Załącznik nr 2 do uchwały nr 409 Senatu Politechniki Opolskiej z dnia 29.05.2024 r.

Załącznik nr 11 do Księgi Jakości Kształcenia

KARTA PROGRAMU STUDIÓW

Nazwa programu studiów Environmental Engineering

Specjalności: przedmioty kierunkowe ogólne - KiOg

Nazwa wydziału wydział Mechaniczny		
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 409 Senatu Politechniki Opolskiej	
data i numer uchwały Senatu ustalającej kierunkowe efekty uczenia się	29.05.2024 Uchwała nr 409 Senatu Politechniki Opolskiej	
dyscyplina wiodąca (w ramach której będzie uzyskiwana ponad połowa efektów uczenia się) – podać udział procentowy	Inżynieria Środowiska, Górnictwo i Energetyka - 100%	
pozostałe dyscypliny – podać udział procentowy		
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 - 2770 Razem - 2770	

Nazwa wydziału Wydział Mechaniczny

wymiar (godzinowy) praktyk zawodowych, zasady i forma ich odbywania oraz liczba punktów ECTS, jaką student musi uzyskać w ramach tych praktyk (jeśli program	KiOg - godziny 160 punkty ECTS 6 Zasady i formę odbywania praktyk określono w karcie opisu przedmiotu oraz w Regulaminie praktyk studenckich w Politechnice Opolskiej.
studiów przewiduje praktyki)	
tytuł zawodowy otrzymywany przez absolwenta	Inzynier
klasyfikacja ISCED	0712
związek z misją i strategią rozwoju Politechniki Opolskiej	Kształcenie na kierunku Inżynieria środowiska łączy najlepsze tradycje myśli technicznej z zadaniami dnia dzisiejszego i wyzwaniem wobec szybkich przemian technologicznych współczesnego świata. W działalności edukacyjnej i naukowo-badawczej wydziału łączy to potrzebę kształtowania nowoczesnej myśli wobec przemian ekonomicznych i perspektyw gospodarczych kraju z tworzeniem wartości etycznych świata nauki i techniki. Wokół tego posłannictwa skupiają się nauczyciele i studenci, badacze oraz pracownicy administracji, jak również przedstawiciele otoczenia gospodarczego i społecznego szkoły. Do podstawowych składników tak postrzeganej misji należą: kształcenie, badania naukowe oraz służba społeczna. Sprzyja to integracji i rozwojowi nauki, a także stymuluje kreatywność oraz wzmacnia więzi społeczne z regionem.
wymagania wstępne – oczekiwane kompetencje kandydata (szczególnie w przypadku studiów drugiego stopnia)	Zainteresowania techniczne i matematyczne, ścisły umysł, nastawienie na poszukiwanie nowych rozwiązań technicznych i technologicznych. Kandydat powinien również posiadać umiejętność rozwiązywania problemów i być zorientowany na pracę w grupie. Poziom 4 PRK
zasady rekrutacji (w tym: przedmioty kwalifikacyjne oraz ustalone dla nich współczynniki wagowe)	Podstawę przyjęcia na studia pierwszego stopnia stanowią wybrane wyniki egzaminu maturalnego (dojrzałości). Kryterium decydującym o przyjęciu na studia pierwszego stopnia jest wartość wskaźnika rankingowego obliczanego w oparciu o liczbę punktów uzyskanych za egzaminie maturalnym (dojrzałości), z języka obcego nowożytnego oraz dwóch przedmiotów wybranych z wykazu zestawionego w warunkach rekrutacji. Przedmioty kwalifikacyjne oraz ustalone dla nich współczynniki wagowe: biologia - 2, chemia - 2, fizyka - 2, informatyka - 2, język polski - 0.5, matematyka - 2, język obcy - 0.5.
sposoby weryfikacji zakładanych efektów uczenia się	Zgodnie ze sposobem weryfikacji przewidzianym przez prowadzącego w karcie przedmiotu.

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 / 115
	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 - 69
	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 - 114
	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 - 77

Program studiów zaopiniowany przez organ samorządu studenckiego.

Sylwetka absolwenta

Environmental Engineering, Studia pierwszego stopnia, Studia stacjonarne,

Wiedza:

Absolwent ma rozszerzoną wiedzę z wybranych działów matematyki, fizyki, chemii, biologii i nauk o ziemi w zakresie potrzebnym do opisywania zjawisk i procesów związanych z technologiami inżynierii środowiska. W zaawansowanym stopniu zna metody numeryczne i informatyczne oraz narzędzia i materiały przydatne do rozwiazywania zadań inżynierskich. Zna zasady projektowania inżynierskiego. Zna zasady identyfikowania zagrożeń, bezpieczeństwa i higieny pracy oraz ergonomii w czasie budowy i eksploatacji instalacji stosowanych w inżynierii środowiska. W zaawansowanym stopniu zna zasady rysunku technicznego i grafiki inżynierskiej umożliwiającej rozwiązywanie problemów technicznych z zakresu inżynierii środowiska. Absolwent posiada wiedzę z zakresu układów elektrycznych i termodynamiki pozwalającą na poszerzone rozumienie zasad eksploatacji maszyn i urządzeń. Ma specjalistyczną i usystematyzowaną wiedzę o roli środowiska naturalnego, ma świadomość zagrożeń oraz zna metody ich identyfikacji i ograniczania. Ma stosowną wiedzę z mechaniki, mechaniki płynów, materiałoznawstwa i maszynoznawstwa oraz wytrzymałości materiałów w zakresie potrzebnym do rozumienia zasad działania i konstruowania urządzeń. Absolwent ma wiedzę o potencjale paliw kopalnych i odnawialnych źródłach energii w Polsce. W zaawansowanym stopniu zna gospodarczą i społeczną rolę wykorzystywania odnawialnych źródeł energii. Posiada stosowną do studiowanego kierunku wiedzę z zakresu obserwacji zjawisk i procesów oraz zna metody wykonywania pomiarów charakterystycznych wielkości, istotnych z punktu widzenia inżynierii środowiska. Ma wystarczający dla potrzeb inżynierskich zasób wiedzy o budowie i eksploatacji obiektów budowlanych i infrastruktury komunalnej. Absolwent dysponuje wiedzą z zakresu zjawisk geologicznych, hydrologicznych i klimatycznych. W zaawansowanym stopniu zna zasady racjonalnej gospodarki energetycznej, odpadowej i wodno-ściekowej oraz przepływu ciepła, a także konwersji energii. Ma wiedzę o stosowaniu przepisów prawych, norm oraz wytycznych w projektowaniu i eksploatacji obiektów technicznych. Absolwent ma wiedzę niezbędną do zrozumienia społecznych, ekonomicznych, prawnych, technicznych i pozatechnicznych uwarunkowań działalności inżynierskiej. Zna i rozumie pojęcia i zasady związane z prawem autorskim i patentowym; zna i rozumie fundamentalne dylematy współczesnej cywilizacji. Ma stosowną do studiowanego kierunku wiedzę ekonomiczną oraz wiedzę z zakresu zarządzania w tym zarządzania jakością, prowadzenia działalności gospodarczej oraz transferu technologii. Zna i rozumie teorie i terminologie z zakresu języka obcego umożliwiającą posługiwanie się językiem obcym na poziomie B2 Europejskiego Systemu Opisu Kształcenia Językowego.

Umiejętności:

Absolwent posiada umiejętności samokształcenia się. Pozyskuje informacje z literatury, baz danych oraz innych źródeł związanych z naukami technicznymi. Potrafi integrować uzyskane informacje, dokonywać ich interpretacji, wyciągać wnioski oraz formułować opinie. Potrafi wykorzystywać różne techniki do porozumiewania się w środowisku zawodowym i społecznym. Potrafi posługiwać się technikami informacyjno-komunikacyjnymi niezbędnymi do realizacji działań typowych do działalności inżynierskiej. Wykorzystuje programy komputerowe do rozwiązywania zadań inżynierskich. Absolwent potrafi posługiwać się językiem obcym na poziomie B2 Europejskiego Systemu Opisu Kształcenia Językowego. Potrafi przygotować i przedstawić w języku polskim oraz języku obcym uznawanym za podstawowy, prezentację ustną dotyczącą szczegółowych zagadnień inżynierskich. Potrafi planować i przeprowadzać eksperymenty, interpretować uzyskane wyniki i formułować wnioski stosując metody analityczne i symulacyjne. Absolwent posiada przygotowanie niezbędne do pracy w przemyśle oraz zna zasady BHP. Potrafi posługiwać się aparaturą pomiarową posiadając przy tym umiejętność szacowania błędów i ocenić przydatność rutynowych metod i narzędzi służących do rozwiązania zadania inżynierskiego o charakterze praktycznym. Potrafi dostrzegać aspekty systemowe i pozatechniczne przy formułowaniu i rozwiązywaniu zadań inżynierskich. Absolwent potrafi dokonać krytycznej analizy sposobu funkcjonowania i ocenić istniejące rozwiązania techniczne stosowane w inżynierii środowiska oraz dokonywać wstępnej analizy ekonomicznej podejmowanych działań inżynierskich. Potrafi identyfikować i formułować zadania inżynierskie o charakterze praktycznym związane z inżynierią środowiska. Umie zrealizować proste zadania badawcze dotyczące szeroko rozumianych technologii ochrony środowiska i zgodnie z zadaną specyfikacją - zaprojektować oraz zrealizować urządzenie, obiekt, system lub proces typowy dla inżynierii środowiska.

Kompetencje społeczne:

Absolwent rozumie potrzebę dokształcania się oraz potrafi samodzielnie planować i realizować proces uczenia się przez całe życie, a także krytycznie oceniać posiadaną wiedzę. Ma poczucie odpowiedzialności za wyniki i skutki swojej aktywności zawodowej, szczególnie w kontekście jej wpływu na środowisko przyrodnicze. Prawidłowo identyfikuje problemy inżynierskie oraz potrafi określać priorytety działań zawodowych, a uznaje znaczenie wiedzy w rozwiązywaniu problemów poznawczych i praktycznych. Absolwent ma świadomość ważności postępowania profesjonalnego, przestrzegania zasad etyki zawodowej oraz poszanowania różnorodności poglądów i opinii, a także jest gotów do dbania o dorobek i tradycje zawodu inżyniera. Potrafi myśleć i działać w sposób kreatywny, innowacyjny i przedsiębiorczy oraz jest gotów do krytycznej oceny posiadanej wiedzy, współdziałać i pracując w grupie, przejmując w niej różne role; rozumie ważność działań zespołowych. Rozumie społeczną rolę inżyniera oraz rozumie potrzebę przekazywania społeczeństwu wiarygodnych informacji dotyczących osiągnięć inżynierskich.

Knowledge:

A graduate has extensive knowledge in selected fields of mathematics, physics, chemistry, biology and earth sciences to the extent necessary to describe phenomena and processes related to environmental engineering technologies. He/She has advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. A graduate knows the principles of engineering design, they knows the principles of identification of hazards and occupational health, safety and ergonomics during the construction and operation of installations used in environmental engineering. A graduate has advanced knowledge of the principles of technical drawing and engineering graphics that enable solving technical problems in the field of environmental engineering. A graduate has knowledge of electrical systems and thermodynamics, allowing for extensive understanding of the principles of operation of machines and devices. They have specialist and systematic knowledge of the role of the natural environment, are aware of hazards and know how to identify and reduce them. A graduate has appropriate knowledge of mechanics, fluid mechanics, material science and theory of machines and strength of materials to a degree needed to understand the principles of operation and construction of devices. A graduate has knowledge of the potential of fossil fuels and renewable energy sources in Poland. They have advanced understanding of the economic and social role of the use of renewable energy sources. A graduate has knowledge in the observation of phenomena and processes that is appropriate for their studies and knows the methods of making measurements of characteristic guantities that are important from the point of view of environmental engineering. They have knowledge of the construction and operation of civil and municipal structures that is sufficient for engineering needs. A graduate has knowledge of geological, hydrological and climatic phenomena. They have advanced knowledge of the principles of rational energy, waste and wastewater management as well as heat transfer and energy conversion. A graduate has knowledge of the application of legal regulations, standards and guidelines in the design and operation of technical facilities. A graduate has the knowledge necessary to understand the social, economic, legal, technical and non-technical aspects of engineering activity. He/She knows and understands copyright and patent concepts and principles; knows and understands the fundamental dilemmas of modern civilisation. They have the knowledge of economics and management that is appropriate to their studies, including guality management, business operations and technology transfer. A graduate knows and understands foreign language theory and terminology enough to use a foreign language at the B2 level of the Common European Framework of Reference for Languages.

