Załącznik nr 2 do uchwały nr 416 Senatu Politechniki Opolskiej z dnia 29.05.2024 r.

Załącznik nr 11 do Księgi Jakości Kształcenia

KARTA PROGRAMU STUDIÓW

Nazwa programu studiów Computer Engineering

Specjalności: przedmioty kierunkowe ogólne - KiOg

Nazwa wydziału Wydział Elektrotechniki, Automatyki i Informatyki

poziom studiów (I stopnia / II stopnia / jednolite studia magisterskie)	Studia pierwszego stopnia
profil studiów (ogólnoakademicki / praktyczny)	Ogólnoakademicki
forma studiów (stacjonarne / niestacjonarne)	Studia stacjonarne
program studiów obowiązuje od roku akademickiego	2024/2025
data i numer uchwały Senatu ustalającej program studiów	29.05.2024 Uchwała nr 416 Senatu Politechniki Opolskiej
data i numer uchwały Senatu ustalającej kierunkowe efekty uczenia się	29.05.2024 Uchwała nr 416 Senatu Politechniki Opolskiej
dyscyplina wiodąca (w ramach której będzie uzyskiwana ponad połowa efektów uczenia się) – podać udział procentowy	Informatyka Techniczna i Telekomunikacja - 75%
pozostałe dyscypliny – podać udział procentowy	Automatyka, Elektronika, Elektrotechnika i Technologie Kosmiczne - 25%
czas trwania studiów (w semestrach)	7 sem.
łączna liczba punktów ECTS (w tym praktyki)	KiOg - 210 Razem - 210
łączna liczba godzin w planie studiów (w tym praktyki)	KiOg - 2650 Razem - 2650

wymiar (godzinowy) praktyk zawodowych, zasady i forma ich	KiOg - godziny 160 punkty ECTS 6
odbywania oraz liczba punktów ECTS, jaką student musi uzyskać w ramach tych praktyk (jeśli program studiów przewiduje praktyki)	Zasady i formę odbywania praktyk określono w karcie opisu przedmiotu oraz w Regulaminie praktyk studenckich w Politechnice Opolskiej.
tytuł zawodowy otrzymywany przez absolwenta	Inżynier
klasyfikacja ISCED	0613
związek z misją i strategią rozwoju Politechniki Opolskiej	Kształcenie na kierunku Informatyka jest zgodne z misją Politechniki Opolskiej oraz jej strategią rozwoju, uchwaloną przez Senat PO.
wymagania wstępne – oczekiwane kompetencje kandydata (szczególnie w przypadku studiów drugiego stopnia)	Kandydat ubiegający się o przyjęcie na studia stacjonarne I-go stopnia na kierunku Informatyka musi posiadać kwalifikacje decydujące o uzyskaniu świadectwa dojrzałości, Kandydat powinien posiadać podstawową wiedzę ogólną, znać podstawowe ekonomiczne, prawne i inne skutki różnych rodzajów działań, oraz potrafić wykorzystywać posiadaną wiedzę.
zasady rekrutacji (w tym: przedmioty kwalifikacyjne oraz ustalone dla nich współczynniki wagowe)	Podstawę przyjęcia na studia stacjonarne I stopnia stanowią wyniki egzaminu maturalnego (dojrzałości). Kryterium decydującym o przyjęciu na studia stacjonarne I stopnia jest wartość wskaźnika rankingowego (R) obliczanego w oparciu o liczbę punktów uzyskanych za egzaminie maturalnym (dojrzałości), z języka obcego nowożytnego oraz dwóch przedmiotów wybranych z grupy przedmiotów fizyka (z astronomią), informatyka, język polski, matematyka. W obliczaniu wskaźnika R, przedmioty mają następujące wagi: język polski oraz język obcy - waga 0,5. Pozostałe przedmioty mają wagę 2.0. Szczegółowe WARUNKI I TRYB REKRUTACJI NA STUDIA W POLITECHNICE OPOLSKIEJ są publikowane na stronie http://www.po.edu.pl w zakładce Rekrutacja i w informatorze dla kandydatów na studia na dany rok akademicki.
sposoby weryfikacji zakładanych efektów uczenia się	Opisy sposobów weryfikacji efektów uczenia się dla kierunku Informatyka studia stacjonarne I stopnia przedstawione są Kartach opisu przedmiotów. Weryfikacja założonych efektów uczenia się osiąganych przez studenta podczas realizacji zajęć dydaktycznych monitorowana jest zgodnie z Procedurą PO M-01 Księgi Jakości Kształcenia - Ocena i weryfikacja efektów uczenia się oraz programów studiów.

sumaryczne wskaźniki charakteryzujące program studiów, a w tym:	łączna liczba punktów ECTS, którą student uzyskuje w ramach zajęć z bezpośrednim udziałem nauczycieli akademickich lub innych osób prowadzących zajęcia	Specj. / ECTS kont. KiOg / 108
	łączna liczba punktów ECTS, którą student uzyskuje w ramach zajęć z zakresu nauk podstawowych, do których odnoszą się efekty uczenia się dla określonego programu studiów, poziomu i profilu studiów	KiOg - 34
	dla profilu praktycznego łączna liczba punktów ECTS przypisanych do zajęć związanych z praktycznym przygotowaniem zawodowym, dla profilu ogólnoakademickiego łączna liczba punktów ECTS przypisanych do zajęć związanych z prowadzonymi w uczelni badaniami naukowymi w dyscyplinie lub dyscyplinach, do których przyporządkowany jest kierunek studiów	KiOg - 143
	liczba punktów ECTS, którą student musi uzyskać w ramach zajęć z dziedziny nauk humanistycznych lub nauk społecznych	KiOg - 7
	w przypadku studiów stacjonarnych I stopnia lub jednolitych magisterskich liczba godzin zajęć z wychowania fizycznego	godziny 60
	liczba punktów ECTS objętych programem studiów uzyskiwana w ramach zajęć do wyboru	KiOg - 78

Program studiów zaopiniowany przez organ samorządu studenckiego.

Sylwetka absolwenta

Computer Engineering, Studia pierwszego stopnia, Studia stacjonarne,

Wiedza:

Absolwent po ukończeniu studiów I stopnia posiada wiedzę w następujących obszarach: w zakresie matematyki obejmującą logikę matematyczną, kombinatorykę, teorię liczb oraz metody probabilistyczne, podstawową wiedzę w zakresie fizyki i elektrotechniki, niezbędną do zrozumienia podstaw działania komputerów, urządzeń z nimi współpracujących oraz sieci komputerowych, elementarną wiedzę w zakresie metod pomiarowych, szacowania niepewności pomiarów i rachunku błędów, znajomość podstawowych technik pracy z grafiką wektorową, bitmapową oraz trójwymiarową, znajomość składni i semantyki języków programowania wykorzystywanych w budowaniu aplikacji, w tym środowiska .NET, znajomość podstawowych metod, technik i narzędzi kompilacji programów, pogłębiona wiedzę w zakresie programowania obiektowego, podstawową wiedzę w zakresie algorytmów i struktur danych, złożoności algorytmów oraz istoty problemów nierozstrzygalnych i niepodatnych, wiedzę z zakresu budowy i funkcjonowania systemów komputerowych, wiedzę z zakresu reprezentacji danych stało- i zmienno-przecinkowych oraz realizacji operacji logicznych i arytmetycznych, wiedzę z zakresu budowy i zadań współczesnych systemów operacyjnych, znajomość i rozumienie celów inżynierii oprogramowania, wiedzę na temat cyklu życia oprogramowania, metod specyfikacji wymagań systemowych oraz metod analizy strukturalnej i obiektowej, uporządkowaną wiedzę dotyczącą sieci komputerowych, protokołów sieciowych i ich wzajemnych relacji, wiedzę w zakresie podstaw projektowania sieci komputerowych zgodnie z obowiązującymi normami i standardami, wiedzę w zakresie urządzeń wchodzących w skład sieci teleinformatycznych, w tym układów bezprzewodowych oraz konfigurowania tych urządzeń w sieciach lokalnych i rozległych, znajomość podstawowych pojęć dotyczących projektowania relacyjnych baz danych: modelowania związków encji, współbieżnego przetwarzania transakcji, normalizacji, więzów integralności oraz dobrą znajomość języków SQL, PL/SQL, T-SQL, szczegółową wiedzę w zakresie zagrożeń bezpieczeństwa i podatności systemów i sieci komputerowych na zagrożenia; znajomość i rozumienie metod ochrony danych i zabezpieczeń systemów i sieci komputerowych, nowoczesnych algorytmów szyfrowania i uwierzytelniania wiadomości, wiedze z zastosowania systemów wbudowanych oraz w zakresie terminologii przetwarzania sygnałów i analizy systemów, wiedzę w zakresie metod sztucznej inteligencji; znajomość m.in. budowy, działania i zastosowań sztucznych sieci neuronowych oraz systemów logiki rozmytej, znajomość technik, metod i narzędzi niezbędnych do budowy serwisów internetowych; znajomość podstawowych pojęć i zasad prawa ochrony własności intelektualnej, zasób słownictwa języka angielskiego niezbędny do komunikowania się w środowisku pracy.

Umiejętności:

Absolwent po ukończeniu studiów I stopnia posiada następujące umiejętności: potrafi tworzyć aplikacje z zastosowaniem języków programowania: C , C#, Java, Python; potrafi programować w środowisku .NET, potrafi zaprojektować i zaimplementować system informatyczny, potrafi zastosować odpowiedni algorytm do danego problemu algorytmicznego, potrafi posługiwać się technikami programowania w asemblerze do tworzenia prostych aplikacji w 16 oraz 32 bitowym trybie pracy procesora (również z zastosowaniem koprocesora, systemu przerwań, itp.), posługuje się podstawowym aparatem matematycznym różnych działów matematyki oraz stosuje metody i pojęcia matematyki w problemach i algorytmach informatyki, potrafi wykonywać podstawowe operacje związane z konfigurowaniem i administrowaniem systemami operacyjnymi Windows oraz Linux, potrafi efektywnie zarządząć użytkownikami i grupami użytkowników oraz poprawnie zabezpieczyć system operacyjny przed niepowołanym dostępem, potrafi analizować modele obiektowe UML oraz dobrać i zastosować narzędzia CASE adekwatne do projektowania SI, potrafi – zgodnie z zadaną specyfikacją – zaprojektować i skonfigurować sieć komputerową, potrafi dokonać wyboru oraz zaprojektować odpowiednią strukturę łącza transmisji danych do rozwiązania określonego zadania, potrafi zaplanować i przeprowadzić eksperymenty, opracować i interpretować uzyskane wyniki, wyciągać i formułować właściwe wnioski, potrafi stosować podstawowe metody statystyczne do różnych zagadnień m.in. do weryfikacji hipotez, potrafi projektować i realizować hurtownie danych z wykorzystaniem narzędzi ORACLE oraz MS SQL Server; posiada umiejetność realizacji obiektowych baz danych z zastosowaniem ORACLE, potrafi przeprowadzić analizę problemu i zaproponować rozwiązanie algorytmiczne i programistyczne systemów bazodanowych, potrafi wykorzystać procesor sygnałowy i jego peryferia programując proste systemy wbudowane, potrafi dokonać wyboru oraz zaprojektować odpowiednią strukturę sztucznej sieci neuronowej (lub systemu rozmytego) do rozwiązania określonego zadania, potrafi wykorzystywać techniki, metody, narzędzia niezbędne do budowy serwisów internetowych, ma umiejętność samokształcenia się, potrafi porozumiewać się w języku angielskim w sytuacjach biznesowych; potrafi pozyskiwać informacje w języku angielskim, przetwarzać je i interpretować, potrafi pozyskiwać informacje z aktów prawnych oraz dokonywać ich interpretacji oraz wyciągać samodzielne wnioski i wyrażać opinie; potrafi ocenić wykonaną pracę zgodnie z prawem patentowym; potrafi dokonać wstępnej analizy ekonomicznej, potrafi pracować indywidualnie i w zespole, stosować zasady bezpieczeństwa i higieny pracy oraz oszacować czas potrzebny na realizację zleconego zadania zapewniający dotrzymanie terminów.

Kompetencje społeczne:

Absolwent po ukończeniu studiów I stopnia posiada następujące, ważniejsze kompetencje społeczne: rozumie potrzebę stałego dokształcania oraz uczenia się przez całe życie; potrafi w kreatywny sposób zastosować zdobytą wiedzę; potrafi zdobywać potrzebne informacje i dzielić się wiedzą z innymi, ma świadomość odpowiedzialności za pracę własną oraz gotowość podporządkowania się zasadom pracy w zespole, potrafi współdziałać i pracować w grupie, przyjmując w niej różne role, ma świadomość ważności przestrzegania zasad etyki zawodowej i społecznej, poszanowania różnorodności poglądów, ma świadomość ważności i rozumie pozatechniczne aspekty i skutki działalności inżynierskiej, w tym jej wpływu na środowisko, prawidłowo identyfikuje i rozstrzyga dylematy związane z wykonywaniem zawodu informatyka.

Knowledge:

Upon completion of I cycle studies, a graduate has knowledge in the following disciplines: mathematics, including mathematical logic, combinatorics, number theory and probability methods, basic knowledge within the scope of physics and electro-technology necessary for understanding the bases for operation of computers, devices connected to them and computer networks. elementary knowledge within the scope of measurement methods, estimating uncertainty of measurement and calculus of errors, familiarity with basic techniques of working with vector, bitmap and three-dimensional graphics, familiarity with syntax and semantics of programming languages used in application development, including NET environment. knowledge of basic methods, techniques and tools for program compilations, deep knowledge within the scope of object programming, basic knowledge within the scope of algorithm and data structures, algorithm complexity and the essence of undecidable and insusceptible problems, knowledge of computer system structure and functions knowledge from the scope of fixed-point and floating point data as well as performance of logical and arithmetic operations, knowledge within the scope of structure and tasks of modern operational systems, knowledge and understanding of software engineering aims, knowledge of the software life cycle, methods of system reguirement specification and methods of structural and object analysis, structured knowledge on computer networks, network protocols and mutual relations, knowledge within the scope of developing computer networks, according to effective norms and standards, knowledge within the scope of devices in the tele-information network, including wireless structures and configuration of these devices in local and extensive networks, knowledge of basic terms concerning the development of relational data bases: modelling entity relationships, transaction concurrent computing, normalisation, integrity constraints and good knowledge of SQL, PL/SQL, T-SQL languages, detailed knowledge within the scope of security threats and vulnerability of computer systems and networks to threats; knowledge and understanding of data protection methods and system and computer network security devices, modern encoding algorithms and message authentication, knowledge of embedded systems and within the scope of terminology of signal processing and system analysis, knowledge within the scope of AI methods; familiarity with, e.g. structure, operation and application of artificial neural networks and fuzzy logic systems, familiarity with techniques, methods and tools necessary to develop internet services; familiarity of basic terms and legal regulations on intellectual property protection, a range of English vocabulary necessary to communicate in working environment.

Skills:

A graduate upon completion of I cycle studies has the following skills: can develop applications with programming languages: C. C#. Java, Python; can program in .NET environment, can develop and implement an IT system, can use an appropriate algorithm for a given algorithm problem, can use programming techniques in the assembler for developing simple applications in 16- and 32-bit processor operation mode (also with the use of floatingpoint unit, interruption system, etc.), uses basic mathematical skills from various mathematical domains and applies mathematical methods and terms to IT problems and algorithms, can perform simple operations connected with configuration and administration of Windows and Linux operational systems, can effectively manage users and user groups as well as correctly protect the operational system against unauthorised access, can analyse UML object models and select and use CASE tools adequate for SI development can according to required specification - develop and configure a computer network, can select and develop appropriate structure for data transmission connection to solve a given task, can plan and perform experiments, develop and interpret obtained results, draw and formulate appropriate conclusions, can apply basic statistical methods for various problems, e.g. for hypothesis verification, can develop and perform data warehouses with the use of ORACLE and MS SQL Server tools; can perform object data bases with the use of ORACLE, can conduct problem analysis and propose algorithm and programming solutions for data base systems, can use a signal processor and its peripheral devices when developing simple embedded systems, can select and develop appropriate structure for artificial neural system (or fuzzy system) to solve a given problem, can use techniques, methods, tools necessary to develop internet services, has a skill of self-development, can communicate in English in business situations; can find information in English, process and interpret it, can obtain information from legal acts and interpret it as well as draw independent conclusions and express opinions; can evaluate the performed work according to the patent law; can conduct initial economic analysis, can work individually and in a team, use principles of occupational health and safety as well as estimate the time necessary to perform an assigned task, ensuring meeting the deadlines.

Social competences:

A graduate upon completion of I cycle studies has the following important social competences: understands the need pf continuous education and learning for life; can creatively use the obtained knowledge; can obtain necessary information and share it with others, is aware of the responsibility for one's work and is ready to observe the rules of team work, can cooperate and work in a team, taking on various roles, is aware of the importance of observing the principles of professional and social ethics, respect for variety of opinion, is aware how important engineer activity is, understands its non-technological aspects and consequences, including influence on the environment. correctly identifies and solves dilemmas connected with the profession of IT programmer.

Tabela kierunkowych efektów uczenia się

program studiów (kierunek studiów): Computer Engineering poziom studiów: Studia pierwszego stopnia profil studiów: Ogólnoakademicki			
symbol kierunkowych efektów uczenia się	efekty uczenia się (treść)		
	Wiedza: zna i rozumie		
K1_W01	A student has knowledge in the area of basic education, i.e. mathematics, physics, and others necessary for solving engineering problems		
K1_W02	A student knows basic topics in the area work safety and ergonomy, economy, economy law, entrepreneurship principles and copyright protection regulations.		
K1_W03	A student has general knowledge of humanities and social education.		
K1_W04	A student knows and understands a foreign language theory and terminology at the B2 level of the European language evaluation scale.		
K1_W05	A student has a general knowledge in the engineering disciplines associated with the computer science.		
K1_W06	A student has knowedge in programming and software engineering. Understands basic processes in the computer systems' life cycle.		
K1_W07	A student has knowledge in the computer networks and operating systems area.		
K1_W08	A student has knowledge in data bases area.		
K1_W09	A student has knowledge in computer graphics area.		
K1_W10	A student has knowledge in selected methods of artificial intelligence and their applications in computer science.		
	Umiejętności: potrafi		
K1_U01	A student can utilize gained knowledge in the area of basic education, i.e. mathematics, physics, and others necessary for solving engineering problems.		
K1_U02	A student can practicaly use his knowledge of the area work safety and ergonomy, economy, economy law, entrepreneurship principles and copyright protection regulations and perform economical evaluation of proposed engineering solutions.		
K1_U03	A student can perceive metatechnical, system, social and ethical aspects of the proposed engineering tasks and their solutions.		
K1_U04	A student can use a foreign language at the B2 level of the European language evaluation scale.		
K1_U05	A student can individually plan and run a live-long self-education process.		

K1_U06A student can select the sources of informaction with the use of advanced ICT techniques in the correct way. He can validate and synthesize data from various sources.K1_U07A student can individually and in a team perform engineering task and run basic scientific research, interpret it's results and make conclusions.K1_U08A student can use specialist terminology (also in a foreign language) and judge other opinions in a debate.K1_U09A student can utilize knowledge in the engineering disciplines associated with the computer science.K1_U10A student can design, according to a given specification, perform and maintain computer systems. Can provide a critical evaluation and propose improvements to existing solutions.K1_U11A student can install, configure and administer operating systems with the use of appropriate methods and techniques.K1_U12A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.K1_U14A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.K1_U15A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.K1_K02A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.K1_K03A student can think and act entrepreneurially.K1_K03A student can think and act entrepreneurially.		
A student can individually and in a team perform engineering task and run basic scientific research, interpret it's results and make conclusions.K1_U08A student can use specialist terminology (also in a foreign language) and judge other opinions in a debate.K1_U09A student can utilize knowledge in the engineering disciplines associated with the computer science.K1_U10A student can design, according to a given specification, perform and maintain computer systems. Can provide a critical evaluation and propose improvements to existing solutions.K1_U11A student can design, according to a given specification, perform and maintain computer systems. Can provide a critical evaluation and propose improvements to existing solutions.K1_U11A student can install, configure and administer operating systems with the use of appropriate methods and techniques.K1_U13A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.K1_U14A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.K1_K1_K01A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.K1_K02A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.K1_K03A student can think and act entrepreneurially.K1_K03A student can make decision and respect to the profestion and respect to the individually and in a team.	K1_U06	A student can select the sources of informaction with the use of advanced ICT techniques in the correct way. He can validate and synthesize data from various sources.
K1_U08 A student can use specialist terminology (also in a foreign language) and judge other opinions in a debate. K1_U09 A student can utilize knowledge in the engineering disciplines associated with the computer science. K1_U10 A student can design, according to a given specification, perform and maintain computer systems. Can provide a critical evaluation and propose improvements to existing solutions. K1_U11 A student can design, according to a given specification, perform and maintain computer networks with appropriate methods and techniques. K1_U12 A student can install, configure and administer operating systems with the use of appropriate methods and techniques. K1_U13 A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques. K1_U14 A student can apply selected methods of Al to basics computer science tasks with appropriate methods and techniques. K1_U15 A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team. K1_K02 A student can think and act entrepreneurially. A student can thik and act enterpreneurially.	K1_U07	A student can individually and in a team perform engineering tasks and run basic scientific research, interpret it's results and make conclusions.
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K1_U10A student can design, according to a given specification, perform and maintain computer systems. Can provide a critical evaluation and propose improvements to existing solutions.K1_U11A student can design, according to a given specification, perform and maintain computer networks with appropriate methods and techniques.K1_U12A student can install, configure and administer operating systems with the use of appropriate methods and techniques.K1_U13A student can design, according to a given specification, perform and maintain data bases with appropriate methods and techniques.K1_U13A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.K1_U14A student can apply selected methods of Al to basics computer science tasks with appropriate methods and techniques.K1_U15A student can make decisions, also in difficult situations, critically 	K1_U09	A student can utilize knowledge in the engineering disciplines associated with the computer science.
K1_U11A student can design, according to a given specification, perform and maintain computer networks with appropriate methods and techniques.K1_U12A student can install, configure and administer operating systems with the use of appropriate methods and techniques.K1_U13A student can design, according to a given specification, perform and maintain data bases with appropriate methods and techniques.K1_U14A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.K1_U15A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.K1_U15A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.K1_K02A student is aware of the impact of the tasks performed on the social environment and the ability to act for the public interest.K1_K03A student can act in accordance with ethics and respect to the professionel tradition.	K1_U10	A student can design, according to a given specification, perform and maintain computer systems. Can provide a critical evaluation and propose improvements to existing solutions.
K1_U12A student can install, configure and administer operating systems with the use of appropriate methods and techniques.K1_U13A student can design, according to a given specification, perform and maintain data bases with appropriate methods and techniques.K1_U14A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.K1_U15A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.K1_K01A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both 	K1_U11	A student can design, according to a given specification, perform and maintain computer networks with appropriate methods and techniques.
K1_U13A student can design, according to a given specification, perform and maintain data bases with appropriate methods and techniques.K1_U14A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.K1_U15A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.K1_U15A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.K1_K01K1 was to the transfer to the tasks with appropriate methods and techniques.K1_K02A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both 	K1_U12	A student can install, configure and administer operating systems, with the use of appropriate methods and techniques.
K1_U14A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.K1_U15A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.K0Kompetencje społeczne: jest gotów doK1_K01A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.K1_K02A student is aware of the impact of the tasks performed on the social environment and the ability to act for the public interest.K1_K03A student can think and act entrepreneurially.A student can act in accordance with ethics and respect to the performed by and in a conduct with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the areformed by a student can act in accordance with ethics and respect to the	K1_U13	A student can design, according to a given specification, perform and maintain data bases with appropriate methods and techniques.
K1_U15A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.Kompetencje społeczne: jest gotów doK1_K01K1_K01K1_K02K1_K03A student is aware of the impact of the tasks performed on the social environment and the ability to act for the public interest.K1_K03A student can think and act entrepreneurially.A student can act in accordance with ethics and respect to the preformed between the respect to the preformed between the respect to the	K1_U14	A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.
Kompetencje społeczne: jest gotów doK1_K01A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.K1_K02A student is aware of the impact of the tasks performed on the social environment and the ability to act for the public interest.K1_K03A student can think and act entrepreneurially.A student can act in accordance with ethics and respect to the prefersional tradition.	K1_U15	A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.
K1_K01A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.K1_K02A student is aware of the impact of the tasks performed on the social environment and the ability to act for the public interest.K1_K03A student can think and act entrepreneurially.A student can act in accordance with ethics and respect to the prefersional tradition.		Kompetencje społeczne: jest gotów do
K1_K02A student is aware of the impact of the tasks performed on the social environment and the ability to act for the public interest.K1_K03A student can think and act entrepreneurially.A student can act in accordance with ethics and respect to the preference and the right	К1_К01	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.
K1_K03 A student can think and act entrepreneurially. A student can act in accordance with ethics and respect to the preference of the dition.	К1_К02	A student is aware of the impact of the tasks performed on the social environment and the ability to act for the public interest.
A student can act in accordance with ethics and respect to the	K1_K03	A student can think and act entrepreneurially.
K1_K04 standards of behaviour both in the professional environment and private life.	К1_К04	A student can act in accordance with ethics and respect to the professional tradition. Promotes a pro-quality culture and the right standards of behaviour both in the professional environment and private life.

Objaśnienia

Symbol efektu tworzą:

- litera K - wyróżnik efektów kierunkowych,

- liczba 1 studia pierwszego stopnia,
- znak _ (podkreślnik),

- litery W, U lub K – oznaczenie kategorii efektów (W – wiedza, U – umiejętności, K – kompetencje społeczne),

- 01, ... - numer efektu w obrębie danej kategorii, zapisany w postaci dwóch cyfr (numery 1-9 należy poprzedzić cyfrą 0).

Tabela odniesień efektów kierunkowych do charakterystyk drugiego stopnia Polskiej Ramy Kwalifikacji (dla programów studiów przypisanych do więcej niż jednej dyscypliny)

program studiów (kierunek studiów): Computer Engineering poziom studiów: Studia pierwszego stopnia profil studiów: Ogólnoakademicki				
dyscypliny naukowe tworzące obszar odniesienia: 1. Informatyka Techniczna i Telekomunikacja 2. Automatyka, Elektronika, Elektrotechnika i Technologie Kosmiczne				
symbol kierunkowych	efekty uczenia sie (treść)	kod składnika	waga (%) efektu kier efektów uczenia się o	unkowego do zbioru dla dyscypliny
efektów uczenia się		opisu	1	2
	Wiedza: zna i rozumie		1	
K1_W01	A student has knowledge in the area of basic education, i.e. mathematics, physics, and others necessary for solving engineering problems	P6S_WG	50	50
K1_W02	A student knows basic topics in the area work safety and ergonomy, economy, economy law, entrepreneurship principles and copyright protection regulations.	P6S_WK2 P6S_WK3	100	0
К1_W03	A student has general knowledge of humanities and social education.	P6S_WK1 P6S_WK2	75	25
K1_W04	A student knows and understands a foreign language theory and terminology at the B2 level of the European language evaluation scale.	P6S_WG	75	25
K1_W05	A student has a general knowledge in the engineering disciplines associated with the computer science.	P6S_WG	0	100
K1_W06	A student has knowedge in programming and software engineering. Understands basic processes in the computer systems' life cycle.	P6S_WG	100	0
к1_W07	A student has knowledge in the computer networks and operating systems area.	P6S_WG	100	0
K1_W08	A student has knowledge in data bases area.	P6S_WG	100	0
K1_W09	A student has knowledge in computer graphics area.	P6S_WG	100	0
К1_W10	A student has knowledge in selected methods of artificial intelligence and their applications in computer science.	P6S_WG	30	70
	Umiejętności: potrafi		1	1
K1_U01	A student can utilize gained knowledge in the area of basic education, i.e. mathematics, physics, and others necessary for solving engineering problems.	P6S_UK1	50	50
K1_U02	A student can practicaly use his knowledge of the area work safety and ergonomy, economy, economy law, entrepreneurship principles and copyright protection regulations and perform economical evaluation of proposed engineering solutions.	P6S_UO1	75	25
К1_U03	A student can perceive metatechnical, system, social and ethical aspects of the proposed engineering tasks and their solutions.	P6S_UO2	50	50
К1_U04	A student can use a foreign language at the B2 level of the European language evaluation scale.	P6S_UK3	100	0
K1_U05	A student can individually plan and run a live-long self-education process.	P6S_UU	50	50
K1_U06	A student can select the sources of informaction with the use of advanced ICT techniques in the correct way. He can validate and synthesize data from various sources.	P6S_UW	100	0
K1_U07	A student can individually and in a team perform engineering tasks and run basic scientific research, interpret it's results and make conclusions.	P6S_UO1 P6S_UO2	50	50
K1_U08	A student can use specialist terminology (also in a foreign language) and judge other opinions in a debate.	P6S_UK1 P6S_UK2 P6S_UK3	100	0
К1_U09	A student can utilize knowledge in the engineering disciplines associated with the computer science.	P6S_UW	0	100
К1_U10	A student can design, according to a given specification, perform and maintain computer systems. Can provide a critical evaluation and propose improvements to existing solutions.	P6S_UW	100	0
К1_U11	A student can design, according to a given specification, perform and maintain computer networks with appropriate methods and techniques.	P6S_UW	100	0
К1_U12	A student can install, configure and administer operating systems, with the use of appropriate methods and techniques.	P6S_UW	100	0
K1_U13	A student can design, according to a given specification, perform and maintain data bases with appropriate methods and techniques	P6S_UW	100	0

K1_U14	A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.	P6S_UW	80	20
К1_U15	A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.	P6S_UW	30	70
	Kompetencje społeczne: jest gotów d))	•	
К1_К01	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	P6S_KK1 P6S_KO3	75	25
К1_К02	A student is aware of the impact of the tasks performed on the social environment and the ability to act for the public interest.	P6S_KO1 P6S_KO2 P6S_KO2 P6S_KR	75	25
K1_K03	A student can think and act entrepreneurially.	P6S_KO3	75	25
K1_K04	A student can act in accordance with ethics and respect to the professional tradition. Promotes a pro-quality culture and the right standards of behaviour both in the professional environment and private life.	P6S_KK2 P6S_KO2 P6S_KR	75	25

Uniwersalne charakterystyki poziomu 6 Polskiej Ramy Kwalifikacji zostały uwzględnione

Tabela pokrycia charakterystyk drugiego stopnia Polskiej Ramy Kwalifikacji przez kierunkowe efekty uczenia się (dla programów studiów przypisanych do więcej niż jednej dyscypliny)

program studiów (kierunek studiów): Computer Engineering poziom studiów: Studia pierwszego stopnia profil studiów: Ogólnoakademicki				
dyscypliny naukowe tv 1. Informatyka Techni 2. Automatyka, Elektro	vorzące obszar odniesienia: czna i Telekomunikacja onika, Elektrotechnika i Technologie Kosmiczne			
kod składnika opisu charakterystyki drugiego stopnia Polskiej Ramy Kwalifikacji ef				
1. Efekty uczen	ia się w zakresie dyscypliny: Informatyka Techniczna i Telekomu	inikacja		
	Wiedza: zna i rozumie			
P6S_WG	Zna i rozumie w zaawansowanym stopniu – wybrane fakty, obiekty i zjawiska oraz dotyczące ich metody i teorie wyjaśniające złożone zależności między nimi, stanowiące podstawową wiedzę ogólną z zakresu dyscyplin naukowych lub artystycznych tworzących podstawy teoretyczne oraz wybrane zagadnienia z zakresu wiedzy szczegółowej – właściwe dla programu studiów.	K1_W01 K1_W04 K1_W06 K1_W07 K1_W08 K1_W09 K1_W10		
P6S_WK1	Zna i rozumie fundamentalne dylematy współczesnej cywilizacji.	K1_W03		
P6S_WK2	Zna i rozumie podstawowe ekonomiczne, prawne, etyczne i inne uwarunkowania różnych rodzajów działalności zawodowej związanej z kierunkiem studiów, w tym podstawowe pojęcia i zasady z zakresu ochrony własności przemysłowej i prawa autorskiego.	K1_W02 K1_W03		
P6S_WK3	Zna i rozumie podstawowe zasady tworzenia i rozwoju różnych form przedsiębiorczości.	K1_W02		
	Umiejętności: potrafi			
P6S_UK1	Potrafi komunikować się z otoczeniem z użyciem specjalistycznej terminologii.	K1_U01 K1_U08		
P6S_UK2	Potrafi brać udział w debacie – przedstawiać i oceniać różne opinie i stanowiska oraz dyskutować o nich.	K1_U08		
P6S_UK3	Potrafi posługiwać się językiem obcym na poziomie B2 Europejskiego Systemu Opisu Kształcenia Językowego.	K1_U04 K1_U08		
P6S_UO1	Potrafi planować i organizować pracę indywidualną oraz w zespole.	K1_U02 K1_U07		
P6S_UO2	Potrafi współdziałać z innymi osobami w ramach prac zespołowych (także o charakterze interdyscyplinarnym).	K1_U03 K1_U07		
P6S_UU	Potrafi samodzielnie planować i realizować własne uczenie się przez całe życie.	K1_U05		

P6S_UW	Potrafi wykorzystywać posiadaną wiedzę – formułować i rozwiązywać złożone i nietypowe problemy oraz wykonywać zadania w warunkach nie w pełni przewidywalnych przez: - właściwy dobór źródeł i informacji z nich pochodzących, dokonywanie oceny, krytycznej analizy i syntezy tych informacji, - dobór oraz stosowanie właściwych metod i narzędzi, w tym zaawansowanych technik informacyjno- komunikacyjnych.	K1_U06 K1_U10 K1_U11 K1_U12 K1_U13 K1_U14 K1_U15
	Kompetencje społeczne: jest gotów do	
P65_KK1	Jest gotów do krytycznej oceny posiadanej wiedzy i odbieranych treści.	К1_К01
P6S_KK2	Jest gotów do uznawania znaczenia wiedzy w rozwiązywaniu problemów poznawczych i praktycznych oraz zasięgania opinii ekspertów w przypadku trudności z samodzielnym rozwiązaniem problemu.	K1_K04
P6S_KO1	Jest gotów do wypełniania zobowiązań społecznych, współorganizowania działalności na rzecz środowiska społecznego.	K1_K02
P6S_KO2	Jest gotów do inicjowania działań na rzecz interesu publicznego.	K1_K02 K1_K02 K1_K04
P6S_KO3	Jest gotów do myślenia i działania w sposób przedsiębiorczy.	K1_K01 K1_K03
P6S_KR	Jest gotów do odpowiedzialnego pełnienia ról zawodowych, w tym: - przestrzegania zasad etyki zawodowej i wymagania tego od innych, - dbałości o dorobek i tradycje zawodu.	K1_K02 K1_K04
2. Efekty uczenia się v	w zakresie dyscypliny: Automatyka, Elektronika, Elektrotechnika Kosmiczne	i Technologie
	Wiedza: zna i rozumie	
P6S_WG	Zna i rozumie w zaawansowanym stopniu – wybrane fakty, obiekty i zjawiska oraz dotyczące ich metody i teorie wyjaśniające złożone zależności między nimi, stanowiące podstawową wiedzę ogólną z zakresu dyscyplin naukowych lub artystycznych tworzących podstawy teoretyczne oraz wybrane zagadnienia z zakresu wiedzy szczegółowej – właściwe dla programu studiów.	K1_W01 K1_W04 K1_W05 K1_W10
P6S_WK1	Zna i rozumie fundamentalne dylematy współczesnej cywilizacji.	K1_W03
P6S_WK2	Zna i rozumie podstawowe ekonomiczne, prawne, etyczne i inne uwarunkowania różnych rodzajów działalności zawodowej związanej z kierunkiem studiów, w tym podstawowe pojęcia i zasady z zakresu ochrony własności przemysłowej i prawa autorskiego.	K1_W03
P6S_WK3	Zna i rozumie podstawowe zasady tworzenia i rozwoju różnych form przedsiębiorczości.	
	Umiejętności: potrafi	
P6S_UK1	Potrafi komunikować się z otoczeniem z użyciem specjalistycznej terminologii.	K1_U01
P6S_UK2	Potrafi brać udział w debacie – przedstawiać i oceniać różne opinie i stanowiska oraz dyskutować o nich.	
P6S_UK3	Potrafi posługiwać się językiem obcym na poziomie B2 Europejskiego Systemu Opisu Kształcenia Językowego.	

P6S_UO1	Potrafi planować i organizować pracę indywidualną oraz w zespole.	K1_U02 K1_U07
P6S_UO2	Potrafi współdziałać z innymi osobami w ramach prac zespołowych (także o charakterze interdyscyplinarnym).	K1_U03 K1_U07
P6S_UU	Potrafi samodzielnie planować i realizować własne uczenie się przez całe życie.	K1_U05
P6S_UW	Potrafi wykorzystywać posiadaną wiedzę – formułować i rozwiązywać złożone i nietypowe problemy oraz wykonywać zadania w warunkach nie w pełni przewidywalnych przez: - właściwy dobór źródeł i informacji z nich pochodzących, dokonywanie oceny, krytycznej analizy i syntezy tych informacji, - dobór oraz stosowanie właściwych metod i narzędzi, w tym zaawansowanych technik informacyjno- komunikacyjnych	
	Kompetencje społeczne: jest gotów do	
P6S_KK1	Jest gotów do krytycznej oceny posiadanej wiedzy i odbieranych treści.	
P6S_KK2	Jest gotów do uznawania znaczenia wiedzy w rozwiązywaniu problemów poznawczych i praktycznych oraz zasięgania opinii ekspertów w przypadku trudności z samodzielnym rozwiązaniem problemu.	
P65_K01	Jest gotów do wypełniania zobowiązań społecznych, współorganizowania działalności na rzecz środowiska społecznego.	
P6S_KO2	Jest gotów do inicjowania działań na rzecz interesu publicznego.	K1_K02 K1_K04
P6S_KO3	Jest gotów do myślenia i działania w sposób przedsiębiorczy.	K1_K01 K1_K03
P6S_KR	Jest gotów do odpowiedzialnego pełnienia ról zawodowych, w tym: - przestrzegania zasad etyki zawodowej i wymagania tego od innych, - dbałości o dorobek i tradycje zawodu.	K1_K02 K1_K04

Tabela odniesień kierunkowych efektów uczenia się do uzyskania kompetencji inżynierskich Polskiej Ramy Kwalifikacji

program studiów (kier poziom studiów: Stud profil studiów: Ogólno	unek studiów): Computer Engineering ia pierwszego stopnia pakademicki	
symbol kierunkowych efektów uczenia się	efekty uczenia się (treść)	kod składnika opisu
	Wiedza: zna i rozumie	•
K1_W01	A student has knowledge in the area of basic education, i.e. mathematics, physics, and others necessary for solving engineering problems	
K1_W02	A student knows basic topics in the area work safety and ergonomy, economy, economy law, entrepreneurship principles and copyright protection regulations.	P6S_WK
K1_W03	A student has general knowledge of humanities and social education.	
K1_W04	A student knows and understands a foreign language theory and terminology at the B2 level of the European language evaluation scale.	
K1_W05	A student has a general knowledge in the engineering disciplines associated with the computer science.	P6S_WG
K1_W06	A student has knowedge in programming and software engineering. Understands basic processes in the computer systems' life cycle.	P6S_WG
K1_W07	A student has knowledge in the computer networks and operating systems area.	P6S_WG
K1_W08	A student has knowledge in data bases area.	P6S_WG
K1_W09	A student has knowledge in computer graphics area.	P6S_WG
K1_W10	A student has knowledge in selected methods of artificial intelligence and their applications in computer science.	P6S_WG
	Umiejętności: potrafi	-
K1_U01	A student can utilize gained knowledge in the area of basic education, i.e. mathematics, physics, and others necessary for solving engineering problems.	P6S_UW3
K1_U02	A student can practicaly use his knowledge of the area work safety and ergonomy, economy, economy law, entrepreneurship principles and copyright protection regulations and perform economical evaluation of proposed engineering solutions.	
K1_U03	A student can perceive metatechnical, system, social and ethical aspects of the proposed engineering tasks and their solutions.	
K1_U04	A student can use a foreign language at the B2 level of the European language evaluation scale.	
K1_U05	A student can individually plan and run a live-long self- education process.	

