reports and students' activity, final oral test	LC	
LO4	evaluation of reports and students' activity, short written quiz, final oral test	LC	
Student workload (in hours)		No. of hours	
Calculation	Lecture attendance	30	
	Revising of the content of subsequent lectures	7	
	Participation in student-teacher sessions (lecture – 2h, laboratory classes – 3h)	5	
	Preparation for the final exam (5h) and participation in it (2h)	7	
	Participation in laboratory classes	15	
	Preparation for laboratory classes and work on reports	11	
	TOTAL:	75	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		52	2.1
Student workload – practical activities		26	1
Basic references	<ol style="list-style-type: none"> <li>1. Stallings W.: Cryptography and Network Security: Principles and Practice, Seventh Edition, Pearson, 2016.</li> <li>2. Brotherston L., Berlin A.: Defensive Security Handbook. O'Reilly, 2017.</li> <li>3. Anderson R. J., Security Engineering: A Guide to Building Dependable Distributed Systems, Second edition, Wiley, 2008.</li> <li>4. Manuals and configuration guides for equipment used in laboratory exercises.</li> </ol>		
Supplementary references	<ol style="list-style-type: none"> <li>1. Pieprzyk J., Hardjono T., Seberry J., Fundamentals of Computer Security, Springer, 2003.</li> <li>2. McNabC.: Network Security Assessment. O'Reilly Media; 3rd edition, 2016.</li> </ol>		

<b>Organisational unit conducting the course</b>	<b>Department of Telecommunications and Electronic Equipment</b>	<b>Date of issuing the programme</b>
<b>Author of the programme</b>	<b>Andrzej Zankiewicz, PhD Eng.</b>	<b>11.05.2019</b>

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar

### COURSE DESCRIPTION CARD

Bialystok University of Technology										
Field of study	Electronics and Telecommunications							Degree level and programme type	Master's degree, full-time	
Specialization/ diploma path	Electronic Devices and Telecommunications							Study profile	General-academic	
Course name	Work placement 2							Course code	TS2E300024	
								Course type	Elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester		
								No. of ECTS credits	2	
Entry requirements	-									
Course objectives	Acquisition of in-depth social competences and development of selected skills.									
Course content	Implementation of tasks ordered by the supervisor in accordance with the individual practice program.									
Teaching methods	Not applicable									
Assessment method	Credits on the basis of diary of internship confirmed by the company supervisor									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study		
LO1	The student is able to obtain information from various sources in order to complete the assigned tasks.							ET2_U01, ET2_K01		
LO2	Taking into account the recipient's knowledge, the student logically explains various aspects of the task being performed.							ET2_U14, ET2_K02		
LO3	The student understands the need of defining the physical and legal resources in order to carry out the assigned tasks properly.							ET2_U11		
LO4	The student understands the need for self-education in order to improve the qualifications and efficiency of his/her work.							ET2_U06, ET2_K03		
LO5										
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed		
LO1	Confirmation by the company supervisor in the training diary and statement of achieving assumed learning outcomes by the Faculty training supervisor.									

L02	Confirmation by the company supervisor in the training diary and statement of achieving assumed learning outcomes by the Faculty training supervisor.	
L03	Confirmation by the company supervisor in the training diary and statement of achieving assumed learning outcomes by the Faculty training supervisor.	
L04	Confirmation by the company supervisor in the training diary and statement of achieving assumed learning outcomes by the Faculty training supervisor.	
L05		
<b>Student workload (in hours)</b>		<b>No. of hours</b>
<b>Calculation</b>	Participation in tasks carried out at the workplace where the student is practicing (2 weeks)	60
	<b>TOTAL:</b>	60
<b>Quantitative indicators</b>		<b>HOURS</b>
		<b>No. of ECTS credits</b>
Student workload – activities that require direct teacher participation		50
Student workload – practical activities		50
<b>Basic references</b>	Internal company documentation: safety instructions, workplace instructions, technical and operational documentation	
<b>Supplementary references</b>	Directives and standards in electronics and telecommunications	
<b>Organisational unit conducting the course</b>	Department of Theoretical Electrotechnics and Metrology	Date of issuing the programme
<b>Author of the programme</b>	Sławomir Kwiećkowski, PhD Eng	31.03.2019