Skills:

A graduate has self-education skills, acquires information from literature, databases and other sources related to technical sciences. He/She is able to integrate obtained information, interpret it, draw conclusions and formulate opinions. A graduate is able to use various techniques to communicate in professional and social environments. He/She is able to use the information and communication technologies necessary to carry out typical engineering activities and use computer software to solve engineering tasks. A graduate is able to use a foreign language at the B2 level of the Common European Framework of Reference for Languages. He/She is able to prepare and make an oral presentation on specific engineering issues in Polish and foreign language recognised as a basic language. A graduate is able to plan and conduct experiments, interpret the obtained results and formulate conclusions using analytical and simulation methods. A graduate has the preparation necessary to work in industry and knows the rules of occupational safety and health. He/She is able to use measuring apparatus and has the ability to estimate errors and assess the suitability of routine methods and tools used to solve a practical engineering task. A graduate is able to see systemic and non-technical aspects while formulating and solving engineering tasks. A graduate is able to conduct a critical analysis of functioning and evaluate the existing technical solutions used in environmental engineering and conduct preliminary economic analysis for undertaken engineering activities. He/She is able to identify and formulate practical engineering tasks related to environmental engineering. A graduate is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of

Social competences:

A graduate understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge. He/She has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment. He/She correctly identifies engineering problems and is able to prioritise professional activities and recognises the importance of knowledge in solving cognitive and practical problems. A graduate is aware of the importance of professional conduct, adherence to professional ethics and respecting the diversity of views and opinions; is also ready to cherish the achievements and traditions of the engineering profession. He/She is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork. A graduate understands the social role of an engineer and understands the need to provide the public with reliable information on engineering achievements.

Tabela kierunkowych efektów uczenia się

program studiów (kierunek studiów): Environmental Engineering poziom studiów: Studia pierwszego stopnia profil studiów: Ogólnoakademicki		
symbol kierunkowych efektów uczenia się		
	Wiedza: zna i rozumie	
IS_K1_W01	A student has extensive knowledge in selected fields of mathematics, physics, chemistry, biology and earth sciences to the extent necessary to describe phenomena and processes related to environmental engineering technologies	
IS_K1_W02	A student has advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. Student knows the principles of engineering design	
IS_K1_W03	A student knows the principles of identification of hazards and occupational health, safety and ergonomics during the construction and operation of installations used in environmental engineering	
IS_K1_W04	A student has advanced knowledge of the principles of technical drawing and engineering graphics that enable solving technical problems in the field of environmental engineering	
IS_K1_W05	A student has knowledge of electrical systems and thermodynamics, allowing for extensive understanding of the principles of operation of machines and devices	
IS_K1_W06	A student has specialist and systematic knowledge of the role of the natural environment, is aware of hazards and knows how to identify and reduce them	
IS_K1_W07	A student has appropriate knowledge of mechanics, fluid mechanics, material science and theory of machines and strength of materials to a degree needed to understand the principles of operation and construction of devices	
IS_K1_W08	A student has knowledge of the potential of fossil fuels and renewable energy sources in Poland. Student has advanced understanding of the economic and social role of the use of renewable energy sources	
IS_K1_W09	A student has knowledge in the observation of phenomena and processes that is appropriate for their studies and knows the methods of making measurements of characteristic quantities that are important from the point of view of environmental engineering	
IS_K1_W10	A student has knowledge of the construction and operation of civil and municipal structures that is sufficient for engineering needs	
IS_K1_W11	A student has knowledge of geological, hydrological and climatic phenomena	
IS_K1_W12	A student has advanced knowledge of the principles of rational energy, waste and wastewater management as well as heat transfer and energy conversion	

IS_K1_W13	A student has knowledge of the application of legal regulations, standards and guidelines in the design and operation of technical facilities
IS_K1_W14	A student has the knowledge necessary to understand the social, economic, legal, technical and non-technical aspects of engineering activity
IS_K1_W15	A student knows and understands copyright and patent concepts and principles; knows and understands the fundamental dilemmas of modern civilisation
IS_K1_W16	A student has the knowledge of economics and management that is appropriate to their studies, including quality management, business operations and technology transfer
IS_K1_W17	A student knows and understands foreign language theory and terminology enough to use a foreign language at the B2 level of the Common European Framework of Reference for Languages
	Umiejętności: potrafi
IS_K1_U01	A student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions
IS_K1_U02	A student is able to use various techniques to communicate in professional and social environments. Student is able to use the information and communication technologies necessary to carry out typical engineering activities
IS_K1_U03	A student uses computer software to solve engineering tasks
IS_K1_U04	A student is able to use a foreign language at the B2 level of the Common European Framework of Reference for Languages
IS_K1_U05	A student is able to prepare and make an oral presentation on specific engineering issues in Polish and foreign language recognised as a basic language
IS_K1_U06	A student is able to plan and conduct experiments, interpret the obtained results and formulate conclusions using analytical and simulation methods.
IS_K1_U07	A student has the preparation necessary to work in industry and knows the rules of occupational safety and health
IS_K1_U08	A student is able to use measuring apparatus and has the ability to estimate errors and assess the suitability of routine methods and tools used to solve a practical engineering task
IS_K1_U09	A student is able to see systemic and non-technical aspects while formulating and solving engineering tasks
IS_K1_U10	A student is able to conduct a critical analysis of functioning and evaluate the existing technical solutions used in environmental engineering and conduct preliminary economic analysis for undertaken engineering activities
IS_K1_U11	A student is able to identify and formulate practical engineering tasks related to environmental engineering

IS_K1_U12	A student is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of environmental engineering in accordance with the provided specification
	Kompetencje społeczne: jest gotów do
IS_K1_K01	A student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge
IS_K1_K02	A student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment
IS_K1_K03	A student correctly identifies engineering problems and is able to prioritise professional activities and recognises the importance of knowledge in solving cognitive and practical problems
IS_K1_K04	A student is aware of the importance of professional conduct, adherence to professional ethics and respecting the diversity of views and opinions; is also ready to cherish the achievements and traditions of the engineering profession
IS_K1_K05	A student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork
IS_K1_K06	A student understands the social role of an engineer and understands the need to provide the public with reliable information on engineering achievements

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

program studiów (kierunek studiów): Environmental Engineering poziom studiów: Studia pierwszego stopnia profil studiów: Ogólnoakademicki		
symbol kierunkowych efektów uczenia się	efekty uczenia się (treść)	kod składnika opisu
	Wiedza: zna i rozumie	
IS_K1_W01	A student has extensive knowledge in selected fields of mathematics, physics, chemistry, biology and earth sciences to the extent necessary to describe phenomena and processes related to environmental engineering technologies	P6S_WG
S_K1_W02	A student has advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. Student knows the principles of engineering design	P6S_WG
S_K1_W03	A student knows the principles of identification of hazards and occupational health, safety and ergonomics during the construction and operation of installations used in environmental engineering	P6S_WG
IS_K1_W04	A student has advanced knowledge of the principles of technical drawing and engineering graphics that enable solving technical problems in the field of environmental engineering	P6S_WG
IS_K1_W05	A student has knowledge of electrical systems and thermodynamics, allowing for extensive understanding of the principles of operation of machines and devices	P6S_WG
IS_K1_W06	A student has specialist and systematic knowledge of the role of the natural environment, is aware of hazards and knows how to identify and reduce them	P6S_WG
IS_K1_W07	A student has appropriate knowledge of mechanics, fluid mechanics, material science and theory of machines and strength of materials to a degree needed to understand the principles of operation and construction of devices	P6S_WG
IS_K1_W08	A student has knowledge of the potential of fossil fuels and renewable energy sources in Poland. Student has advanced understanding of the economic and social role of the use of renewable energy sources	P6S_WG
IS_K1_W09	A student has knowledge in the observation of phenomena and processes that is appropriate for their studies and knows the methods of making measurements of characteristic quantities that are important from the point of view of environmental engineering	P6S_WG
IS_K1_W10	A student has knowledge of the construction and operation of civil and municipal structures that is sufficient for engineering needs	P6S_WG

IS_K1_W11	A student has knowledge of geological, hydrological and climatic phenomena	P6S_WG
IS_K1_W12	A student has advanced knowledge of the principles of rational energy, waste and wastewater management as well as heat transfer and energy conversion	P6S_WG
IS_K1_W13	A student has knowledge of the application of legal regulations, standards and guidelines in the design and operation of technical facilities	P6S_WG
IS_K1_W14	A student has the knowledge necessary to understand the social, economic, legal, technical and non-technical aspects of engineering activity	P6S_WK3
IS_K1_W15	A student knows and understands copyright and patent concepts and principles; knows and understands the fundamental dilemmas of modern civilisation	P6S_WK1 P6S_WK2 P6S_WK3
IS_K1_W16	A student has the knowledge of economics and management that is appropriate to their studies, including quality management, business operations and technology transfer	P6S_WK3
IS_K1_W17	A student knows and understands foreign language theory and terminology enough to use a foreign language at the B2 level of the Common European Framework of Reference for Languages	P6S_WG
	Umiejętności: potrafi	
IS_K1_U01	A student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions	P6S_UW
IS_K1_U02	A student is able to use various techniques to communicate in professional and social environments. Student is able to use the information and communication technologies necessary to carry out typical engineering activities	P6S_UK1 P6S_WG
IS K1 U03	A student uses computer software to solve engineering tasks	P6S UW
IS_K1_U04	A student is able to use a foreign language at the B2 level of the Common European Framework of Reference for Languages	P6S_UK3
IS_K1_U05	A student is able to prepare and make an oral presentation on specific engineering issues in Polish and foreign language recognised as a basic language	P6S_UK2 P6S_UK3
IS_K1_U06	A student is able to plan and conduct experiments, interpret the obtained results and formulate conclusions using analytical and simulation methods.	P6S_UO1 P6S_UU
IS_K1_U07	A student has the preparation necessary to work in industry and knows the rules of occupational safety and health	P6S_UW
IS_K1_U08	A student is able to use measuring apparatus and has the ability to estimate errors and assess the suitability of routine methods and tools used to solve a practical engineering task	P6S_UW
IS_K1_U09	A student is able to see systemic and non-technical aspects while formulating and solving engineering tasks	P6S_UO1 P6S_UW
IS_K1_U10	A student is able to conduct a critical analysis of functioning and evaluate the existing technical solutions used in environmental engineering and conduct preliminary economic analysis for undertaken engineering activities	P6S_UW

IS_K1_U11	A student is able to identify and formulate practical engineering tasks related to environmental engineering	P6S_UO2 P6S_UW
IS_K1_U12	A student is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of environmental engineering in accordance with the provided specification	
	Kompetencje społeczne: jest gotów do	
IS_K1_K01	A student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge	P6S_KK2
IS_K1_K02	A student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment	P6S_KO1 P6S_KO2
IS_K1_K03	A student correctly identifies engineering problems and is able to prioritise professional activities and recognises the importance of knowledge in solving cognitive and practical problems	P6S_KK1 P6S_KK2
IS_K1_K04	A student is aware of the importance of professional conduct, adherence to professional ethics and respecting the diversity of views and opinions; is also ready to cherish the achievements and traditions of the engineering profession	P6S_KK2 P6S_KO1
IS_K1_K05	A student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork	P6S_KK2 P6S_KO3
IS_K1_K06	A student understands the social role of an engineer and understands the need to provide the public with reliable information on engineering achievements	P6S_KO1 P6S_KO2 P6S_KR

Uniwersalne charakterystyki poziomu 6 Polskiej Ramy Kwalifikacji zostały uwzględnione

Tabela pokrycia charakterystyk drugiego stopnia Polskiej Ramy Kwalifikacji przez kierunkowe efekty uczenia się

	runek studiów): Environmental Engineering dia pierwszego stopnia oakademicki	
kod składnika opisu	charakterystyki drugiego stopnia Polskiej Ramy Kwalifikacji	symbol kierunkowych efektów uczenia się
	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.	IS_K1_W01 IS_K1_W02 IS_K1_W03 IS_K1_W04 IS_K1_W05 IS_K1_W07 IS_K1_W07 IS_K1_W08 IS_K1_W09 IS_K1_W10 IS_K1_W10 IS_K1_W11 IS_K1_W12 IS_K1_W13 IS_K1_W17
P6S_WK1	Zna i rozumie fundamentalne dylematy współczesnej cywilizacji.	IS_K1_W15
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.	IS_K1_W15
P6S_WK3	Zna i rozumie podstawowe zasady tworzenia i rozwoju różnych form przedsiębiorczości.	IS_K1_W14 IS_K1_W15 IS_K1_W16
	Umiejętności: potrafi	
P6S_UK1	Potrafi komunikować się z otoczeniem z użyciem specjalistycznej terminologii.	IS_K1_U02
P6S_UK2	Potrafi brać udział w debacie – przedstawiać i oceniać różne opinie i stanowiska oraz dyskutować o nich.	IS_K1_U05
P6S_UK3	Potrafi posługiwać się językiem obcym na poziomie B2 Europejskiego Systemu Opisu Kształcenia Językowego.	IS_K1_U04 IS_K1_U05
P65_U01	Potrafi planować i organizować pracę indywidualną oraz w zespole.	IS_K1_U06 IS_K1_U09
P6S_UO2	Potrafi współdziałać z innymi osobami w ramach prac zespołowych (także o charakterze interdyscyplinarnym).	IS_K1_U11
P6S_UU	Potrafi samodzielnie planować i realizować własne uczenie się przez całe życie.	IS_K1_U06