K1_U06	A student can select the sources of informaction with the use of advanced ICT techniques in the correct way. He can validate and synthesize data from various sources.	P6S_UW3
K1_U07	A student can individually and in a team perform engineering tasks and run basic scientific research, interpret it's results and make conclusions.	P6S_UW1
K1_U08	A student can use specialist terminology (also in a foreign language) and judge other opinions in a debate.	
K1_U09	A student can utilize knowledge in the engineering disciplines associated with the computer science.	P6S_UW1 P6S_UW4
K1_U10	A student can design, according to a given specification, perform and maintain computer systems. Can provide a critical evaluation and propose improvements to existing solutions.	P6S_UW2 P6S_UW4
K1_U11	A student can design, according to a given specification, perform and maintain computer networks with appropriate methods and techniques.	P6S_UW3 P6S_UW4
K1_U12	A student can install, configure and administer operating systems, with the use of appropriate methods and techniques.	P6S_UW2
К1_U13	A student can design, according to a given specification, perform and maintain data bases with appropriate methods and techniques.	P6S_UW2
K1_U14	A student can use the tools for the processing and analysis of digital images, with appropriate methods and techniques.	P6S_UW3
К1_U15	A student can apply selected methods of AI to basics computer science tasks with appropriate methods and techniques.	P6S_UW2
	Kompetencje społeczne: jest gotów do	
K1_K01	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	
К1_К02	A student is aware of the impact of the tasks performed on the social environment and the ability to act for the public interest.	
K1_K03	A student can think and act entrepreneurially.	
K1_K04	A student can act in accordance with ethics and respect to the professional tradition. Promotes a pro-quality culture and the right standards of behaviour both in the professional environment and private life.	

Tabela pokrycia kompetencji inżynierskich Polskiej Ramy Kwalifikacji przez kierunkowe efekty uczenia się

program studiów (kierunek studiów): Computer Engineering poziom studiów: Studia pierwszego stopnia profil studiów: Ogólnoakademicki									
kod składnika opisu	charakterystyki drugiego stopnia Polskiej Ramy Kwalifikacji	symbol kierunkowych efektów uczenia się							
	Wiedza: zna i rozumie								
P6S_WG	Zna i rozumie podstawowe procesy zachodzące w cyklu życia urządzeń, obiektów i systemów technicznych.	K1_W05 K1_W06 K1_W07 K1_W08 K1_W09 K1_W10							
P6S_WK	Zna i rozumie podstawowe zasady tworzenia i rozwoju różnych form indywidualnej przedsiębiorczości.	K1_W02							
	Umiejętności: potrafi								
P6S_UW1	Potrafi planować i przeprowadzać eksperymenty, w tym pomiary i symulacje komputerowe, interpretować uzyskane wyniki i wyciągać wnioski.	K1_U07 K1_U09							
P6S_UW2	Potrafi przy identyfikacji i formułowaniu specyfikacji zadań inżynierskich oraz ich rozwiązywaniu: - wykorzystywać metody analityczne, symulacyjne i eksperymentalne, - dostrzegać ich aspekty systemowe i pozatechniczne, w tym aspekty etyczne, - dokonywać wstępnej oceny ekonomicznej proponowanych rozwiązań podejmowanych działań inżynierskich.	K1_U10 K1_U12 K1_U13 K1_U15							
P6S_UW3	Potrafi dokonywać krytycznej analizy sposobu funkcjonowania istniejących rozwiązań technicznych i oceniać ich rozwiązania.	K1_U01 K1_U06 K1_U11 K1_U14							
P6S_UW4	Potrafi projektować - zgodnie z zadaną specyfikacją - oraz wykonywać typowe dla kierunku studiów proste urządzenia, obiekty, systemy lub realizować procesy, używając odpowiednio dobranych metod, technik, narzędzi i materiałów.	K1_U09 K1_U10 K1_U11							

Wydział Elektrotechniki, Automatyki i Informatyki



Plan studiów Study plan

Kierunek studiów – Field of study

- COMPUTER ENGINEERING

- INFORMATYKA

Studia stacjonarne pierwszego stopnia

First Cycle Programme – Full-Time Studies

CHARAKTERYSTYKA OGÓLNA

kierunek studiów: Computer Engineering

profil: Ogólnoakademicki

nazwa wydziału: Wydział Elektrotechniki, Automatyki i Informatyki

	uchwała Senatu PO z dnia	nr 416 Senatu PO z dn.29.05.2024r.
plan studiów	obowiązuje od roku akademickiego	2024/2025
forma studiów (stacjonarne / niestacjonarne)	stacjonarne
poziom stud	iów (I stopnia / II stopnia)	I-go stopnia
czas	trwania (w sem.)	7
tytuł zawod	lowy otrzymywany przez absolwenta	Inżynier
liczl	oa punktów ECTS	210

PLAN STUDIÓW - STUDY PLAN

POLITECHNIKA OPOLSKA WYDZIAŁ ELEKTROTECHNIKI, AUTOMATYKI I INFORMATYKI	OPOLE UNIVERSITY OF TECHNOLOGY FACULTY OF ELECTRICAL ENGINEERING, AUTOMATIC CONTROL AND INFORMATICS							
Kierunek studiów:	Field of study:							
COMPUTER ENGINEERING	INFORMATYKA							
Studia Stacjonarne Pierwszego Stopnia - In _D ynierskie								
FIRST CYCLE PROGRAMME - FULL-T	FIRST CYCLE PROGRAMME - FULL-TIME STUDIES (Engineer's degree)							

	SEMESTR: 1 (1 st Semester)	Liczba Work	godzin za k <mark>ing time (</mark> l	jęć w semest hours) a sem	rze; E - eg <mark>ester; E -</mark>	gzamin <mark>Exam</mark>			
	Przedmiot	W	С	L	Р	S	ECTS	TYP	
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)			
1 1	Programming I	30	_	30	_		4	ĸ	
	Programowanie I						-		
1 2	Algorithms and data structures	30F	30	_	_		5	ĸ	
1.2	Algorytmy i struktury danych	502	502					5	
1 3	Physics I	30F	15	_	_	_	5	р	
1.5	Fizyka I	502	15				<u> </u>	·	
14	Mathematical analysis I	30	30	_	_	_	4	Р	
1.4	Analiza matematyczna I						-		
15	Linear algebra with analytic geometry	30E	30	_	_	_	5	Р	
1.5	Algebra liniowa z geometrią analityczną		JUE 50					<u>'</u>	
16	Information technology	- 15 15	15	15	_	_	_	2	Р
1.0	Technologia informacyjna						'		
17	Work safety and ergonomic	15	_	_	_	_	1	Р	
	Bezpieczeństwo pracy i ergonomia								
18	Copyright and economy law	30	_	_	_	_	2	нс	
1.0	Prawo autorskie i gospodarcze	50					-		
	Przedmioty humanistyczne lub społeczne (Optional units – co	wybieralne	e – wymagar CTS in a se	na liczba p. EC m <mark>ester)</mark>	TS w seme	strze	2		
1.0	The course in humanities and social sciences I	20					(2)	W LIC	
1.9	Przedmiot humanistyczno-społeczny I	30	_	-	-	-	(2)	W-H5	
Liczb a ser	a godzin w semestrze (Number of hours in nester)	240		150)		20		
Raze hour	m godzin/ECTS w semestrze (Total s/ECTS in a semester)			390			30		

	SEMESTR: 2 (2 nd Semester)	Liczba Work	godzin za ing time (l	jęć w semest hours) a sem	rze; E - e ester; E -	gzamin <mark>Exam</mark>			
	Przedmiot	W	С	L	Р	S	ECTS	TYP	
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)			
2 1	Programming II	30F	_	30	_	_	5	ĸ	
2.1	Programowanie II	JUL	_	50	_	_	5	ĸ	
2 2	Database basics	20	_	15				ĸ	
2.2	Podstawy baz danych	50	_	15	_	_	-		
23	Architecture of computers	30F	_	30	_	_	5	ĸ	
2.5	Architektura komputerów	502			50	_	_		ĸ
24	Electrical engineering for IT specialists	30	30	_			4	р	
2.4	Elektrotechnika dla informatyków		50				-	·	
25	Logic and set theory	15	15	_	_	_	2	р	
2.5	Logika i teoria mnogości							'	
2.6	Mathematical analysis II	- 15E 15	15	_			2	р	
2.0	Analiza matematyczna II								
27	Statistical methods	15	15				2	р	
2.7	Metody statystyczne					_	-		
28	Physics II	15	_	15	_	_	2	р	
2.0	Fizyka II	15		15			-	'	
	Przedmioty humanistyczne lub społeczne (Optional units – co	wybieralne	e – wymagar CTS in a se	na liczba p. EC m <mark>ester)</mark>	TS w seme	strze	3		
2.0	The course in humanities and social	20					(2)		
2.9	Przedmiot humanistyczno-społeczny II	30	-	-	-	-	(3)	W-H5	
Liczba godzin w semestrze (Number of hours in a semester) 210 165						20			
Raze hour	m godzin/ECTS w semestrze (Total s/ECTS in a semester)	375					30		

	SEMESTR: 3 (3 rd Semester)	Liczba Work	godzin za k <mark>ing time (</mark> l	jęć w semest hours) a sem	rze; E - e ester; E -	gzamin <mark>Exam</mark>		
	Przedmiot	W	С	L	Р	S	ECTS	ТҮР
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)		
2 1	Operating systems I	305	_	30			5	ĸ
5.1	Systemy operacyjne I	JUE	-	50	-	-	5	ĸ
2 2	Internet technologies	20	20	20		5	ĸ	
5.2	Technologie internetowe		-	50	-	5	ĸ	
2 2	Programming III	20E	_	20			5	ĸ
5.5	Programowanie III	JUE	-	50	-	-	5	
	Computer aided design I		30 - 15					
3.4	Komputerowe wspomaganie projektowania l	30		-	-	3	К	
3.5	Computer networks I	20		20			Б	V
	Sieci komputerowe I	50	-	30	-	-	5	
26	Database modelling	- 30E -		20			Б	V
5.0	Modelowanie baz danych		30	_	-			
	Przedmioty wybieralne – v (Optional units – co	vymagana l ompulsory E	iczba p. ECT CTS in a se	S w semestrze mester)	9		2	
2 7	Physical education		20					14/
5.7	Wychowanie fizyczne	-	30	-	-	-	(0)	vv
	Foreign language			20			(2)	14/
2 0	Język obcy	-	-	30	-	-	(2)	vv
5.0	Foreign language			20			(2)	14/
	Język obcy	-	-	30	-	-	(2)	vv
Liczba godzin w semestrze (Number of hours in a semester) 180 225							20	
Raze hour	m godzin/ECTS w semestrze (Total s/ECTS in a semester)	405				30		

	SEMESTR: 4 (4 th Semester)	Liczba Work	godzin za k <mark>ing time (</mark>	jęć w semest hours) a sem	rze; E - e ester; E -	gzamin Exam			
	Przedmiot	W	С	L	Р	S	ECTS	TYP	
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)			
4 1	Software engineering	305	30	_	_		5	ĸ	
4.1	Inżynieria oprogramowania	302	50	_	_	_			
4 2	Programming IV	30	_	_	30		4	ĸ	
7.2	Programowanie IV				50		-		
4 3	Operating systems II	30	_	30	_		5	ĸ	
5	Systemy operacyjne ll	50							
4 4	Computer graphics I	30F	-	15	_	-	5	ĸ	
	Grafika komputerowa I			15	_				
4.5	Computer networks II	30E	30F -	30	_	_	5	ĸ	
	Sieci komputerowe II		_						
4.6	Discrete mathematics	15	15	_	_	_	2	Р	
0	Matematyka dyskretna	15	15					<u>'</u>	
47	Numerical methods	15 -	15	_	15	_		2	ĸ
/	Metody numeryczne		15			-			
	Przedmioty wybieralne – v (Optional units – co	vymagana l ompulsory E	iczba p. ECT CTS in a se	S w semestrze mester)	2		2		
	Foreign language			30			(2)	w	
4 8	Język obcy			50			(2)	••	
4.0	Foreign language	_	_	30	_	_	(2)	w	
	Język obcy			50			(2)	••	
4 9	Physical education		30				(0)	W	
4.5	Wychowanie fizyczne		50				(0)	••	
Liczt a ser	a godzin w semestrze (Number of hours in mester)	180 225				20			
Raze hour	m godzin/ECTS w semestrze (Total s/ECTS in a semester)	405				30			

	SEMESTR: 5 (5 th Semester)	Liczba godzin zajęć w semestrze; E - egzamin Working time (hours) a semester; E - Exam							
	Przedmiot	W	С	L	Р	S	ECTS	TYP	
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)			
5 1	Basics of artificial intelligence	205		15			E	L V	
5.1	Podstawy sztucznej inteligencji	JUE	-	15	-	-	5		
	Team project of IT system								
5.2	Projekt zespołowy systemu informatycznego	30E	-	-	30	-	5	К	
	Przedmioty wybieralne – wymagana liczba p. ECTS w semestrze (Optional units – compulsory ECTS in a semester)								
Foreign language								14/	
53	Język obcy			50			(2)	vv	
5.5	Foreign language	_		30		_	(2)	\M/	
	Język obcy			50			(2)	~~	
Przedmioty wybieralne kierunkowe – wymagana liczba p. ECTS w semestrze (Optional units – compulsory ECTS in a semester)									
	Elective course III - Computer graphics II								
	Przedmiot wybieralny III - Grafika komputerowa II	30	-	-	15	-	(4)	W-K	
5.4	Elective course III - Vision systems								
	Przedmiot wybieralny III - Systemy wizyjne	30	-	-	15	-	(4)	W-K	
5.5	Elective course IV - Administration of network operating systems	15		20			(4)	WK	
	Przedmiot wybieralny IV - Administracja sieciowymi systemami operacyjnymi	15		50		_	(4)	VV-IX	
	Elective course IV - System programming								
	Przedmiot wybieralny IV - Programowanie systemowe	15	-	30	-	-	(4)	W-K	
	Elective course V - Fundamentals of control engineering	15	_	15	_	_	(2)	W-K	
5.6	Przedmiot wybieralny V - Podstawy automatyki	15	_				(2)		
5.0	Elective course V - Fundamentals of systems theory	15	_	15	_	_	(2)	W-K	
	Przedmiot wybieralny V - Podstawy teorii systemów						(=/		
	Elective course II - Designing internet solutions	15			15		(3)	W-K	
5.7	Przedmiot wybieralny II - Projektowanie rozwiązań internetowych	15			15		(3)	VV	
	Elective course II - Embedded systems								
	Przedmiot wybieralny II - Systemy wbudowane	15	-	-	15	-	(3)	W-K	
	Elective course I - Good software development practices	30F		15			(5)	W-K	
5.8	Przedmiot wybieralny I - Dobre praktyki wytwarzania oprogramowania	502		15					
5.8	Elective course I - Testing applications and systems	305	_	15		_	(5)	W-K	
	Przedmiot wybieralny I - Testowanie aplikacji i systemów	JUE		15	_			W-N	

Liczba godzin w semestrze (Number of hours in a semester)	165	165		
Razem godzin/ECTS w semestrze (Total hours/ECTS in a semester)		330	30	

	SEMESTR: 6 (6 th Semester)	Liczba Work	godzin za king time (l	jęć w semest hours) a sem	rze; E - e ester; E -	gzamin Exam		
	Przedmiot	W	С	L	Р	S	ECTS	ТҮР
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)		
	User experience design							
6.1	Projektowanie zorientowane na użytkownika	15	-	-	30	-	4	К
6.2	Artificial intelligence tools	15	_	_	30	_		ĸ
0.2	Narzędzia sztucznej inteligencji	15	_	_	50		-	
63	Methodology for scientific research	15	30	_			2	р
0.5	Metodyka badań naukowych	15	50	_	_	_	2	'
Przedmioty wybieralne kierunkowe – wymagana liczba p. ECTS w semestrze (Optional units – compulsory ECTS in a semester)								
	Elective course IX - Data protection in applications	15					(2)	
	Przedmiot wybieralny IX - Ochrona danych w aplikacjach		-	-	15	-	(2)	VV-K
6.4	Elective course IX - Data protection in systems and computer networks	15	-	-	15	-	(2)	
	Przedmiot wybieralny IX - Ochrona danych w systemach i sieciach komputerowych							W-K
C F	Transitional project			_	20		(2)	WK
0.5	Praca przejściowa	-	-	-	30	-	(3)	
C.0	Elective course VIII - Administration of enterprise network infrastructure	- 30E	-	15			(5)	
6.6	Przedmiot wybieralny VIII - Administracja infrastrukturą sieciową przedsiębiorstwa			15		-	(3)	VV-K
0.0	Elective course VIII - Database applications	305		15	_	_	(5)	W-K
	Przedmiot wybieralny VIII - Aplikacje bazodanowe	JUE	_	15	-	_	(3)	VV-IN
	Elective course VI - Corporate IT systems							
	Przedmiot wybieralny VI - Korporacyjne systemy informatyczne	15	-	15	-	-	(2)	W-K
6.7	Elective course VI - Fundamentals of computerized management systems	15	_	15	_	_	(2)	WK
	Przedmiot wybieralny VI - Podstawy zintegrowanych systemów zarządzania	15	_	15	-	_	(2)	VV-IN
	Elective course VII - Data transmission in computer networks	30		15			(4)	MK
6.8	Przedmiot wybieralny VII - Transmisja danych w sieciach komputerowych	50	-	15	-	_	(4)	W-N
6.8	Elective course VII - Internet teleinformation solutions	30		15			(4)	W-K
	Przedmiot wybieralny VII - Rozwiązania teleinformatyczne sieci Internet	50		15			(-+)	VV-IX

	Elective course X - Advanced topics in computer graphics	30	-	15			(2)	WK
	Przedmiot wybieralny X - Zaawansowane zagadnienia grafiki komputerowej	30		15	-	-	(2)	VV-IX
	Elective course X - High level programming languages	30		15			(2)	W-K
6 9	Przedmiot wybieralny X - Języki programowania wysokiego poziomu			15		-	(2)	VV-IX
0.9	Elective course X - Human-machine interface	30					(2)	WK
	Przedmiot wybieralny X - Interfejsy człowiek-maszyna	30		15		-	(2)	VV-IX
	Elective course X - Multimedia presentation techniques						(2)	WK
	Przedmiot wybieralny X - Multimedialne techniki prezentacji		50 -				(2)	VV-N
	Przedmioty wybieralne – w (Optional units – co	ymagana li mpulsory E	czba p. ECT CTS in a ser	S w semestrze nester)			2	
	Foreign language	(E)	-	30	-	-	(2)	W
6.10	Foreign language	(E)		30			(2)	w
	Język obcy						. ,	
Liczba godzin w semestrze (Number of hours in a semester)		165	225			20		
Razei hours	m godzin/ECTS w semestrze (Total /ECTS in a semester)	390					50	

	SEMESTR: 7 (7 th Semester)	Liczba Work	godzin za king time (l	jęć w semest hours) a sem	rze; E - e <mark>ester; E</mark> -	gzamin Exam		
	Przedmiot	W	C	L	Р	S	ECTS	TYP
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)		
7 1	Modern technologies in computer science	30	_	_	_	_	1	к
/	Nowoczesne technologie w informatyce	50	50 -				-	
	Przedmioty wybieralne kierunko (Optional units – co	we – wyma ompulsory E	gana liczba CTS in a sei	p. ECTS w sem <mark>mester</mark>)	nestrze		23	
7 2	Bachelor of Science thesis	aodziu	iny niekon	taktowe (un	contact h	ours)	(15)	W-K
1.2	Praca dyplomowa inżynierska	gouz				oursy	(13)	VV-IX
	Elective course XII - Basics of programming industrial automation systems	30	30 -	15	_	_	(2)	W-K
	Przedmiot wybieralny XII - Podstawy programowania przemysłowych systemów automatyki						(-7	
7.3	Elective course XII - Computational engineering	30	-	15	-	-	(2)	W-K
	Przedmiot wybieralny XII - Inżynieria obliczeniowa							
	Elective course XII - Perception systems for autonomous vehicles	30	_	15	_	_	(2)	W-K
	Przedmiot wybieralny XII - Systemy percepcji w pojazdach autonomicznych							
	Elective course XII - Programming VI	20					(2)	
	Przedmiot wybieralny XII - Programowanie VI	30	-	15	-	-	(2)	VV-K
	Elective course XI - Computer aided design II	30	_	15	_		(2)	W-K
	Przedmiot wybieralny XI - Komputerowe wspomaganie projektowania II	50		15	_		(2)	VV-IX
	Elective course XI - Computer networks III							
74	Przedmiot wybieralny XI - Sieci komputerowe III	30	-	15	-	-	(2)	W-K
/	Elective course XI - Introduction to computer forensics	30	_	15	_	_	(2)	W-K
	Przedmiot wybieralny XI - Wprowadzenie do informatyki śledczej							
	Elective course XI - Programming V Przedmiot wybieralny XI - Programowanie V	30	-	15	-	-	(2)	W-K

	Elective course XIII - Basics of data mining	20		15			(2)	MK
	Przedmiot wybieralny XIII - Podstawy eksploracji danych	30	-	15	-	-	(2)	VV-N
	Elective course XIII - Image analysis and recognition	20	_	15		_	(2)	WK
75	Przedmiot wybieralny XIII - Analiza i przetwarzanie obrazu	50	-	15	-	_	(2)	VV-IX
7.5	Elective course XIII - IT tools in engineering practice	20	-	15	-	-	(2)	WK
	Przedmiot wybieralny XIII - Narzędzia informatyczne w praktyce inżynierskiej	30					(2)	VV-N
	Elective course XIII - Signal processing in embedded systems	20				_	(2)	WK
	Przedmiot wybieralny XIII - Przetwarzanie sygnałów w systemach wbudowanych	30				_	(2)	VV-IX
7.6	Bachelor of Science seminar	_	_	_	_	30	(2)	W-K
/.0	Seminarium dyplomowe					50	(2)	
	Praktyka – wymaga (Practice – com	ana liczba p pulsory ECT	. ECTS w sei S in a seme	mestrze <mark>ster)</mark>			6	
77	Practical training - 4 weeks		_	_	160	_	(6)	W-PR
/./	Praktyka zawodowa - 4 tygodnie				100		(0)	•• • • •
Liczk a ser	a godzin w semestrze (Number of hours in nester)	120	235					
Raze hour	m godzin/ECTS w semestrze (Total s/ECTS in a semester)	355						

PLAN STUDIÓW RAZEM (TOTAL STUDY PLAN)						
Łącznie godzin kontaktowych/ECTS w planie studiów	2650	210				
Total contact hours/ECTS in study plan						

STATYSTYKA PROGRAMU STUDIÓW								
Тур	Przedmioty - p. ECTS razem	wg planu	udział					
HS	Humanistyczne lub społeczne	2	0.95 %					
K	Kierunkowe	96	45.71 %					
Р	Podstawowe	34	16.19 %					
W	Wybieralne	8	3.81 %					
W-HS	Humanistyczne lub społeczne, wybieralne	5	2.38 %					
W-K	Wybieralne kierunkowe	59	28.10 %					
W-PR	Praktyki	6	2.86 %					
	Łącznie:	210	100.00 %					

Program studiów dostosowany do kierunkowych efektów uczenia się dla kierunku studiów COMPUTER ENGINEERING (studia pierwszego stopnia) Plan i program studiów:

- uchwalony przez Senat PO

- zaopiniowany przez samorząd studencki.

Politechnika Opolska Wydział Elektrotechniki, Automatyki i Informatyki Opole 2024 r. Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study		Compu	Computer Engineering						
Profile of Educa	ation	Genera	General Academic						
Level of study		First Cy	cle Studies/						
Specialization									
Form of Study		Full-Tin	Full-Time Studies						
Semester		First							
Course Title		Algorit	hms and data	structures					
Nazwa przedm	iotu	Algoryt	my i struktur	y danych					
ECTS poin	its	5		Subject ty	уре			К	
Language of	lecture	angielsk i	Mode of completing			ne cours	e	Examination	
Course co	de		K2 Subject related to scientific research/pract. profess. prepar. (Y/N)				Т		
	Knowlo					level 4	PRK		
Dustinging	KIIOWIE	uye			2				
requirements	Skille				1	level 4	PRK		
of the course					2				
	Social	Compoten	omnotonco			level 4	PRK		
		Competence							
Course Goals	Prepari	ng Studer	nts for the de	sign of algo	rith	ms for t	he appli	ication.	

Programme content 1. Task algorithmic. Algorithm specification. Algorithm correctness (partial and total). Invariants. Methods of writing algorithms. 2. Memory and time complexity of algorithms. Asymptotic notation. 3. Basic techniques for building algorithms - Recursion. Algorithms from returns; - Divide and conquer; - Dynamic programming; - Greedy method. 4. Algorithms sorting and searching. 5. Dynamic data structures. List, stack, queue. 6. Trees and basic operations on them. Binary search trees. 7. Graphs. Representations, methods search, shortest paths.

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	A student has basic knowledge of implementation algorithmic issues.	K1_W06	W	AGIR
Knowled ge	2	A student has basic knowledge of data structures, knows and understands exploration and optimization methods graphs, as well as other algorithmic problems.	K1_W05	W	AGIR
	3	A student has basic knowledge of implementation algorithmic issues	K1_W06	С	GIJK
	4	A student has basic knowledge of data structures, knows and understands exploration and optimization methods graphs, as well as other algorithmic problems.	K1_W05	С	GIJK
Skills	1	A student can perceive metatechnical, system, social and ethical aspects of the proposed engineering tasks and their solutions in data structures.	K1_U09	С	GIR
	2				
Social Compet ence	1	A student understands the need for constant education and learning throughout life. He can do it in a creative way apply the acquired knowledge. He can conquer needed information and share knowledge with others.	K1_K01	W	AGIR
	2	A student understands the need for constant education and learning throughout life. He can do it in a creative way apply the acquired knowledge. He can conquer needed information and share knowledge with others.	K1_K01	С	EIJPR
Internoos of v	/eri	lication of learning outcomes:			

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, J-assessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				

Lecture (W)	30					
Calculation class (C)	30					
Laboratory class (L)	0	dr hab. inż.	. Kawala-Sterniuk Aleksandra			
Project (P)	0					
Seminar (S)	0					
		Student v	vorkload			
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			30			
Laboratory class (L)			0			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		25			
Preparation of a report project/presentation	ort/paper/		20			
Independent study o	f the course to	pics	20			
Examination or final	colloquium		2			
Additional contact ho	ours		0			
Total student worklo	ad		127			
Number of contact h	ours (from the	study plan)	60			

* hour (class) means 45 minutes

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First Cy	First Cycle Studies						
Specialization								
Form of Study	Full-Tin	Full-Time Studies						
Semester	Second							
Course Title	Archite	Architecture of computers						
Nazwa przedmiotu	Archite	Architektura komputerów						
ECTS points	5	5 Subject type K						

Language of lecture			angielsk i	Mode of completing the course			Examination				
Cour	se	code		K5 Subject related to scientific research/pract. profess. prepar. (Y/N		1)	т				
		Knowle	dge	1	A student has basic knowledge of number systems and their conversion conversions, logic and Boolean algebra. A student knows the basics of programming in high-level						
Prelimir	nar	y its		2	language A student numerica	s (e.g.: C/C++/C#). can convert values l, i.e.: binary, octal, c	between d lecimal, h	different s	systems nal.		
of the co	ours	se Skills		2	A student Is able to use programming techniques in languages high level (e.g.: C/C++/C#) to create simple						
		Social Compe ⁻	tence	1 2	A student	cial compo	etences.				
Course G types of r	oa no	ls Studen dern comp	t will be t outers incl	aug udi	ht regardi ng PCs an	ng construction and d Macs.	architectu	ure of var	ious		
Programr to know t argument programr	ne he ts l nir	content / structure between fung languag	Architectu of orders Inctions, o es.	ire pro com	x86 family cessor and bining ass	v processor and nume d co-processor. The r sembly language pro	erical cop ole of the grams wit	rocessor. stack in th other	Getting passing		
Learning	οι	itcomes fo	r the cour c	se /cle	- after con	npleting the training	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s		
	1	A student floating-po engineerir	knows th pint varial ng problei	e ru oles ms	ules of writ s.others ne	ing fixed-point and ecessary for solving	K1_W06	WL	A G H		
Knowled ge A student has a basic knowledge of the structur and functioning of computer systems, knows th 2 basic functions of individual components of a computer system. He knows the work cycle of a					of the structure tems, knows the ponents of a work cycle of a	K1_W01	WL	A G H			
SkillsA student can use assembly language programming techniques to create simple applications in 16-bit processor mode (also with the use of coprocessor, interrupt system, etc.).K1_U07L					L	A G H					
	2		1	h .c	al a 41						
Social Compet ence	1	A student expand kr	is unders lowledge.	tan	as the nee	ed to constantly	K1_K01	WL	AGH		
	~										

Methods of verification of learning outcomes:

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan						
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course tle/academic degree/professional title, name and surname			
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	30	dr hab. inż	. Kawala-Sterniuk Aleksandra			
Project (P)	0					
Seminar (S)	0					
		Student v	vorkload			
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			0			
Laboratory class (L)			30			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		30			
Preparation of a report project/presentation	ort/paper/		40			
Independent study o	of the course top	pics	0			
Examination or final	colloquium		2			
Additional contact he	ours		0			
Total student worklo	ad		132			
Number of contact h	ours (from the	study plan)	60			

* hour (class) means 45 minutes

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering
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Profile of Education	General Academic									
Level of study Firs			First Cycle Studies							
Specialization										
Form of Study		Full-Tim	e Stu	dies						
Semester		Sixth								
Course Title		Artificia	intel	ligence	tools					
Nazwa przedm	iotu	Narzędz	ia szt	ucznej	inteligencji					
ECTS poir	nts	4			Subject type		K			
Language of lecture		angielsk i	Mode of completing the course			Course credit				
Course code		K20			Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			
	Knowlo	dao	1	A stud	ent has knowledge of algorithm analysis					
	KHOWIE	uye	2							
Preliminary requirements	Skills		1	A stud form o	A student is able to describe of the algorithm in the form of a block diagram					
of the course			2							
	Social	Compoton	1	A stud	ent understands the ne	eed for	self-improvement.			
Social Competen			.e 2							
Course Goals Introducing students to practical knowledge in the field of selected methods of artificial intelligence. The course will present the currently used machine learning techniques, algorithms and tools										
Programme content Lecture in an auditorium or online form. Basic concepts, definitions and										

tools in the field of artificial intelligence, data engineering and data science.
Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowlod	1	A student knows the basic concepts of machine learning and the selected methods and tools	K1_W10	W	С
ge	2	A student understands the position and importance of artificial intelligence. He knows areas of its application.	K1_W05	W	С
Skills	A student has basic knowledge of at least one1dedicated computing tool for solving problems in the field of machine learning			Р	ΚL
	2				
Social Compet	1	A student can propose machine learning solutions that can resolve simple engineering problems	K1_K01	Р	ΚL
ence	2				

Hours in the study plan						
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname			
Lecture (W)	15					
Calculation class (C)	0					
Laboratory class (L)	0	dr hab. inż.	. Tomaszewski Michał			
Project (P)	30					
Seminar (S)	0					
	Student workload					
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			15			
Calculation class (C)			0			
Laboratory class (L)			0			
Project (P)			30			
Seminar (S)			0			
Preparation for class	es		15			
Preparation of a repo project/presentation	ort/paper/		20			
Independent study o	of the course top	pics	20			

Examination or final colloquium	0
Additional contact hours	0
Total student workload	100
Number of contact hours (from the study plan)	45

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Field of study	Compu	Computer Engineering					
Profile of Educa	ation	Genera	al A	cademic			
Level of study	First C	First Cycle Studies					
Specialization							
Form of Study		Full-Tir	Full-Time Studies				
Semester		Sevent	h				
Course Title		Bachel	or c	of Science	thesis		
Nazwa przedm	iotu	Praca d	dyp	lomowa in	żynierska		
ECTS poir	nts	15			Subject type		W-K
Language of	angielsk i		Mode of completing the course		Course credit		
Course co	0	OWPDI		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	
Knowled		dge	1	 Student has a structured, general knowle problems in the studied field of study, inc technical specialised subjects. 		ledge of selected ncluding general,	
			2				
Preliminary requirements	Skills		1	Student can use technical and scientific-engineering tools and techniques to solve IT problems.			
of the course			2				
	Social		1	The stude solving ta	ent is able to properly o asks.	define p	riorities for
	Compe	tence	ence 2 The stud deepenir		e student understands the need for continuous epening of knowledge.		
Course Goals Preparation of the diploma thesis.							

Programme content Depending on the engineering thesis topic, the student independently broadens his knowledge and skills in computer science. Prepares work according to the rules for preparing scientific and diploma theses in the field of technical sciences.

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	Chowled 1 The student has a general knowledge in the engineering disciplines associated with the computer science.				КО
	2				
Skills	1	The student can carry an analysis of the subject matter of the engineering diploma thesis, as well as search for appropriate literature and analyzed them	K1_U06	Ρ	КО
	2	The student can analyze and evaluate the correctness of the proposed solutions	K1_U07	Р	КО
	3	The student is able to notice non-technical aspects during completion of the diploma thesis.	K1_U03	Р	КО
	4	The student is able to plan and implement independently individual stages of your work.	K1_U05	Р	КО
Social	1	The student can critically assess his knowledge	K1_K01	Р	KO
Compet ence	2	The student is able to work with respect for ethical principles professional.	K1_K04	Р	КО

Methods of verification of learning outcomes:

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				
Lecture (W)	0					
Calculation class (C)	0					
Laboratory class (L)	0	dr hab. inż. Rydel Marek				
Project (P)	0					
Seminar (S)	0					
		Student workload				
Types of student act	ivities*	Average number of hours* allocated on completed activities				
Lecture (W)		0				
Calculation class (C)		0				

Laboratory class (L)	0
Project (P)	0
Seminar (S)	0
Preparation for classes	0
Preparation of a report/paper/ project/presentation	50
Independent study of the course topics	325
Examination or final colloquium	0
Additional contact hours	0
Total student workload	375
Number of contact hours (from the study plan)	0

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Field of study	Compu	Computer Engineering				
Profile of Education	Genera	General Academic				
Level of study	First Cy	First Cycle Studies				
Specialization						
Form of Study	Full-Tin	ne Studies				
Semester	Sevent	Seventh				
Course Title	Bachel	Bachelor of Science seminar				
Nazwa przedmiotu	Semina	Seminarium dyplomowe				
ECTS points	2		Subject type		W-K	
Language of lecture	angielsk i	lsk Mode of completing the course			Course credit	
Course code OWSD		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		

		Knowlodge	1	Knowledge of the subject of	of the dipl	oma thes	is	
		Knowledge	2					
Prelimir	nary		1	Using a program to make a	a compute	er present	ation	
requirem	nen	ts Skills	2					
of the co	urs	se Social Competence	1	A student can communicating in a selected environment				
			2					
Course G	oal	s Preparation of the t	hes	is under the supervision of	the super	visor		
Programr	ne	content						
Learning outcomes for the course - after completing the trainir cycle					The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s	
Knowled	1	A student has in-depth study	ı kn	owledge of the field of	K1_W05	S	NO	
ge	2							
	A student can properly search for information on engineering problems				K1_U06	S	NO	
Skills	2	A student can use pro terminology	ional engineering	K1_U08	S	NO		
	3	A student can use con	nput	ter presentation tools	K1_U14	S	NO	
Social Compet	1	A student can indeper the scope of his work	ntly make decisions about	K1_K01	S	NO		
ence	2	A student has maintains the principles of professional ethics			K1_K04	S	NO	
Methods of v	/erif	ication of learning outcomes:						

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	0				
Calculation class (C)	0				
Laboratory class (L)	0	dr hab. inż. Rząsa Mariusz			
Project (P)	0				
Seminar (S)	30				
Student workload					

Types of student activities*	Average number of hours* allocated on completed activities			
Lecture (W)	0			
Calculation class (C)	0			
Laboratory class (L)	0			
Project (P)	0			
Seminar (S)	30			
Preparation for classes	10			
Preparation of a report/paper/ project/presentation	10			
Independent study of the course topics	0			
Examination or final colloquium	0			
Additional contact hours	0			
Total student workload	50			
Number of contact hours (from the study plan)	30			

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Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Compu	Computer Engineering					
Profile of Education	Genera	al Academic					
Level of study	First C	ycle Studies					
Specialization							
Form of Study	Full-Tir	Full-Time Studies					
Semester	Fifth	Fifth					
Course Title	Basics	Basics of artificial intelligence					
Nazwa przedmiotu	Podsta	Podstawy sztucznej inteligencji					
ECTS points	5	Subject type			К		
Language of lecture angielsk		< Mode of completing the course Examination			Examination		
Course code		K17	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		

	Knowledge	1	Student has knowledge of mathematics, including: basics of analysis mathematics, matrix algebra, set theory and logic mathematics.
		2	Student knows selected high-level programming languages.
Preliminary requirements of the course	Skills	1	Student can use the mathematical methods he has learned, including: for examination course of variability and determining the extremes of functions and execution basic matrix operations and logic tasks mathematics.
		2	Student can program in selected programming languages, both in based on procedural and object-oriented methodology.
	Social	1	Student can work in a group.
	Competence	2	

Course Goals The aim of the course is to gain knowledge and skills in the use of artificial intelligence in IT applications.

