

Semester 1

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Sport		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty Information and Comm. Technologies	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: - Classes: 2 Laboratory: - Project/seminars: -		No. of credits 1
Status of the course in the study program (Basic, major, other) basic		(university-wide, from another field) university-wide
Education areas and fields of science and art		ECTS distribution (number and %)
Responsible for subject / lecturer: Wojciech Weiss email: wojciech.weiss@put.poznan.pl tel. 61 6652617 Inter-Faculty Units ul. Jana Pawła II 28, 61-135 Poznań		Responsible for subject / lecturer: Krzysztof Rembicki email: krzysztof.rembicki@put.poznan.pl tel. 61 6652517 Inter-Faculty Unit ul. Jana Pawła II 28, 61-135 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge about the rules of volleyball, basketball, table tennis, football, tennis, swimming, skiing, floorball, squash, aerobics and rowing; knowledge of foundations and principles of warm-up and strength exercises as well as techniques and tactics of the game, scoring and rules regarding the walkover victory.
2	Skills	Improving technical skills taught in these disciplines, knowledge of basic tactics.
3	Social competencies	Ability to suffer a defeat, desire for revenge in a fair sport, respect for sports? equipment, sanities etc. Raising awareness about caring about body care (physical and mental)
Assumptions and objectives of the course:		
Educational: To learn techniques and tactics of the game that will be used daily at work, to learn how to organize a game, contest or tournament with proper scoring and refereeing.		
Educational: Respect for the rival and colleague, being able to support, motivate and encourage the partner, who is not doing well in the game. Cooperation with and respect for the judge.		
Health: To know how to organize spare time, to spend this time effectively, caring for function and fitness, to learn the proper hygienic habits that will have a positive effect on work?s efficiency.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows the technique of performing a particular sport; - [-]		
2. Knows the accepted rules of the game and rivalry; - [-]		
3. Knows how to explain the rules of the game, sum up the competition, and prepare a simple tournament?s score scale. - [-]		
Skills:		
1. Student is able to: prepare a mini-tournament in team games and/or table tennis/ tennis, carry out a rowing competition using ergometer, perform an aerobic dance system with a group; - [-]		
2. Is able to use their knowledge in practice; - [-]		
3. Is able to cooperate with a partner, referee, organizer or participant; - [-]		
4. Is able to find and implement the best solutions that will drive the team to a fair-play victory; - [-]		
5. Is able to recognize the rival team?s tactics. - [-]		
Social competencies:		

1. The student should be aware of the need for exercise and physical activity; - [-]
2. Should be responsible for his/hers decisions and actions and for the teammates; - [-]
3. Should be willing to help, both on the field and in everyday life; - [-]
4. Should be sensitive to injustice and harm. Should follow the rules, standards and binding rules. - [-]

Assessment methods of study outcomes

Basketball: 5 wheels test, mini tournaments.
 Volleyball: Playing the ball in pairs, the three deflections attack, mini tournaments.
 Football: Football test, mini tournaments.
 Table tennis and tennis: Single and double tournament.
 Weight training: Test of lifting the weights, pulls on the stick and abdominal exercises.
 Swimming: Test of swimming in different styles on time.
 Skiing, skating, rollerblading: Test the skills of downhill skiing with a specific technique, the ability to change direction.
 Aerobic: Preparing and performing a training set with music.
 Rowing ergometer : Checking the ability of rowing the distance technically correct on time
 Squash: Tournament.

Course description

Basketball: Improving the skills of throwing in the run and jump, learning the throw and passing feints, learning the 5x0 positional attack, learning how to play 2x1, 3x2 and 4x3 advantage.
 Volleyball: Perfecting the skills of of playing the ball in pairs and of attack and defense with a single block, learning of a go-around attack and of double and triple block.
 Football: Perfecting the pass and go technique and playing in advantage, learning of a zone defense, small games.
 Swimming: Learning of: the crawl, backstroke, classical and butterfly styles.
 Table tennis and tennis: Perfecting forehand and backhand, taking into account the proper footwork, learning to play half volley.
 Skiing: downhill, slalom.
 Snowboard: Perfecting the technique ? must have an own snowboard.
 Rowing ergometer: Learning the technique, training focused on improving speed and stamina.
 Aerobic: Learning new steps and choreography, implementing them into practice.
 Weight training: learning about the human musculoskeletal system, particular exercises and preparing training schedules.