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.	IS_K1_U01 IS_K1_U03 IS_K1_U07 IS_K1_U08 IS_K1_U09 IS_K1_U10 IS_K1_U11 IS_K1_U11 IS_K1_U12
	Kompetencje społeczne: jest gotów do	
P65_KK1	Jest gotów do krytycznej oceny posiadanej wiedzy i odbieranych treści.	IS_K1_K03
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.	IS_K1_K01 IS_K1_K03 IS_K1_K04 IS_K1_K05
P6S_KO1	Jest gotów do wypełniania zobowiązań społecznych, współorganizowania działalności na rzecz środowiska społecznego.	IS_K1_K02 IS_K1_K04 IS_K1_K06
P6S_KO2	Jest gotów do inicjowania działań na rzecz interesu publicznego.	IS_K1_K02 IS_K1_K06
P6S_KO3	Jest gotów do myślenia i działania w sposób przedsiębiorczy.	IS_K1_K05
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.	IS_K1_K06

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

program studiów (kierunek studiów): Environmental Engineering poziom studiów: Studia pierwszego stopnia profil studiów: Ogólnoakademicki		
symbol kierunkowych efektów uczenia się	efekty uczenia się (treść)	kod składnika opisu
	Wiedza: zna i rozumie	
IS_K1_W01	A student has extensive knowledge in selected fields of mathematics, physics, chemistry, biology and earth sciences to the extent necessary to describe phenomena and processes related to environmental engineering technologies	
IS_K1_W02	A student has advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. Student knows the principles of engineering design	
IS_K1_W03	A student knows the principles of identification of hazards and occupational health, safety and ergonomics during the construction and operation of installations used in environmental engineering	
IS_K1_W04	A student has advanced knowledge of the principles of technical drawing and engineering graphics that enable solving technical problems in the field of environmental engineering	
IS_K1_W05	A student has knowledge of electrical systems and thermodynamics, allowing for extensive understanding of the principles of operation of machines and devices	
IS_K1_W06	A student has specialist and systematic knowledge of the role of the natural environment, is aware of hazards and knows how to identify and reduce them	
IS_K1_W07	A student has appropriate knowledge of mechanics, fluid mechanics, material science and theory of machines and strength of materials to a degree needed to understand the principles of operation and construction of devices	
IS_K1_W08	A student has knowledge of the potential of fossil fuels and renewable energy sources in Poland. Student has advanced understanding of the economic and social role of the use of renewable energy sources	
IS_K1_W09	A student has knowledge in the observation of phenomena and processes that is appropriate for their studies and knows the methods of making measurements of characteristic quantities that are important from the point of view of environmental engineering	
IS_K1_W10	A student has knowledge of the construction and operation of civil and municipal structures that is sufficient for engineering needs	P6S_WG

IS_K1_W11	A student has knowledge of geological, hydrological and climatic phenomena	
IS_K1_W12	A student has advanced knowledge of the principles of rational energy, waste and wastewater management as well as heat transfer and energy conversion	
IS_K1_W13	A student has knowledge of the application of legal regulations, standards and guidelines in the design and operation of technical facilities	P6S_WG
IS_K1_W14	A student has the knowledge necessary to understand the social, economic, legal, technical and non-technical aspects of engineering activity	P6S_WK
IS_K1_W15	A student knows and understands copyright and patent concepts and principles; knows and understands the fundamental dilemmas of modern civilisation	P6S_WK
IS_K1_W16	A student has the knowledge of economics and management that is appropriate to their studies, including quality management, business operations and technology transfer	P6S_WK
IS_K1_W17	A student knows and understands foreign language theory and terminology enough to use a foreign language at the B2 level of the Common European Framework of Reference for Languages	
	Umiejętności: potrafi	•
IS_K1_U01	A student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions	
IS_K1_U02	A student is able to use various techniques to communicate in professional and social environments. Student is able to use the information and communication technologies necessary to carry out typical engineering activities	
IS_K1_U03	A student uses computer software to solve engineering tasks	
IS_K1_U04	A student is able to use a foreign language at the B2 level of the Common European Framework of Reference for Languages	
IS_K1_U05	A student is able to prepare and make an oral presentation on specific engineering issues in Polish and foreign language recognised as a basic language	
IS_K1_U06	A student is able to plan and conduct experiments, interpret the obtained results and formulate conclusions using analytical and simulation methods.	P6S_UW1
IS_K1_U07	A student has the preparation necessary to work in industry and knows the rules of occupational safety and health	
IS_K1_U08	A student is able to use measuring apparatus and has the ability to estimate errors and assess the suitability of routine methods and tools used to solve a practical engineering task	
IS_K1_U09	A student is able to see systemic and non-technical aspects while formulating and solving engineering tasks	
IS_K1_U10	A student is able to conduct a critical analysis of functioning and evaluate the existing technical solutions used in environmental engineering and conduct preliminary economic analysis for undertaken engineering activities	P6S_UW2 P6S_UW3

IS_K1_U11	A student is able to identify and formulate practical engineering tasks related to environmental engineering	
IS_K1_U12	A student is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of environmental engineering in accordance with the provided specification	
	Kompetencje społeczne: jest gotów do	•
IS_K1_K01	A student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge	
IS_K1_K02	A student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment	
IS_K1_K03	A student correctly identifies engineering problems and is able to prioritise professional activities and recognises the importance of knowledge in solving cognitive and practical problems	
IS_K1_K04	A student is aware of the importance of professional conduct, adherence to professional ethics and respecting the diversity of views and opinions; is also ready to cherish the achievements and traditions of the engineering profession	
IS_K1_K05	A student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork	
IS_K1_K06	A student understands the social role of an engineer and understands the need to provide the public with reliable information on engineering achievements	

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

	runek studiów): Environmental Engineering dia pierwszego stopnia oakademicki	
kod składnika opisu	charakterystyki drugiego stopnia Polskiej Ramy Kwalifikacji	symbol kierunkowyc h efektów uczenia się
	Wiedza: zna i rozumie	
P6S_WG	Zna i rozumie podstawowe procesy zachodzące w cyklu życia urządzeń, obiektów i systemów technicznych.	IS_K1_W10 IS_K1_W13
P6S_WK	Zna i rozumie podstawowe zasady tworzenia i rozwoju różnych form indywidualnej przedsiębiorczości.	IS_K1_W14 IS_K1_W15 IS_K1_W16
	Umiejętności: potrafi	•
P6S_UW1	Potrafi planować i przeprowadzać eksperymenty, w tym pomiary i symulacje komputerowe, interpretować uzyskane wyniki i wyciągać wnioski.	IS_K1_U06 IS_K1_U12
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.	IS_K1_U10
P6S_UW3	Potrafi dokonywać krytycznej analizy sposobu funkcjonowania istniejących rozwiązań technicznych i oceniać ich rozwiązania.	IS_K1_U10
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.	IS_K1_U12

Wydział Mechaniczny



Plan studiów Study plan

Kierunek studiów – Field of study

- ENVIRONMENTAL ENGINEERING

- INŻYNIERIA ŚRODOWISKA

Studia stacjonarne pierwszego stopnia

First Cycle Programme – Full-Time Studies

CHARAKTERYSTYKA OGÓLNA

kierunek studiów: Environmental Engineering

profil: Ogólnoakademicki

nazwa wydziału: Wydział Mechaniczny

	uchwała Senatu PO z dnia	nr 409 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	ba punktów ECTS	210

PLAN STUDIÓW - STUDY PLAN

POLITECHNIKA OPOLSKA WYDZIAŁ MECHANICZNY	OPOLE UNIVERSITY OF TECHNOLOGY FACULTY OF MECHANICAL ENGINEERING						
Kierunek studiów:	Field of study:						
ENVIRONMENTAL ENGINEERING	INŻYNIERIA ŚRODOWISKA						
Studia Stacjonarne Pierwszego Stopnia - In _D ynierskie							
FIRST CYCLE PROGRAMME - FULL-T	IME STUDIES (Engineer's degree)						

	SEMESTR: 1 (1 st Semester)			jęć w semest hours) a sem				
	Przedmiot	W	С	L	Р		ECTS	TYP
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)		
1.1	General Mathematics	30E	30	_		_	5	Р
1.1	Matematyka ogólna	502	50	-	-	-	5	Г
1.2	Materials science	30					2	Р
1.2	Materiałoznawstwo	30	-	-	-	_	2	Г
1.3	General Physics	15					1	Р
1.5	Fizyka ogólna	15	-	_	-	-	-	Г
1.4	General chemistry	15	15				3	Р
1.4	Chemia ogólna	15	15	-	-	-	3	Г
1.5	Environmental biology and basics of ecology	15		15			3	Р
1.5	Biologia środowiska z podstawami ekologii		13 -	15			5	Г
1.6	Descriptive geometry	15	30			_	4	Р
1.0	Geometria wykreślna	15	50	-	-	-	4	Г
1.7	Ergonomics and industrial safety and hygiene	15					1	к
1.7	Ergonomia oraz bezpieczeństwo i higiena pracy	15	_	_		_		ĸ
1.8	Protection of intelectual property	30				_	2	HS
1.0	Ochrona własności intelektualnej	30	-	-	-	-	2	115
1.9	Energy production techniques	45E		_		_	4	к
1.9	Techniki pozyskiwania energii	456	-	-	-	-	4	
1.10	Technologies and industrial apparatus	30					2	к
1.10	Technologie i urządzenia przemysłowe	30	-	-	-	-	2	ĸ
1.11	Technical metrology	15	15			_	3	к
1.11	Metrologia techniczna	15	15	-	-	-	5	
	a godzin w semestrze (Number of hours in nester)	255	90	15	-	-	30	
	m godzin/ECTS w semestrze (Total ;/ECTS in a semester)			360			30	

	SEMESTR: 2 (2 nd 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)			
2.1	Mathematics for engineers	15E	15	_	_	_	3	Р	
2.1	Matematyka dla inżynierów	IJE	15	-	_	-	5	Г	
2.2	Mechanics	15	15				3	Р	
2.2	Mechanika ogólna	13	15	-	-	-	5	F	
2.3	Physics for engineers	15E		30			4	Р	
2.5	Fizyka dla inżynierów	TDE	-	30	-	-	4	Р	
2.4	Chemistry for engineers	30E	15	15			5	Р	
2.4	Chemia dla inżynierów		15	15	-	-	5	F	
2.5	Basics of technical drawing	15	20				4	Р	
2.3	Podstawy rysunku technicznego		30	-	-	-	4	۲ ۲	
2.6	Information technology	15		16	-		2	Р	
2.0	Technologie informacyjne	15	-	15				Р	
2.7	Elements of informatics and foundations of programming	30	- 20		20			F	р
	Elementy informatyki i podstawy programowania	50	30 -	30	-	_	5	P	
	Przedmioty humanistyczne lub społeczne (Optional units – co				TS w seme	strze	4		
	Elective module - II: Economics in micro- business	30	_	_	_	_	(2)	W-HS	
2.8	Moduł wybieralny - II: Ekonomia w mikrobiznesie	50					(2)	W 113	
	Elective module - II: History of science	30	_	_	_	_	(2)	W-HS	
	Moduł wybieralny - II: Historia nauki						(2)	115	
	Elective module - I: Basis of personal development	30					(2)	W-HS	
2.9	Moduł wybieralny - I: Podstawy rozwoju osobistego	50					(2)	113	
	Elective module - I: Social Communication								
	Moduł wybieralny - I: Komunikacja społeczna	30	-	-	-	-	(2)	W-HS	
	a godzin w semestrze (Number of hours in nester)	r of hours in 195 165					20		
	m godzin/ECTS w semestrze (Total s/ECTS in a semester)			360			30		

	SEMESTR: 3 (3 rd Semester)			jęć w semest hours) a sem						
	Przedmiot	W	С	L	Р	S	ECTS	TYP		
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)				
3.1	Differential and integral calculus	15	15	_	_		3	Р		
5.1	Rachunek różniczkowy i całkowy	15						'		
3.2	Strength of materials	15	15	15	_	_	4	Р		
5.2	Wytrzymałość materiałów	15					-	'		
3.3	Basic Biotechnology	15E	15	_	_	_	3	Р		
5.5	Podstawy biotechnologii i biotechniki	152			_			<u>'</u>		
	Computer Aided Design									
3.4	Komputerowe wspomaganie projektowania	15	-	15	-	-	3	Р		
3.5	Technical thermodynamics	30E	30	15	_		5	Р		
5.5	Termodynamika techniczna		50	15	-	-	3	Г		
3.6	Sanitary Chemistry	30E	20E	15	16			4	к	
5.0	Chemia sanitarna		15	15	-		4			
3.7	Environmental metrology	15	15	15	_	30	_	_	3	к
5.7	Metrologia środowiska			50		_	5			
3.8	Engineering drawing with CAD I		_	15	_	_	1	к		
5.0	Zapis konstrukcji z wykorzystaniem CAD I	_	_		_	_	4			
	Przedmioty wybieralne – w (Optional units – co				9		2			
3.9	Physical education		20				(0)	14/		
3.9	Wychowanie fizyczne	-	30	-	-	-	(0)	W		
	Foreign language			30			(2)	W		
3.10	Język obcy	-	-	30	-	-	(2)	vv		
5.10	Foreign language			30			(2)	W		
	Język obcy	-	-	50	-	-	(2)	vv		
	Przedmioty wybieralne kierunko (Optional units – co				lestrze		2			
	Computer control techniques	15		15			(2)			
2 1 1	Komputerowe techniki sterowania	15	-	15	-	-	(2)	W-K		
3.11	Computer measurement techniques	15		15			(2)			
Komputerowe techniki pomiarów15-15-							(2)	W-K		
	Liczba godzin w semestrze (Number of hours in a semester) 150 270									
	m godzin/ECTS w semestrze (Total s/ECTS in a semester)			420			30			