Programme content The subject provides knowledge on issues related to the applications of artificial intelligence. During the module, the student acquires knowledge and skills in the field of artificial intelligence, the history of AI, neural networks, machine and deep learning, fuzzy logic, linguistic variables and fuzzy relations, reasoning in fuzzy logic, in systems with knowledge bases; defuzzification of knowledge, expert systems, genetic algorithms and other AI algorithms.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	A student has basic knowledge of the construction, operation and application of artificial neural networks and fuzzy logic systems.	K1_W10	W L	AH
ge	2	A student has basic knowledge of artificial intelligence methods and tools and areas of application.	K1_W10	W	А
	1	A student can select and design an appropriate fuzzy system to solve a specific task.	K1_U15	L	ΕH
Skills	2	A student can build and perform a learning and simulation process for artificial neural networks.	K1_U15	L	ΕH
	3	A student can make an application using a genetic algorithm to solve a specific problem.	K1_U15	L	ΕH
Social Compet	1	A student is aware of the responsibility for his own work and follow the rules of working in the team group,	К1_К01	L	Р
ence	2	A student understands the impact of his activities on society and technology development.	K1_K02	W	Р
Methods of v	veri	fication of learning outcomes:			

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan							
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				
Lecture (W)	30						
Calculation class (C)	0						
Laboratory class (L)	15	dr inż. Bryr	niarska Anna				
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student act	ivities*		Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		15				
Preparation of a repo project/presentation	ort/paper/		30				
Independent study o	of the course top	pics	33				
Examination or final	colloquium		2				
Additional contact he	ours		0				
Total student worklo	ad		125				
Number of contact h	ours (from the	study plan)	45				

* hour (class) means 45 minutes

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Field of study	Computer Engineering
Profile of Education	General Academic

Level of st	udy		First C	First Cycle Studies								
Specializa	tion											
Form of St	tudy		Full-Tir	Full-Time Studies								
Semester			Third	Third								
Course Tit	le		Compu	Computer aided design I								
Nazwa prz	zedn	niotu	Kompu	Komputerowe wspomaganie projektowania I								
ECTS	роі	nts	3				Subject type			<		
Languag	e of	lecture	angielsk i		Μ	lode o	f completing the cou	irse	Course	e credit		
Cours	se co	ode		K7 Subject related to scientific research/pract. profess. prepar. (Y/N			1)	т				
		Knowle	dge		1	in acc	cordance with the rec	commend	ations of	PRK Ivl 4		
Prelimina requirement of the cou	ary ents urse	Skills			2 1 2	in acc	cordance with the red	ecommendations of PRK IvI 4		PRK Ivl 4		
		Social (Competer	ompetence			n accordance with the recommendations of PRK I					
Course Go envirnome	als ent	Introdu	cing to th	e pi	rinci	ples o	f creating a technica	l drawing	in CAD			
Programm Drawing a	ne co nd E	ontent I Editing F	Fundamei lat Shape	ntal: s Pr	s of ese	Const ntatio	ruction Notation Cre n and Publication of	ating Tech Fechnical	nnical Dra Documer	wings - Itation		
Learning outcomes for the course - after completing the training outcome for the course - after completing the training outcome cycle Cycle						Methods of verificati on of learning outcome s						
Knowled	1 Tł cr	ne stude eating to	nt knows echnical c	the locu	role ime	e of CA ntatio	AD software in n	K1_W09	WL	С		
Skills	2 Tł 1 C/	ne stude AD envir	nt can ma onment ir	ake n ac	a te coro	chnica dance	al drawing in the with applicable	K1_U08	L	I		
	2	anuarus										
Social Compet	- 1 Tł st	ne stude ages of	nt is able technical	to d dra	defir wing	ne and g deve	l plan particular elopement	K1_K01	L	С		
ence	2											
Methods of verification of learning outcomes: A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, J- assessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.												

Hours in the study plan							
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname				
Lecture (W)	30						
Calculation class (C)	0						
Laboratory class (L)	15	dr inż. Dzie	erżanowski Łukasz				
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student act	ivities*		Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		15				
Preparation of a report project/presentation	ort/paper/		5				
Independent study o	of the course top	pics	10				
Examination or final	colloquium		0				
Additional contact he	ours		0				
Total student worklo	ad		75				
Number of contact h	ours (from the	study plan)	45				

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Fourth

Course Ti	tle		Computer graphics I								
Nazwa pr	ze	dmiotu	Grafika	kor	пp	uterow	ra I				
ECT	S p	oints	5				Subject type	К			
Langua	ge	of lecture	angielsk i		ſ	Mode o	f completing the cou	irse	Examination		
Cour	se	code		K15			Subject related to scientific research/pract. profess. prepar. (Y/N	1)	т		
		Knowle	dge		1 2	A stud	ent has basic knowle	edge of co	mputer s	cience.	
Prelimir requirem of the co	nar nen ours	y its Skills se		_	1 2	A stud progra	ent is ability to opera m in a chosen progra	ate a com amming la	puter and anguage.	1	
		Social (Competer	ce-	1 2	A stud	ent can interact and	work in a	group.		
Course G graphics. and 3D g	oal Dι rap	s The ain uring the la phics, and	n of the co aboratory methods	ours clas for p	e i se oro	s to lea s, stud cessing	arn the basic issues in ents learn the basic i g bitmap graphics	n the field methods (l of comp of creatin	uter g vector	
Programr technique graphic d	ne es s	content suitable fo igns in sele	Lecture in r various ected tool	the aspe s.	au ect	uditoriu s of co	ım. Presentation of s mputer graphics. Pra	elected al ctical imp	gorithms elementat	and ion of	
Learning outcomes for the course - after completing the training cycle Cycle						Methods of verificati on of learning outcome s					
Knowled	1	A student computer	has know graphics.	ledg	je	of the a	algorithms used in	K1_W05	W	АЈК	
ge	2	A student with vecto	knows the	e ba s, w	isic ith	: techn bitma	iques of working o graphics.	K1_W09	W	AJK	
Skills	1	A student vector gra graphics.	can use a aphics, ras	deo ster	dic or	ated p three-c	rogram to handle limensional	K1_U07	L	КМ	
	2	A student problems	can choo in the fiel	se tł d of	he co	right to mpute	ool for the specific r graphics.	K1_U14	L	КМ	
Social	1	A student training.	understa	nds	the	e need	for continuous	K1_K01	WL	PR	
Compet ence	2	A student work and teamwork tasks.	is aware readiness and resp	of re to c onsi	esp con bil	onsibil nply wi ity for j	K1_K02	L	PR		
Methods of v	/erif	ication of lear	ning outcom	es:							

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan							
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname				
Lecture (W)	30						
Calculation class (C)							
Laboratory class (L)	15	dr inż. Kam	niński Marcin				
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student act	ivities*		Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		30				
Preparation of a repo project/presentation	ort/paper/		30				
Independent study o	of the course top	pics	20				
Examination or final	colloquium		2				
Additional contact he	ours		0				
Total student worklo	ad		127				
Number of contact h	ours (from the	study plan)	45				

* hour (class) means 45 minutes

dr hab. inż. Tomczewski Krzysztof Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Field of study	Computer Engineering
Profile of Education	General Academic

Level of study	First Cy	First Cycle Studies							
Specialization									
Form of Study		Full-Tir	ne Si	tuo	dies				
Semester		Third							
Course Title		Compu	Computer networks I						
Nazwa przedm	iotu	Sieci k	ompi	ute	erowe				
ECTS poir	nts	5				Subject type		К	
Language of lecture		angielsk i		ſ	Mode c	f completing the cours	e	Course credit	
Course code			К8			Subject related to scientific research/pract. profess. prepar. (Y/N)		т	
	Knowledge			1	The st knowle	udent should have bas edge.	ic comp	outer network	
Duclinging m				2					
requirements	Skills			1	Studer design	tudent should have basic skills in computer network esign.			
				2					
	Social (Compotor		1	Ability	to work in a group.			
	SUCIAI	Jomperen		2					
Course Goals	To acqu	uaint stud	ents	5 W	ith the	technology existing in	compu	ter networks.	
Programme content Programmed content that will ensure learning outcomes for the subject are issues in the area of broadly understood computer networks. The course will also focus on presenting information on the OSI and TCP/IP models.									

Learning	OL	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	A student has knowledge in the computer networks area.		WL	CHPR
ge	2	A student has knowledge in the operating systems area.	K1_W07	WL	CHPR
Skills	1	A student can design, according to a given specification, perform computer networks with appropriate methods and techniques.	K1_U11	L	HPR
	2	A student can maintain computer networks with appropriate methods and techniques.	K1_U11	L	HPR
Social Compet ence	1	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.		W L	CHPR
	2				

Hours in the study plan						
The course format	The course formatHours/sem. (h)Tutor (coordinator) of the course (title/academic degree/professional title, name and surname					
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	30	dr hab. inż	nż. Paszkiel Szczepan			
Project (P)	0					
Seminar (S)	0					
		Student v	vorkload			
Types of student act	ivities*	Average number of hours* allocated on completed activities				
Lecture (W)			30			
Calculation class (C)			0			
Laboratory class (L)			30			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		25			

Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	40
Examination or final colloquium	0
Additional contact hours	0
Total student workload	125
Number of contact hours (from the study plan)	60

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First Cy	First Cycle Studies						
Specialization								
Form of Study	Full-Tir	Full-Time Studies						
Semester	Fourth	Fourth						
Course Title	Compu	Computer networks II						
Nazwa przedmiotu	Sieci k	Sieci komputerowe II						
ECTS points	5		К					
Language of lecture	angielsk i	Mode c	Mode of completing the course					
Course code		K16	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			

		Knowledge	1	A student should have basic networks.	knowledg	ge of com	puter		
Preliminary requirements	Knowledge	2	A student should have basic knowledge of OSI and TCP/IP model.						
	y ts	1	A Student should have skills in computer network design.						
	urs	SKIIIS	2	A Student should have skills in configuration computer network protocols.					
		Social	1	A Student is ability to work i	n a group				
		Competence	2						
Course G networks	oal	s To acquaint stude	nts	with advanced technologies	existing ir	n compute	er		
Programme content The programmed content that will ensure the learning outcomes for the subject include advanced issues in the field of broadly understood computer networks. The course will also focus on providing information about network protocols, including routing protocols.									
Learning outcomes for the course - after completing the training outcomes for the course - after completing the training outcome (W, C, L, outcome S) (W, C, L, P, S) outcome S						Methods of verificati on of learning outcome s			
Knowled	1	A student has specia computer networks a	lize nd	d knowledge in the operating systems area.	K1_W07	WL	АНР		
ge	2	A student has specia computer networks p	lize oroto	d knowledge in the ocols.	K1_W07	WL	АНР		
Skills	1	A student can design, according to a given specification, perform and maintain computer K1_U11 L networks with appropriate methods and techniques.							
	2								
Social Compet	1	A student can make of situations.	deci	sions also in difficult	K1_K01	L	ΗP		
ence	2								
Methods of v	/erif	ication of learning outcomes		ant D aral accordment E based on pa	tial marks of	Foral answer	E bacad		

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			

Lecture (W)	30							
Calculation class (C)	0]						
Laboratory class (L)	30	dr hab. inż.	dr hab. inż. Paszkiel Szczepan					
Project (P)	0							
Seminar (S)	0							
Student workload								
Types of student activities*			Average number of hours* allocated on completed activities					
Lecture (W)			30					
Calculation class (C)			0					
Laboratory class (L)			30					
Project (P)			0					
Seminar (S)			0					
Preparation for class	es		25					
Preparation of a report/paper/ project/presentation			0					
Independent study o	f the course to	pics	45					
Examination or final colloquium			2					
Additional contact ho	ours		0					
Total student worklo	ad		132					
Number of contact h	ours (from the	study plan)	60					

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

	•							
Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First C	First Cycle Studies						
Specialization								
Form of Study	Full-Tir	Full-Time Studies						
Semester	First	First						
Course Title	Copyri	Copyright and economy law						
Nazwa przedmiotu	Prawo	Prawo autorskie i gospodarcze						
ECTS points	2	2 Subject type HS						

Language of lecture angielsk Mode of			f completing the course			Course credit			
Course code P6			Su re profe	Subject related to scientific research/pract. profess. prepar. (Y/N)					
	Knowledge				1	In aacordance	with PRK	level 4	
Prelimin	nary	,	- ge		2	In accordance	with DDK	loval 4	
requirem	ent	s Skills			2			ievel 4	
of the co	urs	e Social (Competer		1	In aacordance	with PRK	level 4	
			competer		2				
Course Goals The course objectives are to introduce, student, to the basic concepts on the field of copyright and it evolution, use and distribution of creative and expressive work (regulation) on local and global scales.							s on the ork		
Programr of copyrig presentat of harmo	ne o ght tion niza	content and it evo of the leg tion of co	The cours olution, us gal frame opyright re	e includes an le and distribu work (nationa legulation.	intro ution I and	oduction to the k of creative and international) v	basic conc axpressiv vith a viev	epts on t e work . ν on the μ	he field Then a process
Learning outcomes for the course - after completing the training cycle cycle Cycle							Methods of verificati on of learning outcome s		
Knowled	1	The stude rules of co principles	nt has kno ommercia	owledge of th I law and entr	e fur epre	nctions and neurship	K1_W02	W	С
ge	2 t	The stude he use of	nt is able works in	to identify pr business	obler	ns related to	K1_W02	W	С
Skills	1								
	2	The stude	ntvalidat	a hia knowlad		nd the rende of			
Social	1	problems	solved du	ring classes	ige a	nd the range of	K1_K01	W	C
ence	2 t	The stude to achieve	nt choose the inter	es the legal so nded economi	ns appropriate al	K1_K03	W	С	
Methods of v	/erifi	cation of lear	ning outcom	es:					

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, J-assessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan

The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course tle/academic degree/professional title, name and surname			
Lecture (W)	30					
Calculation class (C)	0		daich Said			
Laboratory class (L)	0	dr Edaich S				
Project (P)	0					
Seminar (S)	0	1				
	vorkload					
Types of student activities*			Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			0			
Laboratory class (L)			0			
Project (P)			0			
Seminar (S)			0			
Preparation for class	ses		20			
Preparation of a report/paper/ project/presentation			0			
Independent study o	of the course top	pics	0			
Examination or final	colloquium		0			
Additional contact hours			0			
Total student workload			50			
Number of contact h	ours (from the	study plan)	30			

dr hab. Solga Brygida Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Second
Course Title	Database basics

Nazwa prze	dmiotu	Podsta	wy b	az danyc					
ECTS p	ooints 4 Subject type				ŀ	<			
Language	of lecture	angielsk i	Mode of completing the cou			rse	Course	e credit	
Course code			K4 Subject related to scientific research/pract. profess. prepar. (Y/N)		1)	Т			
	Knowle	daa	1		Student has basic knowledge of programming languages				
	KNOWIE	eage	2	Student algorithr	knows data structure ns	es and ba	sic mathe	ematical	
Preliminar requiremer	y its		1	Student other so	is able to obtain info urces	rmation f	rom litera	ture and	
Social			2	Student informat	is able to analyze prion, test the results (oblems, o obtained	rganize a	nd verify	
		tence	1	Student understands the need for self-education.					
Course Goals Providing knowledge and enabling the acquisition of skills in the field of database basics and SOL.							of		
Programme databases a skills in the SQL comma models, rela trends in cr	content and the SQ field of da ands, build ational dat eating dat	The subjeo L languag tabase ter ing a data a model, c abases.	ct pr e. D min base latal	rovides kr uring the ology, his e server, j base norr	nowledge on issues r module, the student story, types of databa permissions manage nalization, database	elated to acquires ases, data ment, ent security,	the basic knowled types ar ity relatic and curre	s of ge and od basic onship ent	
Learning outcomes for the course - after completing the training course learning outcome for the course - after completing the training course learning (W, C, L, end outcome s) (W, C, L, end outcome s)						Methods of verificati on of learning outcome s			
Knowled 1	Student k database	nows and s and the l	und basio	erstand b cs of the S	asic information on SQL language.	K1_W08	WL	C F	
ge 2									
Skills 1	Student c the SQL la	an create anguage.	basi	ic databas	se commands using	K1_U13	L	F	
2									
Social Compet	Students quality in	become a the datab	ware ases	e of the no s they cre	eed to maintain ate.	K1_K01	WL	Р	
ence 2									
Methods of veri	fication of lea	rning outcom	es:						

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan					
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname		
Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	15	dr inż. Bryr	niarska Anna		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		15		
Preparation of a repo project/presentation	ort/paper/		20		
Independent study o	of the course top	pics	25		
Examination or final	colloquium		0		
Additional contact he	ours		0		
Total student worklo	ad		105		
Number of contact h	ours (from the	study plan)	45		

* hour (class) means 45 minutes

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Field of study	Computer Engineering
Profile of Education	General Academic

Level of study First Cycle				udies			
Specialization							
Form of Study Full-Time Studies							
Semester		Third					
Course Title		Databa	ise mo	delling			
Nazwa przedm	iotu	Modelo	wanie	baz da	anych		
ECTS poir	its	5			Subject type		К
Language of	lecture	angielsk i		Mode of completing the course		Examination	
Course code			К9		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
Knowledge		1	A stud langua	A student should have basic knowledge of Sql anguage and database design.			
		-					
requirements	Skills		1	A stud RDBM	student should have basic skills in the field of DBMS support.		
of the course			2				
Social Competence		ice 1 2	A student is ability to cooperate in a group.				
Course Goals Preparing students for managing database management systems.					stems.		
Programme content Programmed content that will ensure learning outcomes for the subject are issues from the broadly understood area of database modeling. The course will also focus on presenting information on the design of relational and object-oriented databases and the practical use of SQL and OQL.							

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	A student has knowledge in replication in data bases.	K1_W08	WL	AHPR
ge	2	A student has knowledge in indexes in data bases.	K1_W08	WL	АНР
	3	A student has knowledge in data base modeling.	K1_W08	WL	AHPR
Skills		A student can design, according to a given specification, perform and maintain data bases with appropriate methods and techniques.	K1_U13	L	ΗR
	2				
Social Compet ence	1	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.		W L	АНР
	2				

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	30	dr hab. inż. Paszkiel Szczepan				
Project (P)	0					
Seminar (S)	0					
	Student workload					
Types of student act	ivities*	Average number of hours* allocated on completed activities				
Lecture (W)		30				
Calculation class (C)		0				
Laboratory class (L)		30				
Project (P)		0				
Seminar (S)		0				
Preparation for class	es	33				
Preparation of a report project/presentation	ort/paper/	0				

Independent study of the course topics	30
Examination or final colloquium	2
Additional contact hours	0
Total student workload	125
Number of contact hours (from the study plan)	60

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card Field of study **Computer Engineering** Profile of Education **General Academic First Cycle Studies** Level of study Specialization Form of Study **Full-Time Studies** Semester Fourth Course Title **Discrete mathematics** Matematyka dyskretna Nazwa przedmiotu Ρ ECTS points 2 Subject type Language of lecture angielsk Mode of completing the course Course credit Subject related to scientific Course code P12 Ν research/pract. profess. prepar. (Y/N)

	Knowledge	1	Knowledge of basic concepts of linear algebra, incl matrix calculus.		
		2	Knowledge of the concept of function and sequence.		
		1	Ability to perform basic calculations algebra, including matrix calculus.		
Preliminary	Skills	2	Accounting efficiency, operations on real numbers, complex and algebraic expressions		
of the course		3	Determining the limit of a sequence and a function, calculating the derivative functions, determining the primitive function.		
	Social Competence	1	Student is able to work independently and as a team member.		
		2	The desire to explore the world and pursue practical pursuits application of acquired knowledge.		
Course Goals	Improvement of	ma	athematical reasoning and understanding.		
Programme content Within The subject provides knowledge on issues related to number arithmetic natural, mathematical induction and recursion. The student learns to solve some recursive equations, learns number theory, solves problems related to congruencies. The student learns to use combinatorial methods to solve various problems such as also methods for calculating finite sums. The student learns concepts and methods from graph theory.					

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	The student knows the basic techniques of proving, in particular proof by mathematical induction.	K1_W01	W	С
2		The student knows the basic recursive equations, in particular the Fibonacci equation; knows the basic techniques of solving recursive equations.	K1_W01	W	С
ge	3	The student knows the basic techniques of counting combinatorial objects, including the Dirichlet and box principle the principle of inclusion-exclusion.		W	С
	4	The student knows the basic concepts of differential calculus and the methods of finite sums determination.	K1_W01	W	С
	1	The student uses mathematical induction to prove a simple dependence.	K1_U01	С	C F
2 Skills 3 4	2	Student uses various methods to solve linear recursive equations.	K1_U01	С	C F
	3	Student uses various combinatorial methods to calculate the number of elements of a certain set, meet certain criteria.	K1_U01	С	C F
	4	The student uses the calculus of difference to calculate simple finite sums.	K1_U01	С	C F
Social Compet	1	The student acquires the habits of being systematic, organizing knowledge, searching for an appropriate solution to the problem.	K1_K03	W C	СЕР
ence	2	The student is able to analyze, draw conclusions, argue, critically evaluate solutions.	K1_K03	W C	СЕР
Methods of v	veri	fication of learning outcomes:			

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				
Lecture (W)	15					
Calculation class (C)	15					
Laboratory class (L)	0	dr hab. inż. Kawala-Sterniuk Aleksandra				
Project (P)	0					
Seminar (S)	0					

Student workload					
Types of student activities*	Average number of hours* allocated on completed activities				
Lecture (W)	15				
Calculation class (C)	15				
Laboratory class (L)	0				
Project (P)	0				
Seminar (S)	0				
Preparation for classes	10				
Preparation of a report/paper/ project/presentation	0				
Independent study of the course topics	10				
Examination or final colloquium	2				
Additional contact hours	0				
Total student workload	52				
Number of contact hours (from the study plan)	30				

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Car	ď						
Field of study	Compu	Computer Engineering					
Profile of Education	Genera	al Academic					
Level of study	First Cy	cle Studies/					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Fifth	Fifth					
Course Title	Electiv	Elective course I - Good software development practices					
Nazwa przedmiotu	Przedmiot wybieralny I - Dobre praktyki wytwarzania oprogramowania				nia		
ECTS points	5		Subject type		W-K		
Language of lecture	angielsk i	Mode c	of completing the course		Examination		
Course code	KW1		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		

	Knowledge	1	The student has knowledge about the life cycle of the software and understands the goals software engineering.	
		2	The student has a basic knowledge of design and programming objectoriented (Java, C # or C ++).	
		3	The student knows the ways of building software produced by teams.	
Preliminary requirements of the course		1	S/he is able to obtain information from the literature in the field of programming, solving programming problems and simple testing.	
	Skills	2	A student is able to implement the project and build an IT system and solve problems encountered in the implementation of IT systems. He can test the IT system and determine the quality of its operation.	
	Social	1	The student is able to obtain knowledge from various sources and is aware of the need for continuous education.	
	Competence	2		
Course Goals Preparing students to work in teams producing software of good quality, using the latest trends and approaches.				

Programme content Informative lecture, problem lecture, description, instruction, seminar lecture and didactic discussion, situational method, activities, workshop method. the curse goal is preparing students to work in teams producing software of good quality, using the latest trends and approaches.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	A student has knowledge in the field of good manufacturing practices software in various technologies.	K1_W06	W	AEPR
ge -	2	A student has knowledge about selected patterns design used in manufacturing software.	K1_W06	W	AEP
	3	A student has knowledge about dedicated design patterns for data mapping.	K1_W06	W	AER
	1	A student can choose technology and methodologies software development for the task being performed.	K1_U03	WL	EIKLO R
Skills	2	A student can program in accordance with the principles of good software development.	K1_U07	L	EIKPR
	3	A student can choose and apply design patterns well in the chosen programming technology.	K1_U10	L	EIKLM PR
Social Compet ence	1	A student can make decisions about choosing good methodologies software development and design patterns, adapting them to the reality of work with consciousness the impact of your decisions on the work of third parties.	K1_K01	WL	EPR
	2	A student can work in accordance with the principles of professional ethics.	K1_K04	WL	EPR

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	15	dr inż. Zatwarnicka Anna				
Project (P)	0					
Seminar (S)	0					
		Student w	vorkload			
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			0			

Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	30
Preparation of a report/paper/ project/presentation	20
Independent study of the course topics	28
Examination or final colloquium	2
Additional contact hours	0
Total student workload	125
Number of contact hours (from the study plan)	45

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Field of study	Compu	Computer Engineering					
Profile of Education	Genera	General Academic					
Level of study	First C	ycle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Fifth						
Course Title	Electiv	Elective course I - Testing applications and systems					
Nazwa przedmiotu	Przedm	Przedmiot wybieralny I - Testowanie aplikacji i systemów					
ECTS points	5		Subject type		W-K		
Language of lecture	angielsk i	Mode of completing the course		Examination			
Course code		KW1	Subject related to scientific research/pract. profess. prepar. (Y/N)		т		

	Knowledge	1	Student has knowledge about the life cycle of the software. He knows and understands the goals software engineering.			
		2	Knowledge of basic problems of design and programming object.			
		3	Knowledge of object programming languages (Java, C $\#$ or C $++$).			
		4	Knowledge of the UML object modeling language.			
Preliminary requirements		1	Student is able to obtain information from the literature in the field of computer science, also in foreign language. He can integrate the obtained information, make it interpretation, as well as draw conclusions and formulate and justify opinions			
of the course	Skills	2	Student is able to implement the project and build an IT system and solve problems encountered in the implementation of systems information. Student can test the IT system and determine the quality of its operation.			
		3	Has the ability to self-education, including for improving professional competences.			
		4	Student can think in a creative way when solving technical tasks and issues.			
	Social	1	Student can think and act in a creative and enterprising way.			
	competence	2	Student can interact and work in a group.			
Course Goals To familiarize students with the methodologies and tools for testing information systems.						
Programme content Informative lecture, problem lecture, description, instruction,						

conversational lecture and discussion, if possible didactic method, situational method, cases, workshop method. The course is to familiarize students with the methodologies and tools for testing information systems.

Learning	OL	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	Student has knowledge in the field of application testing and information systems. He knows the types of tests and testing methodology.	K1_W06	W	APR
Knowled ge	2 Student knows the rules of building unit tests and knows how to choose tests for the type of IT system.		K1_W06	W	A P
	3	Student knows the rules of work and labor costs of working teams according to the Test Driven Development methodology.	K1_W06	W	A R
	1	Student can choose the right system tests information depending on the complexity of the problems and the type of system. He can develop scenarios testing.	K1_U03	L	EIKLR
Skills	2	Student can perform unit tests in the selected one programming technology, including work user and current trends in development applications and information systems.	K1_U07	L	EIKPR
	3	Student is able to work using the Test Driven Development method the scope of the chosen programming technology.	K1_U10	L	EIKLM PR
Social	1	Student is aware of the responsibility for his own work and team.	K1_K01	WL	EPR
Compet ence	2	Student knows and adheres to ethical standards when working under a team working on software development.	K1_K04	WL	EPR

Hours in the study plan							
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname					
Lecture (W)	30						
Calculation class (C)	0						
Laboratory class (L)	15	dr inż. Zatwarnicka Anna					
Project (P)	0						
Seminar (S)	0						
Student workload							

Types of student activities*	Average number of hours* allocated on completed activities
Lecture (W)	30
Calculation class (C)	0
Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	30
Preparation of a report/paper/ project/presentation	20
Independent study of the course topics	28
Examination or final colloquium	2
Additional contact hours	0
Total student workload	125
Number of contact hours (from the study plan)	45

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Compu	Computer Engineering					
Profile of Education	Genera	General Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Fifth						
Course Title	Electiv	Elective course II - Designing internet solutions					
Nazwa przedmiotu	Przedm	Przedmiot wybieralny II - Projektowanie rozwiązań internetowych					
ECTS points	3	Subject type			W-K		
Language of lecture	angielsk i	Mode of completing the course		Course credit			
Course code		KW2	Subject related to scientific research/pract. profess. prepar. (Y/N)		т		

	nary nents ourse			1	Solid knowledge on the we	b page de	evelopme	nt	
			Knowledge	2					
Prelimin			/	1	Simple web applications development				
requirem of the co			s Skills e		Gaining the subject information from books and Internet				
			Social Compotence	1	Teamworking				
				2					
Course G	oal	S	Teaching how to de	sigr	n and implement an interne	t solution	S.		
Programr and skills	ne in	co en	ntent Lecture in an igineering disciplines	au s re	ditorium hall or on-line vers lated to IT in the field of des	ion. Provi signing In	ding knov ternet sol	vledge utions.	
Learning outcomes for the course - after completing the training outcome for the course - after completing the training outcome (W, C, L, outcome S) (W, C,						Methods of verificati on of learning outcome s			
Knowled 1 Student knows the sorts of internet applications and k			K1_W05	W P	С				
ge	2								
	1	Stı for	udent can design a f r e-commerce	unc	tional internet application	K1_U03	Р	КМО	
Skills	2	Stı rec de	udent can make gra ception of a web app sign principles	K1_U09	Ρ	КМО			
Social 1 Studen can define and assign tasks needed to K1_H design an internet solution in a team				K1_K01	Р	кмо			
ence 2									
Methods of verification of learning outcomes: A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, J- assessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.									

Hours in the study plan							
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname					
Lecture (W)	15						
Calculation class (C)	0						
Laboratory class (L)	0	dr hab. inż. Tomaszewski Michał					
Project (P)	15						
Seminar (S)	0						
Student workload							

Types of student activities*	Average number of hours* allocated on completed activities
Lecture (W)	15
Calculation class (C)	0
Laboratory class (L)	0
Project (P)	15
Seminar (S)	0
Preparation for classes	10
Preparation of a report/paper/ project/presentation	15
Independent study of the course topics	20
Examination or final colloquium	0
Additional contact hours	0
Total student workload	75
Number of contact hours (from the study plan)	30

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Compu	Computer Engineering							
Profile of Education	General Academic								
Level of study	First Cycle Studies								
Specialization									
Form of Study	Full-Time Studies								
Semester	Fifth								
Course Title	Electiv	Elective course II - Embedded systems							
Nazwa przedmiotu	Przedm	Przedmiot wybieralny II - Systemy wbudowane							
ECTS points	3		Subject type		W-K				
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit				
Course code	KW2		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν				

		-	IA student has structured know	ledae in t	he field o	+ C/Cエエ !				
		T	A student has structured knowledge in the field of C/C++ and assembler programming languages/techniques							
Preliminary requirements of the course	Knowledge	2	A student has a structured knowledge of computer architecture, calculating the representation of integer and real numbers and performing basic arithmetical and logical operations on these representations							
	Skills	1	A student can acquire information from literature, the Internet and other sources, can integrate the acquired information and draw conclusions							
		2								
	Social		A student can work in a team, taking on different roles							
	Competence 2									
Course Goals The aim of the course is to acquire basic knowledge and skills in the design and implementation of embedded systems, both in the context of documentation as well as hardware and software										
Programme content The subject provides knowledge in the design and application of embedded systems										
Learning outcomes for the course - after completing the training cycle					Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s				
A s en co	student has a ge Igineering discipl Imputer science.	K1_W05	W	С						
A s	student has a ba ocessing terming	sic olog	K1_W01	W P	СJ					
A s otl an	A student can obtain information from literature and other sources, integrate the obtained information K1_U06 P and interpret it.									
A student can use the signal processor and peripherals by programming simple embed systems.					Ρ	I				
A student is aware of the importance and understands the non-technical aspects and consequences of engineering activity, including its impact on the environment, and the related responsibility for the decisions made.						C K L M N O P				
A se	student can inter le to define prior t by himself or o	K1_K01	W P	IJ						
	y its and cos it A ero A pr A of a A ero A	Knowledge Knowledge Skills Skills Social Competence Social Competence Social Competence Social Competence Social Competence Content The subject Social Content The subject Social	Knowledge 2 y 1 Skills 1 Skills 2 Social 1 Competence 2 Is The aim of the course 2 Is The aim of the course 2 Is The aim of the course 2 content The subject 3 systems 2 A student has a genere cycle A student has a genere cycle A student has a basic processing terminolog A student can obtain i other sources, integra and interpret it. A student can use the peripherals by program systems. A student is aware of understands the non-t consequences of enging impact on the environ responsibility for the consequences of enging impact on the environ able to define priorities set by himself or othe able to define priorities	Knowledge A student has a structured knowledge 2 architecture, calculating the real numbers and performing to logical operations on these representations on these representation on the sources, carrinformation and draw conclusion Skills 1 A student can acquire informate information and draw conclusion 2 Social 1 Competence 2 Is The aim of the course is to acquire basic knowledge entation of embedded systems, both in the context of a software content The subject provides knowledge in the design systems atcomes for the course - after completing the training cycle A student has a general knowledge in the engineering disciplines associated with the computer science. A student has a basic knowledge of signal processing terminology and system analysis. A student can use the signal processor and its peripherals by programming simple embedded systems. A student is aware of the importance and understands the non-technical aspects and consequences of engineering activity, including its impact on the environment, and the related responsibility for the decisions made. A student can interact and work in a group. He is able to define priorities for the realization of a task set by himself or others.	Knowledge A student has a structured knowledge of architecture, calculating the representative real numbers and performing basic aritheling cal operations on these representation from a linternet and other sources, can integrate information and draw conclusions Skills 1 A student can acquire information from and draw conclusions Skills 1 A student can work in a team, taking on competence Social 1 A student can work in a team, taking on competence Social 1 A student can work in a team, taking on competence Competence 2 Image: Competence Social 1 A student can work in a team, taking on competence Content The subject provides knowledge in the context of document dosftware Image: Context of document cycle Content The subject provides knowledge in the design and ap systems Image: Context of the course - after completing the training outcome systems A student has a general knowledge in the engineering disciplines associated with the computer science. Student can obtain information from literature and other sources, integrate the obtained information and interpret it. A student can use the signal processor and its peripherals by programming simple embedded consequences of engineering activity, including its impact on the environment, and the related responsibility for the decisions made. K1_K04 A student can interact and work in a group. He	KnowledgeA student has a structured knowledge of compute architecture, calculating the representation of int real numbers and performing basic arithmetical a logical operations on these representationsSkillsA student can acquire information from literature information and draw conclusionsSkills1A student can work in a team, taking on different 2Social Competence1A student can work in a team, taking on different 2IsThe aim of the course is to acquire basic knowledge and skills in the entation of embedded systems, both in the context of documentation as d softwarecontentThe subject provides knowledge in the design and application systemsutcomes for the course - after completing the training cycleForm of c to the learning outcome sA student has a general knowledge of signal processing terminology and system analysis.K1_W05A student has a basic knowledge of signal processing terminology and system analysis.K1_U00A student can use the signal processor and its peripherals by programming simple embedded systems.K1_U09A student is aware of the importance and understands the non-technical aspects and consequences of engineering activity, including its impact on the environment, and the related responsibility for the decisions made.K1_K01A student can interact and work in a group. He is able to define priorities for the realization of a task set by himself or others.K1_K01				
Hours in the study plan										
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The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname								
Lecture (W)	15									
Calculation class (C)	0									
Laboratory class (L)	0	dr hab. inż.	. Podpora Michał							
Project (P)	15									
Seminar (S)	0									
Student workload										
Types of student act	ivities*		Average number of hours* allocated on completed activities							
Lecture (W)			15							
Calculation class (C)			0							
Laboratory class (L)			0							
Project (P)			15							
Seminar (S)			0							
Preparation for class	es		15							
Preparation of a report project/presentation	ort/paper/		20							
Independent study o	of the course top	pics	10							
Examination or final	colloquium		0							
Additional contact he	ours		0							
Total student worklo	ad		75							
Number of contact h	ours (from the s	study plan)	30							

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Fifth

Course Title Elective co			course III - Computer graphics II					
Nazwa przedmiotu Przedmiot wybi					ıy III - Grafika kompute	rowa II		
ECTS poir	nts	4			Subject type		W-K	
Language of lecture and		angielsk i		Mode c	ode of completing the course		Course credit	
Course code		K	KW3		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	
	Knowledge		1	A stud Graph	dent has knowledge from the lecture Computer nics I			
			2					
requirements	Skills		1	A stud profici	A student has computer skills and programming proficiency			
			2					
	Casial	Compotono	1	A stud	ent can cooperate and	work in	n a group	
	SOCIAL	Jompetenc	e 2					
Course Goals The aim of the course is to get acquainted with advanced computer graphics issues with particular focus on 3D graphics								
Programme content Lecture in the auditorium, Presentation of basic and advanced three- dimensional graphics algorithms. Creating spatial objects, visual effects, animation elements								

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Kasulad	1	A student has an orderly, theoretically founded knowledge covering issues of generating and editing vector, bitmap and three-dimensional graphics	K1_W09	W P	C E K M P R
ge .	2	A student knows the rules of constructing interactive applications graphic		WΡ	C E K M P R
	3	A student up-to-date knowledge on the latest achievements in the field of computer graphics	K1_W09	W	С
Skills	1	A student can develop extensive scene models three-dimensional and enrich them with the so- called special effects	K1_U14	Ρ	E K M P R
	2	A student the preparation necessary for programming three-dimensional graphic applications with the use of programming library	K1_U14	Ρ	E K M P R
	3	A student prepare a well-documented study of the computer graphics problems	K1_U14	Р	EKMP R
Social	1	A student properly define priorities for implementation tasks specified by oneself or others	K1_K01	Р	KPR
ence	2	A student interact and work in a group, accepting in it different roles	K1_K01	Р	KPR

Hours in the study plan						
The course format	Tutor (coordinator) of the courseHours/sem. (h)(title/academic degree/professional title, name and surname					
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	0	dr inż. Kamiński Marcin				
Project (P)	15					
Seminar (S)	0					
		Student w	vorkload			
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			0			

Laboratory class (L)	0
Project (P)	15
Seminar (S)	0
Preparation for classes	15
Preparation of a report/paper/ project/presentation	30
Independent study of the course topics	10
Examination or final colloquium	0
Additional contact hours	0
Total student workload	100
Number of contact hours (from the study plan)	45

dr hab. inż. Tomczewski Krzysztof Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First Cy	cle Studies						
Specialization								
Form of Study	Full-Tir	Full-Time Studies						
Semester	Fifth	Fifth						
Course Title	Electiv	Elective course III - Vision systems						
Nazwa przedmiotu	Przedm	Przedmiot wybieralny III - Systemy wizyjne						
ECTS points	4		W-K					
Language of lecture	angielsk i	Mode c	of completing the course		Course credit			
Course code		KW3	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			

			Knowledge		Basic knowledge of computer science.					
			Knowledge	2						
Preliminary requirements	y nts	Skills	1	Programming skills in one of the programming languages.						
of the co	ur	se		2						
			Casial Commetence	1	Student can interact and w	ork in a g	roup.			
			Social Competence	2						
Course G	oa	ls	Familiarize students	s wi	th the algorithms used in vi	sions syst	tems.			
Programr modern v	ne ⁄isi	co on	ntent Lecture in the systems is provided	e au bas	uditorium. During the classe sed on the extensive use of	es, knowle the Open	edge abou ICV librar	ıt Y		
Learning outcomes for the course - after completing the training cycle cycle CULCE C					Methods of verificati on of learning outcome s					
	1	Sti use	udent has detailed k e the vision system	vledge of practical ways to	K1_W05	W P	CL			
Knowled ge	2	Stı use	udent has practical k ed in applications in	K1_W06	W P	CL				
	3	Stı gra	udent has knowledge aphics.	K1_W09	W P	CL				
	1	Stı sys	udent can propose t stem depending on t	he r the	ight solution of the vision needs	K1_U09	Р	JKPR		
Skills Skills				pro Igoi	ocedure that allows to rithm that processes a	K1_U10	Р	JKPR		
	3	Stu au dig	udent can program a tomation of activitie gital images	K1_U14	Р	JК				
Social	1	Stı tra	udent understands t iining	he r	need for continuous	K1_K01	W P	P R		
Social Compet ence	2	Stu wo tea or	udent is aware of the ork and readiness to amwork and taking r she has carried out	e re cor esp join	K1_K04	Р	PR			