Basic bibliography:

1. Rules of Volleyball 2010, Basketball 2011, Floorball 2008, Football 2005, Tennis and Squash.

Additional bibliography:

1. Press titles concerning particular sports.

Result of average student's workload

Activity	Time (working hours)	
1. Practical training in sports centers	30	
Student's workload		
Source of workload	hours	ECTS
Total workload	30	1
Contact hours	30	1
Practical activities	30	1

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject English		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty Information and Comm. Technologies	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: - Classes: 4 Laboratory: - Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art		ECTS distribution (number and %) 3 100%
Responsible for subject / lecturer:		
<p>Aleksander Kubot email: aleksander.kubot@put.poznan.pl tel. 61 665 24 91 Centre of languages and Communication ul. Piotrowo 3a, 60-965 Poznań</p>		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	According to the national curriculum (http://bip.men.gov.pl/menbip/akty_prawne/rozporzadzenie_20081223_zal_4.pdf), it is assumed that the already acquired language competence compatible with level B1 (CEFR)
2	Skills	The ability to use vocabulary and grammatical structures required on the high school graduation exam with regard to productive and receptive skills
3	Social competencies	The ability to work individually and in a group; the ability to use various sources of information and reference works.
Assumptions and objectives of the course:		
<p>1. Advancing students' language competence towards at least level B2 (CEFR). 2. Development of the ability to use academic and field specific language effectively in both receptive and productive language skills. 3. Improving the ability to understand field specific texts (familiarizing students with basic translation techniques). 4. Improving the ability to function effectively on an international market and on a daily basis. -</p>		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
<p>1. Description and interpretation of graphs and diagrams, mathematical terms - [[K1_W01]] 2. Diagrams and symbols of electronic components, static electricity - [[K1_W05], [K1_W07]] 3. History of computer ? Three generations - [[K1_W13], [K1_W24]] 4. Batteries and fuel cells, - [HDTV [K1_W11]] 5. GPS ? principles of operation - [[K1_W15]] 6. and to be able to define and explain associated terms, phenomena and processes - [? [-]]</p>		
Skills:		
<p>1. give a talk on field specific or popular science topic (in English), and discuss general and field specific issues using an appropriate linguistic and grammatical repertoire - [[K1_U04]] 2. express basic mathematical formulas and to interpret data presented on graphs/diagrams - [[K1_01]] 3. conduct business correspondence in English - [[K1_U06]] 4. describe briefly in writing a short technical process or a particular appliance - [[K1_U03]]</p>		
Social competencies:		

<p>1. As a result of the course, the student is able to communicate effectively in a field specific/professional area, express opinions on the development of electronics and telecommunications and to give a successful presentation in English. - [[K1_K04]]</p> <p>2. The student is able to recognize and understand dilemmas related to work within the scope of electronics and telecommunications, understands cultural differences in a professional and private conversation, and in a different cultural environment. - [[K1_K05]]</p>
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Assessment methods of study outcomes	
?	Formative assessment: on-going assessment (presentations, tests, Mid-term test)
?	Summative assessment: credit

Course description
<p>-Developing the ability to interpret graphs and charts and mathematical operations. Reading technical texts and acquiring general scientific vocabulary. Learning names and functions of electrical and electronic components. Exercising language functions which help the student to describe the physical laws and phenomena enabling the operation of complex electronic equipment and systems (television). Analyzing texts that show the historical development of telecommunications and the consequences of specific inventions for this development (transistors, integrated circuits).</p> <p>Students carry out a program based on selected chapters from the primary and secondary literature and based on the sources of information from the Internet. They also take lexical and grammatical exercises.</p>

<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. E. Glendinning & John McEwan, Oxford English for Electronics 2. CM and D. Johnson, General Engineering, Prentice Hall 3. R. Maksymowicz, Język angielski dla elektroników i informatyków 4. Anna Dubis & Justyna Figranek, English through Electrical and Energy Engineering 5. M. Weber& Ł. Brzosko, English for Engineers 6. Keith Harding & Liz Taylor International Express intermediate New Edition
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<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Liz Taylor International Express pre-intermediate New Edition 2. Liz Taylor International Express intermediate 3. E. Glendinning, Oxford English for Information Technology 4. Bodo Hanf, Angielski w technice, LektorKlett
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Result of average student's workload	
Activity	Time (working hours)
1. Participation in classes	60
2. Participation in Moodle classes	10
3. Preparation for tests/midterm test	20

Student's workload		
Source of workload	hours	ECTS
Total workload	90	3
Contact hours	70	2
Practical activities	90	3