	SEMESTR: 4 (4 th Semester)			jęć w semest hours) a sem				
	Przedmiot	W	С	L	Р	S	ECTS	TYP
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)		
4.1	Fluid mechanics	30E	30	15	_	_	5	Р
	Mechanika płynów							
	Engineering drawing with CAD II							
4.2	Zapis konstrukcji z wykorzystaniem CAD II	-	-	15	-	-	1	K
4.3	Electrical engineering	15	15	_	_	_	2	к
4.5	Inżynieria elektryczna	15	15	_	_	_	2	
4.4	Gas system design	15		_	30		3	к
4.4	Projektowanie instalacji gazowych	15	-	_	50	-	5	ĸ
4.5	Circular economy	= 15E			15		2	к
4.5	Gospodarka obiegu zamkniętego	TOE	-	-	15	-	2	
4.6	Buildings structures	30E			20		5	к
4.0	Konstrukcje budowlane	JUE	-	-	30	-	5	
	Przedmioty wybieralne kierunko (Optional units – co				lestrze		10	
	Energy management in industry	30E	16		20		(6)	W-K
4.7	Gospodarowanie energią w przemyśle		15	-	30	-	(0)	VV-N
4.7	Municipal energy management		15		20		(6)	W-K
	Komunalna gospodarka energetyczna	30E	15	-	30	-	(6)	VV-N
	Mechanical operations in industrial installations	30	16	15	16		(4)	W-K
	Operacje mechaniczne w instalacjach przemysłowych	30	15	15	15	-	(4)	VV-K
4.8	Mechanical operations in sanitary installations	20	15	15	15			
	Operacje mechaniczne w instalacjach sanitarnych	30	15	15	15	-	(4)	W-K
	Przedmioty wybieralne – w (Optional units – co				2		2	
	Foreign language			20				14/
4.9	Język obcy	-	-	30	-	-	(2)	W
4.9	Foreign language			20				14/
	Język obcy	-	-	30	-	-	(2)	W
4.10	Physical education	-	30	-	-	-	(0)	W
Wychowanie fizyczne Image: Comparison of the second seco								
Liczba godzini w seriestrze (Number of Hours in a semester)165300Razem godzin/ECTS w semestrze (Total hours/ECTS in a semester)465					30			

	SEMESTR: 5 (5 th Semester)			jęć w semest hours) a sem				
	Przedmiot	W	С	L	Р	S	ECTS	TYP
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)		
5.1	Environmental protection Ochrona środowiska	30	-	-	-	-	2	Р
5.2	Air protection	15		15			2	к
	Ochrona powietrza							
5.3	Engineering drawing with CAD III Zapis konstrukcji z wykorzystaniem CAD III	_	-	15	-	-	1	к
5.4	Water Technology Technologia wody	15E		30		-	3	к
5.5	Waste management Gospodarka odpadami	30E	15	-			3	к
	Hydrology, meteorology and climatology							
5.6	Hydrologia, meteorologia i klimatologia	30E	-	-	15	-	3	К
5.7	Geotechnics and soil mechanics Geotechnika i mechanika gruntów	15	-	-	-	-	1	к
5.8	Geodesy with geographic information elements	15		15	15		3	к
5.0	Geodezja z elementami informacji przestrzennej	15	15 - 15	15				
	Przedmioty wybieralne kierunko (Optional units - co				lestrze		4	
	Thermal and diffusion processes in industrial installations	15E	15	-	15	_	(4)	W-K
5.9	Procesy cieplne i dyfuzyjne w instalacjach przemysłowych							
	Thermal and diffusion processes in sanitary installations Procesy cieplne i dyfuzyjne w instalacjach	15E	15	-	15	-	(4)	W-K
	sanitarnych Praktyka – wymaga	na liczba n	ECTS W SOL	mostrzo				
	(Practice – comp						6	
5 10	Professional practice Praktyka zawodowa	-	-	-	160	-	(6)	W-PR
	Przedmioty wybieralne – w (Optional units – co				2		2	
	Foreign language							
5.11	Język obcy	-	-	30	-	-	(2)	W
	Foreign language Język obcy	-	-	30	-	-	(2)	w
	a godzin w semestrze (Number of hours in nester)	165		34()			
	n godzin/ECTS w semestrze (Total /ECTS in a semester)			505			30	

	SEMESTR: 6 (6 th Semester)			jęć w semest hours) a sem				
	Przedmiot	w	С	L	Р	S	ECTS	TYP
Nr	Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)		
	Engineering drawing with CAD IV							
6.1	Zapis konstrukcji z wykorzystaniem CAD IV	_	-	15	-	-	1	К
6.2	Wastewater technology	15E		30			2	к
0.2	Technologia ścieków	IJE	-	50	-	-	2	
6.3	Heating, ventilation and air - conditioning	15		_	30		2	к
0.5	Ogrzewnictwo, wentylacja i klimatyzacja	15	-	_	50	-	2	ĸ
6.4	Water system design	15E			30		3	к
0.4	Projektowanie instalacji wodnych	IJE	-	-	30	-	3	
6.5	Design of sewage installation	15E			30		3	к
0.5	Projektowanie instalacji ściekowych	IJE	-	-	30	-	3	
	Przedmioty wybieralne kierunko (Optional units – co				estrze		17	
	Industry water management							
	Gospodarka wodna w przemyśle	30	-	-	15	-	(3)	W-K
6.6	Water management and water protection							
	Gospodarka wodna i ochrona wód	30	-	-	15	-	(3)	W-K
	Energetic efficiency of industrial					1		
	processes	30	15		15		(2)	W-K
6.7	Energochłonność procesów przemysłowych		15	-	12	-	(3)	VV-K
	Energetic efficiency of municipal facilities							
	Energochłonność obiektów komunalnych	30	15	-	15	-	(3)	W-K
	Impact assessment of the enterprises on the environment							
	Ocena oddziaływania przedsiębiorstw na	30	-	-	30	-	(4)	W-K
6.8	środowisko							
0.0	Methods of the impact of industry on the environment							
	Metody oceny oddziaływania przemysłu	30	-	-	30	-	(4)	W-K
	na środowisko							
	Design work - the environmental area			_	30		(2)	W-K
6.9	Praca przejściowa - obszar środowiskowy						(2)	
0.9	Design work - the industrial area				30		(2)	W-K
	Praca przejściowa - obszar przemysłowy				50		(2)	VV-IX
6.10	Diploma work (engineering project)	aoda	viny niekon	taktowe (un	-contact h	ours)	(5)	W-K
0.10	Praca dyplomowa (Projekt inżynierski)	gouz	iny mekon		-contact n	lours	(3)	VV-IX
	Przedmioty wybieralne – w (Optional units – co				5		2	
	Foreign language							
	Język obcy	(E)	-	30	-	-	(2)	W
6.11	Foreign language	()						
	Język obcy	(E)	-	30	-	-	(2)	W
	a godzin w semestrze (Number of hours in nester)	150		27()			
	m godzin/ECTS w semestrze (Total			404			30	
	s/ECTS in a semester)			420				

SEMESTR: 7 (7 th Semester)			jęć w semest hours) a sem					
Przedmiot	W					ECTS	TYP	
Subject unit - semester curricular	(Lecture)	(Practical classes)	(Laboratory classes)	(Project)	(Seminar)			
Costing	15	_	_	15	_	3	к	
Kosztorysowanie								
Zapis konstrukcji z wykorzystaniem CAD v	-	-	15	-	-	1	К	
				nestrze	<u> </u>	25		
Environmental monitoring		_		_	_	(2)	W-К	
Monitoring środowiska	15	-	15	-	-	(2)	VV-N	
Industrial pollutions	15	_	15	_	_	(2)	W-K	
Zanieczyszczenia przemysłowe	10					(-/		
						(2)		
	15	-	-	15	-	(2)	W-K	
	- 15							
processes				15		(2)		
Środowiskowe zagrożenia w procesach		-	-		-		W-K	
przemysłowych								
Excavation works	30		_	15	_	(4)	W-K	
Ziemne roboty instalacyjne	30	50 -					(4)	VV-IX
Underground infrastructure	30	_	_	15	_	(4)	W-K	
Infrastruktura podziemna						,		
, , , ,	30	15	_	_	-	(4)	W-K	
						. ,		
, ,	30	15	-	-	-	(4)	W-K	
					20	(2)	W-K	
	-	-	-	-	30	(3)	VV-N	
•	-	-	-	-	30	(3)	W-К	
przemysłowy								
Diploma work (engineering project)	E -god	lziny nieko	ntaktowe (u	n-contact	hours)	(10)	W-K	
Praca dyplomowa (Projekt inżynierski)	L-gou			n-contact	liours)	(10)	VV-IX	
				TS w seme	strze	1		
Elective module - III: Law and standards in environmental protection	15					(1)		
Moduł wybieralny - III: Prawo i normy w ochronie środowiska	15	-	-	-	-	(1)	W-HS	
Elective module - III: Social responsibility								
•	15	15 -	-	-	-	(1)	W-HS	
odpowiedzialność w ochronie środowiska								
nester)	120		120)		20		
m godzin/ECTS w semestrze (Total s/ECTS in a semester)			240			30		
	Subject unit - semester curricular Costing Kosztorysowanie Engineering drawing with CAD V Zapis konstrukcji z wykorzystaniem CAD V Zapis konstrukcji z wykorzystaniem CAD V Przedmioty wybieralne kierunko (Optional units - co Environmental monitoring Monitoring środowiska Industrial pollutions Zanieczyszczenia przemysłowe Assessment of the nuisance of selected processes Ocena uciążliwości wybranych procesów Environmental hazards in industrial processes Środowiskowe zagrożenia w procesach przemysłowych Excavation works Ziemne roboty instalacyjne Underground infrastructure Infrastruktura podziemna Municipal recycling Recykling w gospodarce komunalnej Vehicle recycling Recykling w motoryzacji Final seminary - the environmental area Seminarium dyplomowe - obszar środowiskowy Diploma work (engineering project) Praced dyplomowa (Projekt inżynierski) Przedmioty humanistyczne lub społeczne (Optional units - co Cetetive module - III: Law and standards in environmental protection Moduł wybieralny - III: Społeczna odpowiedzialność w ochronie środow	PrzedmiotWSubject unit - semester curricular(Lecture)Costing15Kosztorysowanie15Engineering drawing with CAD V-Zapis konstrukcji z wykorzystaniem CAD V-Przedmioty wybieralne kierunkowe - wymar (Optional units - compulsory EEnvironmental monitoring15Monitoring środowiska15Industrial pollutions15Zanieczyszczenia przemysłowe15Assessment of the nuisance of selected processes15Ocena uciążliwości wybranych procesów15Environmental hazards in industrial processes30Ziemne roboty instalacyjne30Underground infrastructure30Infrastruktura podziemna30Municipal recycling30Recykling w gospodarce komunalnej30Vehicle recycling30Recykling w motoryzacji5Final seminary - the industrial area-Seminarium dyplomowe - obszar fordowiskowy-Przedmioty humanistyczne lub społeczne wybieralne (Optional units - compulsory EElective module - III: Law and standards in environmental protection15Moduł wybieralny - III: Społeczna odowiska15Moduł wybieralny - III: Społeczna odpowiedzialność w ochronie środowiska15Moduł wybieralny - III: Społeczna odpowiedzialność w ochronie środowiska15Infrastructure1515Municipal recycling15Moduł wybieralny - III: Społeczna odpowiedzialność w ochronie środowiska15	PrzedmiotWCSubject unit - semester curricular(Lecture)(Practical classes)Costing15-Engineering drawing with CAD VZapis konstrukcji z wykorzystaniem CAD-Zapis konstrukcji z wykorzystaniem CADPrzedmioty wybieralne kierunkowe - wymagana liczba (Optional units - compulsory ECTS in a se15Environmental monitoring15-Monitoring środowiska15-Industrial pollutions15-Zanieczyszczenia przemysłowe15-Assessment of the nuisance of selected processes15-Ocena uciążliwości wybranych procesów15-Environmental hazards in industrial processes30-Orcense wysłowych3015Excavation works30-Ziemne roboty instalacyjne3015Winicipal recycling3015Recykling w gospodarce komunalnej3015Vehicle recycling3015Final seminary - the environmental area-Seminarium dyplomowe - obszar-fordowiskowy15-Diploma work (engineering project)E -godziny niekoPracednioty humanistyczne lub społeczne wybieralne - wymagar (Optional units - compulsory ECTS in a seElective module - III: Social responsibility for environmental protection15Moduł wybieralny - III: Społeczna odowiska15Industrial protection15-Monitoring erodowiska15In env	PrzedmiotWCLSubject unit - semester curricular(Lecture)(Practical) (classes)(Laboratory classes)Costing15Kosztorysowanie15Engineering drawing with CAD V15Zapis konstrukcji z wykorzystaniem CAD15Przedmioty wybieralne kierunkowe - wymagana liczba p. ECTS in a semester)15-15Environmental monitoring15-1515Monitoring środowiska15-15-Industrial pollutions15-15-Zanieczyszczenia przemysłowe15Assessment of the nuisance of selected processes15Coerea uciążiwości wybranych procesów15Environmental hazards in industrial 	Przedmiot W C L P Subject unit - semester curricular (Lecture) (Practical) (Laboratory) (Project) Costing 15 - - 15 Costing 15 - - 15 Engineering drawing with CAD V - - 15 - Zapis konstrukcji z wykorzystaniem CAD - - 15 - Przedmioty wybieralne kierunkowe - wymagana liczba p. ECTS w semestrze (Optional units - compulsory ECTS in a semester) - - Environmental monitoring 15 - 15 - Monitoring 4rodowiska 15 - 15 - Environmental monitoring 15 - 15 - Sasessment of the nuisance of selected processes 15 - 15 Derav actigaliwości wybranych procesów 15 - 15 Environmental hazards in industrial processch 30 - - Przedmioty instalacyjne 30 - - - Underground infrastructure 30 15 - - Infrastructura podziemna 30 15 - - Recykling w gospodarce komunalnej 30 15 -	Przedmiot W C L P S Subject unit - semester curricular (Lecture) (Practical (Laboratory (Lasses)) (Project) (Seminar) Costing 15 - - 15 - Engineering drawing with CAD V Zapis konstrukcji z wykorzystaniem CAD - - 15 - Przedmioty wybieralne kierunkowe - wymagana liczba p. ECTS w semestrze (Optional units - compulsory ECTS in a semester) - - Environmental monitoring 15 - 15 - - Monitoring środowiska Industrial pollutions 15 - 15 - - Zanieczyszczenia przemysłowe 15 - 15 - - Assessment of the nuisance of selected przemysłowych 15 - 15 - Environmental hazards in industrial przemysłowych 30 - - 15 - Municipal recycling Recykling w gospodarce komunalnej 30 15 - - - Wanicipal recycling Recykling w motryzacji 30 15 - - 30 Recykling w motryzacji 30 15 - - - Infastruktura podziemna - - - 30 Dielema work (engineering pr	Przedmiot W C L P S ECTS Subject unit - semester curricular (Caster) (Lecture) (Practical (Casser) (Laboratory (Casser) (Project) (Seminar) 3 Costing Costing Soctorysowanie 15 - - 15 - 1 3 Engineering drawing with CAD V Zopis konstrukcji z wykorzystaniem CAD - - 15 - 1 1 Przedmioty wybieraine kierunkowe - wymagana liczba p. ECTS w semestrze (Optional units - compulsory ECTS in a semestrz) 25 25 Environmental moning Monitoring Srodowiska 15 - 15 - - (2) Sasessment of the nuisance of selected processes 15 - 15 - 15 - (2) Sredowiskawe zagrożenia w procesach processes 15 - 15 - 15 - (2) Sredowiskowe zagrożenia w procesach processes 30 - - 15 - (4) Underground infrastructure infrastruktura podziemna 30 15 - - 30 (3) Sredowiskowy ziemnarium dypiomwe - obszar ordowiskawy	