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			

Lecture (W)	30	0						
Calculation class (C)	0							
Laboratory class (L)	0	dr inż. Kam	dr inż. Kamiński Marcin					
Project (P)	15							
Seminar (S)	0							
Student workload								
Types of student act	ivities*		Average number of hours* allocated on completed activities					
Lecture (W)			30					
Calculation class (C)			0					
Laboratory class (L)			0					
Project (P)			15					
Seminar (S)			0					
Preparation for class	es		20					
Preparation of a report project/presentation	ort/paper/		20					
Independent study o	f the course to	pics	15					
Examination or final	colloquium		0					
Additional contact hours			0					
Total student worklo	ad		100					
Number of contact h	ours (from the	study plan)	45					

dr hab. inż. Tomczewski Krzysztof Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Car	ď							
Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First Cy	First Cycle Studies						
Specialization								
Form of Study	Full-Tir	Full-Time Studies						
Semester	Fifth	Fifth						
Course Title	Electiv	e course IV - Administration of network ope	rating systems					
Nazwa przedmiotu	Przedm operacy	Przedmiot wybieralny IV - Administracja sieciowymi systemami operacyjnymi						
ECTS points	4	Subject type	W-K					

Langua	ge	of lecture	angielsk i	ngielsk Mode of completing the co			f completing the cou	ırse	Course credit	
Course code KW		KW4 Subject related to scientific research/pract. profess, prepar, (Y/N)		1)) T					
		Knowle	dge	dge		Knowle operat	Knowledge in the field of computer networks and operating systems.			
Prelimin requirem	nar nen	y ts Skills			2	Skills i Syster	n the field of comput ns.	ter netwo	rks and O	perating
	, ur s	Social (Competer	ice	2	Group	Group working skills.			
Course G operating	Course Goals Introducing students to the implementation and maintenance of network operating systems in enterprise environment.						vork			
Programr operatior maintena	Programme content The subject provides knowledge on the functioning of network systems operational conditions in the enterprise. Issues related to are presented implementation and maintenance of network operating systems with a directory service.									
Learning outcomes for the course - after completing the training leaded out					The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s			
Knowled	1	A student and opera	has know ting syste	ems	ge ar	in the o ea.	computer networks	K1_W07	WL	С
yc	2									
Skills	1	A student operating methods a	can insta systems, and techn	ll, c wit iqu	onf h tl es	ïgure a ne use	nd administer of appropriate	K1_U11	L	С
	can main < operatin	tair Ig s	n ar yste	nd diag ems.	nose the operation	K1_U12	L	С		
Social Compet ence	1	A student situations range of p team.	can make , critically problems s	an make decisions, also in difficult critically validate his knowledge and the oblems solved both individually and in a K1_K01 W L P						Р
	2									
Methods of \	/erif	ication of lear	ning outcom	es:						

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan

The course formatHours/sem. (h)Tutor (coordinator) of the course (title/academic degree/professional title, name and surnameLecture (W)15							
Lecture (W)	15						
Calculation class (C)	0						
Laboratory class (L)	30	dr inż. Gola	a Mariusz				
Project (P)	0						
Seminar (S)	0						
		Student v	vorkload				
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			15				
Calculation class (C)			0				
Laboratory class (L)			30				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		25				
Preparation of a report/paper/ project/presentation			0				
Independent study o	of the course top	pics	30				
Examination or final	colloquium		0				
Additional contact hours			0				
Total student workload			100				
Number of contact h	ours (from the	study plan)	45				

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Fifth
Course Title	Elective course IV - System programming

Nazwa pr	azwa przedmiotu Przedmiot wybieralny IV - Programowanie systemowe								
ECT	Sр	oints	4	Subject type				W-K	
Language of lecture angielsk				Mode of completing the cours			Course credit		
Course code		KW4 Subject related to scientific research/pract. profess. prepar. (Y/N		т					
		Knowlo	dae	1	A studen compute	t knows the role of th r system	ne operati	ng syster	n in a
		Knowie	age	2	2 A stude program	ent knows the differe s, script and other fil	nce betwo es	een comp	iled
Prelimir requirem	nary nen	ts skille		1	A studen language	t can program in a se e	elected pr	ogrammi	ng
of the co	urs	se Skills		2	A student can run programs from the command line a move in the directory structure				line and
Social Competence		tence	1	A student can independently acquire the knowledge and skills needed to perform a specific task					
Course G file and d	oal ire	s Prepari ctory oper	ng studer ations, co	nts f mm	or progra unication	mming using operati mechanisms and int	ng systen erprocess	n mechan s synchro	isms, i.e. nization
Programr	ne	content l	Linux prog	gran	ning. Files	s, directories and dev	vice files c	on Linux	
Learning outcomes for the course - after completing the training outcome for the course - after completing the training outcome (W, C, L, outcome S) (W, C, L, outcome S) (W, C, L, outcome S)						Methods of verificati on of learning outcome s			
Knowled	1	A student operating	has know system m	ledg	ge of the lanisms.	operation of	K1_W07	WL	СН
ye	2								
Skills	1	A student system m	A student can use the knowledge of the operating system mechanisms during programming.			K1_U12	L	СН	
2									
Social Compet	1	A student decisions.	can learn	, dra	aw conclu	isions, make	К1_К01	WL	СН
ence	2								
A-written ex	Methods of verification of learning outcomes: A-written exam. B-oral exam. C-written assessment. D-oral assessment. E-based on partial marks of oral answers. F-based								

The course formatHours/sem. (h)Tutor (coordinator) of the course (title/academic degree/professional title, name and surname.ecture (W)15							
Lecture (W)	15						
Calculation class (C)	0						
Laboratory class (L)	30	dr inż. Poku	uta Waldemar				
Project (P)	0						
Seminar (S)	0						
		Student v	vorkload				
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			15				
Calculation class (C)			0				
Laboratory class (L)			30				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		20				
Preparation of a report/paper/ project/presentation			25				
Independent study o	of the course top	pics	10				
Examination or final colloquium			0				
Additional contact hours			0				
Total student workload			100				
Number of contact h	ours (from the	study plan)	45				

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Sixth
Course Title	Elective course IX - Data protection in applications

Nazwa przedm	Przedm	edmiot wybieralny IX - Ochrona danych w aplikacjach						
ECTS points		2				W-K		
Language of lecture		angielsk i	Mode of completing the course			Course credit		
Course code		ŀ	KW9			Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowledge		-	1	Basic I applica	<nowledge and="" functioning="" of="" of<br="" operation="" the="">ations and computer systems</nowledge>		
Preliminary			4	2				
requirements	Skille		-	1	Creati	ing and configuring applications		
of the course				2				
	Social	Competen		1	The st	e student can cooperate in a group		
				2	The st	student can acquire knowledge from sources		
Course Goals protection to tl	Course Goals Theoretical and practical implementation of students in issues related to data protection to the extent necessary for system and computer network administrators							
Programme content Basic concepts and methods of data protection. Risk management. Security policy. Application security mechanisms. Symmetric and asymmetric cryptographic systems. Message authentication, digital signatures. Public key infrastructure. Cryptographic protocols. Application security testing.								

Learning outcomes for the course - after completing the training cycle				Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowlod	1	A student has knowledge of the protection and security of personal data in ICT systems.	K1_W07	W P	CHPR
ge		A student has knowledge in the field of designing software / systems ensuring the security of stored and transmitted data	K1_W06	W P	CHPR
	1	A student can both independently and as a team carry out the tasks of designing and implementing secure IT systems, as well as analyze and test them and draw conclusions.	K1_U07	Ρ	CHPR
Skills	2	A student has able to search and use the provisions of legal acts concerning data security and personal data security and other sources of engineering knowledge and to apply the found knowledge in the creation of IT systems.	K1_U09	Ρ	CHPR
Social Compet	1	A student can critically evaluate his knowledge and the range of issues he knows, and he can independently look for solutions and make decisions.	K1_K01	W P	CHPR
ence	2	Is aware of the impact of application security on the social environment and public interest.	K1_K02	W P	CHPR

Hours in the study plan						
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname			
Lecture (W)	15					
Calculation class (C)	0					
Laboratory class (L)	0	dr hab. inż.	lr hab. inż. Rząsa Mariusz			
Project (P)	15					
Seminar (S)	0					
		Student w	vorkload			
Types of student activities*			Average number of hours* allocated on completed activities			
Lecture (W)			15			
Calculation class (C)			0			

Laboratory class (L)	0
Project (P)	15
Seminar (S)	0
Preparation for classes	5
Preparation of a report/paper/ project/presentation	10
Independent study of the course topics	5
Examination or final colloquium	0
Additional contact hours	0
Total student workload	50
Number of contact hours (from the study plan)	30

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Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering							
Profile of Education	Genera	General Academic							
Level of study	First C	First Cycle Studies							
Specialization									
Form of Study	Full-Tir	ne Studies							
Semester	Sixth	Sixth							
Course Title	Electiv network	Elective course IX - Data protection in systems and computer networks							
Nazwa przedmiotu	Przedn kompute	Przedmiot wybieralny IX - Ochrona danych w systemach i sieciach komputerowych							
ECTS points	2		Subject type		W-K				
Language of lecture	angielsk i	Mode c	of completing the course		Course credit				
Course code		KW9	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т				

	Knowledge		Basic knowledge of the operation and functioning of applications and computer systems
Preliminary			
requirements	Skills	1	Creating and configuring network applications
of the course		2	
	Casial Compotence	1	A student can cooperate in a group
	Social Competence		A student can acquire knowledge from sources

Course Goals Theoretical and practical implementation of students in issues related to data protection to the extent necessary for system and computer network administrators

Programme content Discussion of data protection issues relevant to system and computer network administrators.

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowlod	1	A student has knowledge of the protection and security of personal data in ICT systems.	K1_W07	W P	CHPR
ge	2	A student has knowledge in the field of designing software / systems ensuring the security of stored and transmitted data	K1_W06	W P	CHPR
Skills	1	A student can both independently and as a team carry out the tasks of designing and implementing secure IT systems, as well as analyze and test them and draw conclusions.	K1_U07	Ρ	CHPR
	2	A student can able to search and use the provisions of legal acts concerning data security and personal data security and other sources of engineering knowledge and to apply the found knowledge in the creation of IT systems.	K1_U09	Ρ	CHPR
Social Compet ence	1	A student can critically evaluate his knowledge and the range of issues he knows, and he can independently look for solutions and make decisions.	K1_K01	W P	CHPR
	2	Is aware of the impact of application security on the social environment and public interest.	K1_K02	W P	CHPR

Methods of verification of learning outcomes:

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan

The course format	Hours/sem. (h)	 Tutor (coordinator) of the course (h) (title/academic degree/professional title, name and surname 					
Lecture (W)	15						
Calculation class (C)	0						
Laboratory class (L)	0	dr hab. inż.	. Rząsa Mariusz				
Project (P)	15						
Seminar (S)	0						
Student workload							
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			15				
Calculation class (C)			0				
Laboratory class (L)			0				
Project (P)			15				
Seminar (S)			0				
Preparation for class	es		5				
Preparation of a report/paper/ project/presentation			10				
Independent study o	of the course top	pics	5				
Examination or final colloquium			0				
Additional contact hours			0				
Total student worklo	ad		50				
Number of contact h	ours (from the	study plan)	30				

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Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Fifth
Course Title	Elective course V - Fundamentals of control engineering

Nazwa przedmiotu Przedmiot wybieralny V - Podstawy automatyki										
ECT	S po	oints	2			Subject type		W	-K	
Language of lecture angielsk			Mode of completing the cou		rse	Course credit				
Cour	se	code		KW5		Subject related to scientific research/pract. profess. prepar. (Y/N	т			
Knowled			dge	1	A student including complex r with meth systems.	A student is knowledge in mathematical analysis including the differential and integral calculus and complex numbers, necessary to solve problems related with methods for description of dynamical elements and systems.				
Dralinair				2						
requirem of the co	nent ours	e Skills		1	A student analysis k differentia	has skills in applicat nowledge and metho al and integral calculu	ion of ma ods relate us and co	thematica d with the mplex nu	al e mbers.	
				2						
		Social	Social		A student has kills in proper determination of priorities serving to solve the social tasks.					
		Compe	tence	2	A student is understanding of the need for permanent deepening of knowledge.					
Course G	oals	s Studen	ts learn t	he	basics of a	utomation and contro	ol theory.			
Programr the subje theory. T automati technolog	ne ct a he o on a gy.	content are basic i course wil and the th	The progi ssues in t l also foc neory of c	ram the us (ont	imed conte field of bro on present rolling virt	ent that will ensure th badly understood aut ing information abou ual objects using bra	ne learnin omation a t controlle in-compu	g outcom and syste ers used i ter interfa	es for ms n ace	
Learning outcomes for the course - after completing the training cycle cycle C						Methods of verificati on of learning outcome s				
Knowled	1	A student systems	has a ge	ner	al knowled	ge in the control	K1_W05	WL	СНР	
3-	2									
Skills	1	A student systems.	can utiliz	e k	nowledge	in the control	K1_U07	L	НР	
	2									
Social Compet	1	A student	is able to) W (ork in a tea	am.	K1_K01	L	HPR	
ence	2									
Methods of v	/erifi	cation of lear	ning outcon	nes:						

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan							
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname				
Lecture (W) 15							
Calculation class (C) 0							
Laboratory class (L) 15 dr hab. inż. Paszkiel Szczepan							
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			15				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		10				
Preparation of a repo project/presentation	ort/paper/		10				
Independent study o	of the course top	pics	0				
Examination or final	colloquium		0				
Additional contact hours			0				
Total student workload			50				
Number of contact h	ours (from the s	study plan)	30				

* hour (class) means 45 minutes

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Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic

Level of study First Cycle Studies								
Specialization	ecialization							
Form of Study Fu			Full-Time Studies					
Semester		Fifth						
Course Title		Electiv	/e c	ourse V - F	undamentals of syster	ns theoi	ry	
Nazwa przedm	iotu	Przedr	niot	t wybieraln	ny V - Podstawy teorii s	ystemó	W	
ECTS poir	nts	2			Subject type		W-K	
Language of	lecture	angielsk i		Mode o	of completing the cours	e	Course credit	
Course code			KW5		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	
	Knowledge		1	A student is knowledge in mathematical analysis including the differential and integral calculus and complex numbers, necessary to solve problems related with methods for description of dynamical elements and systems.				
		2						
Preliminary requirements of the course	Skills		1	A student has skills in application of mathematical analysis knowledge and methods related with the differential and integral calculus and complex numbers.			thematical d with the mplex numbers.	
			2					
	Social		1	A student serving to	has skills in proper de solve the social tasks	termina	tion of priorities	
	tence	2	A student is understanding of the need for permanent deepening of knowledge.					
Course Goals	Studen	ts learn t	he	basics of a	utomation and control	theory.		
Programme co	ntent	The prog	ram	med conte	ent that will ensure the	learnin	g outcomes for	

the subject are basic issues in the field of broadly understood systems theory. The course will also focus on presenting information on the analysis and mathematical modeling of objects and processes of various nature, as well as the theory of controlling virtual objects using brain-computer interface technology.

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	A student has a general knowledge in the systems theory	K1_W05	WL	СНР
ye	2				
Skills	1	A student can utilize knowledge in the systems theory.	K1_U07	L	ΗP
	2				
Social Compet ence	1	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	K1_K01	L	HPR
	2				

Hours in the study plan					
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname		
Lecture (W)	15				
Calculation class (C)	0				
Laboratory class (L)	15	dr hab. inż.	Paszkiel Szczepan		
Project (P)	0				
Seminar (S)					
Student workload					
Types of student activities*			Average number of hours* allocated on completed activities		
Lecture (W)			15		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for classes			10		
Preparation of a report/paper/ project/presentation			10		
Independent study o	of the course top	pics	0		

Examination or final colloquium	0
Additional contact hours	0
Total student workload	50
Number of contact hours (from the study plan)	30

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course D	escription	Card
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· · · ·							
Field of study Computer			ter Er	Engineering			
Profile of Educa	ucation General Academic						
Level of study		First Cy	cle St	udies			
Specialization							
Form of Study		Full-Tin	ne Stu	ıdies			
Semester		Sixth					
Course Title		Elective	e cour	se VI - (Corporate IT systems		
Nazwa przedm	iotu	Przedm	iot w	ybieralr	y VI - Korporacyjne sys	stemy ir	nformatyczne
ECTS poir	nts	2			Subject type		W-K
Language of	age of lecture angielsk			Mode of completing the course			Course credit
Course code		k	(W6	W6 Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	
	Knowledge		1	A stud compu compa	A student understands the needs of using computerized management systems in the companies.		
Preliminary			2				
of the course	Skills		1	A student can use computer system to data acquisition.			to data
			2				
	Social (Compoton	1	A stud	A student can co-operate in the group of people.		
			2				
Course Goals	Prepara	ation stude	ents t	o using	computerized manage	ment sy	ystems.
Programme con their analysis, d	tent Le esign, in	ctures cov	ering tion, a	the issuend	es of corporate informati oyment. Laboratory exer	on syste cises uti	ems, particularly ilizing ERP software.

Learning	OL	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	A student has knowedge in programming and software engineering. Student understands basic processes in the computer systems' life cycle.	K1_W06	WL	C E H I P R
ge	2	A student is familiar with basic concepts in economics, business law, and principles of running a business.	K1_W02	WL	СНІ
Skills	1	A student can practicaly use his knowledge of the area work safety and ergonomy, economy, economy law, entrepreneurship principles and copyright protection regulations and perform economical evaluation of proposed engineering solutions.	K1_U02	L	C E H I P R
	2	A student can, in the process of formulating and solving engineering tasks, recognize non-technical, systemic, social, and ethical aspects.	K1_U03	L	C E H I P R
	З	A student can properly select sources of information and utilize advanced information and communication techniques (ICT) for this purpose. He can critically evaluate and synthesize information from various sources.	K1_U06	L	C E H I P R
Social Compet	1	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	K1_K01	L	C E H I P R
	2	A student can think and act entrepreneurially.	K1_K03	L	C E H I P R

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				
Lecture (W)	15					
Calculation class (C)	0	dr inż. Radziewicz Wojciech				
Laboratory class (L)	15					
Project (P)	0					
Seminar (S)	0					
Student workload						

Types of student activities*	Average number of hours* allocated on completed activities
Lecture (W)	15
Calculation class (C)	0
Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	10
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	10
Examination or final colloquium	0
Additional contact hours	0
Total student workload	50
Number of contact hours (from the study plan)	30

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Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First C	First Cycle Studies						
Specialization								
Form of Study	Full-Tir	ne Studies						
Semester	Sixth	Sixth						
Course Title	Elective course VI - Fundamentals of computerized management systems							
Nazwa przedmiotu	Przedmiot wybieralny VI - Podstawy zintegrowanych systemć zarządzania				ch systemów			
ECTS points	2		Subject type		W-K			
Language of lecture	angielsk i	Mode c	e of completing the course		Course credit			
Course code	Course code KW6		Subject related to scientific research/pract. profess. prepar. (Y/N)		т			

Knowledge		1	A student understands the needs of using computerize management systems in the companies.							
			Kilowieuge	2		compan				
Preliminary		v			A student can use computer system to data acquisition.					
requirements Skills		Skills	2							
of the co	ur	se		1	A student can co-operate in	a group o	f people.			
			Social Competence	2	A student can provide explai defining a party strategy for assignments.	nations as himself o	appropri r other	ate for		
Course G	oa	ls	Preparation of stu	den	ts to using computerized ma	nagemen	t systems			
Programr enterpris utilizing E	ne es, ERF	coi , pa > so	ntent Lectures co rticularly their evo ftware.	ver luti	ing the issues of integrated in on, structure, and security. L	nformatio aboratory	n system: exercise	s for s		
Learning	οι	utco	omes for the course cyc	e - a le	after completing the training	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s		
Knowled ge	1	A s and ent reg	student knows basi d ergonomy, econo trepreneurship prin gulations.	ent knows basic topics in the area work safety gonomy, economy, economy law, reneurship principles and copyright protection tions.						
	2	A s	student has knowle	edge	e in data bases area.	K1_W08	WL	CHI		
	1	A s are lav pro eva	student can practicaly use his knowledge of the ea work safety and ergonomy, economy, economy w, entrepreneurship principles and copyright K1_U02 L C H I otection regulations and perform economical valuation of proposed engineering solutions							
Skills	2	A s soc en	student can perceiv cial and ethical asp gineering tasks an	tudent can perceive metatechnical, system, ial and ethical aspects of the proposed K1_U03 L C H I gineering tasks and their solutions.						
	3	A s inf cor is c inf	student can approport ormation and utiliz mmunication techr capable of critically ormation from vari	appropriately select sources of d utilize advanced information and n techniques (ICT) for this purpose. He K1_U06 L C H I ritically evaluating and synthesizing m various sources.				СНІ		
Social Compet ence	1	A s situ rar tea	student can make o uations, critically v nge of problems so am.	ke decisions, also in difficult ly validate his knowledge and the s solved both individually and in a K1_K01 L I J P				IJP		
	2	A s	student can think a	nd	act entrepreneurially.	K1_K03	L	IJP		
Methods of v A-written ex on partial m	veri am, arks	ficat , B-o s of \	ion of learning outcomes ral exam, C-written asse written answers, G-term	ssme pape	ent, D-oral assessment, E-based on par er, H-assessment from reports, I-assess	tial marks of ment from r	oral answer ealization of	s, F-based exercises, J-		

assessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan							
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname				
Lecture (W)	15						
Calculation class (C)	0						
Laboratory class (L)	15	dr inż. Rad	ziewicz Wojciech				
Project (P)	0						
Seminar (S)	0						
	Student workload						
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			15				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		10				
Preparation of a report project/presentation	ort/paper/		0				
Independent study o	of the course top	pics	10				
Examination or final	colloquium		0				
Additional contact he	ours		0				
Total student worklo	ad		50				
Number of contact h	ours (from the s	study plan)	30				

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Sixth

Course Title	Elective	Elective course VII - Data transmission in computer networks					
Nazwa przedm	Przedm kompute	Przedmiot wybieralny VII - Transmisja danych w sieciach komputerowych					
ECTS poir	nts	4			Subject type		W-K
Language of lecture		angielsk i		Mode c	lode of completing the course		Course credit
Course code		I	KW7		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowledge		1	A student has knowledge about information technology and operating systems.			
			2	A student has an initial knowledge about computer networks and Internet construction.			
Preliminary requirements of the course			1	A student can acquire information in literature, databases and other sources.			
	Skills		A student is able to integrate the obtained interpret them, and also draw conclusions and justify opinions.		ned information, ons and formulate		
	Social		1	A student can interact and work in a group.			
	Compe	tence	2				
Course Goals	als To obtaining the elementary knowledge in the field of data transmission and						ransmission and

devices included in data transmission links, including wireless systems, configuration of these devices in local networks. Student need to obtain the ability to choose and design an appropriate structure of data connections system to solve the task of connecting two computer devices or LANs.

Programme content The lesson provides knowledge on issues related to the basic concepts of digital data transmission at the physical layer level, properties of transmission media, i.e. copper, fiber optic and wireless media, data modulation, coding techniques, and improving transmission reliability through the use of correction codes. During the module, the student acquires skills in the operation of measuring instruments and applications enabling the diagnosis of data transmission systems and the assessment of their transmission and quality parameters. The acquired competences allow for a systemic approach to data transmission systems in terms of maintaining and ensuring quality and the required reliability, as well as raising awareness of responsibility for their proper operation.

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	The student has the knowledge of data transmission in computer networks and the properties of the transmission media, a specially radio and fiber optic.	K1_W07	WL	CFH
	2				
Skills	1	The student is able to independently and in a team carry out engineering tasks and perform basic research, interpret their results and draw conclusions in the field of data transmission in radio and fiber-optic computer networks.	K1_U07	L	FH
	2				
Social Compet ence	1	The student can act in accordance with the principles of ethics and respect the professional tradition of the workers involved data transmission systems. It promotes culture pro-quality and appropriate patterns of conduct in the professional environment of employees dealing with data transmission systems.	К1_К04	WL	CFHR
	2				

	ŀ	study plan			
The course format	Hours/sem. (h)	(ti	Tutor (coordinator) of the course tle/academic degree/professional title, name and surname		
Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	15	dr hab. inż	hab. inż. Kopka Ryszard		
Project (P)					
Seminar (S)	0				
		Student v	vorkload		
Types of student activities*			Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)	-		0		
Laboratory class (L)			15		
Project (P)			0		

Seminar (S)	0
Preparation for classes	15
Preparation of a report/paper/ project/presentation	30
Independent study of the course topics	10
Examination or final colloquium	0
Additional contact hours	0
Total student workload	100
Number of contact hours (from the study plan)	45

dr hab. inż. Szmajda Mirosław Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card								
Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First Cy	First Cycle Studies						
Specialization								
Form of Study	Full-Tir	ne Studies						
Semester	Sixth	Sixth						
Course Title	Elective course VII - Internet teleinformation solutions							
Nazwa przedmiotu	Przedm Internet	niot wybieralr	ny VII - Rozwiązania tele	einforma	atyczne sieci			
ECTS points	4		Subject type		W-K			
Language of lecture	angielsk i	Mode c	of completing the course		Course credit			
Course code KW7		KW7	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			

	Knowledge		Student has knowledge about data transmission and computer networks.
Preliminary requirements of the course	Skills	1	Student can acquire information from literature, databases and other sources; can integrate the obtained information, make their interpretation, as well as draw conclusions and formulate and justify opinions.
		2	
	Social Competence		Student can interact and work in a team.

Course Goals Preparing students to use modern teleinformation techniques. To familiarize students with the technical structure of ICT networks and the Internet.

Programme content The lesson provides knowledge on issues related to the basic concepts of data transmission in ICT networks at the physical layer level, modulation and coding techniques, and improving transmission reliability through the use of correction codes. The issues of switching in such networks, bandwidth multiplication techniques used in various fields and transmission protocols used in the lower layers of the OSI model are discussed. As part of the module, the student acquires skills in the use of measuring instruments and applications enabling the diagnosis of ICT systems and the assessment of their transmission and quality parameters. The acquired competences allow for a systemic approach to ICT systems in terms of maintaining and ensuring quality and the required reliability, as well as raising awareness of responsibility for their proper operation.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	The student has the knowledge in the field of operation ICT networks and their components, including wireless and fiber optic, used in the local and wide area networks. He knows the switching technic in ICT network and used transmission protocols.	K1_W07	WL	CFH
	2				
Skills	1	The student is able to independently and in a team, carry out engineering tasks and perform basic research, interpret their results and draw conclusions in the field of ICT networks used wireless and fiber optic communication media.	K1_U07	L	FΗ
	2				
Social Compet ence	1	The student can act in accordance with the principles of ethics and respect the professional tradition of network workers ICT. It promotes a pro- quality culture and proper patterns of behavior in the professional environment employees dealing with ICT networks for the Internet.	K1_K04	WL	CFHR
	2				

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	15	dr hab. inż. Kopka Ryszard				
Project (P)	0					
Seminar (S)	0					
		Student wo	orkload			
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			0			

Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	15
Preparation of a report/paper/ project/presentation	30
Independent study of the course topics	10
Examination or final colloquium	0
Additional contact hours	0
Total student workload	100
Number of contact hours (from the study plan)	45

dr hab. inż. Szmajda Mirosław Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering					
Profile of Education	Genera	al Academic					
Level of study	First C	ycle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Sixth						
Course Title	Electiv infrastru	Elective course VIII - Administration of enterprise network					
Nazwa przedmiotu	Przedn przedsię	Przedmiot wybieralny VIII - Administracja infrastrukturą sieciową przedsiębiorstwa					
ECTS points	5	Subject type			W-K		
Language of lecture	angielsk i	Mode c	of completing the course		Examination		
Course code	KW8		Subject related to scientific research/pract. profess. prepar. (Y/N)		т		

		Knowledge	1	1 Knowledge in the field of computer networks and systems operational.						
			2							
Prelimir requirem	iar ien	/ ts Skills	1	Skills in the field of comput Systems.	Skills in the field of computer networks and Operating Systems.					
or the co	urs	se	2							
		Casial Commetence	1	Ability to interact and work	in a grou	ıp.				
			2							
Course G company	oal 's r	s Introducing student network infrastructure.	ts to	the design, implementatio	n and ma	intenance	e of the			
Programr implemer to redunc	ne ntir lan	content The subject ng enterprise network cy, ensuring business	prov infra con	vides knowledge in the field astructure with particular er tinuity and security.	of design nphasis o	ing and n aspects	related			
Learning outcomes for the course - after completing the training outcomes for the course - after completing the training outcome (W, C, L, course cycle) (W, C, L, course outcome S (W,							Methods of verificati on of learning outcome s			
Knowlod	1	A student has knowled implementation. enter	dge opris	of design and e network infrastructure.	K1_W07	W	А			
ge	2	A student can has kno solving. problems in th infrastructure.	wle ne c	dge of maintenance and ompany's network	K1_W07	W	А			
Skille	1	A student can plan an infrastructure. enterpr	d im ise	plement and secure the network.	K1_U11	L	CI			
SKIIIS	2	A student can maintai the infrastructure. ent	n ar erpi	nd diagnose the work of rise network.	K1_U11	L	CI			
Social Compet ence	A student is aware of the responsibility for their own work and readiness to submit to the rules of team work i responsibility for jointly implemented works.						ΙP			
	2									
Methods of \	/erif	ication of learning outcomes:								

Hours in the study plan							
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname					

Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	15	dr inż. Gola	z. Gola Mariusz		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		10		
Preparation of a report project/presentation	ort/paper/		40		
Independent study o	f the course to	pics	28		
Examination or final	colloquium		2		
Additional contact ho	ours		0		
Total student worklo	ad		125		
Number of contact h	ours (from the	study plan)	45		

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card										
Field of study	Compu	Computer Engineering								
Profile of Education	Genera	General Academic								
Level of study	First Cy	First Cycle Studies								
Specialization	pecialization									
Form of Study	Full-Time Studies									
Semester	Semester Sixth									
Course Title Elective course VIII - Database applications										
Nazwa przedmiotu Przedmiot wybieralny VIII - Aplikacje bazodanowe										
ECTS points 5 Subject type W-K										

Language of lecture		angielsk i		Mode of completing the course			irse	Exami	nation	
Course code			KW8		Subject related to scientific research/pract. profess. prepar. (Y/N	т				
		Knowle	Knowledge		1	A student has knowledge of different database models and how to use them in applications.				
Drolimin					2 1	A ctude	ant can use SOL and			
requirem	iar	ts Skills			2	The stu	ident can program ir	n any prog	gramming	
	urs	,e		-		langua A stude	ge. ent is aware of the in	nportance	of prope	
		Social	al		1	database design.				
					2					
Course G efficient a	oal anc	s The ain I scalable (n of the co database-	ours bas	se i: sed	s to pro applica	ovide knowledge and ations.	l skills for	designing	3
Programr language efficient a	ne . U app	content sing datab lications ι	Appropria base mana using data	te s ager Ibas	ele mei ses.	ction o nt syste	f patterns: database ems and their functio	s, applica onalities to	tions and o implem	SQL ent
Learning outcomes for the course - after completing the training outcome for the course - after completing the training outcome (W, C, L, outcome S) (W, C, L, outcome S)							Methods of verificati on of learning outcome s			
Knowled ge	vled 1 additional functionalities databases improving the K1_W08 W L A K operation of the application.						АК			
	2									
Skills	1	A student proper op	can use i eration of	nde the	xes e ap	s, optin oplicatio	nize queries for on.	K1_U13	L	К
	2									
Social Compet	1	A student of the app	dent is aware of the need for the correct design e application database.					K1_K03	L	к
ence	2									
Methods of v	/erif	ication of lear	ning outcom	es:						

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan

The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	15	dr inż. Pioti	rowska Ewelina		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		10		
Preparation of a repo project/presentation	ort/paper/		40		
Independent study o	of the course top	pics	28		
Examination or final	colloquium		2		
Additional contact he	ours		0		
Total student worklo	ad		125		
Number of contact h	ours (from the	study plan)	45		

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Sixth
Course Title	Elective course X - Advanced topics in computer graphics

Nazwa przedm	Przedm kompute	Przedmiot wybieralny X - Zaawansowane zagadnienia grafiki komputerowej						
ECTS poir	2			Subject type		W-K		
Language of	angielsk i	Mode of completing the course			Course credit			
Course co	K	W10)	Subject related to scientific research/pract. profess. prepar. (Y/N)		т		
	Knowledge		1	A studer Graphics	t is knowledge from the lecture Computer			
			2					
Preliminary	Skills		1	A student has computer skills and programming proficiency				
requirements			2					
of the course	Social		1	A student can properly determine priorities for tasks implementation specified by yourself or other				
	Compe	tence		A student understands the need to learn throughout life; can inspire and organize the learning process of other people				
Course Goals Acquiring by students an advanced knowledge in the field of computer graphics								
Programme content Lecture in the auditorium. The aim of the course is to get acquainted with advanced computer graphics issues with particular focus on 3D graphics. Laboratory classes will be devoted to programming selected algorithms for advanced graphic transformations.								

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	A student has an orderly, theoretically founded knowledge covering issues of generating and editing vector, bitmap and three-dimensional graphics	K1_W09	WL	C K M P R
	2	A student Knows the rules of constructing interactive graphics applications	K1_W09	WL	CGPR
	3	A student has up-to-date knowledge about the newest achievements in the field of computer graphics	K1_W09	WL	CGPR
Skills	1	A student can develop extensive models of three- dimensional scene and enrich them with the so- called special effects	K1_U14	Ρ	E K M P R
	2	A student has the necessary preparation for programming three-dimensional graphic applications with the use of programming library	K1_U14	Ρ	E K M P R
	3	A student can prepare a well-documented study computer graphics problems	K1_U14	Р	EKMP R
Social Compet ence	1	A student is able to properly define priorities for implementation self-determined or other tasks	K1_K01	L	KMPR
	2	A student can interact and work in a group, accepting in different roles	K1_K01	L	KMPR

Hours in the study plan							
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname					
Lecture (W)	30	dr inż. Kamiński Marcin					
Calculation class (C)	0						
Laboratory class (L)	15						
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student act	ivities*		Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			0				
Laboratory class (L)	15						
--	----						
Project (P)	0						
Seminar (S)	0						
Preparation for classes	5						
Preparation of a report/paper/ project/presentation	0						
Independent study of the course topics	0						
Examination or final colloquium	0						
Additional contact hours	0						
Total student workload	50						
Number of contact hours (from the study plan)	45						

dr hab. inż. Tomczewski Krzysztof Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First Cy	ycle Studies						
Specialization								
Form of Study	Full-Tir	Full-Time Studies						
Semester	Sixth	Sixth						
Course Title	Electiv	Elective course X - High level programming languages						
Nazwa przedmiotu	Przedm	Przedmiot wybieralny X - Języki programowania wysokiego poziomu						
ECTS points	2			W-K				
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit			
Course code	K	(W10	Subject related to scientific research/pract. profess. prepar. (Y/N)		т			

Knowledge		Knowledge about Python language programming					
		Knowledge	2				
Preliminary requirement		Skills	1	Knowledge regarding struc programming	tural, object and network		
requirements of the course		2					
of the course		Casial	1	Group working skills			
		Competence	2	Capability of using request lecturer / tutor for the sake	s and task of probei	ks specifie m solving	ed by a
Course Goals The aim of the module is to provide students with a knowledge regarding higher level languge programming based on Python language						ding	
Programr	ne c	ontent Python langu	iage	e phylosophy			
Learning outcomes for the course - after completing the training cycle Cycle						Methods of verificati on of learning outcome s	
Knowled ge	A 1 s ir	student has knowed oftware engineering. the computer syster	n programming and lerstands basic processes life cycle.	K1_W06	WL	СНІ	
5	2						
Skills	A 1 e ir	student can individu ngineering tasks and nterpret it's results ar	ally run nd n	and in a team perform basic scientific research, nake conclusions	K1_U07	L	CHIR
	2 A s	student can individu elf-education process	ally	plan and run a live-long	K1_U05	L	CHIR
Social Compet ence	A 1 s ra te	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.				PR	
	2						
Methods of v	verific	ation of learning outcomes:		t D aral according to based on the	utial manks of		

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			

Lecture (W)	30						
Calculation class (C)	0]					
Laboratory class (L)	15	dr inż. Pala Artur					
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student act	ivities*		Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		5				
Preparation of a report/paper/ project/presentation			0				
Independent study o	f the course to	pics	0				
Examination or final colloquium			0				
Additional contact hours			0				
Total student workload			50				
Number of contact hours (from the study plan)			45				

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Car	d						
Field of study	Compu	ter Engineering					
Profile of Education	Genera	al Academic					
Level of study	First Cy	First Cycle Studies					
Specialization							
Form of Study	Full-Tin	Full-Time Studies					
Semester	Sixth						
Course Title	Electiv	Elective course X - Human-machine interface					
Nazwa przedmiotu	Przedm	Przedmiot wybieralny X - Interfejsy człowiek-maszyna					
ECTS points	2	Subject type	W-K				

Language of	angielsk i	Mode of completing the course			Course credit		
Course code		KW10			Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
Knowle		nowledge		A stude ones p	nt has knowledge of the most frequently used ogramming languages.		
		-	2				
Preliminary				A stude	A student can operate a computer.		
requirements of the course	Skills		2	A stude operati	student is able to design a system and describe its peration.		
	Social		1	A student should be able to work independently as well as a team member.			
	Compe	lence	2				
Course Goals	Course Goals Acquainting students with human-machine interfaces.						
Programme co	ntent	Content re	egardi	ing hum	nan-machine interfaces		

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	Student has knowledge in the basic educational area such as inter alia: mathematics, physics and is able to use them for solving engineering problems	K1_W01	WL	СGН
	2	Student has general knowledge of humanities, social education and social norms.	K1_W03	WL	CGH
Knowled	3	Student has knowledge in the engineering disciplines associated with the computer engineering and can use it for problems solving.	K1_W05	WL	СGН
ge -	4	Student has knowledge in creating models of information systems, parameterizing models, conducting research using models of information systems and analyzing results in the context of computer science and related fields.	K1_W09	WL	СGН
	5	Student knows some selected methods of artificial intelligence and their potential application in computer engineering.	K1_W10	WL	СGН
	1	Student is able to use previously obtained knowledge in the area of basic education in order to solve some engineering problems.	K1_U01	L	СGН
Skills	2	Student can work on his/her own and as a team member. He/she is also able to perform engineering tasks and run basic scientific research and to interpret the obtained results making conclusions.	K1_U07	L	СGН
	3	Student can use appropriate tools for both processing and analysis of digital images	K1_U14	L	CGH
	4	Student can apply selected approrpiate methods of Artificial Intelligence to basic scientific tasks.	K1_U15	L	CGH
	1	Student is able to make appropriate decisions, also in difficult situations and critically validate his/her knowledge and the range of problems, which he/she can solve either individually or as a part of a team.	K1_K01	WL	C G H
Social Compet ence	2	The student is aware of the impact of the tasks performed on the social environment and inspiring activities in the public interest.	K1_K02	WL	CGH
	3	Student can act properly in accordance with ethics and respect to the professional tradition, and promotes a pro-quality culture and the right standards of behaviour in all aspects of life.	K1_K04	WL	СGН
Methods of v	/eri	fication of learning outcomes:			

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan								
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname					
Lecture (W)	30							
Calculation class (C)	0							
Laboratory class (L)	15	dr hab. inż. Kawala-Sterniuk Aleksandra						
Project (P)	0							
Seminar (S)	0							
Student workload								
Types of student activities*			Average number of hours* allocated on completed activities					
Lecture (W)			30					
Calculation class (C)			0					
Laboratory class (L)			15					
Project (P)			0					
Seminar (S)			0					
Preparation for class	es		5					
Preparation of a report project/presentation	ort/paper/		0					
Independent study o	of the course top	pics	0					
Examination or final	colloquium		0					
Additional contact hours			0					
Total student workload			50					
Number of contact h	ours (from the	study plan)	45					

* hour (class) means 45 minutes

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic

Level of study First Cycle Studies							
Specialization							
Form of Study		Full-Ti	me	Studies			
Semester		Sixth					
Course Title		Electiv	/e c	ourse X - N	Iultimedia presentatior	n techni	iques
Nazwa przedm	iotu	Przedr	nio	t wybieraln	y X - Multimedialne teo	chniki p	rezentacji
ECTS poir	nts	2			Subject type		W-K
Language of	lecture	angielsk i		Mode c	f completing the cours	e	Course credit
Course code			KW10		Subject related to scientific research/pract. profess. prepar. (Y/N)		т
	Knowledge		1	A student has knowledge in the field of geometry and graphics, including the creation of technical drawings and the use of basic drawing principles.			
			2	A student has basic knowledge of copyright protection.			
Preliminary requirements	Skills		1	A student can use any text editor and spreadsheet to elaborate / compose complex texts and to process and present numerical data.			
			2	A student can use a technical drawing to present physica objects and block diagrams of designed algorithms.			o present physical algorithms.
	Social	tonco	1	A student can properly define priorities for the implementation of a task set by himself or others.			
	Compe	lence	2	A student	can interact and work	in a gro	up.
Course Goals	- gain g	ractical	skill	ls in desiar	ing, creating and deliv	ering m	ultimedia

presentations, - acquisition of skills in preparing other forms of information dissemination and data visualization.