### COURSE DESCRIPTION CARD

Bialystok University of Technology										
Field of study	Electronics and Telecommunications							Degree level and programme type	Master's degree Full time	
Specialization/ diploma path	Electronic Devices and Telecommunications							Study profile	General-academic	
Course name	Professional responsibility, constructionlaw							Course code	TS2E300025	
								Course type	Obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3	
	30							No. of ECTS credits	2	
Entry requirements										
Course objectives	To familiarize students with the basic legal concepts, legal system and issues related to broadly understood construction and telecommunications law. To familiarize students with the issues of legal professional responsibility, taking into account the specifics of telecommunications specialization.									
Course content	<p>Contents of the Construction Law and Telecommunications Law. Implementing rules. Act on the protection of persons and property, the Act on supporting the development of telecommunications services and networks. European Community Directives implemented by Construction Law and Telecommunications Law. Standards harmonized with the EC Directives.</p> <p>Independent technical functions in construction. Rights and obligations of the investor, the supervisor of the investor's supervision, the construction manager or the works manager, designer, contractor, expert. Copyright in construction. Designer's supervision.</p> <p>The procedure of granting construction permits in Poland. Information on the regulations, which knowledge is required during exams for building qualifications. Types of responsibility of people working in construction: criminal, professional, civil and disciplinary liability. Legal professional responsibility in the light of the applicable Construction Law and related regulations.</p> <p>Engineering art. Code of professional ethics.</p>									
Teaching methods	Lecture, Discussion									
Assessment method	Lecture – written test,									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study		

LO1	The student knows issues related to the security of telecommunications systems in the aspect of legal provisions.	ET2_W08	
LO2	The student knows the design principles resulting from the provisions of applicable law.	ET2_W08	
LO3	The student knows the issues related to the protection of intellectual property in investment processes.	ET2_W09	
LO4	The student knows non-technical conditions of engineering activities and engineering ethics resulting from legal conditions in Poland.	ET2_K03	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	writtentests	L	
LO2	writtentests	L	
LO3	writtentests	L	
LO4	writtentests	L	
Student workload (in hours)		No. of hours	
Calculation	Participation in lectures	30	
	Participation in consultations	5	
	Preparation for the test	15	
	TOTAL:	50	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		35	1.4
Student workload – practical activities		-	-
Basic references	<ol style="list-style-type: none"> <li>1. Ustawa Prawo Budowlane. Dz.U. 1994 nr 89 poz. 414 z późn. zm.</li> <li>2. Rozporządzenie MI w sprawie warunków echnicznych jakim powinny odpowiadać budynki i usytuowanie Dz.U. Nr 75, poz. 690 z 12.04.2002 r. z późn. zm.</li> <li>3. Rozporządzenie MI w sprawie warunków technicznych, jakim powinny odpowiadać telekomunikacyjne obiekty budowlane i ich usytuowanie Dz.U. 2005 nr 219 poz. 1864 z późn. zm.</li> <li>4. Ustawa Kodeks Postępowania Administracyjnego Dz.U. 1960 nr 30 poz. 168 z późn. zm.</li> <li>5. Ustawa Kodeks Cywilny Dz.U. 1964 nr 16 poz. 93 z późn. zm.</li> </ol>		
Supplementary references	<ol style="list-style-type: none"> <li>1. Substyk M., Tarłowski M: Przygotowanie i odbiór iwestycji. Poradnik inwestora. Wyględy. Warszawa 2014</li> <li>2. Ustawa o zamówieniach publicznych Dz.U. 2004 nr 19 poz. 177 z późn. zm.</li> <li>3. Saganek P.: Dyrektywy nowego podejścia a problem dostosowania prawa polskiego do prawa Unii Europejskiej : wybrane zagadnienia. Przegląd Prawa Europejskiego, 2001, nr 2, s. 52.</li> </ol>		
Organisational unit conducting the course	Department of Electric Power Engineering, Photonic and Lighting Technology	Date of issuing the programme	



<b>Author of the programme</b>	<b>Marcin Andrzej Sulkowski, Ph.DEng.</b>	<b>15.04.2019</b>
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**L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar**