PLAN STUDIÓW RAZEM (TOTAL STUDY PLAN)						
Łącznie godzin kontaktowych/ECTS w planie studiów	2770	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 %					
К	Kierunkowe	62	29.52 %					
Р	Podstawowe	69	32.86 %					
W	Wybieralne	8	3.81 %					
W-HS	Humanistyczne lub społeczne, wybieralne	5	2.38 %					
W-K	Wybieralne kierunkowe	58	27.62 %					
W-PR	Praktyki	6	2.86 %					
	Łącznie:	210	100.00 %					

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

- uchwalony przez Senat PO

- zaopiniowany przez samorząd studencki.

Politechnika Opolska Wydział Mechaniczny Opole 2024 r.

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card							
	Enviro	nme	ental Engir	neering			
Profile of Education Genera							
Level of study First Cycle Studies							
	Full-Tir	ne S	Studies				
	Fifth						
	Air protection						
iotu	Ochror	na p	owietrza				
its	2			Subject type		К	
Language of lecture angielsk			Mode of completing the course			Course credit	
Course code			scientific			Т	
		1	Understanding of basic physical and chemical laws				
Knowle	dge	2		Understanding of the fundamentals of ecology including environmental phenomena and interactions			
		1	Distinguish between basic physical and chemical processes occurring in nature				
SKIIIS		2			nical pł	nenomena and	
<u> </u>		1	Ability to verify the information received				
	tence	2	Ability to	discuss, analyse and c	onstruc	t conclusions	
compe		3	Ability to	conduct practical expe	riments	5	
	ation iotu ts lecture de Knowle Skills Social	Enviror ation Genera First Cy Full-Tir Fifth Air pro iotu Ochror ts 2 lecture angielsk i de Knowledge	Environme ation General Ad First Cycle First Cycle Full-Time S Fifth Air protect iotu Ochrona p ts 2 lecture angielsk i de D.1 Knowledge 2 Skills 1 Social 2	Environmental EnginationEnvironmental EnginationAirFirst Cycle StudiesFull-Time StudiesFifthAir protectioniotuOchrona powietrzats2ecture angielsk iMode odeD.1.Knowledge1Skills1Social Competence1Social Competence1Ability to2Ability to	Environmental EngineeringationGeneral AcademicFirst Cycle StudiesFull-Time StudiesFull-Time StudiesFifthAir protectioniotuOchrona powietrzats2SectureangielskDetectureD.1.Skills1Understanding of the fundamen environmental phenomena and processes occurring in natureSocial Competence1Ability to verify the information 2Ability to discuss, analyse and c	Environmental Engineering ation General Academic First Cycle Studies First Cycle Studies Full-Time Studies Fifth Air protection iotu Ochrona powietrza ts 2 Subject type de D.1. Subject related to scientific research/pract. profess. prepar. (Y/N) Knowledge 1 VInderstanding of basic physical and ch environmental phenomena and interact processes occurring in nature Skills 1 Social Competence 2 Ability to verify the information receive 2 Ability to discuss, analyse and construct	

Course Goals The aim is to familiarise Students with the problems of protecting one of the most important components of the environment. The course imparts knowledge on the formal, legal and technical requirements for monitoring and maintaining indicative aerosanitary parameters. In addition, Students are practically acquainted with ways of controlling atmospheric air quality.

Programme content The course provides knowledge on issues related to counteracting local and global changes in the atmosphere caused by anthropogenic activities. Within the framework of the module, students acquire knowledge on the characteristics of pollutants and their sources, legal guidelines for limiting emissions of substances and energy, and maintaining the satisfactory quality of the troposphere, as well as methods of collecting information on emissions, immission and deposition of pollutants. The subject also serves to familiarise Students with practical methods of measuring selected indicator pollutants. The acquired knowledge allows Students to identify hazards causing degradation of aerosanitary parameters, and enables them to understand and practically apply lawful methods and techniques to counteract these hazards.

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	Students have a structured knowledge of the role of the atmosphere; student is aware of the threats and knows the methods of identifying and reducing them	IS_K1_W 01	WL	СНЈ
ge	2	Students have adequate knowledge of observation of phenomena and processes and know the basic methods to perform measurements of characteristic quantities relevant to air protection	IS_K1_W 02	W L	СНЈ
	1	Student is able to use measurement equipment with the ability to estimate errors and assess the suitability of routine methods and tools for air quality monitoring.	IS_K1_U 08	W L	СНЈ
		Students are able to observe phenomena and processes and are able to carry out measurements of characteristic physical, chemical and biological quantities relevant to environmental engineering as part of an experiment and to interpret the results obtained	IS_K1_U 06	WL	СНЈ
Social	1	Student understands the need for further education, improvement of professional competence	IS_K1_K 01	WL	СНЈ
Compet ence	2	Student has a sense of responsibility for the results and consequences of his/her professional activity, especially in the context of its impact on the natural environment	IS_K1_K 02	W L	СНЈ

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 (title/academic degree/professional title, name and surname						
Lecture (W)	15							
Calculation class (C)	0							
Laboratory class (L)	15	dr hab. inż. Olszowski Tomasz						
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	6
Preparation of a report/paper/ project/presentation	8
Independent study of the course topics	16
Examination or final colloquium	0
Additional contact hours	0
Total student workload	60
Number of contact hours (from the study plan)	30

* hour (class) means 45 minutes

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card								
Field of study	Enviror	Environmental Engineering						
Profile of Education	Genera	l Academic						
Level of study	First Cy	cle Studies/						
Specialization								
Form of Study	Full-Tin	ne Studies						
Semester	Sevent	Seventh						
Course Title	Assess	Assessment of the nuisance of selected processes						
Nazwa przedmiotu	Ocena	uciążliwości v	wybranych procesów					
ECTS points	2		Subject type		W-K			
Language of lecture	angielsk i	Mode o	of completing the cours	e	Course credit			
Course code		E.6.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			

		Knowledge	1	A student knows the compon and the interdependencies b			iment			
		Knowledge	2	A student has basic knowledge of technology and devices industrial.						
Prelimir requirem	nent	ts skille	1		student is able to assess the risk of individual omponents industrial processes.					
of the co	ours	e	2							
		Social Competence	1	A student has a sense of soci engineer's role.	ial import	ance of th	ne			
		Competence	2							
				e is to familiarize students wit ted industrial processes	h the con	cepts rela	ated to			
Programme content The subject provides knowledge on issues related to the assessment of the burdensomeness of selected processes. During the module, the student acquires knowledge and skills in the field of assessment and analysis of the harmfulness of industrial processes at the design stage, process approval and use. Acquired knowledge in the field of identifying sources of ecological threats and ecological nuisance in industrial processes allows determining the degree of harmfulness of an industrial process for various branches of the economy, with particular emphasis on the energy industry.										
Learning outcomes for the course - after completing the training cycle (W, C, L, outcome P, S)						Methods of verificati on of learning outcome s				
		Student knows the p hazards in environm		ciples of identification of al engineering	IS_K1_W 03	W P	CKLR			
Knowled ge	2	Student has specialist and systematic knowledge of the role of the natural environment, is aware of hazards in selected proecesses and knows how to identify and reduce them								
Skills	1	Student is able to conduct a critical analysis of functioning and evaluate the existing technicalIS_K1_U 10PK L Rsolutions used in industrial processesK L R								
	2 Student is able to design system or process typical for environmental engineering						KLR			
Social	1	Student correctly ide	enti	fies engineering problems	IS_K1_K 03	W P	CKLR			
Compet ence	2	Student is able to th	ink	and act in a creative way	IS_K1_K 05	Р	KLR			
Methods of verification of learning outcomes:										

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.

The course format	Hours/sem. (h)	(tit	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.	. Guziałowska-Tic Joanna				
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		5				
Preparation of a report/paper/ project/presentation			10				
Independent study o	f the course top	pics	5				
Examination or final	colloquium		0				
Additional contact ho	ours		0				
Total student worklo	ad		50				
Number of contact h	ours (from the s	study plan)	30				
* hour (class) moons	45 1 1						

* hour (class) means 45 minutes

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card						
Field of study	Environmental Engineering					
Profile of Education	General Academic					
Level of study	First Cycle Studies					
Specialization						
Form of Study	Full-Time Studies					
Semester	Third					
Course Title	Basic Biotechnology					

Nazwa przedmiotu Pods			wy biotechnologii i biotechniki				
ECTS points 3		3			Subject type		Р
Language of lecture angielsk		angielsk i	Mode of completing the course			Examination	
Course code		,	A.12.		Subject related to scientific research/pract. profess. prepar. (Y/N)	N	
	Preliminary requirements		1	Basic knowledge in the field of mathematical- natural sciences and technical sciences.			
			2	Basic knowledge of biology and chemistry.			
Preliminary requirements			1	Student is able to obtain information from literature, databases and other sources related to technical sciences.			
of the course			2	Student is	dent is able to perform simple chemical calculations.		
	Social	Social Competence 2		Student understands the need for further education and enhancing qualifications			er education and
	Compe			The student demonstrates communication and team cooperation skills.			
					familiarize students wi eld of biotechnology ar		

knowledge, the latest achievements in the field of biotechnology and the prospects for development perspectives of this field of science. 2. Discussion of the applide nature of scientific research and the latest implementations in the field of plant and animal biotechnology, industrial biotechnology, medical and environmental biotechnology. 3. The student acquires and develops competences in the technical aspects of implementing biotechnological processes and technologies for producing selected bioproducts.