Programme content Within the scope of the subject, knowledge of creating and conducting multimedia presentations is conveyed. As part of the module, the student acquires knowledge and practical skills in designing, creating, and conducting multimedia presentations, as well as skills in preparing other forms of information and data visualization.

Learning	OL	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	A student has the knowledge necessary to create advanced multimedia presentations and other ways of presenting information.	K1_W09	WL	C H I J P R
-	2				
Skills	1	A student can communicate using various techniques transfer of information in the professional environment and in other environments.	K1_U14	L	HIJPR
	2				
Social Compet	1	A student can present achievements in an appropriate way and present a clearly and interesting presentation of the subject matter.	K1_K02	L	C H I J P R
	2				
Methods of v	/eri	fication of learning outcomes:			

Hours in the study plan							
The course format	Hours/sem. (h)	sem. (h) Tutor (coordinator) of the course (title/academic degree/professional title, name and surname					
Lecture (W)	30						
Calculation class (C)	0						
Laboratory class (L) 15 dr inž			oł Michał				
Project (P)	0						
Seminar (S)	0						
	Student workload						
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for classes			5				
Preparation of a report/paper/ project/presentation			0				

Independent study of the course topics	0
Examination or final colloquium	0
Additional contact hours	0
Total student workload	50
Number of contact hours (from the study plan)	45

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Descrip	tion Ca	rd					
Field of study		Compu	Computer Engineering				
Profile of Educa	ation	Genera	l Academic				
Level of study		First Cy	cle Studies/				
Specialization							
Form of Study		Full-Tir	ne Studies				
Semester		Sevent	h				
Course Title		Electiv	e course XI - (Com	outer aided design	n II	
Nazwa przedm	iotu	Przedm projekto	niot wybieraln wania II	y XI	- Komputerowe we	spomag	anie
ECTS poir	nts	2		Su	bject type		W-K
Language of lecture		angielsk i	Mode of completing the course		Course credit		
Course code		ĸ	KW11		bject related to scientific esearch/pract. ess. prepar. (Y/N)		т
	Knowlo	dae	dge		Required by the F	PRK leve	el 4
	Knowie	uge					
Preliminary	Chille				Required by the PRK level 4		
of the course	SKIIIS			2			
	Social	Competer		1	The student can work in a team		
		Joinperen		2			
Course Goals Advanced 3D modeling techniques, encompassing the creation of technical documentation and animations.							
Programme content Creating 3D models 3D visualisation Parametric modelling Dynamic blocks Drawing annotation Programmers interface							

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	The student has theoretically founded detailed knowledge related to the use of technical documentation	K1_W09	WL	CI
-	2				
Skills 1 The student is al		The student is able to make and present a 3D model in accordance with the given specification.	K1_U07	L	I
Social Compet	1	The student understands the need to update the knowledge along with the development of CAD software	К1_К01	L	I
	2				

	study plan				
The course format Hours/sem. (h) (t			Tutor (coordinator) of the course le/academic degree/professional title, name and surname		
Lecture (W)	30				
Calculation class (C) 0					
Laboratory class (L)	15	dr inż. Dziei	rżanowski Łukasz		
Project (P)	0				
Seminar (S)	0				
Student workload					
Types of student activities*			Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for classes			5		
Preparation of a report/paper/ project/presentation			0		
Independent study of the course topics			5		

Examination or final colloquium	0
Additional contact hours	0
Total student workload	55
Number of contact hours (from the study plan)	45

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card	
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Field of study	Compu	Computer Engineering				
Profile of Education	Genera	General Academic				
Level of study	First C	cle Studies				
Specialization						
Form of Study	Full-Tir	ne Studies				
Semester	Sevent	h				
Course Title	Electiv	Elective course XI - Computer networks III				
Nazwa przedmiotu	Przedn	Przedmiot wybieralny XI - Sieci komputerowe III				
ECTS points	2	Subject type			W-K	
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit	
Course code	k	W11	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	

	Knowledge	1	Fundamentals of Computer Networks: A solid understanding of basic networking concepts, including the OSI model, TCP/IP protocols, network topologies, network devices, and fundamental network protocols such as DHCP, DNS, HTTP.
		2	Advanced Protocols and Network Services: Knowledge of advanced network protocols such as OSPF, EIGRP, BGP, VLANs, VPNs, and experience in configuring and managing advanced network services.
		3	Network Security: Basic knowledge of network security, including encryption, security protocols such as SSL/TLS, IPSec, firewall principles, and the basics of Intrusion Detection Systems (IDS) and Intrusion Prevention Systems (IPS).
	Skills	1	Configuration of Network Hardware and Software: Ability to configure and manage network devices such as routers, switches, access points, as well as network software including network operating systems and diagnostic tools.
requirements of the course		2	Analysis and Troubleshooting of Network Issues: The ability to detect, diagnose, and resolve network issues, including connectivity problems, network performance issues, and security concerns.
		3	Network Design: Experience in designing computer networks, including the ability to plan network topologies, select network devices, and plan IP addressing and subnetting schemes.
	Social Competence	1	Teamwork: Experience in working within project teams, the ability to effectively communicate and collaborate with others to design, implement, and manage network projects.
		2	Technical Communication: The skill to clearly communicate complex network and technical concepts to both IT specialists and non-specialists, including preparing technical documentation and presentations.
		3	Ethical and Legal Awareness: Understanding of the ethical and legal aspects related to computer networks, including privacy, data security, and the responsibility for managing and operating network infrastructure.

Course Goals The objectives of the course will be focused on a deep understanding and advanced aspects of the design, implementation, and analysis of computer networks, specifically: advanced network protocols, network security, network and services management, wireless and mobile networks, programmable and virtual networks (SDN and NFV), P2P networks, IoT and new network architectures, advanced network analysis and design, and research and innovations in the field of computer networks.

Programme content The course content will include advanced and specialized topics in the field of computer networks such as advanced routing protocols and traffic management, advanced IP network concepts, network security, network virtualization and network functions, software-defined networking (SDN), performance management and quality of service (QoS), wireless and mobile networks, as well as the Internet of Things (IoT) and future networks.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	The student has basic knowledge for solving engineering tasks.	K1_W01	WL	СНІР
Knowled		The student has extended and in-depth knowledge of the network computer.	K1_W07	L	HIP
ge .	3	The student has knowledge of development trends and the most important new engineering achievements in the field of computer networks.	K1_W05	W	СНІР
Skills		The student can acquire knowledge from various sources concerning computer science, in particular computer networks, on the basis of which it draws appropriate conclusions and formulates and justifies opinions		L	C H I N O R
	2	The student can solve tasks in a creative way	K1_U06	L	HIPR
	3	On the basis of the results obtained, the student can make analyze these data and skillfully use them introduce.	K1_U11	L	HIPR
Social Compet	1	The student understands the necessity of continuous education and improvement of his professional competences.	K1_K01	W	C R
ence	2	The student can work in a group in which he is a leader.	K1_K04	L	HIPR

Hours in the study plan							
The course format	Hours/sem. (h)	Tutor (coordinator) of the course h) (title/academic degree/professional title, name and surname					
Lecture (W)	30						
Calculation class (C)	0						
Laboratory class (L)	15	dr inż. Kopterski Wiesław					
Project (P)	0						
Seminar (S)	0						
		Student w	vorkload				
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			30				

Calculation class (C)	0
Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	5
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	5
Examination or final colloquium	0
Additional contact hours	0
Total student workload	55
Number of contact hours (from the study plan)	45

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First C	cle Studies						
Specialization								
Form of Study	Full-Tir	ne Studies						
Semester	Sevent	h						
Course Title	Electiv	Elective course XI - Introduction to computer forensics						
Nazwa przedmiotu	Przedn	Przedmiot wybieralny XI - Wprowadzenie do informatyki śledczej						
ECTS points	2		Subject type		W-K			
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit			
Course code	k	W11	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			

			A student has basic knowledge of information technology
	Knowledge	2	A student has basic knowledge of operating systems
Preliminary		3	A student has basic knowledge of file systems
requirements	Skills	1	A student can use a computer and an operating system
of the course		2	A student can independently make changes to the hardware configuration of a computer
	Social		A student can work in a team
	Competence	2	

Course Goals The aim of the course is to acquire basic knowledge and skills in the field of securing digital media and analysis of data obtained from protected media in terms of their use as evidence.

Programme content The subject provides knowledge and skills in the field of securing digital media and analysis of data obtained from protected media in terms of their use as evidence.

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	A student has knowledge of the methodology of working with IT system in a digital context evidence.	K1_W07	WL	СНІЈ
Knowled 2 ge		A student knows basic methods, techniques, tools 2 and materials used for protection electronic evidence.		WL	СНІЈ
	3	A student has basic knowledge of development trends in IT and their impact on processing i data storage on PCs.	K1_W05	WL	СНІЈ
	1	A student can individually plan and run a live-long self-education process	K1_U05	L	C H I J P R
Skills		A student can select the sources of informaction with the use of advanced ICT techniques in the correct way. He can validate and synthesize data from various sources		L	HIJPR
Social		A student can make professional decisions.	K1_K01	L	HIJP
Compet	2	A student is aware of the enginner's impact.	K1_K02	WL	CHIP
ence	3	A student is able to act ethically.	K1_K04	L	HIJ

Methods of verification of learning outcomes:

The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname		
Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	15	dr hab. inż.	. Podpora Michał		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		5		
Preparation of a repo project/presentation	ort/paper/		0		
Independent study o	of the course top	pics	5		
Examination or final	colloquium		0		
Additional contact he	ours		0		
Total student worklo	ad		55		
Number of contact h	ours (from the	study plan)	45		

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Seventh
Course Title	Elective course XI - Programming V

Nazwa przedmiotu Przedmiot wy					ybieralny XI - Programowanie V			
ECTS points 2						W-K		
Language of	lecture	angielsk i	Mode of completing the course			Course credit		
Course code		K	W11		Subject related to scientific research/pract. profess. prepar. (Y/N)		т	
	Knowlo	dao	1	A stud	ent has basic knowledge of computer science.			
	Knowledge		2					
Preliminary requirements	Skills		1	A student is ability to operate a computer and create programs in a selected programming language.				
of the course			2					
	Social (A stud	A student can interact and work in a group.			
	SOCIAL	Jomperen	2					
Course Goals To acquaint students with Python programming methods, to learn about available libraries that expand Python capabilities, to familiarize students with the LaTeX typesetting system and to use Python to automatically generate files for the LaTeX system to convert them to the .pdf format								
Programme co	ntent I	Lecture us	sing a	multim	edia projector presenti	ng sele	cted aspects of	

the Python language. Using Python to process various types of data and an illustration of how to format these results for .pdf documents using the LaTeX typesetting system.

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	A student has detailed knowledge of how to use Python programming language in data processing	K1_W06	WL	СІЈК
ge	2	A student has knowledge about how to create web applications using the Python language	K1_W05	WL	СІЈК
	1	A student can prepare an solving the problem application in Python programming language	K1_U07	L	DK
Skills 2	2	A student can use Python programming language to automate activities related to data processing	K1_U09	L	DK
3 A stud using		A student is able to implement a web application using the Django software framework	K1_U10	L	DJK
	1	The student is aware of the need to create the correct code	K1_K02	L	PR
Social 2	2	The student is convinced of the need for continuous training	K1_K01	L	P R
ence	3	The student is aware of responsibility for their own work and readiness to comply with the rules of teamwork and responsibility for jointly performed tasks	K1_K04	L	PR

Hours in the study plan					
The course formatHours/sem. (h)Tutor (coordinator) of the course (title/academic degree/professional title name and surname					
Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	15	dr inż. Kamiński Marcin			
Project (P)	0				
Seminar (S)	0				
		Student workload			
Types of student act	ivities*	Average number of hours* allocated on completed activities			
Lecture (W)		30			
Calculation class (C)		0			
Laboratory class (L)		15			

Project (P)	0
Seminar (S)	0
Preparation for classes	5
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	5
Examination or final colloquium	0
Additional contact hours	0
Total student workload	55
Number of contact hours (from the study plan)	45

dr hab. inż. Tomczewski Krzysztof Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card									
Field of study	Compu	Computer Engineering							
Profile of Education	Genera	General Academic							
Level of study	First C	cle Studies							
Specialization									
Form of Study	Full-Tir	ne Studies							
Semester	Sevent	h							
Course Title	Electiv systems	Elective course XII - Basics of programming industrial automation systems							
Nazwa przedmiotu	Przedmiot wybieralny XII - Podstawy programowania przemysłowyc systemów automatyki								
ECTS points	2		Subject type		W-K				
Language of lecture	angielsk i	Mode c	of completing the course		Course credit				
Course code	KW12		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т				

	Knowledge			A student has an elementary knowledge of electrical engineering, covering the basics of electrical equipment, electronics, and measuring devices.						
Preliminary requirements of the course Skills		1	A student be able to apply th methods, algorithms and dat involving the programming o systems.	student be able to apply the learned programming ethods, algorithms and data structures to tasks volving the programming of industrial automation stems.						
			2							
		Social		A student can interact and w	ork in a g	roup.				
Course G controllin basic con	oal g c trc	s - providing knowl levices and processe l systems using a pr	edg es, - ogra	l e about hardware devices and acquisition of skills by the stu ammable controller.	d systems udent in th	s used in t ne develo	asks of pment of			
Programr and syste module, t programr	Programme content Within the subject, knowledge is imparted regarding hardware devices and systems used in tasks related to controlling devices and processes. As part of the module, the student acquires knowledge and skills in developing basic control systems using programmable controllers.					devices ne ms using				
Learning outcomes for the course - after completing the training cycle				after completing the training	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s			
Knowled	1	A student has knowledge of hardware devices and systems used in equipment and process control K1				W	С			
ge	2	A student has knowl tasks using mobile F	edg PLCs	e of performing basic control and ASi controllers.	K1_W06	WL	C H I J P R			
	1	A student can obtain literature and other	n inf sou	ormation from technical rces.	K1_U06	L	HIJPR			
Skills	2	A student be able to plan and implement basic control tasks using a mobile programmable K1_U10 L H I J P controller and ASi controller.								
Social	1	A student is aware of work and is ready to	A student is aware of responsibility for their own vork and is ready to follow the rules of teamwork. K1_K01 W L R							
Compet ence	2	A student can under learning and a critic literature informatio	star al a n.	nds the need for continuous pproach to the available	K1_K02	L	HIJPR			
IMethods of v	Aethods of verification of learning outcomes:									

The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course title/academic degree/professional title, name and surname		
Lecture (W)	30				
Calculation class (C) 0					
Laboratory class (L)	15	dr inż. Kozi	inż. Kozioł Michał		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for class	ses		5		
Preparation of a report project/presentation	ort/paper/		0		
Independent study o	of the course top	pics	5		
Examination or final	colloquium		0		
Additional contact h	ours		0		
Total student worklo	ad		55		
Number of contact h	ours (from the	study plan)	45		

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Seventh
Course Title	Elective course XII - Computational engineering

Nazwa pr	ze	dmiotu	Przedn	edmiot wybieralny XII - Inżynieria obliczeniowa						
ECT	ECTS points 2				Subject type				W-K	
Language of lecture angielsk		angielsk i	Mode of completing the cou			irse	se Course credit			
Cour	se	code	KW12		12	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		
		Knowle	dge	1	A student intelligen	has knowledge in se ce and their applicati	elected me ons in co	ethods of mputer so	artificial cience.	
				2						
Prelimir requirem	nar nen	y Its		1	A student use of adv can valida	can select the sourc vanced ICT technique ate and synthesize da	es of info es in the c ata from v	rmaction correct wa various so	with the ay. He urces.	
of the co	our	se		2	A student engineeri interpret	can individually and ng tasks and run bas it's results and make	in a team ic scientif conclusio	n perform ic researc ons.	ch,	
		Social		1	A student understands the need of self-improvement					
		Compe	tence	2						
Course G including	oa th	s The over a stificial	erview of intelligen	the ce	e advanced and data s	l computation and ar science techniques	nalytics al	gorithms,		
Programr	ne	content	ecture							
Learning outcomes for the course - after completing the training outcome for the course - after completing the training outcome cycle Cycle					Methods of verificati on of learning outcome s					
Knowled ge	1	A student artificial ir computer	lent has knowledge in selected methods of ial intelligence and their applications in K1_W10 W L C J uter science.					CJ		
-	2									
Skills	1	A student with the u correct wa from vario	student can select the sources of informaction ith the use of advanced ICT techniques in the prrect way. He can validate and synthesize data om various sources.					J		
	A student can individually and in a team perform 2 engineering tasks and run basic scientific research, K1_U07 L J interpret it's results and make conclusions.						J			
Social Compet ence	1	A student situations range of p team.	student can make decisions, also in difficult tuations, critically validate his knowledge and the nge of problems solved both individually and in a am.							
	2									
Methods of v	/erii	ication of lear	ning outcom	les:						

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan							
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname				
Lecture (W)	30						
Calculation class (C)	0						
Laboratory class (L)	15	dr inż. Rusz	zczak Bogdan				
Project (P)	0						
Seminar (S)	0						
		Student v	vorkload				
Types of student act	ivities*		Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		5				
Preparation of a repo project/presentation	ort/paper/		0				
Independent study o	of the course top	pics	5				
Examination or final	colloquium		0				
Additional contact he	ours		0				
Total student worklo	ad		55				
Number of contact h	ours (from the	study plan)	45				

* hour (class) means 45 minutes

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic

Level of study First			st Cycle Studies				
Specialization							
Form of Study		Full-Tin	ne S	tudies			
Semester		Sevent	h				
Course Title		Elective	e co	urse XII -	Perception systems for	r autono	omous vehicles
Nazwa przedm	iotu	Przedm autonom	niot niczr	wybieralr 1ych	y XII - Systemy percep	cji w po	jazdach
ECTS poir	nts	2			Subject type		W-K
Language of	lecture	angielsk i		Mode c	of completing the cours	e	Course credit
Course co	Course code		KW12		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowledge		1	The student has an organized and in-depth knowledge in the field of artificial intelligence methods and their application in automation and robotics systems for autonomous vehicles			
			2				
Preliminary requirements of the course Skills			1	The student can analyze and interpret technical project documentation and utilize scientific literature related to a given problem.			
			2				
	Social		1	Student understands the need for technical documentation.			nical
	compe		2				
Course Goals	- Impar	ting know	ledg	ge about	the construction of aut		is systems -

Imparting knowledge about the functioning of the perception layer in ADS systems -Familiarizing students with simulation environments used in testing ADS - Students acquiring knowledge about the construction of an autonomous system

Programme content Within the course, knowledge is conveyed on issues related to the development of autonomous systems, with a special emphasis on the perception element. As part of the module, the student acquires knowledge and skills in the field of designing an autonomy system, including its hardware and algorithmic components. The knowledge gained about the system's operation enables the development of algorithms for the specific component of the perception system and validation in simulation environments.

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	Student has basic knowledge of the calculation of measurement errors and evaluation of the measurement result, based on the recorded data.	K1_W10	W	С
	2				
Skills	1	Student is able to apply the appropriate algorithm to build simple perceptual systems	K1_U14	L	I
	2				
Social Compet	1	Student understands the need for constant training and is aware of the current limitations of technology.	К1_К01	L	I
ence	2				

	Hours in the study plan					
The course format	e format Hours/sem. (h) Tutor (coordinator) of the course (title/academic degree/professional title name and surname					
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	15	dr inż. Mich	alski Paweł			
Project (P)	0					
Seminar (S)	0					
Student workload						
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			0			
Laboratory class (L)			15			
Project (P)			0			
Seminar (S)			0			
Preparation for classes			5			
Preparation of a repo project/presentation	ort/paper/		0			
Independent study o	of the course top	pics	5			

Examination or final colloquium	0
Additional contact hours	0
Total student workload	55
Number of contact hours (from the study plan)	45

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study Computer				r Engineering				
Profile of Educa	ofile of Education General Academic							
Level of study		First Cy	/cle	St	udies			
Specialization								
Form of Study		Full-Tir	ne S	Stu	dies			
Semester		Sevent	h					
Course Title		Electiv	е со	urs	se XII -	Programming VI		
Nazwa przedm	iotu	Przedm	niot	wy	bieralr	y XII - Programowanie	VI	
ECTS poir	nts	2				Subject type		W-K
Language of	lecture	angielsk i		Mode of completing the course			Course credit	
Course code		ĸ	KW12			Subject related to scientific research/pract. profess. prepar. (Y/N)		т
	Knowlo	dao		1	Basic I	knowledge of compute	r scienc	e
	Knowle	uge		2				
Preliminary reguirements Skills				1	Ability to create computer programs in a selected programming language			
of the course				2				
	Social (omneter		1	Studer	nt can interact and wor	'k in a g	roup
				2				
Course Goals To familiarize students with the JavaScript programming language and its strengths. Particular emphasis will be placed on the specific features of this language, which distinguish it from popular programming languages								

Programme content Lecture in the auditorium. Presentation of various features of the JavaScript language and its wide range of applications. Discussion of a number of specialized libraries that allow you to conveniently create web applications

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled 1		Student has detailed knowledge of the methods of use JavaScript elements in creating the code		WL	C K L P R
lge	2				
Skills	1	Student can use the rich properties of language in creating code	K1_U10	L	C K L P R
	2				
Social Compet	1	The student is convinced of the need for continuous training	K1_K02	WL	PR
ence	2				
Methods of v	/eri	fication of learning outcomes:			

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	15	dr inż. Kamiński Marcin			
Project (P)	0				
Seminar (S)	0				
Student workload					

Types of student activities*	Average number of hours* allocated on completed activities
Lecture (W)	30
Calculation class (C)	0
Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	5
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	5
Examination or final colloquium	0
Additional contact hours	0

Total student workload	55
Number of contact hours (from the study plan)	45

dr hab. inż. Tomczewski Krzysztof Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card									
Field of study		Compu	Computer Engineering						
Profile of Educa	ation	Genera	General Academic						
Level of study		First C	First Cycle Studies						
Specialization									
Form of Study		Full-Tir	Full-Time Studies						
Semester		Sevent	h						
Course Title		Electiv	e coui	rse 2	XIII -	Basics of data mining			
Nazwa przedm	iotu	Przedn	niot w	ybie	eralr	iy XIII - Podstawy ekspl	oracji d	anych	
ECTS poir	nts	2				Subject type		W-K	
Language of	lecture	e angielsk			Mode of completing the course			Course credit	
Course code KV		W13	V13 Subject sc reseat profess.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		
	Knowlo	dao		1	Knc	wledge of programmir	ig.		
	Knowie	uge		2	Kno	wledge of analysis and	d algebr	a and statistics.	
	Skille			1	Abi	lity to programming an	d abstra	act thinking.	
of the course	SKIIIS			2					
	Social	Compotor		1	Abi	lity to learn independe	ntly.		
Social competence 2									
Course Goals The purpose of the course is to introduce students to basic methods of extracting knowledge from data sets.									

Programme content Lecture in an auditorium or remote format. Computer-based activities using specialized software or programming environments. Topics include: introduction to data mining, concepts and definitions, data acquisition methods, methods for cleaning, consolidating, and transforming data, time domain and statistical analysis methods, frequency analysis methods, data filtering methods, methods for examining trends and deviations, methods for identifying outlier observations and anomalies, methods for studying correlation and association, feature dimension reduction methods, methods, methods of pattern evaluation and feature selection, methods for visualizing data.

Learning	OL	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	A student has a basic knowledge of data mining.	K1_W05	WL	CHIJ
Knowled ge	2	A student has a basic understanding of how to prepare data for applications using artificial intelligence methods.	K1_W10	WL	СНІЈ
Skills	1	A student has the ability to select and apply an appropriate data mining method.	K1_U15	L	HIJ
	2				
Social Compet	1	A student is able to independently or collaboratively solve a task in the area of data mining.	K1_K01	WL	PR
ence	2				

Hours in the study plan							
The course format	Hours/sem. (h)	(til	Tutor (coordinator) of the course cle/academic degree/professional title, name and surname				
Lecture (W)	30						
Calculation class (C)	0						
Laboratory class (L)	15	dr hab. inż	. Wotzka Daria				
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student act	ivities*		Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		5				
Preparation of a report project/presentation	ort/paper/		0				
Independent study o	f the course top	pics	5				
Examination or final	colloquium		0				

Additional contact hours	0
Total student workload	55
Number of contact hours (from the study plan)	45

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

eedise Beschip	cioni cui	G							
Field of study Computer Engineering									
Profile of Educa	ation	Genera	General Academic						
Level of study		First Cycle Studies							
Specialization									
Form of Study		Full-Time Studies							
Semester		Sevent	h						
Course Title		Electiv	e cour	rse XIII -	Image analysis and re	cognitio	on		
Nazwa przedm	iotu	Przedm	niot w	ybieralr	ny XIII - Analiza i przetw	varzanie	e obrazu		
ECTS poir	nts	2			Subject type		W-K		
Language of	lecture	angielsk i		Mode of completing the course Co			Course credit		
Course code		ĸ	KW13		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		
	Knowle	dge	1	Student possesses organized and advanced knowledge in the field of statistical methods and algorithmics.			vanced nethods and		
Preliminary			2						
requirements of the course	Skills		1	Studer Python	Student can independently implement algorithms in Python based on a schematic.				
			2						
	Social		1	Studer	nt understands the nee	d for pr	ocess automation		
Competence			2						
Course Goals -C image represent -Developing stuc tracking, and tex languages and to and analysis.	Conveyin ation, co lents' ski kture ana pols (e.g.	g knowledg mpression, Ils in apply IlysisEnal , Python w	ge on f filtrat ing va bling s ith libr	undame ion, edge rious alg tudents aries suc	ntal concepts related to di e detection, segmentation orithms for pattern recogr to acquire knowledge on h ch as OpenCV, PIL, scikit-ir	igital ima , and im nition, cla now to us mage) fo	ages, including age transformation. assification, motion se programming r image processing		

Programme content The image processing course introduces the basics of digital images, filtering and processing techniques, edge detection, and segmentation methods. It covers pattern recognition, machine learning, and applications in object recognition and medical image analysis. The classes combine theory with practical examples, preparing for solving real-world computer vision problems.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	Student knows the basic concepts in the field image processing, knows selected methods and tools	K1_W06	W	С
ge	2				
Skills	1	Student can use tools and the methods used in image processing	K1_U14	L	I
	2				
Social Compet	Student can propose solutions from the scope of image processing, which can contribute to solutions to simple problems.		К1_К01	L	L
	2				
Mathada of		finition of looming outcomes.			

Methods of verification of learning outcomes:

Hours in the study plan							
The course format	course format Hours/sem. (h) Tutor (coordinator) of the course (title/academic degree/professional title, name and surname						
Lecture (W)	30						
Calculation class (C)	0						
Laboratory class (L)	15	dr inż. Mich	alski Paweł				
Project (P)	0	0					
Seminar (S)	0						
		Student v	vorkload				
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			0				
Laboratory class (L)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		5				

Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	5
Examination or final colloquium	0
Additional contact hours	0
Total student workload	55
Number of contact hours (from the study plan)	45

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

eld of study Computer Engineering							
ation	General Academic						
Level of study First Cycle Studies							
n							
	Full-Time Studies						
	Seventh						
	Elective course XIII - IT tools in engineering practice						ce
Nazwa przedmiotu Przedmiot wybieralny XIII - Narzędzia informatyczne w praktyce inżynierskiej					ne w praktyce		
nts	2				Subject type		W-K
Language of lecture angielsk			Mode of completing the course			Course credit	
Course code		KW13			Subject related to scientific research/pract. profess. prepar. (Y/N)		т
Knowledge		1	L A s fiel	A student has basic and advanced knowledge in the field of computer science			nowledge in the
		2	2				
Skills		1	L A s tec	A student is ability to use various information technologies			
		2	2				
Social	Compoton		L A s	tud	ent can interact and w	ork in a	group
Social C	Joinperen		2				
	ation ation iotu its lecture de Knowle Skills Social (ComputationComputationationGeneralFirst CyFirst CyFull-TinSeventInduFull-TinSeventInduPrzedminizyniersIts2IectureangielskIectureangielskKnowledgeSkillsSocial Competen	Computer E ation General Aca First Cycle S First Cycle S Full-Time St Seventh Elective cou iotu Przedmiot v iotu Przedmiot v inżynierskiej nts 2 lecture angielsk i Knowledge Skills Social Competence	Computer Engine Computer Engine First Cycle StudieationGeneral Academi First Cycle StudieFirst Cycle StudieFirst Cycle StudieFull-Time StudiesSeventhSeventhElective course XiotuPrzedmiot wybier inżynierskiejnts2lecture angielsk iModdeKW13Knowledge1Skills2Social Competence 21A s s 2Social Competence 21	Computer EngineeriationGeneral AcademicFirst Cycle StudiesFirst Cycle StudiesFull-Time StudiesSeventhElective course XIII -iotuPrzedmiot wybieralriotuPrzedmiot wybieralriotuA studfictureangielskdeKW13Knowledge1SkillsA studSocial Competence1A stud21A stud23334445445544554554444444444444444444445444 </td <td>Computer Engineering ation General Academic First Cycle Studies Full-Time Studies Seventh Elective course XIII - IT tools in engineering iotu Przedmiot wybieralny XIII - Narzędzia informinżynierskiej nts 2 Subject type lecture angielsk i Mode of completing the course scientific research/pract. profess. prepar. (Y/N) Knowledge 1 A student has basic and advarfield of computer science 2 2 Skills 1 A student is ability to use var technologies 2 2 Social Competence 1 A student can interact and w 2</td> <td>Computer Engineering ation General Academic First Cycle Studies Full-Time Studies Seventh Elective course XIII - IT tools in engineering practice iotu Przedmiot wybieralny XIII - Narzędzia informatyczninżynierskiej ists 2 Subject type lecture angielsk i Mode of completing the course de KW13 Knowledge 1 A student has basic and advanced krifield of computer science 2 Skills 1 A student is ability to use various inf technologies 2 Social Competence 1</td>	Computer Engineering ation General Academic First Cycle Studies Full-Time Studies Seventh Elective course XIII - IT tools in engineering iotu Przedmiot wybieralny XIII - Narzędzia informinżynierskiej nts 2 Subject type lecture angielsk i Mode of completing the course scientific research/pract. profess. prepar. (Y/N) Knowledge 1 A student has basic and advarfield of computer science 2 2 Skills 1 A student is ability to use var technologies 2 2 Social Competence 1 A student can interact and w 2	Computer Engineering ation General Academic First Cycle Studies Full-Time Studies Seventh Elective course XIII - IT tools in engineering practice iotu Przedmiot wybieralny XIII - Narzędzia informatyczninżynierskiej ists 2 Subject type lecture angielsk i Mode of completing the course de KW13 Knowledge 1 A student has basic and advanced krifield of computer science 2 Skills 1 A student is ability to use various inf technologies 2 Social Competence 1

Course Goals To acquaint students with modern tools useful in the work of IT specialists

Programme content Lecture with the use of a multimedia projector. The aim of the classes in this subject is to show the possibilities of using commonly used advanced infoematic tools - the VIM editor, the Git version control system, the LaTeX publication system.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	A student has detailed knowledge about typesseting system and version control methods	K1_W06	WL	CPR
ge	2	A student has knowledge of selected computer tools In engineering	K1_W06	WL	CPR
	1	A student can prepare professional documents based on source code prepared in a text composition system.	K1_U03	L	HPR
Skills	2	A student can use in practice the tools that are used to controlling the version of the code	K1_U10	L	HPR
	3	A student can create applications using selected computer tools used in engineering activities	K1_U09	L	HPR
Social	1	A student is aware of the need to create the correct code	K1_K04	WL	PR
ence	2	The student is convinced of the need for continuous training	K1_K01	WL	P R

Methods of verification of learning outcomes:

Hours in the study plan						
The course formatHours/sem. (h)Tutor (coordinator) of the course (title/academic degree/professional title, name and surname						
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	15	nż. Kamiński Marcin				
Project (P)	0					
Seminar (S)	0					
		Student workload				
Types of student act	ivities*	Average numbe on compl	er of hours* allocated eted activities			
Lecture (W)			30			
Calculation class (C)			0			

Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	5
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	5
Examination or final colloquium	0
Additional contact hours	0
Total student workload	55
Number of contact hours (from the study plan)	45

dr hab. inż. Tomczewski Krzysztof Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering			
Profile of Education	Genera	General Academic			
Level of study	First C	First Cycle Studies			
Specialization					
Form of Study	Full-Tir	Full-Time Studies			
Semester	Sevent	Seventh			
Course Title	Electiv	Elective course XIII - Signal processing in embedded systems			
Nazwa przedmiotu	Przedn wbudow	Przedmiot wybieralny XIII - Przetwarzanie sygnałów w systemach wbudowanych			
ECTS points	2	Subject type			W-K
Language of lecture	angielsk i	Mode of completing the course		e	Course credit
Course code	KW13		Subject related to scientific research/pract. profess. prepar. (Y/N)		т

Preliminary requirements of the course	Knowledge	1	A Student knows the basics of C/C++ programming language.
		2	A Student knows the basics of numerical algorithms
	Skills	1	A Student has skills in C/C++ language.
		2	
	Social Competence	1	A student is aware of continuous learning.
		2	

Course Goals The subject aims to present computer science in embedded systems, which can be used to process electrical, audio, and biomedical signals. The student will learn to implement digital signal processing algorithms with limited hardware resources in embedded systems.

Programme content - Introduction to advanced microprocessor systems. - Programming of peripherals using dedicated libraries. - Implementation of selected data processing algorithms. - Application of real-time operating systems.

Learning outcomes for the course - after completing the training cycle				Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled 1 ge 2	1	A student has a general knowledge of embedded systems.	K1_W05	W	СР
	2	A student with knowledge of C++ programming and dedicated RTOS.	K1_W06	W	СР
Skills -	1	A student can individually plan and run a lifelong self-education process.		L	IJP
	2	A student can utilize knowledge solved with signal processing discipline.	K1_U09	L	IJP
Social Compet ence	1	A student can make decisions in complex situations and critically validate his knowledge.	K1_K01	WL	PR
	2				

Methods of verification of learning outcomes:

Hours in the study plan			
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname	

Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	15	dr hab. inż. Szmajda Mirosław			
Project (P)	0				
Seminar (S)	0				
	Student workload				
Types of student activities*			Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for classes			5		
Preparation of a report/paper/ project/presentation			0		
Independent study of the course topics			5		
Examination or final colloquium			0		
Additional contact hours			0		
Total student workload			55		
Number of contact hours (from the study plan)			45		

dr hab. inż. Szmajda Mirosław Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

-	• •										
Course Description Ca	rd										
Field of study	Compu	Computer Engineering									
Profile of Education	Genera	General Academic									
Level of study	First C	First Cycle Studies									
Specialization											
Form of Study	Full-Tir	Full-Time Studies									
Semester	Second	Second									
Course Title	Electric	Electrical engineering for IT specialists									
Nazwa przedmiotu	Elektro	Elektrotechnika dla informatyków									
ECTS points	4	Subject type	Р								
Language of lecture angielsk				Mode of completing the course				Course credit			
---	--	---	--	--------------------------------	----------------------------	--	--	---	--------------------------------------	------------------------------	--
Course code			P10			Subject related to scientific research/pract. profess. prepar. (Y/N	T				
		Knowle	owledge		1 2	The stu concerr	he student knows the fundamental laws of physics oncerning electricity and magnetism.				
Prelimin requirem	nary nent	s Skills		1	1	The student knows how to solve a set of linear equations.					
of the co	urs	e		2	2	The stu comple	dent knows how to a x numbers.	calculate e	equations	with	
		Social Compe	tence	1	1 ⁻ 2	The stu	dent can cooperate	with othe	r student	S.	
Course G the cours electrical coupled c	oals e g circ circu	5 The sub et informa cuits. Also uits and ty	oject prov ation abou , students wo-port ne	ides ut me s acc etwo	s kr eth qui orks	iowledo iods ho re knov s.	ge regarding electric ow to solve constant wledge about resona	al circuits and altern ant circuits	s. Student nating cu s, magnet	s during rrent tically	
Programr circuits.	ne (content ⁻	The cours	e air	ms	to prov	vide students with ki	nowledge	about ele	ectrical	
Learning	Learning outcomes for the course - after completing the training outcome for the course - after completing the training outcome cycle Learning outcome S						Methods of verificati on of learning outcome s				
Knowled ge	1 0	A student occurring circuits.	has basic in direct a	kno and a	owl alte	edge o ernatin	f phenomena g current electrical	K1_W01	W C	СIJ	
	2										
Skills	1	A student current cii	can solve rcuits.	a si	im	ple dire	ect and alternating	K1_U01	С	СIJ	
2 A student can make decisions independently, also in difficult situations. Can critically evaluate own K1_K01 W C A student can make decisions independently, also in compet ence K1_K01 W C					СIJ						
Methods of y	2	cation of lear	ning outcom	05'							
A-written exa on partial ma	Aethods of verification of learning outcomes: A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, J-										

assessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan

The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course title/academic degree/professional title, name and surname		
Lecture (W)	30				
Calculation class (C) 30					
Laboratory class (L) 0 prof. dr hab. inż. Tomczuk Bronisław					
Project (P)	0				
Seminar (S)	0				
Student workload					
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			30		
Laboratory class (L)			0		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		15		
Preparation of a report project/presentation	ort/paper/		15		
Independent study o	of the course top	pics	15		
Examination or final	colloquium		0		
Additional contact he	ours		0		
Total student worklo	ad		105		
Number of contact h	ours (from the	study plan)	60		

dr hab. inż. Koteras Dariusz Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Politechnika Opolska

Wydział Elektrotechniki, Automatyki i Informatyki

Karta Opisu Przedmiotu

Kierunek studiów	Computer Engineering
Profil kształcenia	Ogólnoakademicki
Poziom studiów	Studia pierwszego stopnia
Specjalność	
Forma studiów	Studia stacjonarne
Semestr studiów	Czwarty
Nazwa przedmiotu	Foreign language

Subject Title	Język obcy							
Liczba punktów ECTS		2		Typ przedmiotu				W
Język wykładowy		polski	-	Tryb) za	liczenia przedmiotu (E/	Z)	Zaliczenie na ocenę
Kod przedmiotu		OWJO2				Przedmiot powiązany z badaniami naukowymi/ prakt. przygot. zawodowym (T/N)		N
	Wiedza			1	In a leve	eccordance with the rec	commer	ndations of PRK
O and the second								
wstępne w	Umiejęt	tności	ności		In a leve	n accordance with the recommendations of PRK evel 4.		
przedmiotu				2				
p	Kompet	cencje		1	In accordance with the recommendations of PRK level 4.			
	spolecz	ne		2				
Cele przedmio and listening) European Fran	tu: Dev as well a nework o	velopmen as commu of Referer	t of th inicati nce fo	e fo ve s r La	our k skill: ngu	basic language skills (s s and competencies at ages (CEFR).	peaking level A	, reading, writing, of the Common
European Framework of Reference for Languages (CEFR). Treści programowe zapewniające uzyskanie efektów uczenia się dla przedmiotu: The course provides the student with universal linguistic knowledge: vocabulary, phrases, and structures as well as intercultural knowledge necessary for establishing and maintaining communication with target language users according to level A of the Common European Framework of Reference for Languages (CEFR). The student develops the four basic language skills - listening, speaking, reading, and writing, and learns the basic grammar (declensions, conjugations, basic parts of speech, present, past, and future tenses) required at level A according to the CEFR, and acquires the skills of searching, using and selecting information from various sources - including the use of online dictionaries and translators as well as language learning applications.								