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject History of Poland		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty Information and Comm. Technologies	Subject offered in: English	Course (compulsory, elective) elective
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) Other		(university-wide, from another field) university-wide
Education areas and fields of science and art Humanistics		ECTS distribution (number and %)
Responsible for subject / lecturer: dr Radosław Kot email: radoslaw.kot@put.poznan.pl tel. 61 665 34 15 Wydział Inżynierii Zarządzania ul. Strzelecka 11 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic historical knowledge
2	Skills	Ability of observing and logical thinking
3	Social competencies	Reflective social and historical attitude
Assumptions and objectives of the course: Obtaining the basic knowledge about history of Poland and it's connections with global history.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Of main social ties and sociological context of human behavior. - [K1A_W06]		
2. Of relations between an individual and a group. - [K1A_W08]		
Skills:		
1. Can interpret social and psychological phenomenons. - [K1A_U01]		
2. Can apply basic theoretical knowledge in social practice. - [K1A_U02]		
3. Can analyse chosen social and ethical problems. - [K1A_U03]		
4. Can better understand human behaviour and social changes. - [K1A_U08]		
Social competencies:		
1. Is aware of the limitations of his/her current knowledge and skills; is committed to further self-study. - [K1A_K01]		
2. Demonstrates responsibility for designed electronic and telecommunication systems. Is aware of the hazards they pose for individuals and communities if they are improperly designed or produced. - [K1A_K03]		
3. Correctly interprets and solves the dilemmas related to working in electronics and telecommunication. Is able to think and act in a businesslike way. - [K1A_K05]		
Assessment methods of study outcomes		
Final test in 13th/14th week of the course or final essay		

Course description		
1. Historical background of Europe in the time before the written history 2. An evolution of Middle European tribes into national groups 3. Christianity in Middle Europe 4. Piast dynasty period of time 5. Jagiellonian Dynasty 6. Polish-Lithuanian Commonwealth 7. Poland in the Renaissance era 8. The fall of the kingdom of Poland 9. The partition of Poland. 10. Polish nation in XIX Century 11. Independence regained 12. The Second World War - Polish armed forces and an occupation of Polish territory 13. How Stalin divided Europe – Cold War 14. The fall of Eastern Block – Polish Republic again 15. Poland and Europe in XXI first Century		
Basic bibliography:		
1. Norman Davis, God's Playground: A History of Poland, CUP, 2005		
Additional bibliography:		
1. Robert Bubczyk, A History of Poland in Outline, Toruń, 2011		
Result of average student's workload		
Activity	Time (working hours)	
1. Lecture	28	
2. Consultations	5	
3. Preparing for the final test	15	
4. Final test	2	
Student's workload		
Source of workload	Hours	ECTS
Total workload	50	2
Contact hours	35	0
Practical activities	0	0

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Elements of Sociology and Ethics		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty Information and Comm. Technologies	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art		ECTS distribution (number and %)
Responsible for subject / lecturer: dr Radosław Kot email: radoslaw.kot@put.poznan.pl tel. 61 665 34 15 Wydział Inżynierii Zarządzania ul. Strzelecka 11 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic social knowledge and practice.
2	Skills	Ability of observation social phenomenon and noticing relations among them.
3	Social competencies	Reflective social and emotional attitude.
Assumptions and objectives of the course: Obtaining the basic knowledge about sociological phenomenon, ethics and terms of contemporary sociology.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Of main social ties and sociological context of human behaviour. - [K1A_W06] 2. Of relations between an individual and a group. - [K1A_W08] 3. Of ethical norms and their sources and changes in social and psychological context. - [K1A_W15]		
Skills:		
1. Can interpret social and psychological phenomenon. - [K1A_U01] 2. Can apply basic theoretical knowledge in social practice. - [K1A_U02] 3. Can analyze chosen social and ethical problems. - [K1A_U03] 4. Can better understand human behavior and social changes. - [K1A_U08]		
Social competencies:		
1. Is aware of the limitations of his/her current knowledge and skills; is committed to further self-study. - [K1A_K01] 2. Demonstrates responsibility for designed electronic and telecommunication systems. Is aware of the hazards they pose for individuals and communities if they are improperly designed or produced. - [K1A_K03] 3. 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. - [K1A_K04] 4. Correctly interprets and solves the dilemmas related to working in electronics and telecommunication. Is able to think and act in a businesslike way. - [K1A_K05]		

Assessment methods of study outcomes		
Final test in 13th/14th week of the course.		
Course description		
Sociology - subject, structure and methods; limitations and possible future development. Main sociological schools. An individual in social structure, social groups. Social groups influencing individuals, conformity and social roles. Group interactions. Human personality and socialization. Ethics and morality. Sociological view on ethics. Ethical dilemmas and discussions.		
Basic bibliography:		
1. Aronson, Social Animal, 1998 2. Michael Slote, Essays on the History of Ethics, 2010		
Additional bibliography:		
1. E. Aronson, „Social Psychology”, 1998		
Result of average student's workload		
Activity	Time (working hours)	
1. Lecture	28	
2. Consultations	5	
3. Preparing for the final test	15	
4. Final test	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	50	2
Contact hours	35	0
Practical activities	0	0