Programme content The course covers topics related to the latest advancements and current state of knowledge in the field of biotechnology. Students gain knowledge concerning the objectives of scientific research and the newest applications in plant and animal biotechnology, industrial biotechnology, medical biotechnology, and environmental biotechnology, along with their impact on the modern economy and human life. Furthermore, students gain and improve competencies in the technical aspects of implementing biotechnological processes and technologies for the production of specific bioproducts. As part of the course, students also gain knowledge and skills in biotechnology calculations.

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	Student has knowledge in selected fields of biology and biotechnology to the extent necessary to describe phenomena and technological processes related to production of bioproducts and realisation of selected environmental engineering technologies.	IS_K1_W 01	W C	A C
Knowled ge 2		A student knows the importance of the development of biotechnology for the modern economy, human life and environmental protection.	IS_K1_W 12	W C	A C
	3	A student knows the principles of identification of hazards and occupational health, safety connect with construction and operation of installations used in biotechnology production processes.	IS_K1_W 03	wс	A C
	1	The student has self-education skills. The student is able to obtain information from literature and other sources to perform biotechnology calculations. The student is able to integrate the obtained information, interpret it, as well as draw conclusions and formulate opinions on the implemented biotechnological processes.	IS_K1_U 01	С	С
-	2	The student is able to identify and formulate practical engineering tasks related to biotechnology calculations or calculations of bioreactor components.	IS_K1_U 11	С	С
	3	The student is able to perform simple research tasks on a wide range of environmental technologies related to the use of microorganisms, the implementation of biotechnological processes, as well as describe typical equipment and operating parameters of these devices.	IS_K1_U 12	С	С

	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge particularly within the field of biotechnology and bioprocess engineering.	IS_K1_K 01	W C	A C
Social Compet ence	2	Student correctly identifies engineering problems and is able to prioritise professional activities and recognises the importance of knowledge in solving cognitive and practical problems in biotechnology and bioprocess engineering.	IS_K1_K 03	W C	A C
	3	The student demonstrates proficiency in creative and innovative thinking, along with a readiness to critically evaluate their own knowledge within the domains of biotechnology and bioprocess engineering. Additionally, they exhibit the ability to collaborate effectively within a team, adeptly assuming various roles in aim to resolve tasks.	IS_K1_K 05	C	С

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		dr inż. Płaczek Małgorzata		
Laboratory class (L)	0	dr inż. Płacz			
Project (P)	0				
Seminar (S)	0				
	·	Student w	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			15		
Calculation class (C)			15		

	15
Laboratory class (L)	0
Project (P)	0
Seminar (S)	0
Preparation for classes	20
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	25
Examination or final colloquium	2
Additional contact hours	0

Total student workload	77
Number of contact hours (from the study plan)	30

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering							
Faculty of Mechanical Engineering Course Description Card							
Field of study	Enviror	nmental Engi	neering				
Profile of Education	Genera	al Academic					
Level of study	First C	cle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Second	Second					
Course Title	Basics	Basics of technical drawing					
Nazwa przedmiotu	Podsta	Podstawy rysunku technicznego					
ECTS points	4		Subject type		Р		
Language of lecture angielsk Mode		Mode c	of completing the cours	e	Course credit		
Course code			Subject related to scientific research/pract. profess. prepar. (Y/N)		N		

			1	A student has detailed knowled for projecting complex spatial o	-	field of m	iethoas				
		Knowledge	2	-	A student has knowledge in constructing projections of spatial objects on the drawing plane.						
			3	A student is familiar with methods for determining relationships between spatial objects.							
			1	A student has the ability to solve problems in solid geometry.							
Prelimir requirem of the co	nent		2	A student has practical skill in a traditional methods.	A student has practical skill in aesthetically drawing using						
of the ct	Juise	=	3	A student has practical ability to geometry regarding recording objects.							
			1	Student correctly identifies and between complex spatial object		relations	hips				
		Social Competence	2	Student can record and commu spatial objects	inicate ini	formation	about				
			3	Student can think and act in an	entrepre	neurial w	ау				
		The aim of the cumentation	sub	ject is to familiarize students wi	th the pri	nciples of	:				
				of requirements for engineering							
projectio arrangen	n, pr 1ent	rinciples of stand	ardi	zation in technical drawing, dim cation in drawing typical machin	ensioning	rules and	d n				
projectio arrangen environm	n, pr nent nenta	rinciples of stand of dimensions. A al engineering.	ardi Appli	zation in technical drawing, dim cation in drawing typical machin e - after completing the training	ensioning ne eleme The referenc e to the	Form of (W, C, L,	d n Methods				
projection arrangen environm Learning	n, pr nent nenta out	rinciples of stand of dimensions. A al engineering. comes for the co	ardi appli urse cycl	zation in technical drawing, dim cation in drawing typical machin e - after completing the training	The referenc e to the learning outcome	Form of course (W, C, L, P, S)	d n Methods of verificati on of learning outcome				
projection arrangen environm Learning	n, pr nent enta out 1 g e 2 r	rinciples of stand of dimensions. A al engineering. comes for the co student has an ac graphics to prese equipment Student knows th	ardi: appli urse cycl dvar nt co e sc	zation in technical drawing, dim cation in drawing typical maching e - after completing the training le	The referenc e to the learning outcome s	Form of course (W, C, L, P, S)	d n Methods of verificati on of learning outcome s C F G I P				
projection arrangen environm Learning Knowled ge	n, pr nent ienta out 1 g e 2 r a 1 n	rinciples of stand of dimensions. A al engineering. comes for the co graphics to prese equipment Student knows th equirements for advanced degree Student can make	ardi: ardi: ardi: urse cycl dvar nt co e sc cons e sc cons e a s	zation in technical drawing, dim cation in drawing typical maching e - after completing the training le nced knowledge of engineering omplex devices and industrial ope of standardization and	The referenc e to the learning outcome s IS_K1_W 04	Form of course (W, C, L, P, S) W C	d n Methods of verificati on of learning outcome s C F G I P R				
projection arrangen environm Learning Knowled ge	n, pr nent ienta out 1 g e 2 r a 1 n a 2 S	rinciples of stand of dimensions. A al engineering. comes for the co student has an ac graphics to prese equipment student knows th equirements for advanced degree student can make machine element apparatus	ardi: appli urse cycl dvar nt co e sc cons e s s cons ulato	e - after completing the training le nced knowledge of engineering omplex devices and industrial ope of standardization and struction documentation to an simple technical drawing of a echanism and industrial e a specification of engineering	The referenc e to the learning outcome s IS_K1_W 04 IS_K1_W 04	Form of course (W, C, L, P, S) W C	d n Methods of verificati on of learning outcome s C F G I P R C F G I P R				
projection arrangen environm Learning Knowled	out out 1 g 2 r 1 n 2 t	rinciples of stand of dimensions. A al engineering. comes for the co student has an ac graphics to prese equipment student knows th requirements for advanced degree student can make machine element apparatus student can form asks of a practica	ardi: urse cycl dvar nt co e sc cons e a s , me ulato al na	e - after completing the training le nced knowledge of engineering omplex devices and industrial ope of standardization and struction documentation to an simple technical drawing of a echanism and industrial e a specification of engineering	The referenc e to the learning outcome s IS_K1_W 04 IS_K1_W 04 IS_K1_U 02 IS_K1_U	Form of course (W, C, L, P, S) W C W C W C W C	d n Methods of verificati on of learning outcome s C F G I P R C F G I P R C F G I P R				

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 cle/academic degree/professional title, name and surname		
Lecture (W)	15				
Calculation class (C)	30				
Laboratory class (L)	0	dr inż. Kow	alski Mateusz		
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)			30		
Laboratory class (L)			0		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		23		
Preparation of a repo project/presentation			0		
Independent study o	of the course top	oics	30		
Examination or final	colloquium		2		
Additional contact he	ours		0		
Total student worklo	ad		100		
Number of contact h	ours (from the	study plan)	45		

* hour (class) means 45 minutes

dr hab. inż. Kluger Krzysztof Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study		First Cy	cle S	Studies			
Specialization							
Form of Study	Full-Tim	Full-Time Studies					
Semester		Fourth					
Course Title		Building	gs sti	ructures			
Nazwa przedm	iotu	Konstru	kcje	budowla	ane		
ECTS poir	nts	5			Subject type		К
Language of	lecture	angielsk i		Mode c	of completing the cours	ie	Examination
Course code		D	D.7.1.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowle	dge 1 A student has general knowledge of materials a materials used in construction			naterials and raw		
	Skills		1		nt is able to identify th of materials and the d		
of the course	Social				nt is able to identify the relationships betweer of materials and the durability of the structure		
	Compe	tence	2				·
Developing the	e ability	to recogn	ize b	ouilding o	e basic materials used components. Providing ilding structures.		
materials in er skills in recogr	igineerii iizing co s knowle	ng structu Instructior Instructior	res. I eler ildin	During t ments aı g materi	nowledge on issues rel he module, the studen nd the possibilities of u als produced based on my.	t acquir ising bui	es knowledge and ilding materials in

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled	1	Student has knowledge about the construction of buildings sufficient for engineering needs.	IS_K1_W 10	W P	AKL
ge	2	Student understands and knows the multi-faceted conditions of engineering activities.	IS_K1_W 14	W P	AKL
Skills	1	Student can make a simple construction project.	IS_K1_U 02	Р	KL
SKIIIS	2	Student perceives and analyzes various issues in solving engineering tasks.	IS_K1_U 09	Р	KL
Social	1	Student has a need for further education.	IS_K1_K 01	W P	AKL
Compet ence	2	Student correctly defines priorities in engineering activities.	IS_K1_K 03	W P	AKL

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course			
Lecture (W)	30				
Calculation class (C)	0				
Laboratory class (L)	0	dr hab. inż. Król Anna			
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	10			
Preparation of a report project/presentation		25			
Independent study o	f the course top	pics 28			

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

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

Field of study		Environ	ment	al Engii	neering			
Profile of Educa	ation	Genera	l Acad	Academic				
Level of study		First Cy	cle St	udies				
Specialization								
Form of Study		Full-Tim	ne Stu	ıdies				
Semester		Second						
Course Title		Chemis	try fo	r engin	eers			
Nazwa przedm	iotu	Chemia	dla i	nżynier	ów			
ECTS poir	nts	5			Subject type		Р	
Language of	Language of lecture angielsk		Mode of completing the course				Examination	
Course code		А	A.3.2.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	
	Knowlo	dao	1	Basic	knowledge in the field of	inorga	nic chemistry.	
	Knowle	uge	2					
Preliminary	Skills		1	Ability to use professional literature.				
requirements	JKIIIS		2					
of the course Social (Competen	ce 1	A student understands the need for continuous training.				
			2					
Course Goals calculations ar					miliarize students with th nistry.	e basio	c issues,	

Programme content The subject provides knowledge on basic issues in organic chemistry. During the module, the student acquires knowledge and skills, among others, in the field of nomenclature and classification of organic chemical compounds, characteristics of selected groups of compounds, including the group of saturated and unsaturated hydrocarbons, reactivity of organic chemical compounds and their applications. The acquired knowledge of basic issues in organic chemistry allows you to determine the basic properties of organic chemical compounds that occur in the water, soil and atmosphere environments.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	Student has extensive knowledge in organic chemistry to the extent necessary to describe phenomena and processes related to environmental engineering technologies	IS_K1_W 01	WCL	A C F H I J
	2				
Skills	1	Student is able to plan and conduct experiments, interpret the obtained results and formulate conclusions	IS_K1_U 06	L	FΗ
JKIIIS	2	Student is able to identify and formulate practical engineering tasks in organic chemistry related to environmental engineering	IS_K1_U 11	С	СIJ
Social	1	Student understands the need to learn	IS_K1_K 01	WCL	A C F
Compet ence	2	Student is able to think and act in a creative way	IS_K1_K 05	L	IJ

Methods of verification of learning outcomes:

	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)	15					
Laboratory class (L)	15	dr hab. inż. Guziałowska-Tic Joanna				
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)	15
Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	30
Preparation of a report/paper/ project/presentation	17
Independent study of the course topics	17
Examination or final colloquium	1
Additional contact hours	0
Total student workload	125
Number of contact hours (from the study plan)	60

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental Engineering				
Profile of Education	Genera	General Academic				
Level of study	First Cy	First Cycle Studies				
Specialization						
Form of Study	Full-Tin	ne Studies				
Semester	Fourth	Fourth				
Course Title	Circula	Circular economy				
Nazwa przedmiotu	Gospoo	larka obiegu	zamkniętego			
ECTS points	2	Subject type		К		
Language of lecture	angielsk i	gielsk Mode of completing the course		e Examination		
Course code	D	9.6.1.	Subject related to scientific research/pract. profess. prepar. (Y/N)	T		