Efekty	/ u	czenia się dla przedmiotu - po zakończonym cyklu studiów	Odniesie nie do kierunko wych efektów uczenia się	Formy realizacj i (W, C, L, P, S)	Formy weryfika cji efektów uczenia się
Wiedza	1	A student knows and understands a foreign language theory and terminology at the B2 level of the European language evaluation scale.	K1_W04	L	СЕГР
	2				
Umiejet	1	A student can use a foreign language at the B2 level of the European language evaluation scale.	K1_U04	L	CEFP
ności	2	A student can individually plan and run a live-long self-education process.	K1_U05	L	CEFP
Kompet encje społeczn	1	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	K1_K01	L	Ρ
	2				
Formy wery	ika	cji efektów uczenia się:			

A-egzamin pisemny, B-egzamin ustny, C-zaliczenie pisemne, D-zaliczenie ustne, E-na podstawie ocen cząstkowych z odpowiedzi ustnych, F-na podstawie ocen cząstkowych z odpowiedzi pisemnych, G-praca kontrolna, H-ocena ze sprawozdań, I-ocena z przebiegu ćwiczeń, J-ocena z przygotowania do ćwiczeń, K-ocena z przebiegu realizacji projektu, Locena pisemnej realizacji projektu, M-ocena z obrony projektu, N-ocena formy prezentacji, O-ocena treści prezentacji, Pobserwacja aktywności na zajęciach, R-obserwacja systematyczności.

	Godziny w planie studiów						
Forma zajęć Liczba godzin zajęć w semestrze		Opiekun (koordynator) przedmiotu (tytuł/stopień naukowy/ tytuł zawodowy, imię i nazwisko)					
Wykład	0						
Ćwiczenia	0						
Laboratorium	30	dr Świerczewska Beata					
Projekt	0						
Seminarium	0						
	Nakład pracy studenta						
Rodzaje zajęć	studenta*	Średnia liczba godzin* przeznaczonych na zrealizowane aktywności					
Wykład		0					
Ćwiczenia		0					
Laboratorium		30					
Projekt		0					
Seminarium		0					
Przygotowanie	e do zajęć	8					
Przygotowanie projektu/preze	e sprawozdania/referatu/ entacji	4					

Samodzielne studiowanie tematyki zajęć	8
Egzamin lub kolokwium zaliczeniowe	0
Dodatkowe godziny kontaktowe	0
Łączny nakład pracy studenta	50
Liczba godzin kontaktowych (z planu studiów)	30

* godzina (lekcyjna) oznacza 45 minut

dr Świerczewska Beata Kierownik jednostki organizacyjnej/bezpośredni przełożony (pieczęć/podpis) dr inż. Zygarlicka Małgorzata Dziekan Wydziału (pieczęć/podpis)

Politechnika Opolska

Wydział Elektrotechniki, Automatyki i Informatyki

Karta Opisu Przedmiotu

•									
Kierunek studiów		Compu	Computer Engineering						
Profil kształcer	Ogólno	Ogólnoakademicki							
Poziom studióv	Studia	Studia pierwszego stopnia							
Specjalność									
Forma studiów	Studia	Studia stacjonarne							
Semestr studió	Św	Piąty							
Nazwa przedm	iotu	Foreigr	n lang	uag	e				
Subject Title		Język o	bcy						
Liczba punktó	w ECTS	2				Typ przedmiotu		W	
Język wykła	dowy	polski	-	Tryk	o zal	liczenia przedmiotu (E/	Z)	Zaliczenie na ocenę	
Kod przedmiotu		0	OWJO3			Przedmiot powiązany z badaniami naukowymi/ prakt. przygot. zawodowym (T/N)		Ν	
	Wiedza		1	ln a leve	accordance with the rec	the recommendations of PRK			
				2					
Oczekiwania wstępne w	Umieietności			1	In accordance with the recommendations of PRK level 4.			ndations of PRK	
przedmiotu				2					
preconnoca	Kompetencje			1	In accordance with the recommendations of PRK level 4.			ndations of PRK	
	ne		2						
Cele przedmiotu: Development of the four basic language skills (speaking, reading, writing, and listening) as well as communicative skills and competencies at level A of the Common European Framework of Reference for Languages (CEFR).									

Treści programowe zapewniające uzyskanie efektów uczenia się dla przedmiotu: The course provides the student with universal linguistic knowledge: vocabulary, phrases, and structures as well as intercultural knowledge necessary for establishing and maintaining communication with target language users according to level A of the Common European Framework of Reference for Languages (CEFR). The student develops the four basic language skills - listening, speaking, reading, and writing, and learns the basic grammar (declensions, conjugations, basic parts of speech, present, past, and future tenses) required at level A according to the CEFR, and acquires the skills of searching, using and selecting information from various sources - including the use of online dictionaries and translators as well as language learning applications.

Efekty	/ u	czenia się dla przedmiotu - po zakończonym cyklu studiów	Odniesie nie do kierunko wych efektów uczenia się	Formy realizacj i (W, C, L, P, S)	Formy weryfika cji efektów uczenia się
Wiedza	1	A student knows and understands a foreign language theory and terminology at the B2 level of the European language evaluation scale.	K1_W04	L	СЕГР
	2				
Umiejęt	1	A student can use a foreign language at the B2 level of the European language evaluation scale.	K1_U04	L	CEFP
ności	2	A student can individually plan and run a live-long self-education process.	K1_U05	L	СЕГР
Kompet encje społeczn	1	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	K1_K01	L	Ρ
e	2				

Formy weryfikacji efektów uczenia się:

A-egzamin pisemny, B-egzamin ustny, C-zaliczenie pisemne, D-zaliczenie ustne, E-na podstawie ocen cząstkowych z odpowiedzi ustnych, F-na podstawie ocen cząstkowych z odpowiedzi pisemnych, G-praca kontrolna, H-ocena ze sprawozdań, I-ocena z przebiegu ćwiczeń, J-ocena z przygotowania do ćwiczeń, K-ocena z przebiegu realizacji projektu, Locena pisemnej realizacji projektu, M-ocena z obrony projektu, N-ocena formy prezentacji, O-ocena treści prezentacji, Pobserwacja aktywności na zajęciach, R-obserwacja systematyczności.

Godziny w planie studiów							
Forma zajęć	Liczba godzin zajęć w semestrze	Opiekun (koordynator) przedmiotu (tytuł/stopień naukowy/ tytuł zawodowy, imię i nazwisko)					
Wykład	0						
Ćwiczenia	0						
Laboratorium	30	dr Świerczewska Beata					
Projekt	0						
Seminarium	0						
Nakład pracy studenta							

Rodzaje zajęć studenta*	Średnia liczba godzin* przeznaczonych na zrealizowane aktywności
Wykład	0
Ćwiczenia	0
Laboratorium	30
Projekt	0
Seminarium	0
Przygotowanie do zajęć	8
Przygotowanie sprawozdania/referatu/ projektu/prezentacji	4
Samodzielne studiowanie tematyki zajęć	8
Egzamin lub kolokwium zaliczeniowe	0
Dodatkowe godziny kontaktowe	0
Łączny nakład pracy studenta	50
Liczba godzin kontaktowych (z planu studiów)	30

* godzina (lekcyjna) oznacza 45 minut

dr Świerczewska Beata Kierownik jednostki organizacyjnej/bezpośredni przełożony (pieczęć/podpis) dr inż. Zygarlicka Małgorzata Dziekan Wydziału (pieczęć/podpis)

Politechnika Opolska

Wydział Elektrotechniki, Automatyki i Informatyki

Karta Opisu Przedmiotu

Kierunek studiów	Compu	Computer Engineering						
Profil kształcenia	Ogólno	Ogólnoakademicki						
Poziom studiów	Studia	pierwszego s	topnia					
Specjalność								
Forma studiów	Studia	Studia stacjonarne						
Semestr studiów	Szósty							
Nazwa przedmiotu	Foreign language							
Subject Title	Język o	Język obcy						
Liczba punktów ECTS	2		Typ przedmiotu		W			
Język wykładowy	polski	Tryb za	liczenia przedmiotu (E/	Z)	Egzamin			
Kod przedmiotu OWJO4		Przedmiot powiązany z badaniami naukowymi/ prakt. przygot. zawodowym (T/N)		Ν				

	Wiedza Umiejętności		In accordance with the recommendations of PRK level 4.
Oczekiwania wstępne w			In accordance with the recommendations of PRK level 4.
przedmiotu		2	
P	Kompetencje społeczne		In accordance with the recommendations of PRK level 4.

Cele przedmiotu: Development of the four basic language skills (speaking, reading, writing, and listening) as well as communicative skills and competencies at level A of the Common European Framework of Reference for Languages (CEFR).

Treści programowe zapewniające uzyskanie efektów uczenia się dla przedmiotu: The course provides the student with universal linguistic knowledge: vocabulary, phrases, and structures as well as intercultural knowledge necessary for establishing and maintaining communication with target language users according to level A of the Common European Framework of Reference for Languages (CEFR). The student develops the four basic language skills - listening, speaking, reading, and writing, and learns the basic grammar (declensions, conjugations, basic parts of speech, present, past, and future tenses) required at level A according to the CEFR, and acquires the skills of searching, using and selecting information from various sources - including the use of online dictionaries and translators as well as language learning applications.

Efekty	/ u	czenia się dla przedmiotu - po zakończonym cyklu studiów	Odniesie nie do kierunko wych efektów uczenia się	Formy realizacj i (W, C, L, P, S)	Formy weryfika cji efektów uczenia się
Wiedza	1	A student knows and understands a foreign language theory and terminology at the B2 level of the European language evaluation scale.	K1_W04	L	A B C E F P
	2				
Umiejęt	A student can use a foreign language at the B2 leve of the European language evaluation scale.		K1_U04	L	A B C E F P
ności	2	A student can individually plan and run a live-long self-education process.	K1_U05	L	A B C E F P
Kompet encje społeczn	Kompet encje społeczn 1 A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.		K1_K01	L	Р
C	2				

Formy weryfikacji efektów uczenia się:

A-egzamin pisemny, B-egzamin ustny, C-zaliczenie pisemne, D-zaliczenie ustne, E-na podstawie ocen cząstkowych z odpowiedzi ustnych, F-na podstawie ocen cząstkowych z odpowiedzi pisemnych, G-praca kontrolna, H-ocena ze sprawozdań, I-ocena z przebiegu ćwiczeń, J-ocena z przygotowania do ćwiczeń, K-ocena z przebiegu realizacji projektu, Locena pisemnej realizacji projektu, M-ocena z obrony projektu, N-ocena formy prezentacji, O-ocena treści prezentacji, Pobserwacja aktywności na zajęciach, R-obserwacja systematyczności.

	Godziny w planie studiów						
Forma zajęć	Liczba godzin zajęć w semestrze	Opiekun (koordynator) przedmiotu (tytuł/stopień naukowy/ tytuł zawodowy, imię i nazwisko)					
Wykład	0						
Ćwiczenia	0						
Laboratorium	30	dr Świerczewska Beata					
Projekt	0						
Seminarium	0						
Nakład pracy studenta							
Rodzaje zajęć studenta*		Średnia liczba godzin* przeznaczonych na zrealizowane aktywności					
Wykład		0					
Ćwiczenia		0					
Laboratorium		30					
Projekt		0					
Seminarium		0					
Przygotowanie	e do zajęć	10					
Przygotowanie sprawozdania/referatu/ projektu/prezentacji		6					
Samodzielne s	studiowanie tematyki zajęć	12					
Egzamin lub k	olokwium zaliczeniowe	2					
Dodatkowe go	odziny kontaktowe	0					
Łączny nakłac	l pracy studenta	60					
Liczba godzin	kontaktowych (z planu studiów)	30					

* godzina (lekcyjna) oznacza 45 minut

dr Świerczewska Beata Kierownik jednostki organizacyjnej/bezpośredni przełożony (pieczęć/podpis) dr inż. Zygarlicka Małgorzata Dziekan Wydziału (pieczęć/podpis)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Fourth

Course Title	ourse Title Foreign language							
Nazwa przedm	iotu	Język o	bcy	рсу				
ECTS poir	nts	2		Subject type W				
Language of	lecture	angielsk i		Mode of completing the course Co			Course credit	
Course code		0	WJO2		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	
	Knowledge			The stud of the En Common Languago	ent knows vocabulary a glish Language at B2 lo European Framework es (CEFR)	and gra evel as of Refe	mmar structures defined by the rence for	
Droliminany	Preliminary requirements of the course Skills		2	2				
requirements of the course			 The student can use the English language at B2 levents defined by the Common European Framework of Reference for Languages (CEFR) 			age at B2 level as nework of		
			2	2				
	Social	tonco	1	A studen roles.	t can cooperate in a gr	oup acc	cepting various	
	Compe	lence	2 A student understands the need for self-study					
Course Goals studied faculty Level scale (CE	To acqu in acco FR)	uire langu ordance w	age ith r	skills in t requireme	he field of science and ents specified for C leve	discipli el of Eur	nes relevant to ropean Language	
Programme co Computer Engl concluding cor presentations, offers, preparin student acquir speaking, read	ntent ineering itracts, solving ng job a es real- ing and	n the cou as well a negotiatic problems pplication world kno writing, a	rse s th ons a and s - wleo and	students le languag and conve d conflicts curriculur dge, deve extends t	acquire technical voca ge of work environment ersations with partners s, arguing, presenting of n vitae, cover letter) . A lops four basic languag he ability to seek, use	bulary i t (condu and clie offers, a As part ge skills and sele	n the area of ucting meetings, ents, giving nalyzing job of the module, the - listening, ect tinformation	

from different sources .The course is focused on active implementing technical and academic vocabulary with the view of students' future business and scientific careers.

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	The student knows and understands English terminology at C level as defined by the Common European Framework of Reference for Languages (CEFR)	K1_W04	L	CEFP
	2				
Skills	1	The student can use the English language at C level as defined by the Common European Framework of Reference for Languages (CEFR).	K1_U04	L	CEGP
	2 The student can individually plan and run a live-long self-education process.				CEFP
Social Compet ence	1	The student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	K1_K01	L	Ρ
	2				
Maklaala af		Castion of Learning autoences			

	ŀ	lours in the	study plan	
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname	
Lecture (W)	0			
Calculation class (C)	0			
Laboratory class (L)	30	mgr Kowal	czyk Bogusława	
Project (P) 0				
Seminar (S)	0			
Student workload				
Types of student activities*			Average number of hours* allocated on completed activities	
Lecture (W)			0	
Calculation class (C)			0	
Laboratory class (L)			30	
Project (P)			0	
Seminar (S)			0	
Preparation for classes			8	

Preparation of a report/paper/ project/presentation	4
Independent study of the course topics	8
Examination or final colloquium	0
Additional contact hours	0
Total student workload	50
Number of contact hours (from the study plan)	30

dr Świerczewska Beata Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

eedibe Beschiption ea	6					
Field of study	Compu	Computer Engineering				
Profile of Education	Genera	al Academic				
Level of study	First Cy	cle Studies				
Specialization						
Form of Study	Full-Tir	ne Studies				
Semester	Fifth					
Course Title	Foreigr	Foreign language				
Nazwa przedmiotu	Język o	Język obcy				
ECTS points	2	Subject type			W	
Language of lecture	angielsk i	Mode c	ode of completing the course		Course credit	
Course code OWJO3		WJO3	Subject related to scientific research/pract. profess. prepar. (Y/N)		N	

Preliminary requirements of the course Image: construction of the student can use the English language at B2 level as 1 defined by the Common European Framework of Reference for Languages (CEFR) Social Competence Image: construction of the student can cooperate in a group accepting various roles. Course Goals To acquire language skills in the field of science and disciplines relevant to studied faculty in accordance with requirements specified for C level of the Common European Framework of Reference for Languages (CEFR) Programme content In the course students acquire technical vocabulary in the area of Computer Engineering as well as the language of work environment (conducting meetings, concluding contracts, negotiations and conversations with partners and clients, giving presentations, solving problems and conflicts, arguing, presenting offers, analyzing job offers, preparing job applications - curriculum vitae, cover letter) . As part of the module, the student acquires real-world knowledge, develops four basic language skills - listening, speaking, reading and writing, and extends the ability to seek, use and select tinformation from different sources. The course is focused on active implementing technical and academic vocabulary with the view of students' future business and scientific careers. Learning outcomes for the course - after completing the training ge The student knows and understands English terminology at C level as defined by the Common European Framework of Reference for Languages (CEFR). K1_W04 L C E F P 2 Image: defined by the Common European Framework of Reference for Languages (CEFR). K1_U04 L C E F P </th <th></th> <th></th> <th>Knowledge</th> <th>1</th> <th>The student knows vocabular of the English Language at B2 Common European Framewor Languages (CEFR)</th> <th>y and gra ? level as k of Refei</th> <th>mmar str defined b rence for</th> <th>uctures y the</th>			Knowledge	1	The student knows vocabular of the English Language at B2 Common European Framewor Languages (CEFR)	y and gra ? level as k of Refei	mmar str defined b rence for	uctures y the	
Social Competence 1 The student can cooperate in a group accepting various roles. 2 The student understands the need for self-study. Course Goals To acquire language skills in the field of science and disciplines relevant to studied faculty in accordance with requirements specified for C level of the Common European Framework of Reference for Languages (CEFR) Programme content In the course students acquire technical vocabulary in the area of Computer Engineering as well as the language of work environment (conducting meetings, concluding contracts, negotiations and conversations with partners and clients, giving presentations, solving problems and conflicts, arguing, presenting offers, analyzing job offers, preparing job applications – curriculum vitae, cover letter) . As part of the module, the student acquires real-world knowledge, develops four basic language skills - listening, speaking, reading and writing, and extends the ability to seek, use and select tinformation from different sources. The course is focused on active implementing technical and academic vocabulary with the view of students' future business and scientific careers. Learning outcomes for the course - after completing the training ge The student knows and understands English terminology at C level as defined by the Common European Framework of Reference for Languages (CEFR). K1_W04 L C E F P Skills 1 The student can use the English language at C level as defined by the Common European Framework of Reference for Languages (CEFR). K1_U04 L C E F P 2 <t< td=""><td>Prelimir requirem of the co</td><td>nar<u>y</u> nen ours</td><td>y ts se Skills</td><td>1</td><td>The student can use the Engli defined by the Common Euro Reference for Languages (CEI</td><td>sh langua pean Fran FR)</td><td>nge at B2 Nework of</td><td>level as</td></t<>	Prelimir requirem of the co	nar <u>y</u> nen ours	y ts se Skills	1	The student can use the Engli defined by the Common Euro Reference for Languages (CEI	sh langua pean Fran FR)	nge at B2 Nework of	level as	
Course Goals To acquire language skills in the field of science and disciplines relevant to studied faculty in accordance with requirements specified for C level of the Common European Framework of Reference for Languages (CEFR) Programme content In the course students acquire technical vocabulary in the area of Computer Engineering as well as the language of work environment (conducting meetings, concluding contracts, negotiations and conversations with partners and clients, giving presentations, solving problems and conflicts, arguing, presenting offers, analyzing job offers, preparing job applications - curriculum vitae, cover letter) As part of the module, the student acquires real-world knowledge, develops four basic language skills - listening, speaking, reading and writing, and extends the ability to seek, use and select tinformation from different sources. The course is focused on active implementing technical and academic vocabulary with the view of students' future business and scientific careers. Learning outcomes for the course - after completing the training outcome for the student knows and understands English terminology at C level as defined by the Common European Framework of Reference for Languages (CEFR). Methods of verificati on favoring and writing, and extends the ability to seek. 2 In the student can use the English language at C level K1_W04 L C E F P 8 Individually plan and run a live-long self-education process. C E F P P 2 Can individually plan and run a live-long self-education process. C E F P P 2 Can individually plan and run a li			Social Competence	1	The student can cooperate in roles. The student understands the	a group a	accepting self-study	various	
Programme content In the course students acquire technical vocabulary in the area of Computer Engineering as well as the language of work environment (conducting meetings, concluding contracts, negotiations and conversations with partners and clients, giving presentations, solving problems and conflicts, arguing, presenting offers, analyzing job offers, preparing job applications – curriculum vitae, cover letter). As part of the module, the student acquires real-world knowledge, develops four basic language skills - listening, speaking, reading and writing, and extends the ability to seek, use and select tinformation from different sources. The course is focused on active implementing technical and academic vocabulary with the view of students' future business and scientific careers. Learning outcomes for the course - after completing the training outcome s for the course - after completing the training outcome s The reference re for course is no of course is no of course is no of course (CEFR). 2 Interminology at C level as defined by the Common European Framework of Reference for Languages (CEFR). K1_W04 L C E F P Skills Inte student can use the English language at C level as defined by the Common European Framework of Reference for Languages (CEFR). K1_U04 L C E F P Skills Inte student can make decisions, also in difficult at and earning of problems solved both individually and in a team. Inte student can wake decisions, also in difficult at and earning outcomes is a solution, critically validate his knowledge and the range of problems solved both individually and in a team. C E F P <td>Course G studied fa Europear</td> <td>oal acu 1 Fr</td> <td>s To acquire langu Ilty in accordance w amework of Referer</td> <td>age ith r nce</td> <td>skills in the field of science ar equirements specified for C le for Languages (CEFR)</td> <td>nd discipli evel of the</td> <td>nes relev Commor</td> <td>ant to 1</td>	Course G studied fa Europear	oal acu 1 Fr	s To acquire langu Ilty in accordance w amework of Referer	age ith r nce	skills in the field of science ar equirements specified for C le for Languages (CEFR)	nd discipli evel of the	nes relev Commor	ant to 1	
Learning ultionoutcomes for the course - after completing the training cycleThe referenc to the learning outcome sMethods of verificati on of learning outcome sKnowled ge1The student knows and understands English terminology at C level as defined by the Common (CEFR).K1_W04LC E F P22222Skills1The student can use the English language at C level as defined by the Common European Framework of Reference for Languages (CEFR).K1_U04LC E F P22222231The student can use the English language at C level as defined by the Common European Framework of Reference for Languages (CEFR).K1_U04LC E F P2222222231The student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.K1_K01LP42222224244242522444444444444452244444644444447444444484444444	Programm Compute concludin presental offers, prostudent a speaking from diffe academic	Programme content In the course students acquire technical vocabulary in the area of Computer Engineering as well as the language of work environment (conducting meetings, concluding contracts, negotiations and conversations with partners and clients, giving presentations, solving problems and conflicts, arguing, presenting offers, analyzing job offers, preparing job applications – curriculum vitae, cover letter). As part of the module, the student acquires real-world knowledge, develops four basic language skills - listening, speaking, reading and writing, and extends the ability to seek, use and select tinformation from different sources. The course is focused on active implementing technical and							
Knowled 1 The student knows and understands English terminology at C level as defined by the Common European Framework of Reference for Languages (CEFR). K1_W04 L C E F P 2 2	Learning	Learning outcomes for the course - after completing the training outcome for the course - after completing the training outcome (W, C, L, P, S) verificat						Methods of verificati on of learning outcome s	
2 Image: Constraint of perification of learning outcomest. 2 Image: Constraint of perification of learning outcomest. 3 Skills 1 The student can use the English language at C level as defined by the Common European Framework of Reference for Languages (CEFR). 2 Can individually plan and run a live-long self-education process. 2 Can individually plan and run a live-long self-education process. Social Compet ence The student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team. K1_K01 L P	Knowled ge	1	The student knows and understands English terminology at C level as defined by the Common European Framework of Reference for Languages (CEFR).						
Skills Image: The student can use the English language at C level as defined by the Common European Framework of Reference for Languages (CEFR). K1_U04 L C E F P Skills 2 Can individually plan and run a live-long self-education process. K1_U05 C E F P Social Compet ence 1 The student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team. K1_K01 L P		2							
2 Can individually plan and run a live-long self- education process. K1_U05 C E F P Social Compet ence 1 The student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team. K1_K01 L P 2 2 1 Methods of verification of learning outcomes: 1 Methods of verification of learning outcomes:	Skills	1	The student can use as defined by the Co Reference for Langu	The student can use the English language at C level C E F P as defined by the Common European Framework of K1_U04 C E F P Reference for Languages (CEFR). C E F P					
Social Compet ence 1 The student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team. K1_K01 L P 2 Vethods of verification of learning outcomes: Vethods of verification of learning outcomes: Vethods of verification of learning outcomes:		2	Can individually pla education process.	Can individually plan and run a live-long self- education process.					
2 Methods of verification of learning outcomes:	Social Compet ence	1	The student can ma situations, critically range of problems s team.	he student can make decisions, also in difficult tuations, critically validate his knowledge and the ange of problems solved both individually and in a eam.					
	Methods of y	2	ication of learning outcom	<u> </u>					

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

	Hours in the study plan						
The course format Hours/sem. (h) (ti			Tutor (coordinator) of the course le/academic degree/professional title, name and surname				
Lecture (W)	0						
Calculation class (C) 0							
Laboratory class (L)	30	mgr Kowal	czyk Bogusława				
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			0				
Calculation class (C)			0				
Laboratory class (L)			30				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		8				
Preparation of a report/paper/ project/presentation			4				
Independent study o	of the course top	pics	8				
Examination or final	colloquium		0				
Additional contact he	ours		0				
Total student worklo	ad		50				
Number of contact h	ours (from the	study plan)	30				

* hour (class) means 45 minutes

dr Świerczewska Beata Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic

Level of study First			irst Cycle Studies				
Specialization							
Form of Study Full-Ti				Studies			
Semester		Sixth					
Course Title		Foreigr	n lar	iguage			
Nazwa przedm	iotu	Język o	bcy				
ECTS poir	nts	2			Subject type		W
Language of	lecture	angielsk i		Mode o	f completing the cours	e	Examination
Course code		0	OWJO4		Subject related to scientific research/pract. profess. prepar. (Y/N)		N
	Knowledge		1	The stude of the En Common Language	The student knows vocabulary and grammar structure of the English Language at B2 level as defined by the Common European Framework of Reference for Languages (CEER)		
			2				
Preliminary requirements of the course	Skills		1	he stude defined k Referenc	he student can use the English language at B2 level as defined by the Common European Framework of Reference for Languages (CEFR)		
			2				
	Social	tonco	1	A student can cooperate in a group accepting various roles.			
	Compe		2	A studen	t understands the need	d for sel	f-study.
Course Goals	To acqu	Course Goals To acquire language skills in the field of science and disciplines relevant to					

Course Goals To acquire language skills in the field of science and disciplines relevant to studied faculty in accordance with requirements specified for C level of the Common European Framework of Reference for Languages (CEFR)

Programme content In the course students acquire technical vocabulary in the area of Computer Engineering as well as the language of work environment (conducting meetings, concluding contracts, negotiations and conversations with partners and clients, giving presentations, solving problems and conflicts, arguing, presenting offers, analyzing job offers, preparing job applications – curriculum vitae, cover letter). As part of the module, the student acquires real-world knowledge, develops four basic language skills - listening, speaking, reading and writing, and extends the ability to seek, use and select tinformation from different sources .The course is focused on active implementing technical and academic vocabulary with the view of students' future business and scientific careers.

Learning	OL	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	The student knows and understands English terminology at C level as defined by the Common European Framework of Reference for Languages (CEFR)	K1_W04	L	A B C E F P
	2				
1 Skills		The student can use the English language at C level as defined by the Common European Framework of Reference for Languages (CEFR).	K1_U04	L	A B C E F P
	2	Can individually plan and run a live-long self- education process.	K1_U05	L	A B C E F P
Social Compet ence	1	The student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	K1_K01	L	Ρ
	2				

Hours in the study plan				
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname	
Lecture (W)	0			
Calculation class (C)	0			
Laboratory class (L)	30	mgr Kowal	czyk Bogusława	
Project (P)	0			
Seminar (S)	0			
		Student v	vorkload	
Types of student act	ivities*		Average number of hours* allocated on completed activities	
Lecture (W)			0	
Calculation class (C)			0	
Laboratory class (L)			30	
Project (P)			0	
Seminar (S)			0	
Preparation for class	es		10	

Preparation of a report/paper/ project/presentation	6
Independent study of the course topics	12
Examination or final colloquium	2
Additional contact hours	0
Total student workload	60
Number of contact hours (from the study plan)	30

dr Świerczewska Beata Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Politechnika Opolska

Wydział Elektrotechniki, Automatyki i Informatyki

Karta Opisu Przedmiotu								
Kierunek studi	ów	Compu	ter Er	ngin	eeri	ng		
Profil kształcer	nia	Ogólno	akade	emic	:ki			
Poziom studiów Studia pierw			szeg	go s	topnia			
Specjalność								
Forma studiów	1	Studia	stacjo	nar	ne			
Semestr studió	ów	Trzeci						
Nazwa przedm	niotu	Foreigr	n lang	uag	е			
Subject Title		Język o	bcy					
Liczba punktó	w ECTS	2				Typ przedmiotu		W
Język wykła	idowy	polski		Tryb zaliczenia przedmiotu (E/Z)			Z)	Zaliczenie na ocenę
Kod przedmiotu		OWJO1				Przedmiot powiązany z badaniami naukowymi/ prakt. przygot. zawodowym (T/N)		Ν
	Wiedza			1	In a lev	In accordance with the recommendations of PRK level 4.		
				2				
Oczekiwania wstępne w	Umiejęt	ności		1	In a lev	accordance with the rec el 4.	commer	ndations of PRK
				2				
przedmotu	Kompet	encje		1	In a lev	accordance with the rec	commer	ndations of PRK
	sporecz	пе		2				

Cele przedmiotu: Development of the four basic language skills (speaking, reading, writing, and listening) as well as communicative skills and competencies at level A of the Common European Framework of Reference for Languages (CEFR).

Treści programowe zapewniające uzyskanie efektów uczenia się dla przedmiotu: The course provides the student with universal linguistic knowledge: vocabulary, phrases, and structures as well as intercultural knowledge necessary for establishing and maintaining communication with target language users according to level A of the Common European Framework of Reference for Languages (CEFR). The student develops the four basic language skills - listening, speaking, reading, and writing, and learns the basic grammar (declensions, conjugations, basic parts of speech, present, past, and future tenses) required at level A according to the CEFR, and acquires the skills of searching, using and selecting information from various sources - including the use of online dictionaries and translators as well as language learning applications.

Efekty	y u	czenia się dla przedmiotu - po zakończonym cyklu studiów	Odniesie nie do kierunko wych efektów uczenia się	Formy realizacj i (W, C, L, P, S)	Formy weryfika cji efektów uczenia się
Wiedza	1	A student knows and understands a foreign language theory and terminology at the B2 level of the European language evaluation scale.	K1_W04	L	CEFP
Γ					
Umieiet 1		A student can use a foreign language at the B2 level of the European language evaluation scale.	K1_U04	L	СЕГР
ności	2	A student can individually plan and run a live-long self-education process.	K1_U05	L	СЕГР
Kompet encje społeczn	A student can make decisions, also in difficult situations, critically validate his knowledge and t range of problems solved both individually and ir team.		K_K01	L	Ρ
e	2				

Formy weryfikacji efektów uczenia się:

A-egzamin pisemny, B-egzamin ustny, C-zaliczenie pisemne, D-zaliczenie ustne, E-na podstawie ocen cząstkowych z odpowiedzi ustnych, F-na podstawie ocen cząstkowych z odpowiedzi pisemnych, G-praca kontrolna, H-ocena ze sprawozdań, I-ocena z przebiegu ćwiczeń, J-ocena z przygotowania do ćwiczeń, K-ocena z przebiegu realizacji projektu, Locena pisemnej realizacji projektu, M-ocena z obrony projektu, N-ocena formy prezentacji, O-ocena treści prezentacji, Pobserwacja aktywności na zajęciach, R-obserwacja systematyczności.

Godziny w planie studiów						
Forma zajęć	Liczba godzin zajęć w semestrze	Opiekun (koordynator) przedmiotu (tytuł/stopień naukowy/ tytuł zawodowy, imię i nazwisko)				
	Semestize	imię i nazwisko)				

Wykład	0		
Ćwiczenia	0		
Laboratorium 30		dr Świerczewska Beata	
Projekt	0		
Seminarium	0		
	Nakład pra	cy studenta	
Rodzaje zajęć	studenta*	Średnia liczba godzin* przeznaczonych na zrealizowane aktywności	
Wykład		0	
Ćwiczenia		0	
Laboratorium		30	
Projekt		0	
Seminarium		0	
Przygotowanie	e do zajęć	8	
Przygotowanie projektu/preze	e sprawozdania/referatu/ entacji	4	
Samodzielne s	studiowanie tematyki zajęć	8	
Egzamin lub k	olokwium zaliczeniowe	0	
Dodatkowe go	odziny kontaktowe	0	
Łączny nakłac	l pracy studenta	50	
Liczba godzin	kontaktowych (z planu studiów)	30	

* godzina (lekcyjna) oznacza 45 minut

dr Świerczewska Beata Kierownik jednostki organizacyjnej/bezpośredni przełożony (pieczęć/podpis) **dr inż. Zygarlicka Małgorzata** Dziekan Wydziału (pieczęć/podpis)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering				
Profile of Education	Genera	General Academic				
Level of study	First Cy	First Cycle Studies				
Specialization						
Form of Study	Full-Tir	Full-Time Studies				
Semester	Third	Third				
Course Title	Foreigr	Foreign language				
Nazwa przedmiotu	Język o	Język obcy				
ECTS points	2	Subject type W				

Language of lecture		angielsk i	Mode of completing the course		Course credit		
Course code		OWJO1		91	Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν
	Knowledge		1	A studen at B2 lev (CEFR) fo	dent has lexical and grammar knowledge of English level according to European Language Level scale () for foreign languages.		
			2				
Preliminary requirements of the course	Skills		1	A studen manner a Level sca	lent can use English language in a communicative er at B2 level according to European Language scale (CEFR)		
			2				
	Social		1	A student can cooperate in a group accepting various roles.			cepting various
	compe		2	A studen	A student understands the need for self-education.		

Course Goals To acquire language skills in the field of science and disciplines relevant to studied faculty in accordance with requirements specified for C level of European Language Level scale (CEFR)

Programme content In the course students acquire technical vocabulary in the area of Computer Engineering and language of work environment (conducting meetings, concluding contracts, negotiations and conv as well as conversations with partners and clients, giving presentations, solving problems and conflicts, arguing, presenting offers, analyzing job offers, preparing job applications – curriculum vitae, cover letter). As part of the module, the student acquires real-world knowledge, develops four basic language skills - listening, speaking, reading and writing, and extends the ability to seek, use and select tinformation from different sources. The course is focused on active implementing technical and academic vocabulary the view of students' future business and scientific careers.