### COURSE DESCRIPTION CARD

Bialystok University of Technology										
Field of study	Electronics and Telecommunications							Degree level and programme type	Master's degree Full time	
Specialization/ diploma path	Electronic Devices and Telecommunications							Study profile	General-academic	
Course name	Free-space optical communications							Course code	TS2E300 026	
								Course type	obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3	
	15							No. of ECTS credits	1	
Entry requirements										
Course objectives	Presentation of the issues related to the transmission of optical signal in the open space. Teach recognition of free-space optical links.									
Course content	Propagation of optical signals in the atmosphere, maximum range of the link in various atmospheric conditions, power budget, satellite optical communications. Optical communication over long distances, detection and tracking. Principles of visual light communication. Comparison of radio and optical transmission. Optical short-range communication: types and structures of links, sources and receivers, sources of noise.									
Teaching methods	Lecture									
Assessment method	Final test									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study		
L01	The student characterizes free-space optical communication systems.							ET2_W02		
L02	The student describes phenomena affecting the attenuation of the signal in free space.							ET2_W01 ET2_W02		
L03	The student describes and analyzes the power budget in the free-space systems.							ET2_W01 ET2_W02		
L04	The student discusses optical short- and long-range links - optical satellite links.							ET2_W02		
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed		
L01	final test							L		

L02	final test	L	
L03	final test	L	
L04	final test	L	
Student workload (in hours)		No. of hours	
Calculation	Participation in lectures	15	
	Current analysis and assimilation of content subsequent lectures	3	
	Participation in consultations	5	
	Preparation for the test	2	
	TOTAL:	25	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		20	0.8
Student workload – practical activities		-	-
Basic references	1.Kaushal, Hemani, Jain, V.K., Kar, Subrat, „Free Space Optical Communication”, Springer 2017.		
Supplementary references	1. The Photonics dictionary „1998. Book 4.Pittsfield”, Laurin Publishing, 1998. 2. Dorf R. „Electronics, power electronics, optoelectronics, microwaves, electromagnetics, and radar”, CRC/Taylor & Francis, 2006.		
Organisational unit conducting the course	Department of Electrical Power Engineering, Photonics and Lighting Technology	Date of issuing the programme	
Author of the programme	M. Kochanowicz,PhDAssoc. Prof.	08.04.2019	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar

### COURSE DESCRIPTION CARD

Bialystok University of Technology										
Field of study	Electronics and Telecommunications							Degree level and programme type	Master's degree, full-time	
Specialization/ diploma path	Electronic Devices and Telecommunications							Study profile	General-academic	
Course name	Techniques of presentation							Course code	TS2E300132	
								Course type	Elective	
Forms and number of hours of tuition	W	C	LC	P	SW	FW	S	Semester	3	
							30	No. of ECTS credits	3	
Entry requirements	-									
Course objectives	To receive the skills of preparing a good presentation of a technical subject with the use of Power Point or Prezi software. Also the abilities to make a poster for a meeting or conference with presenting it in a limit time and familiarization with the speech before camera.									
Course content	Perception about speaker. Examples of bad presentations. The communication process. Presentation model. Delivering the presentation. Designing a conference poster. Recording the selfpresentation on camera.									
Teaching methods	Class discussion conducted by teacher, small group teaching, demonstration-performance method									
Assessment method	Continuing evaluation of realised tasks focused on three elements: language, technique and structure									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study		
EU1	The student prepares a good presentation of a technical subject in a computer software.							ET2 U04		
EU2	The student makes and carries an oral presentation out with the use of multimedia techniques.							ET2 U04, ET2 U05		
EU3	The student elaborates a poster for a conference and explains and discuss a technical problem on the base of it.							ET2 K03		
EU4	The student elaborates and records on camera the selfpresentation including own CV.							ET2 U04, ET2 U05		
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed		