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Math. I – Analysis		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 4 Classes: 4 Laboratory: - Project/seminars: -		No. of credits 8
Status of the course in the study program (Basic, major, other) basic		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 6 100% 6 100%
Responsible for subject / lecturer: Dr Andrzej Maćkiewicz email: andrzej.mackiewicz@put.poznan.pl tel. 61 665 2805 Electrical Department ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The prerequisites are high school algebra and trigonometry. Prior experience with calculus is helpful but not essential.
2	Skills	The ability to solve problems using mathematical tools in the range of high school.
3	Social competencies	Aware of the need to broaden their knowledge and practical skills.. Ability to work in a group of students.
Assumptions and objectives of the course: Calculus is a foundational course; it plays an important role in the understanding of science, engineering, economics, and computer science, among other disciplines. This introductory calculus course covers differentiation and integration of functions of one and several variables, with applications.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Has a systematic knowledge of mathematical analysis and linear algebra. - [K1_W01] 2. The student knows the basic theorems and formulas occurring in mathematical analysis - [K1_W01] 3. The student can solve properly selected problems of mathematical analysis - [K1_W01]		
Skills: 1. Is able to use known mathematical analysis and algebra concepts to solve basic problems in electronics and telecommunication..- [K1_U07] 2. The student can use the mathematical tools associated with mathematical analysis, can make appropriate calculations and mathematical transformations - [K1_U07] 3. Is able to extract information from English language literature, databases and other sources. Is able to synthesize gathered information, draw conclusions, and justify opinions - [K1_U01].		
Social competencies: 1. The student is aware of the need to broaden their knowledge and practical skills..- [K1_K01,K1_K04] 2. Has awareness of the need for a professional approach to problem solving - [K1_K02,K1_K05]		
Assessment methods of study outcomes		

<p>Homework, Practical sections. Control of the skills in the form of four quizzes. The midterm and the final exam (in written form). Grades will be based on the following percentages. Homework: 10% Midterm Exam : 25% Final Exam: 40% Quizzes : 25%</p>		
Course description		
<p>A Preview of Calculus; Review—Graphs, Models, and Functions; Review—Functions and Trigonometry; Absolute value inequalities; Summation Notation and Related Topics; Mathematical induction, Binomial Theorem; What are mathematical proofs? Finding Limits; An Introduction to Continuity; Infinite Limits and Limits at Infinity; The Derivative and the Tangent Line Problem; Basic Differentiation Rules; Product and Quotient Rules; The Chain Rule; Implicit Differentiation and Related Rates; Extrema on an Interval; Increasing and Decreasing Functions; Concavity and Points of Inflection; Curve Sketching and Linear Approximations; Applications—Optimization Problems; Antiderivatives and Basic Integration Rules; The Area Problem and the Definite Integral; The Fundamental Theorem of Calculus; Integration by Substitution; Numerical Integration; Natural Logarithmic Function—Differentiation; Natural Logarithmic Function—Integration; Exponential Function; Bases other than e; Inverse Trigonometric Functions; Area of a Region between 2 Curves; Volume—The Disk Method; Volume—The Shell Method; Applications—Arc Length and Surface Area; Basic Integration Rules; Other Techniques of Integration Differential Equations and Slope Fields; Differential Equations—Growth and Decay; Linear Differential Equations; Applications of Differential Equations; Areas and Volumes; Arc Length, Surface Area, and Work; Moments, Centers of Mass, and Centroids; Integration by Parts; Trigonometric Integrals; Integration by Trigonometric Substitution; Integration by Partial Fractions; Indeterminate Forms and L'Hôpital's Rule; Improper Integrals; Sequences and Limits; Infinite Series—Geometric Series; Series, Divergence, and the Cantor Set; Integral Test—Harmonic Series, p-Series; The Comparison Tests; Alternating Series; The Ratio and Root Tests; Taylor Polynomials and Approximations; Power Series and Intervals of Convergence;; Representation of Functions by Power Series; Taylor and Maclaurin Series; Complex Series, Euler formula. Fourier Series; Parabolas, Ellipses, and Hyperbolas; Parametric Equations and the Cycloid; Polar Coordinates and the Cardioid; Area and Arc Length in Polar Coordinates; Vectors in the Plane; The Dot Product of Two Vectors; Vector-Valued Functions; Velocity and Acceleration; Acceleration's Tangent and Normal Vectors; Curvature and the Maximum Bend of a Curve Max-min problems; least squares; Second derivative test; boundaries and infinity; Differentials; chain rule; Gradient; directional derivative; tangent plane; Lagrange multipliers; Double integrals and line integrals in the plane; Double integrals in polar coordinates; applications; Change of variables ; Vector fields and line integrals in the plane; Path independence and conservative fields; Gradient fields and potential functions; Triple integrals and surface integrals in 3- space; Triple integrals in rectangular and cylindrical coordinates ; Spherical coordinates; surface area; Vector fields in 3D; surface integrals and flux; Divergence theorem; Line integrals in space, curl, exactness and potentials.</p>		
Basic bibliography:		
<p>This course is self-contained and no textbook is required. If you have access to a single variable calculus text it will probably serve as a useful companion to this course, although you might have to deal with slight differences in terminology and notation. Lecture notes are available (in PDF format).</p>		
Additional bibliography:		
<p>A. Banner, "The Calculus Lifesaver". Princeton 2007. R. Larson and B. Edwards, "Calculus". Brooks\Cole 2012. R. Larson and B. Edwards, "Multivariable Calculus" .Brooks\Cole 2010. E. Mendelson, "3000 Solved Problems in Calculus, McGraw Hill 1988. A. Mattuck, " Introduction to Analysis", Prentice Hall 2013.</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in the lectures and exercises..	120	
2. Self-preparation for practical sections.	40	
3. Solving homework problems.	40	
Student's workload		
Source of workload	hours	ECTS
Total workload	200	8
Contact hours	120	5
Practical activities	80	3