		Knowledge	Knowledge					
				2				
	Preliminary			1				
requirem				2				
of the co	of the course		npetence	1	A student understands the training	need for	continuou	IS
				2				
Course Goals The aim of the course is to familiarize students with the basic issues of restructuring of devastated areas						of		
environm economy	nen v co	tal problems, ntained in fou	and a dis ur aspects	cus s: pr	of the circular economy as a sion of issues related to mo oduction and consumption, iveness and innovation.	nitoring o	of the circ	ular
Learning outcomes for the course - after completing the training cycle cycle (W, C, L, outcome P, S)						Methods of verificati on of learning outcome s		
	1		tudent knows the principles of identification of azards in environmental engineering				W P	AKLR
Knowled ge	2	the role of th hazards and	udent has specialist and systematic knowledge of e role of the natural environment, is aware of izards and knows how to identify and reduce them the area of restructuring of devastated areas					
Skills	1	information f	Student has self-education skills. Student acquires nformation from literature, databases and other ources related to restructuring of devasted areas 01 W A					
	2		udent is able to design system or process typical IS_K1_U P K L F environmental engineering 12					
Social Compet	1	and consequ particularly i	udent has a sense of responsibility for the results d consequences of their professional activity, rticularly in the context of its impact on the 02 W P A K L tural environment and environmental devastation					
EIICE	2	Student is ab	le to thin	k ar	nd act in a creative way	IS_K1_K 05	Р	KLR
ence Methods of v		Student is ab		k ar	nd act in a creative way		Р	K L R

Hours in the study plan					
The course format	lours/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.	. Kłosok-Bazan Iwona				
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		10				
Preparation of a report project/presentation	ort/paper/		6				
Independent study o	f the course to	pics	0				
Examination or final	colloquium		4				
Additional contact ho	ours		0				
Total student worklo	ad		50				
Number of contact h	ours (from the	study plan)	30				

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental 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	Third	Third				
Course Title	Compu	Computer Aided Design				
Nazwa przedmiotu	Kompu	Komputerowe wspomaganie projektowania				
ECTS points	3	3 Subject type P				

Language of	e of lecture angiels		ngielsk Mode o		of completing the course		Course credit		
Course co	Course code		A.7.1.		Subject related to scientific research/pract. profess. prepar. (Y/N)		N		
	Knowledge				1	with technic	ling of Technical Drawin cal drawing principles, jections, dimensioning	includir	ng geometric
			2	understand important f	ematics and Geometry Knowledge: A solid rstanding of mathematics, particularly geometry rtant for CAD work. Concepts such as angles, surements, and geometric transformations are ently used.				
Preliminary	uirements		1	are advanta	alization Skills: Strong ageous for understandi their representations.	ng thre			
requirements of the course			2	mandatory such as Aut However, ir	in CAD Software (Optic for beginners, familiari oCAD, SolidWorks, or C ntroductory courses oft with specific CAD tools	ty with CATIA ca en assu	CAD software an be helpful.		
			3	problems a	lving Skills: The ability nd think critically is impoting issues that may a sess.	portant	for		
	Social		1	A student u knowledge	nderstands the need to	o learn a	and gather		
	Compe	tence	2	A student is adapted to work both individually and in a team			ually and in a		
	Course Goals The aim of the course is to practice the basics and extend the skills of correct solid modeling in the 3D CAD system. Students learn how to design individual parts, perform								

solid modeling in the 3D CAD system. Students learn how to design individual parts, perform presentations, technical documentation, and teams.

Programme content Introduction to CAD Principles: Understanding the fundamental concepts and principles of Computer Aided Design, including software interface navigation, basic drawing commands, and file management. 2D Drafting and Design: Learning to create and modify 2D drawings using CAD software, including techniques for drawing lines, circles, arcs, and text, as well as dimensioning and annotation tools.

Learning	οι	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	A student has an advanced knowledge of methods, techniques, tools used to solve simple engineering tasks in the field of three-dimensional modeling, preparation of technical documentation	IS_K1_W 02	WL	СDН
	2				
Skills	1	A student uses computer software to solve engineering tasks in environmental engineering	IS_K1_U 03	L	ΗP
	2				
Social Compet ence	1	A student understands the need to learn throughout life; can inspire and organize the learning process of other people	IS_K1_K 01	WL	CDP
	2				

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course			
Lecture (W)	15				
Calculation class (C)	0				
Laboratory class (L)	15	dr inż. Pochwała Sławomir			
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 class	es	30			
Preparation of a report project/presentation		10			
Independent study o	of the course top	pics 4			

Examination or final colloquium	1
Additional contact hours	0
Total student workload	75
Number of contact hours (from the study plan)	30

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

Field of study		Environmental Engineering					
Profile of Educ	of Education General Academic						
Level of study First Cycle Studies							
Specialization							
Form of Study		Full-Tim	e Stu	dies			
Semester		Third					
Course Title		Comput	er co	ntrol te	chniques		
Nazwa przedm	iotu	Komput	erowe	e techn	iki sterowania		
ECTS poir	nts	2			Subject type		W-K
Language of	lecture	angielsk i	Mode of completing the course			Course credit	
Course code		E	E.3.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowle	dao	1	Basic knowledge in the field of electrical engineering			rical engineering
Dustinging	KIIOWIE	uge	2	Basics of measuring typical physical quantities			
Preliminary requirements	Skille		1	Comp	uter operation		
of the course			2				
	Social	omnetenc	1	Ability	to work in a group		
Social Competence			2				
Course Goals To acquaint students with basic knowledge in the field of modern control techniques.							
Programme content Acquire knowledge about computer control techniques and system which consists of a high-reliability computer, various control modules with reliable properties, and various sensors, which is equipped with a software control system.							

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
	1	A student knows the structure of typical control systems to an advanced degree	IS_K1_W 02	WL	СDН
Knowled ge	2	A student knowledge of the principles of selection of electrical systems	IS_K1_W 05	WL	СDНО
		A student knows the typical control systems to an advanced degree	IS_K1_W 02	WL	DH
Skills	1	The ability to select the settings of typical regulators	IS_K1_U 06	L	CDH
	2				
Social Compet ence	1	A student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork	IS_K1_K 05	L	ΗI
	2				
Methods of v	/eri	fication of learning outcomes:			

Hours in the study plan						
The course format	Hours/sem. (h)	Tutor (coordinator) o (title/academic degree/p name and suri	rofessional title,			
Lecture (W)	15					
Calculation class (C)	0					
Laboratory class (L)	15	r inż. Łukasiewicz Ewelina				
Project (P) 0						
Seminar (S)	0	1				
		Student workload				
Types of student act	ivities*		of hours* allocated ted activities			
Lecture (W)			15			
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	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

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card								
Field of study Environmental Engineering								
Profile of Educa	ation	Genera	al Acad	emi	С			
Level of study		First C	ycle St	udie	S			
Specialization								
Form of Study		Full-Tir	ne Stu	dies				
Semester		Third						
Course Title		Compu	iter me	easu	rer	nent techniques		
Nazwa przedm	iotu	Kompu	terowe	e teo	:hn	iki pomiarów		
ECTS poir	nts	2				Subject type		W-K
Language of lecture a		angielsk i	Mode o			of completing the course		Course credit
Course co	de		E.3.			Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowlo	dao		1	Ba	sics of measuring typic	cal phys	ical quantities
	Knowle	uge		2	Knowledge of typical industrial processes			rocesses
Preliminary requirements	Skille			1	Сс	omputer operation		
of the course	SKIIIS			2				
	Social	omneter		1	Ability to work in a group			
Social Competence				2				
Course Goals To acquaint students with basic knowledge on modern measurement techniques.								

Programme content Acquire knowledge about computer supported measurement techniques used to communicate with measurement equipment to automate a measurement.

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 knows the construction of computer measuring systems to an advanced degree	IS_K1_W 02	W	CDO
Knowled ge	2	A student knows the rules of selecting the measuring apparatus to an advanced degree	IS_K1_W 02	WL	СDНО
	3	A student knows advanced solutions of measurement systems to an advanced degree	IS_K1_W 02	L	Н
Skills	1	Using virtual measuring instruments	IS_K1_U 03	L	Н
SKIIIS	2	Using computer measuring systems	IS_K1_U 03	L	Н
Social Compet	1 Teamwork		IS_K1_K 05	L	ні
ence	2				

Methods of verification of learning outcomes:

	Hours in the study plan						
The course format	Hours/sem. (h)	(titl	Tutor (coordinator) of the course e/academic degree/professional title, name and surname				
Lecture (W)	15						
Calculation class (C)	0						
Laboratory class (L)	15	dr inż. Łuka:	r inż. Łukasiewicz Ewelina				
Project (P)	0						
Seminar (S)	0						
		Student w	orkload				
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	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

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit

(stamp/signature)

dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card								
Field of study	Environmental Engineering							
Profile of Educa	ation	Genera	l Aca	demic				
Level of study		First Cy	First Cycle Studies					
Specialization								
Form of Study		Full-Tim	าe Stเ	udies				
Semester	Seventh							
Course Title		Costing						
Nazwa przedm	iotu	Kosztor	ysow	anie				
ECTS poir	nts	3			Subject type		К	
Language of	Language of lecture angielsk			Mode o	Course credit			
Course code D.1			0.10.		Subject related to scientific research/pract. profess. prepar. (Y/N)		т	
Knowledge		dge	1	A student provides knowledge on designing process and technological installations related to environmental engineering.				
Preliminary			2					
requirements of the course	Skille		1	A stud	lent cultivates creative	skills.		
			2					
	Social	Competen	1	Stude	nts can act creatively.			
		Joinperen	2					

Course Goals The aim of the course is to prepare students for preparing cost estimates in environmental engineering.

Programme content Within the course, knowledge is conveyed regarding cost estimation, particularly in environmental engineering, the principles of their execution, and best practices applicable in this area of engineering activity. The acquired knowledge will enable students to develop skills in preparing both general and specialized cost estimates. The acquired social competencies will allow for reinforcing the importance of a proper approach to carrying out engineering tasks, with particular emphasis on their economic aspects.

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 of the application of legal regulations, standards and guidelines in the design and operation of technical facilities.	IS_K1_W 13	W	С
ge	2	Student has advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. Student knows the principles of engineering design	IS_K1_W 02	Ρ	LM
Skills	1	Student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions	IS_K1_U 01	Ρ	LM
	2	Student uses computer software to solve engineering tasks	IS_K1_U 03	Р	LM
Social	1	Student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment	IS_K1_K 02	W	С
Compet ence		Student is aware of the importance of professional conduct, adherence to professional ethics and respecting the diversity of views and opinions; is also ready to cherish the achievements and traditions of the engineering profession	IS_K1_K 04	Р	L M P

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)	15	-					
Calculation class (C)	0	dr hab. inż. Szmolke Norbert					
Laboratory class (L)	0						
Project (P)	15						
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)			0				
Project (P)			15				
Seminar (S)			0				
Preparation for class	es		10				
Preparation of a report project/presentation	ort/paper/		19				
Independent study o	f the course to	pics	15				
Examination or final	colloquium		1				
Additional contact ho	ours		0				
Total student worklo	ad		75				
Number of contact h	ours (from the	study plan)	30				
*							

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Course Description cu							
Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	I Academic					
Level of study	First Cy	/cle Studies					
Specialization							
Form of Study	Full-Tir	Full-Time Studies					
Semester	First	First					
Course Title	Descrip	Descriptive geometry					
Nazwa przedmiotu	Geome	Geometria wykreślna					
ECTS points	4	Subject type P					