EU1	evaluating the student's presentation of a technical problem with the use of multimedia software	S	
EU2	evaluating the student's oral presentation	S	
EU3	evaluating the student's poster (contents and aesthetic impression) and the way of the use of it to present and discuss a technical problem	S	
EU4	evaluating the content and performance of student's CV registered on camera	S	
Student workload (in hours)		No. of hours	
Calculation	Attending the classsessions	30	
	Preparing of data and looking for recources of the practical advices	15	
	Preparation for and participation in presentations	15	
	Elaboration of report and poster	5	
	Observing good presentations at web recources	5	
	Consultations	5	
TOTAL:		75	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		35	1.4
Student workload – practical activities		75	3
Basic references	1.Niedzicki W.: Sztuka prezentacji w nauce, biznesie i polityce. Wydawnictwo Poltext. Warszawa 2010 2. <a href="http://www.effective-public-speaking.com">www.effective-public-speaking.com</a> 3. <a href="http://www.posterpresentations.com">www.posterpresentations.com</a> 4. <a href="http://www.exp.washington.edu">www.exp.washington.edu</a> (08_02_2013) 5. <a href="http://www.posters.f1000.com">www.posters.f1000.com</a>		
Supplementaryreferences	1. <a href="http://www.postergenius.com/cms/index.php">www.postergenius.com/cms/index.php</a> 2. <a href="http://www.qrstuff.com">www.qrstuff.com</a> 3. <a href="http://www.qrcode.kaywa.com">www.qrcode.kaywa.com</a> 4. <a href="http://www.cns.cornell.edu/documents/ScientificPosters.pdf">www.cns.cornell.edu/documents/ScientificPosters.pdf</a>		
Organisational unit conducting the course	Department of Theoretical Electrotechnics and Metrology	Date of issuing the programme	
Author of the programme	Dr inż. Jarosław Makal	18.04.2019	

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### COURSE DESCRIPTION CARD

Bialystok University of Technology										
Field of study	Electronics and Telecommunications							Degree level and programme type	Master's degree, full-time	
Specialization/ diploma path	Electronic Devices and Telecommunications							Study profile	General-academic	
Course name	Innovations in electronic industry							Course code	TS2E300134	
								Course type	Elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3	
							30	No. of ECTS credits	3	
Entry requirements	-									
Course objectives	Presentation of modern technological and scientific solutions used in the electronics industry in relation to the production process and their impact on economic development.									
Course content	The high technology industry using the latest scientific, technical and technological achievements both in the production process and in the finished product. Innovation strategy. Determining the consequences of innovation and technology transfer through the research and development area. Introduction to protection in the field of inventiveness and intellectual property. Promotion of innovation. Innovative technologies: laser material processing, 3D laser scanners, SmartGrid technologies, RTF technology (Real Time Follow), IoT (internet of things) technology, biometrics, intelligent clothing, 3D printing, reverse engineering, composite materials.									
Teaching methods	Seminar, brain-storming, oral presentation, group work									
Assessment method	Oral presentation, discussion									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study		
LO1	The student characterise modern technological solutions in terms of their use in the electronics industry.							ET2_U01, ET2_U04		
LO2	The student can solve a technological problems using knowledge from different fields of science.							ET2_K01, ET2_U12		
LO3	The student is able to design an innovative product respecting the rights of intellectual and industrial property protection.							ET2_U10		
LO4	The student organizes the team work in an entrepreneurial manner, taking into account the principles of ethics.							ET2_K02		

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	oral presentation and discussion	S	
LO2	oral presentation and discussion	S	
LO3	oral presentation and discussion	S	
LO4	oral presentation and discussion	S	
Student workload (in hours)		No. of hours	
Calculation	Participation in seminar	30	
	Preparation for seminar	20	
	Preparation of oral presentation, project management	20	
	Participation in student-teacher sessions:	5	
	TOTAL:	75	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		35	1.4
Student workload – practical activities		75	3
Basic references	1. Jean-Philippe Deschamps, Liderzy innowacyjności: Jak rozwijać i utrzymywać innowacyjność w firmie, Wolters Kluwer, 2015 2. Edyta Dworak, Tomasz Grabia, Witold Kasperkiewicz, Walentyna Kwiatkowska, Gospodarka oparta na wiedzy, innowacyjność i rynek pracy, Wydawnictwo Uniwersytetu Łódzkiego, 2014		
Supplementary references	1. Elsevier/Springer/IEEE Journals – electronic access		
Organisational unit conducting the course	Department of Power Engineering, Photonics and Lighting Technology	Date of issuing the programme	
Author of the programme	Jacek Żmojda, DSc., PhD.	8.04.2019	

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