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	A student knows and understands a foreign language theory and terminologythe at C level according to European Language Level scale (CEFR).	K1_W04	L	СЕГР
	2				
Skille	1	The student can use a foreign language at C level of European Language Level scale (CEFR)	K1_U04	L	CEFP
SKIIIS	2	A student can individually plan and run a live-long self-education process.	K1_U05	L	CEFP
Social Compet ence	1	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	K1_K01	L	Ρ
	2				

Hours in the study plan				
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname		
Lecture (W)	0			
Calculation class (C)	0			
Laboratory class (L)	30	mgr Kowalczyk Bogusława		
Project (P)	0			
Seminar (S)	0			
		Student workload		
Types of student act	ivities*	Average number of hours* allocated on completed activities		
Lecture (W)		0		
Calculation class (C)		0		
Laboratory class (L)		30		
Project (P)		0		
Seminar (S)		0		
Preparation for class	es	8		
Preparation of a repo project/presentation	ort/paper/	4		

Independent study of the course topics	8
Examination or final colloquium	0
Additional contact hours	0
Total student workload	50
Number of contact hours (from the study plan)	30

dr Świerczewska Beata Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Car	Course Description Card							
Field of study	Compu	iter Engineeri	ng					
Profile of Education	Genera	General Academic						
Level of study	First Cy	cle Studies						
Specialization								
Form of Study	Full-Tin	Full-Time Studies						
Semester	First	First						
Course Title	Information technology							
Nazwa przedmiotu	Technologia informacyjna							
ECTS points	2		Subject type		Р			
Language of lecture	angielsk i	Mode c	Mode of completing the course		Course credit			
Course code		P4	Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν			

		Knowledge	1	A student has fundamental knowledge regarding information technology issues, including knowledge of the basics of the binary system, computer architecture						
			2	the busies of the bindry system						
Preliminary requirements of the course Skills				A student has fundamental kn including basics of algebra an necessary to describe and and computer systems and perform binary numbers.	student has fundamental knowledge in mathematics, cluding basics of algebra and mathematical analysis ecessary to describe and analyze the operation of imputer systems and perform arithmetic operations on nary numbers.					
		Social Competence	1	A student is able to work inde member.	pendently	v as well a	as a team			
			2							
and floati arithmeti Introduct methods.	ing-p c op ion t	erations, - Acquisi o the basics of co	uce tion nbii	the student to the implement of skills by the student in the national circuits, - Familiarizati	ation of lo field of po on with n	ogical and ositional s etwork ac	-point ystems, - ldressing			
Programr represent and arith in the bas	Programme content Within the subject, knowledge is imparted regarding the representation of fixed-point and floating-point data, as well as the implementation of logical and arithmetic operations. As part of the module, the student acquires knowledge and skills in the basics, including positional systems, combinational circuits, and network addressing.									
Learning outcomes for the course - after completing the training outcomes for the course - after completing the training outcome (W, C, L, Outcome S) (W, C, L, P, S) (W, C, L)						Methods of verificati on of learning outcome s				
Knowled	wled A student has a basic knowledge of the representation of fixed and floating point data and the implementation of logical and arithmetic operations.						CIPR			
ge	A 2 tr te	student has basic rends in new solut echnologies.	: kn ions	owledge of developmental applied in internet	K1_W05	W	С			
Chille	A student he can work individually and in a team, apply the principles of occupational health and safety and estimate the time needed to complete the commissioned task ensuring meeting deadlines						CIPR			
54115	2 2 fr	student can obta ther sources, integ nterpret it, as well prmulate and justi	formation from literature and e the obtained information, draw conclusions and pinions.	K1_U06	С	CIPR				
Social Compet ence	A 1 p ir	student is aware erformed on the s nitiate actions for t	of tl ocia the	he impact of the tasks Il environment and is able to public interest.	K1_K02	W C	CIPR			
	2									

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan						
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course tle/academic degree/professional title, name and surname			
Lecture (W)	15					
Calculation class (C)	15					
Laboratory class (L)	0	dr inż. Kozi	oł Michał			
Project (P)	0					
Seminar (S)	0					
Student workload						
Types of student activities*			Average number of hours* allocated on completed activities			
Lecture (W)			15			
Calculation class (C)			15			
Laboratory class (L)			0			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		15			
Preparation of a report project/presentation	ort/paper/		0			
Independent study o	of the course top	oics	15			
Examination or final colloquium			0			
Additional contact hours			0			
Total student workload			60			
Number of contact h	ours (from the	study plan)	30			

* hour (class) means 45 minutes

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering	
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Profile of Education General A			l Aca	ademic			
Level of study First Cycle Studies							
Specialization							
Form of Study		Full-Tin	ne Sti	udies			
Semester		Third					
Course Title		Interne	t tecł	nologie	S		
Nazwa przedm	niotu	Techno	logie	interne	towe		
ECTS poir	nts	5			Subject type		K
Language of	lecture	angielsk i		Mode o	of completing the cours	e	Course credit
Course code			K11		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
Knowledge		dge	1	The st and C	udent should have bas SS.	ic know	ledge of HTML
Duclinging							
requirements	Skills	Skills		The st techno	udent should have basic skills in Internet blogy.		
			2				
Social Competence		ce 1 2	Ability	Ability to work in a group.			
Course Goals	Prepari	ng Studer	nts fo	the de	sign of websites.		
Programme co outcomes for t The course wil including popu	ntent l he subje l also fo llar fram	Programm act are iss cus on pro neworks. H	ied co sues i esent ITML,	ontent t n the ar ing info CSS tee	hat will ensure the achi ea of broadly understo rmation on specific pro chnology and popular s	evemer od Inter grammi cripting	nt of learning met technologies. ng solutions, I languages in the

area of web technologies will be discussed in detail.

Learning	οι	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	The student has knowledge of creating and use of databases.	K1_W08	W P	CFGH
ge	2	The student has well-established knowledge in the field of graphics computer and its applications.	K1_W09	W P	CFGH
	1	The student has knowledge of creating and use of databases.	K1_U06	Р	LM
Skills	2	The student is able to see non-technical aspects, systemic, social and ethical in the implementation of tasks engineering.	K1_U03	Ρ	LM
	3	The student has the ability to use knowledge from different engineering disciplines related to IT i use it to create systems IT, which can include applications web.	K1_U09	Ρ	LM
Social Compet	1	A Student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	K1_K01	W P	CFGH
ence	2	The student is able to act in accordance with the principles of ethics professional. Promotes good practices in professional environment and beyond.	K1_K04	W P	CFGH

Hours in the study plan						
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	0	dr hab. inż.	r hab. inż. Paszkiel Szczepan			
Project (P)	30	-				
Seminar (S)	0					
		Student w	vorkload			
Types of student activities*			Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			0			

Laboratory class (L)	0
Project (P)	30
Seminar (S)	0
Preparation for classes	30
Preparation of a report/paper/ project/presentation	30
Independent study of the course topics	5
Examination or final colloquium	0
Additional contact hours	0
Total student workload	125
Number of contact hours (from the study plan)	60

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Compu	Computer Engineering					
Profile of Education	Genera	General Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tin	ne Studies					
Semester	First	First					
Course Title	Linear	Linear algebra with analytic geometry					
Nazwa przedmiotu	Algebra	Algebra liniowa z geometrią analityczną					
ECTS points	5	5 Subject type			Р		
Language of lecture	angielsk i	Mode c	of completing the cours	e	Examination		
Course code	P3		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		

		1	Knowledge of basic procedures for solving linear equations. Knowledge of solving quadratic equations. Knowledge of drawing graphs in a rectangular coordinate system.		
	Knowledge	2	Knowledge of algorithms for working with matrices and solving matrix equations.		
		3	Knowledge of the application of the method of least squares and knowledge of data processing.		
Preliminary		1	The student controls the mathematical operations of vector and matrix algebra. The student knows how to algorithmise and program these operations.		
of the course	Skills	2	The student can prepare input data for analysis using computer technology and interpret the calculation results.		
		3	The student can independently process the graphic materials needed to calculate the task.		
		4	The student knows the basic procedures of mathematical optimisation.		
	Social Competence	1	Students are able to use modern tools (calculators, computers, multimedia) and information sources (manuals, encyclopedias, network resources).		
		2			
Course Goals Providing the background for more advanced mathematical and technical courses. Application of matrix calculus for solving computationally demanding technical problems. Knowledge application of analytical geometry for solving technical problems.					
Programme content Lecture in auditorium based on usage of visualisation of a computer algebra system. The exercise provided an independent solution of sample examples, and the results were discussed with students. Continuous control of the achieved level of knowledge through written tests. Lectures, exercises and solved tests are immediately published on the					

subject's e-learning pages.

Learning	οι	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	Students know basic theorems of algebra, algebraic structures and their relationships.	K1_W01	W C	ACFP
Knowled ge	2	Students are knowledgeable in terms of algebraic concepts and methods important in further mathematical and computer education.	K1_W01	W C	ACFP
	3	Students understand the universality and generality of linear algebra.	K1_W01	W C	ACFP
		Students are able to use basic mathematical concepts of linear algebra.	K1_U01	С	CFP
Skills	2	Students are able to use complex numbers, matrix calculus, and is able solve any system of linear equations.	K1_U01	С	CFP
	3	Students use an algebraic description of objects and geometric transformations in the 3-D space.	K1_U01	С	CFP
Social Compet	1	Students are aware of the need for continued training, in particular, in methods of modern mathematics used in the technology.	К1_К01	W C	CEGP
CIICE	2				

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				
Lecture (W)	30					
Calculation class (C)	30					
Laboratory class (L)	0	dr hab. Barton Stanislav				
Project (P)	0					
Seminar (S)	0					
		Student workload				
Types of student act	ivities*	Average number of hours* allocated on completed activities				
Lecture (W)		30				
Calculation class (C)		30				
Laboratory class (L)		0				

Project (P)	0
Seminar (S)	0
Preparation for classes	35
Preparation of a report/paper/ project/presentation	30
Independent study of the course topics	0
Examination or final colloquium	2
Additional contact hours	0
Total student workload	127
Number of contact hours (from the study plan)	60

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card								
Field of study Computer Engin				eeri	ng			
Profile of Education	ation	Genera	al Academ	nic				
Level of study		First Cy	ycle Studi	es				
Specialization								
Form of Study		Full-Tir	ne Studie	S				
Semester		Second	k					
Course Title		Logic a	nd set th	eory	/			
Nazwa przedm	iotu	Logika	i teoria m	nnog	jości			
ECTS poir	nts	2			Subject type		Р	
Language of lecture		angielsk i	Мо	de c	of completing the course		Course credit	
Course code			P11		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	
	Knowlo	daa	dge 1 2		Linear algebra and ana	inear algebra and analytical geometry.		
	Knowie	uge			Knowledge of the basic concepts of set calculus.			
Preliminary	Skille		1 2		Ability to perform basic algebraic calculations.			
of the course	SKIIIS				Ability to perform basic set theory calculations.			
	Social	Competer		1	Communication skills, note-taking skills.			
		Joinperen		2	Awareness of responsibility for work.			

Course Goals Providing logical foundations and concepts of set theory for mastering programming languages and problem solving IT.								
Programme content The subject provides knowledge and skills in the field of such topics as: set, operations on sets, Cartesian product of sets, functional relation, ordering relation, equivalence relation, algebraic system, cardinal numbers of sets, propositional logic, binary Boolean algebra, logic of concepts, predicate logic, fuzzy set and fuzzy logic.								
Learning outcomes for the course - after completing the training cycle Cycle								
A student has knowledge of the laws of propositional calculus and quantifier calculus. A student has knowledge of proving techniques and basics of logic of concepts.								
Knowled	2	A student has knowledge of the properties of relations and functions.	K1_W01	W	С			
ge	3	A student has knowledge of the cardinal numbers of sets.	K1_W01	W	С			
	4	A student has knowledge of the basics of algebraic systems and Boolean algebras.	K1_W01	W	С			
	5	A student has knowledge of basics of fuzzy logic and other non-classical logics.	K1_W01	W	С			
	1	A student can able to check the tautology of expressions, perform operations on sentences and predicates, and conduct proofs.	K1_U01	С	C F			
	2	A student uses various relations and functions. A student does set theory operations on sets.	K1_U01	С	C F			
Skills	3	A student can determine cardinal numbers for infinite sets and prove the equinumerous of sets.	K1_U01	С	C F			
	4	A student can use the properties of Boolean algebras.	K1_U01	С	C F			
	5	A student understands the differences between classical logic and non-classical logics.	K1_U01	С	C F			
Social	1	A student knows the limitations of his own knowledge and understands the need further education.	K1_K01	W C	ΕP			
Compet ence	2	A student can independently search for information in the literature, also in materials in foreign languages.	К1_К01	W C	ΕP			
	3	A student can work in a team.	K1_K04	W C	ΕP			

Hours in the study plan							
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname				
Lecture (W)	15						
Calculation class (C)	15						
Laboratory class (L)	0	dr Lupenko	Serhii				
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			15				
Calculation class (C)			15				
Laboratory class (L)			0				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		15				
Preparation of a report project/presentation	ort/paper/		15				
Independent study o	of the course top	pics	0				
Examination or final	colloquium		0				
Additional contact hours			0				
Total student worklo	ad		60				
Number of contact h	ours (from the	study plan)	30				

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	First

Course Title	Mather	Mathematical analysis I						
Nazwa przedm	Analiza	Analiza matematyczna I						
ECTS poir	nts	4		Subject type				
Language of lecture		angielsk i		Mode o	f completing the course		Course credit	
Course code			P2		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	
	Knowle	wledge		Students seconda	s have knowledge of mathematics at the ary school level (high school level).			
			2					
Preliminary			1	Ability of abstract and logical thinking.				
requirements	Skills		2	2 Ability to perform basic algebraic calculations.				
of the course			3	3 English language knowledge (min B1 level).				
			1	1 The ability to co-work in a group.				
	Social	tence	2	2 Understanding of need for self-education.				
		tenee	3	3 Student's responsibility for his own work.				
Course Goals courses.	Course Goals Providing the background for more advanced mathematical and technical courses.							
Programme co	ntent l	Lecture in	aud	itorium.				

Learning outcomes for the course - after completing the training cycle				Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	Students have theoretical knowledge concerning differential and integral calculus of functions of a single variable.	K1_W01	W C	CFP
Knowled ge	2	Students have knowledge with regard to application of differential and integral calculus of single variable functions.	K1_W01	W C	CFP
	3	3 Students know English terminology used in mathematics.		W C	CFP
	1	Students can calculate the derivative of the function and understand its geometric and physical interpretation and evaluate the accuracy of approximation of functions by polynomials and can calculate indefinite and definite integrals by selecting appropriate calculation methods.	K1_U01	С	CFP
Skills	2	Students are able to evaluate the accuracy of approximation of functions by polynomials.	K1_U01	С	CFP
	3	Students are able to calculate indefinite and definite integrals by selecting appropriate calculation methods.	K1_U01	С	CFP
	4	Students use English during the solving process of tasks on mathematical analysis.	K1_U01	С	CFP
Social Compet	1	Students are able to apply simple mathematical models and mathematical logic in solving practical problems and team leadership.	К_К01	W C	CFP
	2				

	Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname					
Lecture (W)	30						
Calculation class (C) 30							
Laboratory class (L)	0	dr hab. inż. Marszałek Wiesław					
Project (P)	0						
Seminar (S)	0						
	Student workload						

Types of student activities*	Average number of hours* allocated on completed activities
Lecture (W)	30
Calculation class (C)	30
Laboratory class (L)	0
Project (P)	0
Seminar (S)	0
Preparation for classes	50
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	0
Examination or final colloquium	2
Additional contact hours	0
Total student workload	112
Number of contact hours (from the study plan)	60

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Course Description cu								
Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First Cy	First Cycle Studies						
Specialization								
Form of Study	Full-Time Studies							
Semester	Second							
Course Title	Mathematical analysis II							
Nazwa przedmiotu	Analiza	Analiza matematyczna II						
ECTS points	3		Subject type		Р			
Language of lecture	angielsk i	Mode c	of completing the course		Examination			
Course code		Р7	Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν			

		1	Knowledge of fundamental algebra, symbolic mathematical logic and set theory.								
		Knowledge	2	Knowledge of differential calcuvariable.	Ilus of fun	octions of	one				
			3	Knowledge of integral calculus of functions of one variable.							
Prelimir	nar		1	kills of abstract and logic reasoning.							
requirem	nen	ts	2	Skills of proofing simple theore	Skills of proofing simple theorem from algebra.						
of the co	ours	se Skills	3	<pre><ills formulation="" in="" mathematical="" nguage.<="" of="" pre="" problems=""></ills></pre>							
			4	Skills of formulation of mathen English language.	natical pro	oblems in	the				
		Casial	1	The ability to co-work in a grou	Jp.						
		Social	2	Understanding of need for self	-educatio	n.					
		competence	3	Student's responsibility for his	own work	۲.					
Course G courses.	Course Goals Providing the background for more advanced mathematical and technical courses.										
Program	ne	content Lecture i	n aı	ıdytorium.							
Learning outcomes for the cou			urse cycle	- after completing the training	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s				
	1	Students have kno calculus of multiva	owle ariat	dge with regard to differential lle functions.	K1_W01	W C	ACEP				
Knowled ge	2	Students have knowledge regarding to the application of differential calculus of multivariable functions, especially regarding to solve optimization w C A problems.									
	Students have knowledge regarding to algorithms of 3 expansions of functions in power series and K trigonometric series.					W C	АСЕР				
Students are able to calculate partial derivat 1 and directional derivatives and understand th geometric and physical interpretation.					K1_U01	С	ACFP				
Skills	2	Students are able multivariable func	Students are able to use differential calculus of multivariable function to optimization problems.				ACFP				
	3	Students are able periodic processes	to p s by	erform spectral analysis of using Fourier series.	K1_U01	С	ACFP				
Social Compet	1	Students understa improvement in th mathematics meth	nd r ne ra nods	need of continuous nge of applying of modern used in technology.	K1_K01	С	CFP				
ence	2	Students more eff group of co-worke	ectiv rs.	vely cooperate and work in a	K1_K01	С	СР				
A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan						
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname			
Lecture (W)	15					
Calculation class (C)	15					
Laboratory class (L)	0	dr hab. inż	. Marszałek Wiesław			
Project (P)	0					
Seminar (S)	0					
		Student v	vorkload			
Types of student activities*			Average number of hours* allocated on completed activities			
Lecture (W)			15			
Calculation class (C)			15			
Laboratory class (L)			0			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		15			
Preparation of a report/paper/ project/presentation			30			
Independent study of the course topics			0			
Examination or final colloquium			2			
Additional contact hours			0			
Total student workload			77			
Number of contact hours (from the study plan)			30			

* hour (class) means 45 minutes

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering	
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Profile of Education Ge		Genera	General Academic				
Level of study First Cycle			cle St	Studies			
Specialization							
Form of Study		Full-Tim	ne Stu	dies			
Semester		Sixth					
Course Title		Method	ology	for scie	entific research		
Nazwa przedm	iotu	Metody	ka ba	dań na	ukowych		
ECTS poir	nts	2			Subject type		Р
Language of	lecture	angielsk i		Mode of completing the course		Course credit	
Course code		F	P14		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowle	dge	1	A student has general knowledge of IT and computer architecture.			
			2				
Preliminary requirements Skills		ills		A student has the ability to solve basic technical problems			sic technical
			2				
	Social (Compoton	1	A student can work in a group.			
Social Competence		2					
Course Goals	Course Goals Preparing students to conduct scientific research.						
Programme co	Programme content Methods and examples of determining the research problem.						

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	A student has a knowledge with methodology of scientific research in the engineering disciplines associated with the computer science.	K1_W05	W C	CIJ
	2				
1		A student can use specialist terminology with methodology of scientific research and judge other opinions in a debate.	K1_U06	С	CIJ
2 Skills 3	2	A student can consider non-technical, systemic, social, and ethical aspects during the execution, formulation, and resolution of engineering tasks.	K1_U03	С	CIJ
	3	A student is able to carry out engineering tasks and conduct basic scientific research, analyze results, create documentation, and prepare publications (or other written works).	K1_U07	С	CIJ
2		A student can use specialized terminology within the scope of the studied field, including in foreign languages.	K1_U08	С	CIJ
Social Compet	1	A student can act in accordance with ethics and respect to the professional tradition in methodolgy of scientific research.	К1_К01	С	Ι
ence		A student is preparing a publication, he acts in accordance with ethical principles.	K1_K04	С	I

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	15				
Calculation class (C)	30				
Laboratory class (L)	0	dr inż. Nagi Łukasz			
Project (P)	0				
Seminar (S)	0				
Student workload					
Types of student act	ivities*	Average number of hours* allocated on completed activities			

Lecture (W)	15
Calculation class (C)	30
Laboratory class (L)	0
Project (P)	0
Seminar (S)	0
Preparation for classes	0
Preparation of a report/paper/ project/presentation	5
Independent study of the course topics	0
Examination or final colloquium	0
Additional contact hours	0
Total student workload	50
Number of contact hours (from the study plan)	45

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

	-					
Field of study	Compu	Computer Engineering				
Profile of Education	Genera	al Academic				
Level of study	First C	cle Studies				
Specialization						
Form of Study	Full-Tir	ne Studies				
Semester	Sevent	h				
Course Title	Moderr	Modern technologies in computer science				
Nazwa przedmiotu	Nowoc	Nowoczesne technologie w informatyce				
ECTS points	1		Subject type		К	
Language of lecture	angielsk i	ngielsk Mode of completing the course				
Course code	K21		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	

Preliminary requirements of the course	Knowledge	1	The student has knowledge in the field of software engineering, algorithms and creating software in selected programming languages.	
		2	The student has basic knowledge in the field of construction and using relational databases.	
		3	The student has knowledge of the operation of popular operating systems and attitudes of computer networks (services, protocols).	
		1	The student is able to use text editor, chosen programming environment, coud install the necessary software and implement selected functionalities in the chosen programming language.	
	Skills	2	The student can design and program a simple relational database data. Can use operating systems and write and run applications on them.	
		3	The student could - when formulating and solving engineering tasks - recognize their systemic and non- technical aspects, including their impact on work of other IT systems.	
	Social	1	The student could interact and work in a group.	
	Competence	2		
Course Goals The mail goal is to familiarize students with the latest trends in the IT industry, both technologies and tools with work environments. Presentation of perspectives in particular IT departments and demand for specialists on the market in Poland and Europe.				

Programme content Informative lecture, problem lecture, description, instruction, conversational lecture and discussion, if possible: didactic, situational method, cases, workshop method. The mail goal is to familiarize students with the latest trends in the IT industry, both technologies and tools with work environments. Presentation of perspectives in particular IT departments and demand for specialists on the market in Poland and Europe.

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	The student knows advanced concepts and concepts of technology systems and applications used in industry.	K1_W05	W	СДЕР
Knowled , ge	2	The student has knowledge about the development trends of systems information systems, including database ones, used in big IT companies.	K1_W06	W	C D N P R
	3	The student knows the basic methods, techniques, tools and software used to create complex applications and high availability systems.	K1_W06	W	CDP
Skills	1	•			
SKIIIS	2				
		The student understands the need to learn throughout life.	K1_K01	W	EOR
Compet	Has the ability to assess phenomena and behaviors, can determine priorities for actions performed in situations difficult.		K1_K02	W	R
	3	The student can share knowledge and others.	K1_K03	W	ER
Mothode of	ori	fication of learning outcomes			

Hours in the study plan						
The course format	he course format Hours/sem. (h) Tutor (coordinator) of the course name and surname					
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	lass (L) 0 dr inż. Zatwarnicka Anna					
Project (P)	0					
Seminar (S)	0					
		Student workload				
Types of student act	ivities*	Average number of hours* alloc on completed activities	ated			
Lecture (W)		30				
Calculation class (C)		0				
Laboratory class (L)		0				
Project (P)		0				

Seminar (S)	0
Preparation for classes	0
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	0
Examination or final colloquium	0
Additional contact hours	0
Total student workload	30
Number of contact hours (from the study plan)	30

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card						
Field of study	Compu	Computer Engineering				
Profile of Education	Genera	al Academic				
Level of study	First Cy	cle Studies				
Specialization						
Form of Study	Full-Tir	ne Studies				
Semester	Fourth					
Course Title	Numer	Numerical methods				
Nazwa przedmiotu	Metody	/ numeryczne	2			
ECTS points	2		Subject type		К	
Language of lecture	angielsk i	ngielsk Mode of completing the course			Course credit	
Course code		P13	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	

		Knowledge	1	The student can use a suitable numerical method corresponding to the solved problem.						
			1	The student can independently convert the assigned echnical problem into a task from the field of numerical mathematics and find its solution.						
requirem of the co	iar <u>i</u> nen ours	se Skills	2	The student has an overview of the algorithms of numerical mathematics and can use them effectively. He can use the corresponding algorithms in a suitable computer environment.						
			3	The student can correctly inte calculations.	rpret the	results of				
		Social	1	The student can work in a grou	up.					
		Competence	2							
Course G independ	oal en	s The student can tly.	de	velop and implement numerica	l mathem	atical me	thods			
Programr audiovisu	ne Ial	content Lecture ir equipment.	า ลเ	iditorium supported by the com	nputer alg	ebra syst	em and			
Learning outcomes for the course - after cor cycle				- after completing the training	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s			
Knowled	1	The student has ge methods related to	ner IT.	ral knowledge of the numerical	K1_W01	WL	CGI			
ge	2									
- - The student can select the sources of the information correctly using advanced ICT techniques and evaluate and synthesize data from various K1_U06 L Skills L							CGI			
	2									
Social Compet ence	1	The student makes decisions, also in difficult situations, critically evaluates his knowledge and the range of problems solved both individually and in a team.								
	2									
Methods of v A-written ex	Methods of verification of learning outcomes: A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based									

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan

The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	15				
Calculation class (C)	0				
Laboratory class (L)	15	dr hab. Bar	ton Stanislav		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			15		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		10		
Preparation of a report project/presentation	ort/paper/		5		
Independent study o	of the course top	pics	5		
Examination or final	colloquium		0		
Additional contact he	ours		0		
Total student worklo	ad		50		
Number of contact h	ours (from the	study plan)	30		

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Third
Course Title	Operating systems I

Nazwa przedm	Systemy operacyjne I								
ECTS poir	5			Subject type		К			
Language of	lecture	angiel i	sk	Mode c	f completing the course		Examination		
Course co			K10	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			
			1	Fundamenta programmir functions, a programmir as many op write low-le	als of Programming: Ur ng concepts, including nd data structures. Kno ng language, such as C erating systems course vel code.	nderstar variable owledge /C++ or es requir	nding of basic es, loops, e of at least one r Python, is crucial re students to		
	Knowledge		2	 Basics of Computers and Computer System Archited Understanding how computers work at the hardwar including knowledge of processors, memory, input/or devices, and other computer system components. 					
			3	Basic Knowledge of Operating Systems: A general understanding of what an operating system is and the functions it serves, including process management, memory management, and file systems.					
	Skills		1	Analytical and Problem-Solving Skills: The ability to analyze technical problems and think logically to find solutions, which is crucial for debugging code and understanding complex operating systems.					
Preliminary requirements of the course			2	Low-Level Programming Skills: The ability to write and understand low-level code that is close to hardware, such as programming in C or assembly language, often required to understand the internal mechanisms of an operating system.					
					3	Understand understand as processe constructs.	ing of Abstract System and work with abstract s, threads, address spa	Concep t systen aces, an	ots: The ability to n concepts such d other system
				Teamwork: many projec require colla	amwork: The ability to work effectively in a group, as any projects within the operating systems course may quire collaboration.				
	Social Compe	tence	2	Technical Co communicat in writing, w presenting s	ommunication: The ski te complex technical co which is crucial for docu solutions.	ll to clea oncepts imentin	arly and precisely , both orally and g projects and		
			3		ssional Ethics and Social Awareness: Understanding of thical and social implications of technology, especially ms of privacy, security, and accessibility, which is rtant in the context of designing and implementing ating systems that are used by a broad audience.				

Course Goals The objectives of the course are for students to gain a comprehensive understanding of key concepts, mechanisms, and strategies used in modern operating systems such as: understanding the role and functions of operating systems, knowledge of operating system architecture, understanding and ability to manage processes, memory management and file systems, understanding input/output and device control, security and protection in operating systems, practical skills in using operating systems.

Programme content The course content will cover both theoretical foundations and practical applications of operating systems such as: introduction to operating systems, process management, memory management, file systems, input and output operations, security and protection, the operating system user interface, and an overview of contemporary operating systems.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	A student has knowledge in the computer networks and operating systems area.	K1_W07	WL	AHI
ye	2				
Skills	1	A student can install, configure and administer operating systems, with the use of appropriate methods and techniques	K1_U12	L	AHI
	2	A student can individually plan and run a live-long self-education process.	K1_U05	L	AHI
Social Compet	1	A student can act in accordance with ethics and respect to the professional tradition. Promotes a pro-quality culture and the right standards of behaviour both in the professional environment and private life.		WL	PR
ence	2	A student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team	K1_K01	W L	PR

Methods of verification of learning outcomes:

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				

Lecture (W)	30				
Calculation class (C)	0]			
Laboratory class (L)	30	dr inż. Kop	terski Wiesław		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			30		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		30		
Preparation of a report project/presentation	ort/paper/		20		
Independent study o	f the course to	pics	30		
Examination or final	colloquium		2		
Additional contact ho	ours		0		
Total student worklo	ad		142		
Number of contact h	ours (from the	study plan)	60		

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

	-								
Field of study	Compu	Computer Engineering							
Profile of Education	Genera	General Academic							
Level of study	First C	First Cycle Studies							
Specialization									
Form of Study	Full-Tir	Full-Time Studies							
Semester	Fourth								
Course Title	Operating systems II								
Nazwa przedmiotu	zedmiotu Systemy operacyjne II								
ECTS points	5	Subject type	K						

Language of lecture		angielsk i	Mode of completing the cou			ırse	Course	e credit			
Course code			К14			Subject related to scientific research/pract. profess. prepar. (Y/N	т))				
		Knowle	edge	-	1	Studer systen	Student has Knowledge from course Operating systems I				
Prelimir requirem	nar ner	y Its Skills			2 1 2	Studer	nt has Skills from cou	irse Opera	ating syst	ems I	
	ur	Social	Competer	ice	1	Studer differe	Student can interact and work in a group, taking on different roles.				
Course G some sele	oa ect	ls The ma	ain goal fo	or th ms	2 nis r adr	nodule ninistra	is to provide studen	ts with kr	owledge	about	
Programr outcomes The cours architect	Programme content Programmed content that will ensure the achievement of learning outcomes for the subject are issues in the area of broadly understood operating systems. The course will also focus on presenting information about the system kernel, system								ning tems. m sed.		
Learning outcomes for the course - after completing the training course learning outcome for the course - after completing the training cycle s							Methods of verificati on of learning outcome s				
Knowled	1	Student h and opera	as knowle ating syste	edge ems	e in s are	the co ea.	mputer networks	K1_W07	WL	CI	
ye	2										
	1	Student c	an install	mo	der	n opera	ating systems.	K1_U12	L	I	
Skills	2	Student c self-educa	an individ ation proc	ual ess	ly p	lan and	d run a live-long	K1_U05	L	I	
	3	Student is operating	able to c systems.	onf	igu	re and	administer modern	K1_U12	L	I	
Social Compet ence	1	Student c situations range of p team.	Student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.							CI	
	2										

Hours in the study plan						
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course le/academic degree/professional title, name and surname			
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	30	dr hab. inż.	Paszkiel Szczepan			
Project (P)	0					
Seminar (S)	0					
		Student v	vorkload			
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			0			
Laboratory class (L)			30			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		25			
Preparation of a report project/presentation	ort/paper/		25			
Independent study o	of the course top	pics	25			
Examination or final	colloquium		0			
Additional contact he	ours		0			
Total student worklo	ad		135			
Number of contact h	ours (from the	study plan)	60			

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Third

Course Title	Physica	Physical education						
Nazwa przedm	Wycho	Wychowanie fizyczne						
ECTS poir	nts	0			Subject type		W	
Language of	angielsk i	Mode of completing the course			e	Credit unrated		
Course co	01	WWF1		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		
			1	Studer	nt has knowledge of individual and team sports.			
	Knowle	dge	2	Studer physic	nt has knowledge about recreational forms of cal activity.			
Preliminary requirements	Skills	škills		Studer of a se	Student can perform basic elements of the technique of a selected sport.			
			2					
	Social		1	Studer	Student is capable to co-work in an exercising group			
	Compe	tence	2					
Course Coole. Taking one of boolth, consolidating active attitudes to want a busical automa								

Course Goals Taking care of health, consolidating active attitudes towards physical culture as well as educating and improving physical skills in the field of a selected sport discipline or various forms of physical recreation.

Programme content The curriculum content includes the concepts of physical activity and sport as well as selected issues in the field of methodology of teaching technical elements in selected team and individual disciplines. They also include the rules of participation in sports disciplines and recreational physical activity, as well as the basics of refereeing.

Learning	οι	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	Student has the knowledge of professional ethics, necessary to make moral decisions, respecting human rights, taking into account the categories of justice in everyday life, sport and physical recreation.		С	R
	2				
Skills	1	Student has the ability to understand and analyze interpersonal relationships, including the causes and effects of conflict situations in the workplace, and is able to propose preventive actions.		С	R
	2				
Social Compet ence	1	Student understands the need for lifelong learning, broadening knowledge, and knows the possibilities of further education.		С	R
	2	Student is ready to interact and cooperate in a group, taking on different roles in it.		С	R
Methods of v	/eri	fication of learning outcomes:			

Hours in the study plan						
The course format	Hours/sem. (h)	ד (title)	Futor (coordinator) of the course /academic degree/professional title, name and surname			
Lecture (W)	0					
Calculation class (C)	30					
Laboratory class (L)	ıch Magdalena					
Project (P)	0					
Seminar (S)	0					
		Student wo	rkload			
Types of student activities* Average number of hours* allo on completed activities						
Lecture (W)			0			
Calculation class (C)			30			
Laboratory class (L)			0			
Project (P)			0			
Seminar (S)			0			

Preparation for classes	0
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	0
Examination or final colloquium	0
Additional contact hours	0
Total student workload	30
Number of contact hours (from the study plan)	30

dr Woś Barbara Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Compu	Computer Engineering							
Profile of Educa	Genera	General Academic							
Level of study	First Cy	First Cycle Studies							
Specialization									
Form of Study		Full-Tir	Full-Time Studies						
Semester		Fourth							
Course Title		Physica	al ed	uca	tion				
Nazwa przedm	iotu	Wycho	wani	ie fiz	zyczn	e			
ECTS poir	nts	0				Subject type		W	
Language of	angielsk i	Mode of completing the course			Credit unrated				
Course code		01	OWWF2			Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	
			1	1 S	tuder	it has knowledge of inc	dividual	and team sports.	
	Knowledge		2	2 Studen physica		nt has knowledge about recreational forms of cal activity.		tional forms of	
Preliminary requirements	Skills	kills			Student can perform basic elements of the technique of a selected sport.			of the technique	
			2	2					
	Social		1	1 S	tuder	it is capable to co-work	k in an e	exercising group	
	Compe	tence	2	2					

Course Goals Taking care of health, consolidating active attitudes towards physical culture as well as educating and improving physical skills in the field of a selected sport discipline or various forms of physical recreation.

Programme content The curriculum content includes the concepts of physical activity and sport as well as selected issues in the field of methodology of teaching technical elements in selected team and individual disciplines. They also include the rules of participation in sports disciplines and recreational physical activity, as well as the basics of refereeing.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled ge	1	Student has the knowledge of professional ethics, necessary to make moral decisions, respecting human rights, taking into account the categories of justice in everyday life, sport and physical recreation.		С	R
	2				
Skills	1	Student has the ability to understand and analyze interpersonal relationships, including the causes and effects of conflict situations in the workplace, and is able to propose preventive actions.		С	R
	2				
Social Compet ence	1	Student understands the need for lifelong learning, broadening knowledge, and knows the possibilities of further education.		С	R
	2	Student is ready to interact and cooperate in a group, taking on different roles in it.		С	R

Methods of verification of learning outcomes:

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname				
Lecture (W)	0					
Calculation class (C)	30					
Laboratory class (L)	0	dr inż. Tataruch Magdalena				
Project (P)	0					
Seminar (S)	0					
Student workload						

Types of student activities*	Average number of hours* allocated on completed activities			
Lecture (W)	0			
Calculation class (C)	30			
Laboratory class (L)	0			
Project (P)	0			
Seminar (S)	0			
Preparation for classes	0			
Preparation of a report/paper/ project/presentation	0			
Independent study of the course topics	0			
Examination or final colloquium	0			
Additional contact hours	0			
Total student workload	30			
Number of contact hours (from the study plan)	30			

dr Woś Barbara Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Compu	Computer Engineering					
Profile of Education	Genera	General Academic					
Level of study	First Cy	ycle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	First						
Course Title	Physics	Physics I					
Nazwa przedmiotu	Fizyka	Fizyka I					
ECTS points	5	Subject type			Р		
Language of lecture angiel		< Mode of completing the course			Examination		
Course code		P1	Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		

		Knowledge	1	Basics of mathematics. Drawing graphs.					
		Knowledge	2						
Prelimir requirem of the co	narv		1	he student understands the function of mechanical, ydromechanical and thermomechanical systems. He can ontrol their activity; he understands the data of control levices.					
	nen ours	ts Skills se	2	he student can optimise the operation of technical nechanisms regarding energy consumption and peration efficiency.					
			3	The student has a basic overv	iew of mo	dern phy	sics.		
		Social Competence	1	Students can think and act inc groups.	lividually	and work	in		
		Competence	2						
Course G understa technolog determin	oal nd gy a ing	s The aim of the c phenomena and ph and in everyday life and measuring phy	our ysio , as ysic	se is to provide students with t cal processes in nature and to a s well as to familiarize students al quantities	he knowle apply the with met	edge nece laws of n hods of	essary to ature in		
Programr algebra p discussio knowledg publishec	Programme content Lecture in auditorium room combined with multimedia and computer algebra presentation. In the exercise, independent solution of sample examples and discussion with students about the results. Continuous control of the achieved level of knowledge through written tests. Lectures, exercises and solved tests are immediately published on the subject's e-learning pages								
Learning outcomes for the course - after completing the training course learning outcome for the course - after completing the training course learning outcome P, S) s							Methods of verificati on of learning outcome s		
Knowled	1	Student has knowle solving engineering	edg g pr	e in the area of physics for oblems.	K1_W01	W C	A B E F P		
ge	2	Student understand technological proce	ds t esse	he basics of natural and es.	K1_W01	W C	A B E F P		
	1	Student can utilize physics for solving	gai pro	ned knowledge in the area of blems.	K1_U01	С	A B E F P		
Skills	2	The student is able natural and techno practical tasks.	to logi	implement the basics of cal procedures in solving	K1_U01	С	A B E F P		
	3	Student has the ab	ility	for self-education.	K1_U05	С	ABEF P		
Social 1 Student can make decisions, critically validate his Lompet 1 knowledge and the range of problems solved both Individually and in a team. K1_K01						W C	A B E F P R		
Mothods of y	2	ication of loarning outcom					<u> </u>		
Imerious of V	/eriff	ication of learning outcom	ies:						

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan						
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	30					
Calculation class (C)	15					
Laboratory class (L)	0	dr hab. Bar	ton Stanislav			
Project (P)	0					
Seminar (S)	0					
		Student v	vorkload			
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			15			
Laboratory class (L)			0			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		43			
Preparation of a repo project/presentation	ort/paper/		0			
Independent study o	of the course top	pics	35			
Examination or final	colloquium		2			
Additional contact he	ours		0			
Total student worklo	ad		125			
Number of contact h	ours (from the	study plan)	45			

* hour (class) means 45 minutes

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic

Level of study	First C	t Cycle Studies							
Specialization									
Form of Study	Full-Tir	Full-Time Studies							
Semester		Second	Second						
Course Title		Physics	Physics II						
Nazwa przedm	iotu	Fizyka	II						
ECTS poir	nts	2			Subject type		Р		
Language of	angielsk i		Mode c	f completing the cours	e	Course credit			
Course code			P9		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		
	Knowle	dge	1	Basics of thermom	Basics of higher mathematics, basics of mechanics and thermomechanics.				
			2						
			1	The stude electrical	ent can independently of circuit and measure its	ndependently connect a simpler nd measure its necessary quantities.			
Preliminary requirements of the course	Skills	kills		The student can correctly evaluate the measured electrical quantities and change the properties of the circuit as needed.					
			3	The student knows the basics of quantum and nuclear physics.					
	Social	tonco	1	Students can think and act individually and work in groups.					
	compe		2						
Course Goals and physical p	Provide rocesse	students s in natur	s wit e a	th the kno nd to appl	wledge necessary to u y the laws of nature in	ndersta technol	nd phenomena ogy and in		

everyday life. Programme content Lecture in auditorium room combined with multimedia and computer

algebra presentation.