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Math. II – Algebra		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: 2 Laboratory: - Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) basic		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 3 100% 3 100%
Responsible for subject / lecturer: Dr Andrzej Maćkiewicz email: andrzej.mackiewicz@put.poznan.pl tel. 61 665 2805 Electrical Department ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The prerequisites are high school algebra and trigonometry.
2	Skills	Freedom to pursue manipulation of algebraic expressions. Skilled use of trigonometric functions and trigonometric transformations.
3	Social competencies	Aware of the need to broaden their knowledge and practical skills.. Ability to work in a group of students.
Assumptions and objectives of the course: This course covers elements of matrix theory and linear algebra, emphasizing topics useful in other disciplines such as engineering, natural sciences, and physics.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has a systematic knowledge of complex numbers. - [K1_W01]		
2. Mastering the basic methods and concepts of linear algebra. - [K1_W01]		
Skills:		
1. Is able to use linear algebra in various context.. - [K1_U07]		
2. Could fluently manipulate on complex numbers and matrices. - [K1_U07]		
3. Will be able to analyze simple linear problems and solve them using matrices. - [K1_U07].		
Social competencies:		
1. The student will think structurally, which will allow him/her to determine the essence of the problem encountered and information noise rejection. - [K1_K01]		
Assessment methods of study outcomes		

<p>Homework, Practical sections. Control of the skills in the form of two quizzes. The final exam (in written form). Grades will be based on the following percentages. Homework: 10% Midterm Exam : 25% Quizzes : 25% Final Exam: 40%</p>		
Course description		
<p>Complex Numbers, The Fundamental Theorem of Algebra and its Consequences, Solving Linear Equations, Complex Vectors and Matrices, Vector Spaces and Subspaces, Orthogonality, Determinants, Eigenvalues and Eigenvectors, Linear Transformations</p>		
Basic bibliography:		
<p>This course is self-contained and no textbook is required. If a student has access to a Linear Algebra text it will probably serve as a useful companion to this course, although he/she might have to deal with slight differences in terminology and notation. Lecture notes are available (in PDF format).</p>		
Additional bibliography:		
<p>1. G.. Strang, Introduction to Linear Algebra, 4th Edition; WELLESLEY - CAMBRIDGE PRESS, 2009 2. S. Axler, Linear algebra done right, 2nd Edition, Springer-Verlag, 1996. 3. J. Hefferton, Linear Algebra, http://joshua.smcvt.edu/linearalgebra.</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in the lectures and practical sections.	45	
2. Self-preparation for practical sections.	15	
3. Self-preparation for quizzes.	10	
4. Consultation with the teacher.	5	
5. Self-preparation for the final test.	15	
Student's workload		
Source of workload	hours	ECTS
Total workload	90	3
Contact hours	50	2
Practical activities	17	0

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Algorithms in Electronics and Telecommunications		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty -	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: 2 Project/seminars: -		No. of credits 6
Status of the course in the study program (Basic, major, other) basic		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 6 100% 6 100%
Responsible for subject / lecturer: Prof. dr hab inż. Krzysztof Wesolowski email: wesolows@et.put.poznan.pl tel. +48 61 665 38 12 Faculty of Electronics and Telecommunications ul. Piotrowo 3A, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of mathematics and physics at the high school level.
2	Skills	Student is acquainted with the use of a PC/notebook and is able to create documents using any text editor.
3	Social competencies	Student understands a necessity to acquire a new knowledge and skills stemming from a chosen field of studies.
Assumptions and objectives of the course: The aim of the course is to teach a student how to solve basic computational problems by building appropriate algorithms. This knowledge has to help in efficient learning of programming in high-level languages widely used in electronics and telecommunications.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Has a solid knowledge of construction of computational algorithms by means of a graphical description, syntax and programming in MATLAB. It understands the rules of iterative solution, recurrence and has basic knowledge in the most popular numerical methods (solution of a linear equation set, finding a value of a finite integral, finding a zero of a function, etc.) - [K1_W09]		
Skills: 1. Is able to develop computational algorithms in the form of both textual and graphical description for solving basic computational problems in the area of mathematics and engineering. Is able to implement these algorithms using programming language MATLAB, also employing the iterative computing technique. - [K1_U13] 2. Is capable of studying autonomously -- to improve his/her fluency in programming in MATLAB - [K1_U05]		
Social competencies: 1. Is aware of the limitations of his/her current knowledge and skills; is committed to further self-study, in particular in the field of programming using high level programming languages. - [K1_K01]		
Assessment methods of study outcomes		
Credit for laboratory classes. Written exam of lecture content.		

Course description		
Lecture content:		
<p>1. Introduction Definition of an algorithm, textual and graphical description of a computational algorithm, examples of algorithms from a life and engineering.</p> <p>2. Basic blocks of graphical representation of algorithms, building simple algorithms in a graphical manner</p> <p>3. Introduction of MATLAB/OCTAVE programming language as a tool for performing engineering computations: Elements and syntax of MATLAB: data types, arithmetic operators and precedence of operators, input and output statements, loops, decisions, vectors and matrices, graphics, function M-files.</p> <p>4. Examples of an algorithmic approach to solve computational problems</p> <p>4.1. Representation of continuous functions as a sequence of samples, tabulating of functions, graphical representation of tabulated functions.</p> <p>4.2 Numerical methods for computing the derivative of a function, basic algorithms for computing the area under a function curve, estimation of an error in numerical integration.</p> <p>4.3 Iterative techniques, criteria for stopping computations, numerical methods for finding solutions of equations.</p> <p>3.4 Numerical methods for finding solutions of linear systems, Gauss method, iterative methods.</p>		
Laboratory classes program:		
<p>1. Graphical description of algorithms – introduction application of Magic Blocks software</p> <p>2. Graphical description of algorithms - operations on vectors</p> <p>3. Graphical description of algorithms - operations on matrices</p> <p>4. Binary representation of numbers</p> <p>5. Introduction to MATLAB</p> <p>6. Loops in MATLAB</p> <p>7. Function M-files in MATLAB</p> <p>8. Graphics in MATLAB</p> <p>9. Programming in MATLAB using iterative techniques</p>		
Basic bibliography:		
1. Lecture notes prepared by the academic teachers available in form of a PDF file		
Additional bibliography:		
<p>1. B. D. Hahn, D. T. Valentine, Essential Matlab for Engineers and Scientists, Butterworth-Heinemann (Elsevier), 2007</p> <p>2. S. Attaway, Matlab. A Practical Introduction to Programming and Problem Solving, Elsevier, Butterworth-Heinemann, 2009</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures	30	
2. Participation in laboratory classes (practical use of knowledge acquired during lectures)	30	
3. Self-reliant preparation to laboratory classes (acquiring of syntax and programming rules of MATLAB and writing programs in MATLAB given as a homework during laboratory classes)	40	
4. Writing own programs on the basis of the literature and supplied teaching materials	20	
4. Preparation to the written exam	18	
5. Participation in consulting hours with the lecturer or lab instructors	5	
6. Participation in lab credits	2	
7. Participation in the exam	5	
Student's workload		
Source of workload	hours	ECTS
Total workload	150	6
Contact hours	72	2
Practical activities	90	4

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Introduction to ICT Networks		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty Information and Comm. Technologies	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: 1 Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) major		(university-wide, from another field) from field
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 2 100% 2 100%
Responsible for subject / lecturer: Rafał Krenz, PhD email: rafal.krenz@put.poznan.pl tel. +48.61.6653912 Faculty of Electronics and Telecommunications Piotrowo 3A, 60-965 Poznań, POLAND		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	n.a.
2	Skills	n.a.
3	Social competencies	n.a.
Assumptions and objectives of the course: The course aims at providing basic information devoted to the beginning, development and functioning of the Internet, introduces the most important Internet services and teaches how to use them efficiently. The basic terms related to the information networks are introduced and explained.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Knows and understands the basic technical meaning of the terms describing telecommunication and computer networks. - [K1_W22]		
Skills: 1. Is able to design www pages, using appropriate programming languages. - [K1_U22]		
Social competencies: 1. Is aware of the impact electronics and ICT systems and networks will have on the development of the information society. - [K1_K04]		