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	Student has knowledge in the area of physics for solving engineering problems.	K1_W01	WL	CFIP
ye	2				
	1	The student can utilize gained knowledge in the area of physics for solving engineering problems and can apply physical laws in solving technical problems	K1_U01	L	CFIP
Skills	2	The student can practically use his knowledge of work safety and ergonomy, economy, and an economic evaluation of proposed engineering solutions.	K1_U02	L	CFIP
	З	The student can individually and in a team perform engineering tasks, run basic scientific research, interpret its results, and make conclusions.	K1_U07	L	IJPR
	1	Student is able to validate his knowledge and improve his skills and reflect new knowledges.	K1_K01	L	EIPR
Social Compet ence	2	Student understands the need to adhere to safety and workplace hygiene principles, professional and social ethics, respect for diversity of views, and is aware of the importance of applying principles and conducting oneself in accordance with the spirit of professionalism.	K1_K04	L	EIPR

Hours in the study plan							
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname					
Lecture (W)	15						
Calculation class (C)	0						
Laboratory class (L)	15	dr hab. Barton Stanislav					
Project (P)	0						
Seminar (S)	0						
Student workload							
Types of student act	ivities*		Average number of hours* allocated on completed activities				

Lecture (W)	15
Calculation class (C)	0
Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	10
Preparation of a report/paper/ project/presentation	10
Independent study of the course topics	8
Examination or final colloquium	2
Additional contact hours	0
Total student workload	60
Number of contact hours (from the study plan)	30

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card	Course	Descri	ption	Card
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Field of study	Computer Engineering						
Profile of Education	Genera	General Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Sevent	h					
Course Title	Practic	Practical training - 4 weeks					
Nazwa przedmiotu	Praktyl	Praktyka zawodowa – 4 tygodnie					
ECTS points	6	Subject type			W-PR		
Language of lecture	angielsk i	gielsk Mode of completing the course			Course credit		
Course code	OWPZ		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		

	Knowlodgo	1	The student has basic knowledge in the field of ergonomics and work safety.			
	Kilowieuge	2	The student has basic knowledge of running a business and intellectual property protection.			
Preliminary requirements	Skills	1	The student can carry out engineering tasks and carry out engineering and scientific research independently and in a team.			
		2				
	Social Competence	1	The student has understands the need and knows the possibilities of continuous training and raising professional, personal and social competences.			
		2				
Course Goals Implementation of the professional practice program. To familiarize the student with the practical aspects of an IT specialist's work.						
Programme co	ntent The imple	me	ntation of the course tasks requires that the student			

Programme content The implementation of the course tasks requires that the student undergoes professional practice in an IT company or a company with a large enough IT department to ensure the achievement of the subject learning outcomes.

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowled	1	The student knows and understands issues in the field of computer science necessary to perform the assigned tasks.	K1_W05	Ρ	HKPR
ge	2	The student knows the requirements of future employers regarding the principles of teamwork, quality management and the use of new development trends in selected areas of IT.	K1_W02	Ρ	HKPR
1		The student is able to use devices and programs that he learned during the practice.	K1_U07	Р	HKPR
Skills	2	The student is able to plan and carry out the process of self-learning within the discipline of computer science and related areas.	K1_U05	Ρ	HKPR
	3	The student is able to apply in practice: the principles of ergonomics, occupational health and safety, intellectual property protection law, economic law and make an economic assessment of the proposed engineering solutions.	K1_U02	Ρ	HKPR
	4	The student is able to work individually and in a group and to organize such work by carrying out the tasks entrusted by the internship tutor in the enterprise.	K1_U07	Ρ	HKPR
Cocial	1	The student is able to use the acquired knowledge in the enterprise.	K1_K01	Р	HKPR
Compet	2	The student is aware of the impact of the tasks performed on the company's operations.	K1_K02	Р	HKPR
	3	The students acts in accordance with the principles of ethics and respect for professional traditions.	K1_K04	Р	HKPR

Hours in the study plan				
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname		

Lecture (W)	0					
Calculation class (C)	0					
Laboratory class (L)	0	dr inż. Pala Artur				
Project (P)	160	1				
Seminar (S)	0]				
		Student v	vorkload			
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			0			
Calculation class (C)			0			
Laboratory class (L)			0			
Project (P)			160			
Seminar (S)			0			
Preparation for class	es		0			
Preparation of a report project/presentation	ort/paper/		0			
Independent study o	f the course to	pics	0			
Examination or final	colloquium		0			
Additional contact ho	ours		0			
Total student worklo	ad		160			
Number of contact h	ours (from the	study plan)	160			

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card Computer Engineering Field of study Profile of Education **General Academic** Level of study **First Cycle Studies** Specialization **Full-Time Studies** Form of Study First Semester Course Title Programming I Nazwa przedmiotu Programowanie I **ECTS** points Subject type 4 Κ

Language of lecture			angielsk i	Mode of completing the cour			irse	Course	e credit		
Course code				K1 Subject re scient research profess. pre		Subject related to scientific research/pract. profess. prepar. (Y/N	1)	Т			
						1	Bas	ic knowledge of prog	Iramming		
			Knowle	dge		2	Bas	sic knowledge of strue	ctural pro	grammin	g
Prelimir	nar	y .				3	Bas	ic knowledge of obje	ct-oriente	d prograu	nming
requirem	ier IIIr	nts se	Skills			1	Bas	sic structural program	nming skil		
	u	50				2 1	Bas	are object-oriented pro	ogrammir	ig skills	
			Social (Competen	ce	2	Tea				
Course G of object- object-ori	oa or en	ls ient ted	The ain ted prog I applica	n of the co gramming ations in a	ourse and t a high	is to to a -lev	o pro cqui el p	ovide students with k ire by students the p rogramming languag	nowledge ractical at e	e of the pr pility to cr	rinciples reate
Programr programr programr	ne nir nir	coi ng a ng la	ntent - and the anguag	The subje practical e	ct pro ability	vide / to	es ki crea	nowledge of the prind ate object-oriented a	ciples of o pplication	bject-orie s in a hig	nted h-level
Learning outcomes for the course - after completing the training e to the course cycle Cyc						Methods of verificati on of learning outcome s					
Knowled	1	A s pro	student ogramm	has know ning langu	edge lage.	in a	i sel	ected high-level	K1_W06	WL	C H I J P R
ge	2	Ha the	s basic e non-ol	knowledg oject C++	je of t · lang	he s uag	ne syntax and semantics of lage		K1_W06	WL	C H I J P R
Skills	1	A s ap	student propriat	can creat te prograr	e a co mmino	onso g en	ole a iviro	pplication using nment.	K1_U07	L	HIJ
	2										
Cocial	1	A s val	student lidating	can make his know	e profe ledge	essi	onal	l decisions, critically	K1_K01	WL	HIJPR
Compet	2	A s pu	student blic inte	can initia erest.	te act	iviti	es f	or good of the	K1_K03	L	HIJ
	3	ls a kno	able to owledge	obtain ne e with oth	cessa ers.	ry ir	nforr	mation and share	K1_K04	L	HIJPR
Methods of v A-written ex	veri am,	ficat B-o	ion of lear ral exam,	ning outcom C-written as	es: sessme	nt, D	-oral	assessment, E-based on par	tial marks of	oral answer	s, F-based

on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan

The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname		
Lecture (W)	30			
Calculation class (C)	0			
Laboratory class (L)	30	dr hab. inż.	. Podpora Michał	
Project (P)	0			
Seminar (S)	0			
		Student v	vorkload	
Types of student act	ivities*		Average number of hours* allocated on completed activities	
Lecture (W)			30	
Calculation class (C)			0	
Laboratory class (L)			30	
Project (P)			0	
Seminar (S)			0	
Preparation for class	ses		20	
Preparation of a report project/presentation	ort/paper/		10	
Independent study o	of the course top	pics	10	
Examination or final	colloquium		0	
Additional contact he	ours		0	
Total student worklo	ad		100	
Number of contact h	ours (from the s	study plan)	60	

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Second
Course Title	Programming II

Nazwa przedmiotu Programowanie II										
ECTS points			5	Subject type					<	
Language of lecture			angielsk i	Mode of completing the cou			irse	Exami	Examination	
Course code				К3 р			Subject related to scientific research/pract. profess. prepar. (Y/N	1)	т	
Preliminary requirements		Knowle	dge		1 2 3 1	Bas Bas Bas Bas	grammin d prograi ls	g mming		
of the co	ur	Social (Competer	ice	2 1 2	Bas Tea	sic object-oriented pro am work skills	ogramming skills		
Course G programr	oa nir	Is The ain	n of the coselected l	ourse nigh-le	is to evel	o pr pro	ovide students with k gramming language	nowledge	e of advar	nced
Programr using a se	ne ele	content	The subje level prog	ct pro Iramm	vide ning	es k Ian	nowledge on advance guage	ed progra	mming te	chniques
Learning outcomes for the course - after completing the training cycle					The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s			
	1	A student and softwa	has a ger are engin	neral l eering	دno، ع.	wed	ge in programming	K1_W06	WL	АНІЈ
Knowled ge	2	Knows the basic methods, techniques and tools of object-oriented programming and techniques for creating graphical applications in modern high-level programming languages.					K1_W06	W L	АНІЈ	
Skills	1	A student technique typical for	A student can use object-oriented programming techniques to create applications that perform tasks K1_U07 typical for engineering activities.					L	ніј	
	2									
Social Compet	1	A student	can make	e infor	me	d de	ecisions.	K1_K01	WL	AIJOP R
ence	2	Is able to a strive to ir	assess the nprove it.	e qual	lity	of th	ne code created and	K1_K04	WL	AIJOP R

Hours in the study plan					
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname		
Lecture (W)	Lecture (W) 30				
Calculation class (C)	0				
Laboratory class (L)	30	dr hab. inż.	Podpora Michał		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			30		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		30		
Preparation of a report project/presentation	ort/paper/		20		
Independent study o	of the course top	pics	20		
Examination or final	colloquium		2		
Additional contact he	ours		0		
Total student worklo	ad		132		
Number of contact h	ours (from the s	study plan)	60		

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Third

Course Title Programming III										
Nazwa pr	lmiotu	Progra	mowa	nowanie III						
ECTS	pints	5		Subject type				<		
Langua	ge (of lecture	angielsk i		Mode o	f completing the cou	irse	Exami	nation	
Course code				К4		Subject related to scientific research/pract. profess. prepar. (Y/N	1)	Т		
		Knowle	dge	1	Basic knowledge about structured and object oriented programming.					
Prelimin	nary	Skills		1	Basic sl prograr	asic skills in the field of structured and object oriented orogramming.				
of the co	urs	e		2						
		Social		1	1Reading and understanding Computer Science.		technical text in the field of			
		Compe	tence	2	Ability I teacher	bility to carry out orders and tasks given by the eacher.				
Course G principles	oals s of	s The ain programr	n of the coning in Ca	ourse # lang	e is to pro guage.	ovide students with k	nowledge	e about th	ie	
Programr programr objects al modifiers	ne nin nd : . Al	content g in C# la structures so, studer	The subje nguage. S in C#, lik nts acquir	ct pro Stude (e: at e kno	ovides kr ents durir tributes, owledge	nowledge regarding on ng the course get informer methods, constructor of how to use inherit	object-orie ormation ors, destru ance and	ented regarding uctors, an polymorg	l classes, d access bhism.	
Learning outcomes for the course - after completing the training outcome for the course - after completing the training outcome (W, C, L, on learning outcome S)						Methods of verificati on of learning outcome s				
Knowled	1	The stude especially	nt has ba in the C#	sic kr ± lang	nowledge guage.	e of programming,	K1_W06	W	А	
ge	2	The stude oriented p	nt has ad programm	vance ing.	ed know	ledge of object-	K1_W06	W	А	
	1	The stude software ι	nt can inc using obje	leper ct-or	ndently c iented te	reate simple echniques.	K1_U10	L	EFI	
Skills	2	The stude object-orie given task appropriat requireme	nt can inc ented tecl c. The stuc te object- ents of a g	leper nniqu dent orien jiven	ndently s les for th can inde ted tech task.	elect appropriate le requirements of a pendently select niques for the	K1_U06	L	E F	
Social	1	The stude	nt can ca	rry oı	ut the ta	sks set before him.	K1_K02	L	ΕI	
ence	2									

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan					
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname		
Lecture (W)	30	30			
Calculation class (C) 0					
Laboratory class (L)	30	dr hab. inż.	. Wajnert Dawid		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			30		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		30		
Preparation of a report project/presentation	ort/paper/		0		
Independent study o	of the course top	pics	50		
Examination or final	colloquium		2		
Additional contact he	ours		0		
Total student worklo	ad		142		
Number of contact h	ours (from the	study plan)	60		

* hour (class) means 45 minutes

dr hab. inż. Koteras Dariusz Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering
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Profile of Education		General Academic						
Level of study		First Cy	First Cycle Studies					
Specialization								
Form of Study		Full-Tir	ne S	Studies				
Semester		Fourth						
Course Title		Progra	mm	ing IV				
Nazwa przedm	iotu	Progra	mov	vanie IV				
ECTS poir	nts	4			Subject type		K	
Language of lecture		angielsk i		Mode c	of completing the cours	e	Course credit	
Course code			K13		Subject related to scientific research/pract. profess. prepar. (Y/N)		Τ T	
	Knowle	dge	ge 1 A studen inheritan polymor		t has knowledge to use object-oriented ming in C #, including mechanisms such as ce, constructors, virtual methods, phism, delegates.			
			2		· · · · · · · · · · · · · · · · · · ·			
Preliminary requirements of the course	Skills	kills		A studen program and C# p	A student has practical skills in implementing selected programming issues using the Visual Studio environment and C# programming language.			
			2					
	Social Compe	tence	1 A studen knowledg		t has the ability to conge and inquisitiveness.	stantly	acquire	
	Course Coole Droppring students for advanced object oriented programming							
Drogramma as	ntont -						high love	
Programme content The scope of the material covers programming in the high-level language C#.								

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s		
Knowled	1	A student has extended knowledge of programming in the C# programming language.		W P	CGK		
ge	2						
Skills	1	A student can use knowledge from engineering disciplines related to computer science in the creation of information systems.	K1_U10	Ρ	СGК		
	2						
Social Compet	1	A student can independently make decisions, critically evaluate his knowledge of programming in C # and the scope of issues to be solved.		W P	СGК		
	2						
Methods of	Methods of verification of learning outcomes:						

Hours in the study plan						
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	0	dr inż. Poku	uta Waldemar			
Project (P)	30					
Seminar (S)	0					
Student workload						
Types of student act	ivities*		Average number of hours* allocated on completed activities			
Lecture (W)			30			
Calculation class (C)			0			
Laboratory class (L)			0			
Project (P)			30			
Seminar (S)			0			
Preparation for class	es		15			
Preparation of a repo project/presentation	ort/paper/		15			
Independent study o	f the course top	pics	10			

Examination or final colloquium	0
Additional contact hours	0
Total student workload	100
Number of contact hours (from the study plan)	60

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course	Description	Card	k

Field of study		Computer Engineering							
Profile of Educa	Genera	General Academic							
Level of study		First Cy	First Cycle Studies						
Specialization									
Form of Study		Full-Tin	ne Stu	ıdies					
Semester		Fourth							
Course Title		Softwa	re eng	jineerin	g				
Nazwa przedm	iotu	Inżynie	ria op	rogram	owania				
ECTS poir	nts	5			Subject type		К		
Language of lecture		angielsk i		Mode of completing the course		Examination			
Course code		K12			Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		
	Knowle	edge		Stude applic	lent should have basic knowledge of the lication development process.				
		-	2						
Preliminary requirements	Skills	5		Stude langua	Students should have basic skills in programming languages.				
			2						
	Social	Compoton	1	Ability	to work in a group.				
		Joinperen	2						
Course Goals	Course Goals Preparing students to document the software development process.								
Programme content Programmed content that will ensure learning outcomes for the subject are issues from the broadly understood area of software engineering. The course will also focus on presenting information on IT project management methodologies, such as Agile. Additionally, the UML language will be discussed.									
Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s				
------------------------------	------------	---	---	---	--				
Knowled	1	A student has knowedge in programming and software engineering.	K1_W06	W C	AEIJ				
ge	2	A student has understands basic processes in the computer softwares' life cycle.	K1_W08	W C	AEIJ				
Skills	1	A student can design, according to a given specification, perform and maintain computer engineering with appropriate methods and techniques.	K1_U09	С	EIJ				
		A student is able to design and improve his own computer program.	K1_U10	С	EIJ				
Social 1		A student can make decisions in difficult situations. validate his knowledge in software engineering and the range of problems solved individually.	K1_K01	W C	AEIJ				
ence	2	Students are aware of the accomplished task's impact and can initiate activities for good of the public interest.	К1_К02	W C	AEIJ				
Methods of v A-written ex	/eri am	fication of learning outcomes: B-oral exam, C-written assessment, D-oral assessment, F-based on par	tial marks of	foral answer	s F-based				

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	30				
Calculation class (C)	30				
Laboratory class (L)	0	dr hab. inż.	Paszkiel Szczepan		
Project (P)	0				
Seminar (S)	0				
		Student w	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			30		
Laboratory class (L)			0		
Project (P)			0		
Seminar (S)			0		

Preparation for classes	15
Preparation of a report/paper/ project/presentation	30
Independent study of the course topics	20
Examination or final colloquium	2
Additional contact hours	0
Total student workload	127
Number of contact hours (from the study plan)	60

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Field of study	Compu	Computer Engineering					
Profile of Education	Genera	General Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tin	ne Studies					
Semester	Second	Second					
Course Title	Statisti	Statistical methods					
Nazwa przedmiotu	Metody	Metody statystyczne					
ECTS points	2	Subject type			Р		
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit		
Course code	P8		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		

		Knowledge	1	A student has knowledge in including algebra in the field school and obtained during t	the field o I the level the first se	of mathen of secon emester c	natics, dary of study		
Prolimin	arv		2						
requirem of the co	ent	s e Skills	1	A student can use the known mathematical methods to analyze and processing the results of calculations.					
			2						
		Social	1	A student can interact and w	vork in a g	group.			
		Competence	2						
Course G methods correlatio interpreta	Course Goals Familiarize students with the use of parametric and descriptive statistical methods to analyze the test results. Introduction to the issues of regression analysis and correlation for the purpose of correct evaluation of measurement results using graphical interpretation								
Programr	ne o	content Concepts of	fm	athematical statistics					
Learning outcomes for the course - after completing the training outcomes for the course - after completing the training outcome for the course cycle							Methods of verificati on of learning outcome s		
Knowled ge	1 e r	A student has knowle education, i.e. mathe necessary for solving	edge ma en	e in the area of basic tics, physics, and others gineering problems.	K1_W01	W C	СІЈР		
	2								
Skills	1 (A student can utilize of basic education, i. others necessary for	gai e. n solv	K1_U01	С	СІЈР			
	2								
Social Compet ence A student can make decisions, also in difficu situations, critically validate his knowledge a range of problems solved both individually a team. A student can clearly identify and pres statistical issues in both social and technical				isions, also in difficult date his knowledge and the d both individually and in a arly identify and present social and technical terms.	K1_K01	W C	СІЈР		

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			

Lecture (W)	15						
Calculation class (C)	15						
Laboratory class (L)	0	dr inż. Nag	dr inż. Nagi Łukasz				
Project (P)	0	0					
Seminar (S)	0		1				
Student workload							
Types of student act	ivities*		Average number of hours* allocated on completed activities				
Lecture (W)			15				
Calculation class (C)			15				
Laboratory class (L)			0				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		10				
Preparation of a report project/presentation	ort/paper/		10				
Independent study o	f the course to	opics	7				
Examination or final	colloquium		0				
Additional contact ho	ours		0				
Total student worklo	ad		57				
Number of contact h	ours (from the	e study plan)	30				

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

	•							
Field of study	Compu	Computer Engineering						
Profile of Education	Genera	General Academic						
Level of study	First Cy	First Cycle Studies						
Specialization	cialization							
Form of Study	Full-Time Studies							
Semester Fifth								
Course Title Team project of IT system								
Nazwa przedmiotu	Projekt	Projekt zespołowy systemu informatycznego						
ECTS points	5	Subject type	К					

Language of	angielsk i		Mode o	of completing the course		Examination			
Course co	K18			Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			
			1	The studen engineering programmi	dent has knowledge in the field of software ering, algorithms creating software in selected nming languages.				
	Knowle	dge	2	The studen constructio	The student has basic knowledge in the field of construction and use relational databases.				
			3	The studen operating s (services, p	The student has knowledge of the operation of popular operating systems and attitudes of computer networks (services, protocols).				
Preliminary requirements of the course	Skills		1	The studen environmer and program software.	It knows the text editor, chosen programming nt, can install the necessary software yourself Im a selected issue in the chosen language				
			The student is able to design and program a simp relational database data. Can use operating syste write and run applications on them.		m a simple ing systems and				
			3	The studen engineering technical as IT systems.	t can - when formulating tasks - recognize the spects, including their	ng and s ir syster impact	solving mic and non- on work of other		
	Social		1	The studen	t can interact and worl	k in a gi	roup.		
	Compe	tence	2						
Course Goals	Prepari	ng stude	nts	s for work in	modernly managed p	roject te	eams.		

Familiarizing students with modern methodologies of software development.

Programme content Informative lecture, problem lecture, description, instruction, conversational lecture, if possible didactic discussion, situational method, cases. As part of the course, students will be familiarized with currently used teamwork methodologies, especially the modern approach. Students will become familiar with the roles, ceremonies and artifacts in methodolody and will practice practically implementing tasks during project classes.

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	The student knows advanced concepts and concepts of technology systems and applications used in industry.	K1_W06	W	ADEP
Knowled ge	2	The student has knowledge about the development trends of systems IT, including database ones, used in large IT companies.	K1_W08	W	ADO
	3	The student knows the basic methods, techniques, tools and software used to create complex applications and high availability systems.	K1_W05	W	A D E
	1	The student is able to design and implement advanced IT systems (including web and mobile), using, among others, advanced databases.	K1_U13	Ρ	ELPR
Skills	2	The student can use the software appropriate for the tasks typical of engineering activities.	K1_U06	Р	E K M N O P
	3	He can - when formulating and solving engineering tasks - see their systemic and non-technical aspects.	K1_U03	Р	EKNO R
	1	The student can make decisions regarding the construction of an IT system and work in a software development team.	К1_К01	W P	ELOR
Social Compet ence	2	The student is able to locate the implemented project among trends in the IT industry, caring for potential users and for monetization of the implemented IT system.	K1_K03	W P	PR
	3	The student works with respect for the principles of group work and professional ethics. He cares about the quality of his work (quality of code, modules etc.).	K1_K04	W P	EPR

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			

Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	0	dr inż. Zatv	dr inż. Zatwarnicka Anna		
Project (P)	30				
Seminar (S)	0				
		Student v	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			30		
Calculation class (C)			0		
Laboratory class (L)			0		
Project (P)			30		
Seminar (S)			0		
Preparation for class	es		20		
Preparation of a report project/presentation	ort/paper/		15		
Independent study o	f the course to	pics	28		
Examination or final	colloquium		2		
Additional contact he	ours		0		
Total student worklo	ad		125		
Number of contact h	ours (from the	study plan)	60		

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Car	ď							
Field of study	Compu	iter Engineering						
Profile of Education	Genera	General Academic						
Level of study	First Cy	First Cycle Studies						
Specialization								
Form of Study	Full-Tir	Full-Time Studies						
Semester	First	First						
Course Title	The co	The course in humanities and social sciences I						
Nazwa przedmiotu	Przedm	Przedmiot humanistyczno-społeczny I						
ECTS points	2 Subject type W-HS							

Language of lecture a		angielsk i		Mode of completing the cours			irse	Course credit			
Cour	se	сос	le	OWHS1			Subject related to scientific research/pract. profess. prepar. (Y/N) N			
		I	Knowle	dge		1	According to PRK level 4				
 Prelimir	nar	v				2	Accord	ling to PRK level 4			
requirem	nen	ts	Skills			2		5			
of the co	urs	se [Social (Competer	ce	1	Understand the need for improvement in terms of soft skills.				
				•		2					
Course G humanist	oal ic (s or s	The ain ocial is	n of the co sues.	our	se i	s for th	e student to acquire	knowledg	ge of sele	cted
Programr sciences the techr	ne sel iica	cor ecte al gr	ntent ed by t raduate	The progr he studer e.	am its	me thai	conten t enhan	t includes issues in t ice the knowledge ar	the humai nd social d	nities and competen	social ices of
Learning outcomes for the course - after completing the training course learning (W, C, L, on learning outcome P, S) s						Methods of verificati on of learning outcome s					
Knowled ge	1	A s' hur cov	tudent nanitie vered ir	has a ger s and soc the cour	nera ial se.	al ki scie	nowled ences ir	ge of the terms of the topics	K1_W03	W	C P
	2										
Skills	1										
Social Compet	2	A s knc pro knc	A student he is ready to recognise the importance of mowledge in the humanities and social sciences in problem solving and to critically evaluate his mowledge.					e the importance of I social sciences in evaluate his	K1_K02	W	C P
ence	2	A s per env	student is aware of the impact of the tasks erformed on other people and the social nvironment.					K1_K02	W	C P	
Methods of \	/erif	rcatio	on of lear	ning outcom	es:						

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan

The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course tle/academic degree/professional title, name and surname
Lecture (W)	30		
Calculation class (C)	0		
Laboratory class (L)	0	dr Zamelsk	ki Piotr
Project (P)	0		
Seminar (S)	0		
		Student v	vorkload
Types of student act	ivities*		Average number of hours* allocated on completed activities
Lecture (W)			30
Calculation class (C)			0
Laboratory class (L)			0
Project (P)			0
Seminar (S)			0
Preparation for class	es		20
Preparation of a repo project/presentation	ort/paper/		0
Independent study o	of the course top	pics	0
Examination or final	colloquium		0
Additional contact he	ours		0
Total student worklo	ad		50
Number of contact h	ours (from the	study plan)	30

dr hab. Solga Brygida Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Second
Course Title	The course in humanities and social sciences II

Nazwa przedmiotu Przedmiot humanistyczno-				yczno-społeczny II						
ECTS points			3	Subject type				W-	·HS	
Langua	ge	of lecture	angielsk i		Mode o	of completing the cou	irse	Course credit		
Cour	rse	code	0	OWHS2		Subject related to scientific research/pract. profess. prepar. (Y/N) N			
		Knowle	dge	1	Accor	cording to PRK level 4				
Prelimir	nary	/ Skills		2	Accord	According to PRK level 4				
of the co	ours	se Social (Competer	1	Under skills.	stand the need for in	nproveme	nt in tern	ns of soft	
		Social V	competer	2						
Course G humanist	oal ic c	s The ain or social is	n of the co sues.	ourse	is for th	ne student to acquire	knowledg	ge of sele	cted	
Programr sciences the techr	ne sel ica	content ected by t I graduate	The progr he studer e.	amme its tha	e conter it enhar	nt includes issues in t nce the knowledge ar	the humaind social o	nities and competer	social ices of	
Learning outcomes for the course - after completing the training course learning (W, C, L, on or course cycle) S							Methods of verificati on of learning outcome s			
Knowled ge	1	A student humanitie covered ir	has a ger s and soc n the cour	neral k ial sci se.	nowled ences i	lge of the n terms of the topics	K1_W03	W	СР	
	2									
Skills	1									
	2	Δ student	he is read	dv to r	econie	se the importance of				
Social Compet	1	knowledge problem s knowledge	e in the hi olving and e.	umani d to ci	ties and ritically	d social sciences in evaluate his	K1_K02	W	СР	
ence	2	A student performed environme	is aware d on other ent.	of the peop	impact le and t	of the tasks he social	K1_K02	W	C P	
Methods of v	/erif	ication of lear	ning outcom	es:						

Hours in the study plan								
The course format	Hours/sem. (h)	Tutor (coordinator) of the course ours/sem. (h) (title/academic degree/professional title, name and surname						
Lecture (W)	30							
Calculation class (C)	0							
Laboratory class (L)	0	dr Zamelsk	ci Piotr					
Project (P)	0							
Seminar (S)	0							
	Student workload							
Types of student activities*			Average number of hours* allocated on completed activities					
Lecture (W)			30					
Calculation class (C)			0					
Laboratory class (L)			0					
Project (P)			0					
Seminar (S)			0					
Preparation for class	es		45					
Preparation of a report project/presentation	ort/paper/		0					
Independent study o	of the course top	pics	0					
Examination or final	colloquium		0					
Additional contact he	ours		0					
Total student worklo	ad		75					
Number of contact h	ours (from the s	study plan)	30					

dr hab. Solga Brygida Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

	-
Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Sixth

Course Title	Transiti	Transitional project							
Nazwa przedmiotu		Praca p	Praca przejściowa						
ECTS poir	nts	3			Subject type		W-K		
Language of	lecture	angielsk i		Mode o	of completing the cours	e	Course credit		
Course code		0	WPF	D	Subject related to scientific research/pract. profess. prepar. (Y/N)		N		
	Knowledge		1	Ability to Ability to	to share data and algorithms with collaborators. to create individual and team control procedures.				
Preliminary requirements	Skills		1	Ability to work as a team. Ability to plan teamwork and division of sub-activities. Ability to create a schedule for team activities.					
of the course			2						
	Social Competence		1	The student can properly define the priorities for implementing the task set by himself and others—team discussion ability.					
			2						
Course Goals activities in a t	Course Goals Preparation for writing a diploma thesis. Ability to participate in scientific activities in a team.								
Programme content Applied information technology team project. Co-responsibility for leading the team and for the results achieved. Cooperation in the final presentation of the achieved results.									

Learning	OL	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
	1	The student has knowledge in the area of basic education, i.e. mathematics, physics, and others necessary for solving engineering problems	K1_W01	Р	J M N O P R
Knowled ge	2	The student knows essential topics in work safety and ergonomy, economy, economy law, entrepreneurship principles and copyright protection regulations.	K1_W02	Р	IJ
	3	The student has a general knowledge of the engineering disciplines associated with computer science	K1_W05	Ρ	J M N O P R
	1	The student can individually plan and run a live-long self-education process	K1_U05	Р	IJ
	2	The student can select the sources of the information correctly using advanced ICT techniques. He can evaluate and synthesise data from various sources.	K1_U06	Р	I
Skills	3	The student can individually and in a team perform engineering tasks, run basic scientific research, interpret its results, and make conclusions.	K1_U07	Ρ	IJMNO
	4	The student can use specialist terminology (also in a foreign language) and judge other opinions in a debate.	K1_U08	Р	IJMNO
	5	In carrying out work, student can utilize the knowledge acquired in subjects related to basic sciences.	K1_U01	Р	ΝΟΡ
	6	In carrying out his work, student can also perceive non-technical aspects within his project.	K1_U03	Р	ΝΟΡ
Social	1	The student can make decisions, also in difficult situations, critically validate his knowledge and the range of problems solved both individually and in a team.	K1_K01	Ρ	IJMNO
Compet ence	2	The student is aware of the impact of the accomplished tasks and can initiate activities for the good of the public interest.	K1_K02	Ρ	IJ
-	3	Student can work according to the principles of professional ethics.	K1_K04	Р	ΝΟΡ

Hours in the study plan								
The course format	format Hours/sem. (h) Tutor (coordinator) of the course (title/academic degree/professional title, name and surname							
Lecture (W)	0							
Calculation class (C)	0							
Laboratory class (L)	0	dr hab. Bar	ton Stanislav					
Project (P)	30							
Seminar (S)	0							
	Student workload							
Types of student act	ivities*		Average number of hours* allocated on completed activities					
Lecture (W)			0					
Calculation class (C)			0					
Laboratory class (L)			0					
Project (P)			30					
Seminar (S)			0					
Preparation for class	es		20					
Preparation of a report project/presentation	ort/paper/		15					
Independent study o	of the course top	pics	10					
Examination or final	colloquium		0					
Additional contact he	ours		0					
Total student worklo	ad		75					
Number of contact h	ours (from the s	study plan)	30					

dr inż. Zatwarnicka Anna Head of the organizational unit (stamp/signature) dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic
Level of study	First Cycle Studies
Specialization	
Form of Study	Full-Time Studies
Semester	Sixth

Course Ti	Title User experience design								
Nazwa przedmiotu			Projekt	owanie zorientowane na użytkownika					
ECTS points			4			Subject type		ł	<
Languag	ge (of lecture	angielsk i	Mode	e of	completing the cou	irse	Course credit	
Cour	se	code		K19		Subject related to scientific research/pract. profess. prepar. (Y/N	1)	т	
		Knowle	dge		1	According to the Pl	RK level 4	•	
Prelimin requirem	iary ient	s Skills			1 2	According to the Pl	RK level 4.		
	ars	Social (Competen	се	1 2	The student is able	e to work i	in a group).
interactio intuitive, identifyin the qualit Programn centered Propositio użyteczno make mis	interactions with a given product, service, or system, with the goal of providing the most intuitive, satisfying, and efficient user experience possible. This subject focuses on identifying user needs, analyzing their behaviors, and implementing solutions that enhance the quality of interactions and contribute to achieving business goals. Programme content Introduction to User Experience theory User-centered Design i Human- centered Design Emotional Design Customer Journey Mapping UX workshop (example: Value Proposition Canvas) UX Research Mental and conteptual models Stosowanie heurystyk użyteczności i zasady gestalt Elements of cognitive science (how people read, think and								
make mistakes) UX writing The Methods Learning outcomes for the course - after completing the training The Form of of cycle cycle Verificat on of learning outcome P, S) learning							Methods of verificati on of learning outcome s		
Knowled	1	The stude design pro	nt knows ocess	the assum	otio	ns of the UX	K1_W05	WΡ	С
ge	2	The stude universal	nt unders design pri	tands the i nciples.	mp	ortance of	K1_W05	W	С
Skills	1	The stude organize t design of	nt is able asks relat useful we	to properly ed to the r bsites	' pr ese	ioritize, plan and arch, analysis and	K1_U03	Р	М
	2								
Social Compet	1	s able to JX in an e	use the ki entreprene	nowledge a eurial way.	nd	skills in the field of	K1_K03	Р	МО
ence	2	cotion of lar	ning						
methods of v	erin	cation of lear	ning outcom	es:					

A-written exam, B-oral exam, C-written assessment, D-oral assessment, E-based on partial marks of oral answers, F-based on partial marks of written answers, G-term paper, H-assessment from reports, I-assessment from realization of exercises, Jassessment from preparations for exercises, K-assessment from the project implementation, L-assessment of the written implementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment of content of presentation, P-observation of students' activity, R-observation of the regularity.

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	15				
Calculation class (C)	0	dr inż. Dzierżanowski Łukasz			
Laboratory class (L)	0				
Project (P)	30				
Seminar (S)	0				
Student workload					
Types of student activities*			Average number of hours* allocated on completed activities		
Lecture (W)			15		
Calculation class (C)			0		
Laboratory class (L)			0		
Project (P)			30		
Seminar (S)			0		
Preparation for class	es		15		
Preparation of a repo project/presentation	ort/paper/		20		
Independent study o	of the course top	pics	20		
Examination or final	colloquium		0		
Additional contact he	ours		0		
Total student worklo	ad		100		
Number of contact hours (from the study plan)			45		

* hour (class) means 45 minutes

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Opole University of Technology

Faculty of Electrical Engineering, Automatic Control and Informatics

Course Description Card

Field of study	Computer Engineering
Profile of Education	General Academic

Level of study		First Cycle Studies							
Specialization									
Form of Study		Full-Tir	Full-Time Studies						
Semester		First	First						
Course Title		Work s	Work safety and ergonomic						
Nazwa przedmiotu		Bezpie	Bezpieczeństwo pracy i ergonomia						
ECTS points		1	Subject type			Р			
Language of lecture		angielsk i	Mode of completing the course			f completing the cours	se	Course credit	
Course code			P5			Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	
	Knowledge			1	Gener safety	al knowledge about oc acquired in high schoo	e about occupational health and high school		
Preliminary				2					
requirements	Skills			1					
of the course				2					
	Social (ompetence		1	A stud	student abides by the group working principles			
				2					
Course Goals To familiarize students with the principles and applications of ergonomics and occupational health and safety in the work environment. Providing knowledge about safety in the workplace, potential hazards, with particular emphasis on the specific work of a computer engineer and computer workstations. Providing knowledge on how to protect health at work and prevent work-related risks.									
Programme co applications of part of the more of an ergonom health and safe and ways to m	ntent ergono dule, the ic workp ety and inimize	The subje mics and e student blace, sele labor law this impa	ct pr occu acq ecteo , the ct.	rov upa luir d r e ne	rides kr ational es kno egulati egative	nowledge on issues rel health and safety in th wledge in the field of: ons and principles reg e impact of the working	ated to ne work planning arding o g enviro	the principles and environment. As g and organization occupational nment on humans	

Learning outcomes for the course - after completing the training cycle				Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s
Knowlod	1	A student knows basic topics of work safety and ergonomics with relations to computer engineering	K1_W02	W	С
ge	2	A student has basic knowledge of labor code and other regulations related to occupational health and safety	K1_W03	W	С
Chille					
	2				
Social	1	A student is able to critically validate his knowledge and the range of problems solved both individually and in a team, especially regarding the ergonimics	K1_K01	W	С
Compet ence	2	A student is aware of the impact of the accomplished tasks on the work environment and is able to initiate actions to improve the ergonomics of the workplace	K1_K02	W	С
Methods of v	/eri	fication of learning outcomes:			

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course (title/academic degree/professional title, name and surname			
Lecture (W)	15				
Calculation class (C)	0				
Laboratory class (L)	0	dr inż. Kunicki Michał			
Project (P)	0				
Seminar (S)	0				
Student workload					
Types of student activities*			Average number of hours* allocated on completed activities		
Lecture (W)			15		
Calculation class (C)			0		
Laboratory class (L)			0		
Project (P)			0		
Seminar (S)			0		
Preparation for classes			0		

Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	15
Examination or final colloquium	0
Additional contact hours	0
Total student workload	30
Number of contact hours (from the study plan)	15

prof. dr hab. inż. Borucki Sebastian Head of the organizational unit (stamp/signature)

dr inż. Zygarlicka Małgorzata Dean of Faculty (stamp/signature)

Agorithms and data structures Architecture of computers Architecture of computers are set of a computer architecture are set of a computer architecture are computer attend defain 1 Computer arteriod in intelligence Computer arteriod in intelligence Computer arteriod in intelligence Computer arteriod in intelligence Computer arteriod in intelligence Department architecture Brechte course II. Computer graphitics 1 Computer arteriod in architecture Brechte course II. Computer graphitics 1 Computer arteriod in architecture Brechte course II. Computer graphitics 1 Elective course II. Pation 1. Elective course II. Lender for course II. Administrations Elective course II. I. Elective course II. I. Elective course II. Elective course II	Programming IVSoftware engineeringStatistical methodsStatistical methodsTeam project of IT systemThe course in humanities and social sciences IThe course in humanities and social sciences IITransitional projectUser experience designWork safety and ergonomic
K1_W05 X X X X X X X X X X X X X X X X X X X	x x x .
K1_W06 X X	XX.X.X
K1_W07 I A A A A A A A A A A A A A A A A A A	
K1_W08 I I I I I I I I I I I I I I I I I I I	. X . X
K1_W09	
K1_W10 . X X	
	· · X · · · X · ·
	. X
K1_U10 I I I I I I I I I I I I I I I I I I I	XX
K1_U11 I I I I I I I I I I I I I I I I I I	
K1_U12 I I I I I I I I I I I I I I I I I I I	
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Wiedza - efekty nie pokryte: Brak Umiejętności - efekty nie pokryte: Brak Kompetencje - efekty nie pokryte: Brak