Assessment methods of study outcomes
Laboratory exercises and individual projects. Written tests.
Course description

<p>Lectures:</p> <ol style="list-style-type: none"> 1.Introduction to the Internet. 2.World Wide Web. Searching the Internet. 3.Unix OS and computer networks. 4.Internet services and their applications. 5.Local area networks - introduction. <p>Laboratory exercises:</p> <ol style="list-style-type: none"> 1.HTML basics. 2.CSS and forms. 3.XML - introduction. 4.Basic Unix/Linux commands. 		
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Books devoted to HTML/CSS/XML programming languages. 2. Books devoted to unix/linux OS. 3. Books devoted to the Internet and its services. 		
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Magazines devoted to computers and internet. 		
<p>Result of average student's workload</p>		
<p>Activity</p>	<p>Time (working hours)</p>	
1. Participation in lectures.	15	
2. Preparation of lab exercises.	15	
3. Individual projects.	10	
4. Preparation to the tests.	5	
<p>Student's workload</p>		
<p>Source of workload</p>	<p>hours</p>	<p>ECTS</p>
Total workload	45	3
Contact hours	35	2
Practical activities	20	1

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Metrology		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty -	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: - Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) Major		(university-wide, from another field) from field
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 4 100% 4 100%
Responsible for subject / lecturer: dr inż. Maciej Wawrzyniak email: mwawrz@et.put.poznan.pl tel. 665 3835 Electronics and Telecommunications Polanka 3		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	1. Has a systematic knowledge of mathematical analysis, algebra and theory of probability. (K1_W01) 2. Has a basic, systematic knowledge of physics. (K1_W02) 3. Has a detailed, systematic knowledge of the fundamentals of circuit theory, together with necessary mathematical background; this knowledge allows him/her to understand, analyze and evaluate the operation of electrical circuits. (K1_W05)
2	Skills	1. Is able to extract information from Polish or English language literature, databases and other sources. Is able to synthesize gathered information, draw conclusions, and justify opinions. (K1_U01) 2. Is capable of studying autonomously. (K1_U05) 3. Demonstrates the ability to solve basic problems in physics. (K1_08) 4. Demonstrates the ability to solve typical tasks and problems related to analysis of electrical circuits. (K1_09) 5. Can implement the occupational health and safety principles. (K1_U27)
3	Social competencies	1. Is aware of the limitations of his/her current knowledge and skills; is committed to further self-study. (K1_K01) 2. Is able to participate in collaborative projects. (K1_K02)
Assumptions and objectives of the course: -To present of the basic definitions and concepts of metrology, measurement methods and measurement equipment. To introduce students to the analysis and presentation of data and the determination of errors and measurement uncertainty. Practical carrying out laboratory experiments involving the preparation and execution of measurements.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Has a systematic knowledge, together with necessary mathematical background, of the fundamentals of metrology, which is necessary to measure the signal properties and the parameters of electronic and telecommunication systems components. Has knowledge of measurement methods, measurement equipment. - [K1_W18] 2. Has knowledge of devices and systems exploitation. - [K1_W20]		
Skills:		

<p>1. Is able to extract information from English language literature, databases and other sources. Is able to synthesize gathered information, draw conclusions, and justify opinions. - [K1_U01]</p> <p>2. Is able to prepare a well-documented study, in English or in Polish, on problems related to electronics and telecommunication. - [K1_U03]</p> <p>3. Is capable of studying autonomously. - [K1_U05]</p> <p>4. Is able to measure typical parameters of signals, systems and devices, in particular those used in telecommunication. Is able to choose appropriate methods to measure given electrical quantities and parameters of signals and devices. Is able to plan and perform measurements and analyze the results. - [K1_U17]</p>		
Social competencies:		
<p>1. Demonstrates responsibility and professionalism in solving technical problems. - [K1_K02]</p> <p>2. Demonstrates responsibility for designed electronic and telecommunication systems. Is aware of the hazards they pose for individuals and communities if they are improperly designed or produced. - [K1_K03]</p> <p>3. Is aware of the main challenges facing electronics and telecommunication in the 21st century. - [K1_K04]</p>		
Assessment methods of study outcomes		
-Lectures passing based on written test from content of the lectures.		
Course description		
<p>- Basic definitions and terms of metrology.</p> <p>- Methods, principles and procedures of measurements. Digital measurements of frequency and period.</p> <p>- Sources of errors. Identification of systematic errors.</p> <p>- Statistics in metrology. Point and range estimation.</p> <p>- Uncertainty and error in direct and indirect measurements. Calculation of the total standard uncertainty.</p> <p>- Measurements with analog and digital oscilloscopes.</p> <p>- Analogue and digital measurements of voltage, current and resistance.</p> <p>- Metrological attributes of modern measuring instruments.</p> <p>- Selected characteristics of analog and digital measurements.</p> <p>- Conditioning circuitry and signal conditioners.</p> <p>- Digital to analog converters.</p> <p>- Analog to digital converters: the dual ramp ADC; flash , successive approximation and sub-ranging types. ADC errors.</p>		
Basic bibliography:		
<p>1. Czichos H., Tetsuya S., and Leslie E. S., eds, Springer handbook of metrology and testing, Springer, 2011.</p> <p>2. Rabinovich S. G., Measurement errors and uncertainty: theory and practice. Springer, 2005.</p> <p>3. Bucher J. L., ed., The metrology handbook, ASQ Quality Press, 2012.</p> <p>4. Keithley Instruments, Inc, Low Level Measurements Handbook: Precision DC Current, Voltage, and Resistance Measurements, Keithley, 1998</p>		
Additional bibliography:		
<p>1. Fraden J., Handbook of modern sensors. Springer, 2010.</p> <p>2. Fornasini P., The uncertainty in physical measurements, Springer, 2008.</p> <p>3. Layer E., Tomczyk K, eds., Measurements, modelling and simulation of dynamic systems, Springer, 2010.</p> <p>4. Scott A. W.,Frobenius R., RF Measurements for Cellular Phones and Wireless Data Systems, Wiley, 2013.</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures.	30	
2. Literature studies	50	
3. Preparation to the test.	20	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	35	2
Practical activities	0	0

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Health and Safety		Code
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty Information and Comm. Technologies	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: - Project/seminars: -		No. of credits 0
Status of the course in the study program (Basic, major, other) basic		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 0 100%
Responsible for subject / lecturer: dr inż. Beata Mrugalska email: beata.mrugalska@put.poznan.pl tel. +48(61) 6653364 Faculty of Engineering Management ul. Strzelecka 11 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student recognizes the fundamental risks to health and life, which are associated with functioning at the University.
2	Skills	The student is able to apply this knowledge during the whole process of studying.
3	Social competencies	The student is capable of taking responsible action in emergency situations.
Assumptions and objectives of the course: - The students become acquainted with the rules, regulations and rules relating to safety, work hygiene and fire protection.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Knows occupational health and safety principles. - [K1_W25]		
Skills:		
1. Is able to extract information from Polish or English language literature, databases and other sources. Is able to synthesize gathered information, draw conclusions, and justify opinions. - [K1_U01]		
2. Can implement the occupational health and safety principles. - [K1_U27]		
Social competencies:		
1. Is aware of the limitations of his/her current knowledge and skills; is committed to further self-study. - [K1_K01]		
2. Demonstrates responsibility for designed electronic and telecommunication systems. Is aware of the hazards they pose for individuals and communities if they are improperly designed or produced. - [K1_K03]		
Assessment methods of study outcomes		
- written test - answers are scored 0 or 1; credits will be given if a student has achieved at least 85% of all points		
Course description		

<p>- Selected legal legislation concerning occupational health safety and, including:</p> <p>a) the rights and obligations of students and universities in terms of occupational health and safety, and liability for infringement of the provisions and principles of health and safety at work,</p> <p>b) accidents and illnesses</p> <p>c) prevention with regard to the protection of the health of students.</p> <p>The impact of hazardous, harmful, and disruptive factors on safety and health. Risk assessment of factors which exist in learning and working processes and methods to protect against risks towards students' health and life. Problems that are linked to the organisation of workplace, taking into account ergonomic principles, as well as including work stations with screen monitors and other office equipment. The proceedings in the event of accidents and emergency (e.g. fire, failure), including rules of first aid in the event of an accident.</p>		
<p>Basic bibliography:</p> <p>1. Selected legal legislation</p>		
<p>Additional bibliography:</p>		
<p>Result of average student's workload</p>		
<p>Activity</p>		<p>Time (working hours)</p>
<p>1. Participation in lectures</p>		<p>4</p>
<p>Student's workload</p>		
<p>Source of workload</p>	<p>hours</p>	<p>ECTS</p>
Total workload	4	0
Contact hours	4	0
Practical activities	4	0