Langua	ge of	f lecture	angielsk Mode (of completing the cou	irse	Course credit	
Course code A		A.6.1.		Subject related to scientific research/pract. profess. prepar. (Y/N	1)	Ν			
				1	A sudent	knows the geometry	of high s	chool.	
		Knowle	dge	2	A sudent plane.	knows the basics of	projectior	n methods	s on the
				3		know the definitions ions between them.	of basic g	geometric	c objects
Prelimir requiren				1	A studen	t can perform basic g	jeometric	al constru	uctions.
of the co				2	A studen	t can use drafting too	ols.		
				3	A studen	t is able to recognize	spatial ol	bjects.	
		Social		1	A student objects	t understands the ne	ed to ider	ntify geon	netric
		Compe	tence	2	A student objects	t can describe the re	lations be	tween sp	atial
Course Goals To acquaint students with the correct definition of the location of a point, line and complex shapes in three-dimensional space.									
and com		•			•		owledge a	about the	
and com Programi principles specific c	me co s of d object	ontent descriptiv ts with th	The stude ve geome ne use of	ent o try I proj	btains ba together v	sic and extended known with the tools and tec ethods. The students	hniques ι	used to dr	aw
and com Programi principles specific c of the Mc	me co s of d object	ontent lescriptiv ts with th protocol	The stude ve geome ne use of s and 3D r the cou	ent c try I proj proj	btains ba together v ection me ection me	sic and extended known with the tools and tec ethods. The students	thniques u are being The	Form of (W, C, L,	raw he basics Methods
and com Programi principles specific c of the Mc Learning Knowled	me co s of d object onge outc	ontent descriptiv ts with th protocol	The stude ve geome ne use of s and 3D r the cour cy nas an ad	ent c try f proj proj rse - ycle van	btains ba together v ection me ection me	sic and extended know with the tools and tec ethods. The students ethods. npleting the training ledge of methods of	The referenc e to the learning outcome	Form of (W, C, L, P, S)	aw he basics of verificati on of learning outcome
and com Programi principles specific c of the Mc	me co s of d object onge outc	ontent descriptiv ts with th protocol	The stude ve geome ne use of s and 3D r the cour cy nas an ad	ent c try f proj proj rse - ycle van	btains ba together v ection me ection me - after con	sic and extended know with the tools and tec ethods. The students ethods. npleting the training ledge of methods of	The referenc e to the learning outcome s IS_K1_W 04	Form of (W, C, L, P, S)	raw he basics Methods of verificati on of learning outcome s C F G I P R
and com Programi principles specific c of the Mc Learning Knowled ge	me co s of d object onge outc 1 A 1 A 1 A 1 in	ontent descriptiv ts with th protocol comes fo sudent l rojecting	The stude ve geome ne use of s and 3D r the cour complex nas the skon	rt c try f proj proj cse - ycle van spa	btains ba together v ection me ection me - after con ced know atial objec	sic and extended knowith the tools and tec ethods. The students ethods. npleting the training ledge of methods of ts	The referenc e to the learning outcome s IS_K1_W	Form of (W, C, L, P, S)	Methods of verificati on of learning outcome S C F G I P
and com Programi principles specific c of the Mc Learning Knowled	me co s of d objectonge outconge outconge 1 A 1 in 2 th 2 th	ontent descriptiv ts with th protocol comes fo sudent l naginatio sudent l	The stude re geome a use of s and 3D r the cour cy nas an ad complex nas the skon nas the al	rse - ycle	btains ba together v ection me ection me - after con ced know atial objec of advance y to solve	sic and extended know with the tools and tec ethods. The students ethods. npleting the training ledge of methods of ts	The referenc e to the learning outcome s IS_K1_W 04 IS_K1_U	Form of (W, C, L, P, S)	raw he basics Of verificati on of learning outcome S C F G I P R C F G I P
and com Programi principles specific c of the Mc Learning Knowled ge	me co s of d objectonge outconge outconge 1 A 1 in 2 tr ol 2 tr ol 1 A	ontent descriptiv ts with th protocol comes fo sudent l nojecting sudent l naginatio sudent l ne field o bjects student	The stude ve geome ne use of s and 3D r the cour cr nas an ad complex nas the sk on nas the al f stereom correctly	rt c try t proj proj proj cse - ycle van spa kill c oility ide	btains ba together v ection me ection me - after con ced know atial objec of advance y to solve y saving d ntifies and	sic and extended knowith the tools and tec ethods. The students ethods. npleting the training ledge of methods of ts ed spatial practical tasks in	The referenc e to the learning outcome s IS_K1_W 04 IS_K1_U 01 IS_K1_U	Form of course (W, C, L, P, S) W C C C	raw he basics Methods of verificati on of learning outcome s C F G I P R C F G I P R C F G I P

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.

	study plan				
The course format Hours/sem. (h)			Tutor (coordinator) of the course le/academic degree/professional title, name and surname		
Lecture (W)	15				
Calculation class (C)	30				
Laboratory class (L)	0	dr inż. Böh	m 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)			15		
Calculation class (C)			30		
Laboratory class (L)			0		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		13		
Preparation of a report project/presentation			30		
Independent study o	of the course top	pics	10		
Examination or final	colloquium		2		
Additional contact he	ours		0		
Total student worklo	ad		100		
Number of contact h	ours (from the s	study plan)	45		

* hour (class) means 45 minutes

dr hab. inż. Kluger Krzysztof Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study		First Cycle Studies						
Specialization								
Form of Study		Full-Time Studies						
Semester		Sixth						
Course Title		Design	of s	sewa	age in	stallation		
Nazwa przedm	iotu	Projekt	owa	nie	instal	acji ściekowych		
ECTS poir	nts	3				Subject type		K
Language of	lecture	angielsk i		Μ	lode o	f completing the cours	se	Examination
Course co	Course code D.5			5.3. Subject related to scientific research/pract. profess. prepar. (Y/N)			Т	
	Knowle	dae			the principles of engineering design			
				2		SI 'II ' I ' II		
Preliminary requirements	Skille					Skills in solving mather ering applications	matical	equations in
of the course			F	2	engine			
				_	A student can think and act in a creative way			
	Social	Competen	ce	2 /	A student correctly identifies engineering problems			
Course Goals Students learn about the principles of engineering design of sanitary installations, materials and performance principles.								
Programme content Overview of sewage systems and their importance in public health and environmental protection. Basic components of sewage systems: collection, conveyance, treatment, and disposal. Determination of design flow rates based on population projections, water usage data, and peak flow considerations. Design considerations for sewage collection networks, including pipe sizing, slope determination, and hydraulic calculations								

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	Student has advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. Student knows the principles of engineering design	IS_K1_W 02	W P	АМР
Knowled ge	2	Student knows the principles of identification of hazards and occupational health, safety and ergonomics during the construction and operation of installations used in environmental engineering	IS_K1_W 03	W P	A M P
	3	Student has advanced knowledge of the principles of technical drawing and engineering graphics that enable solving technical problems in the field of environmental engineering	IS_K1_W 04	W P	A M P
	1	A student uses computer programs to solve basic tasks of sanitary installations	IS_K1_U 03	Р	АМР
Skills	2	A student knows how to perform simple research tasks regarding widely understood environmental protection technologies and in accordance with the given specification - design and implement a simple device, object, system or process typical for environmental engineering	IS_K1_U 12	Ρ	A M P
	3	A student is able to identify and formulate simple engineering tasks of a practical nature, related to environmental engineering	IS_K1_U 11	Р	АМР
Social	1	A student has a sense of responsibility for the results and effects of his professional activity, especially in the context of its impact on the natural environment and the environment	IS_K1_K 02	W P	A M P
Compet ence	2	A student is aware of the importance of professional conduct, compliance with the rules of professional ethics and respect for diversity of views and opinions, and is ready to take care of the achievements and traditions of the engineering profession	IS_K1_K 04	W P	A M P

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

Γ	1 1			
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. Boguniewicz-Zabłocka Joanna		
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 classes		14		
Preparation of a report/pape project/presentation	r/	14		
Independent study of the co	urse topics	0		
Examination or final colloqui	um	2		
Additional contact hours		0		
Total student workload		75		
Number of contact hours (fro	om the study plan	45		
* hour (class) means 45 min				

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card					
Field of study	Environmental Engineering				
Profile of Education	General Academic				
Level of study	First Cycle Studies				
Specialization					
Form of Study	Full-Time Studies				
Semester	Sixth				
Course Title	Design work - the environmental area				

Nazwa przedm	zwa przedmiotu Praca przejściowa - obszar środowiskowy								
ECTS poir	ECTS points 2			Subject type			W-K		
Language of	of lecture angielsk			Mode of completing the course			Course credit		
Course co	Course code			.12. Subject related to scientific research/pract. profess. prepar. (Y/N)			Т		
	Knowle	dge	1	machine	The student must possess knowledge of the basics of nachine and equipment design as well as drafting locumentation.				
			2						
Preliminary			1	A studen	A student has the ability to operate CAD software.				
requirements of the course	Skills		2	A student can independently search for relevant information in available databases.					
	Social		1	Self-reliance in solving project problems and the ability to work in a team.			s and the ability		
	Competence			The ability to manage time effectively. Personal discipline.					
Course Goals The objective of the course is to prepare students to independently solve project tasks related to implementing mechanical operations in the environmental sector.									
Programme content Consolidating skills in planning the project process using appropriate techniques, methods, and tools. Developing students' ability for creative thinking in solving complex engineering problems in the environmental sector.									

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 advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. Student knows the principles of engineering design.	IS_K1_W 02	Р	L
Knowled ge	2	Student has appropriate knowledge of mechanics, fluid mechanics, material science and theory of machines and strength of materials to a degree needed to understand the principles of operation and construction of devices.	IS_K1_W 07	Р	L
	3	Student has the knowledge necessary to understand the social, economic, legal, technical and non- technical aspects of engineering activity	IS_K1_W 14	Р	L
	1	Student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions.	IS_K1_U 01	Ρ	L
Skills	2	Student is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of environmental engineering in accordance with the provided specification	IS_K1_U 12	Ρ	L
	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge.	IS_K1_K 01	Ρ	L
Social Compet ence		Student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment	IS_K1_K 02	Ρ	L
		Student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork fication of learning outcomes:	IS_K1_K 05	Ρ	L

	ŀ	lours 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)	0				
Calculation class (C)	0				
Laboratory class (L)	0	dr inż. Bors	suk Grzegorz		
Project (P)	30				
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)			30		
Seminar (S)			0		
Preparation for class	es		0		
Preparation of a report project/presentation	ort/paper/		15		
Independent study o	f the course top	oics	5		
Examination or final	colloquium		0		
Additional contact ho	ours		0		
Total student worklo	ad		50		
Number of contact h	ours (from the s	study plan)	30		
< hour (class) means 15 minutes					

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

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

Course Title	Design	esign work - the industrial area						
Nazwa przedmiotu Praca			orze	rzejściowa - obszar przemysłowy				
ECTS poir	nts	2		Subject type			W-K	
Language of	lecture	angielsk i		Mode o	Mode of completing the course		Course credit	
Course code		E	E.12.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	
	Knowledge			 The student must possess knowledge of the basics of machine and equipment design as well as drafting documentation. 				
			2					
Preliminary				A student has the ability to operate CAD software.				
requirements of the course	Skills		2	A student can independently search for relevant information in available databases.			r relevant	
	Social		1	Self-reliance in solving project problems and the a to work in a team.			s and the ability	
Competence				The ability to manage time effectively. Personal discipline.				
Course Goals The objective of the course is to prepare students to independently solve project tasks related to implementing mechanical operations in the industrial sector.								
Programme content Consolidating skills in planning the project process using appropriate techniques, methods, and tools. Developing students' ability for creative thinking in solving complex engineering problems in the industrial sector.								

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 advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. Student knows the principles of engineering design.	IS_K1_W 02	Р	L
Knowled ge	2	Student has appropriate knowledge of mechanics, fluid mechanics, material science and theory of machines and strength of materials to a degree needed to understand the principles of operation and construction of devices.	IS_K1_W 07	Р	L
	3	Student has the knowledge necessary to understand the social, economic, legal, technical and non- technical aspects of engineering activity	IS_K1_W 14	Р	L
	1	Student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions.	IS_K1_U 01	Ρ	L
Skills	2	Student is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of environmental engineering in accordance with the provided specification	IS_K1_U 12	Ρ	L
	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge.	IS_K1_K 01	Ρ	L
Social Compet ence	2	Student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment	IS_K1_K 02	Ρ	L
		Student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork fication of learning outcomes:	IS_K1_K 05	Ρ	L

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)	0					
Calculation class (C)	0					
Laboratory class (L)	0	dr inż. Bors	suk Grzegorz			
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		0			
Preparation of a report project/presentation	ort/paper/		15			
Independent study o	f the course top	oics	5			
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			
<pre>< hour (class) means 45 minutes</pre>						

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

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

Course Title Differe				tial and integral calculus					
Nazwa przedm	Nazwa przedmiotu Rachu				ek różniczkowy i całkowy				
ECTS points 3		3			Р				
Language of	lecture	angielsk i	Mode of completing the course Course		lode of completing the course		Course credit		
Course code		,	A.1.3.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		
			1		erience with mathema athematical logic, theo				
	Knowledge		2	Fundamental knowledge of differential calculus of single variable real functions.					
Preliminary			3	³ Fundamental knowledge of integral calculus of single variable real functions.					
requirements			1	The ability	y to abstractional think	ing.			
of the course	Skills		2	The ability	y to construct proofs of	simple	theorems.		
	SKIIIS		3	-	The ability to formulate problems in the mathematical language.				
	Social		1	The ability	The ability to co-work in a group.				
	Compe	tence	2	Understar	nding of need for self-e	ducatio	n.		
competence			3	Student's	responsibility for his or	wn worl	۲.		
Course Goals courses.	5 5								
Programme co and its applica					l calculus of two and th the classes.	nree vai	riables functions		

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
	1	Students have knowledge with regard to differential calculus of multivariable functions and its application.	IS_K1_W 01	W	С
Knowled ge	2	Students have knowledge with regard to integral calculus of multivariable functions and its application.	IS_K1_W 01	W	С
	3	Students know English terminology used in mathematics.	IS_K1_W 17	W	С
	1	Students are able to apply differential calculus of multivariable functions to solve certain optimization issues.	IS_K1_U 06	С	СЕГР
Skills	2	Students are able to apply integral calculus of multivariable functions to solve certain geometric issues.	IS_K1_U 06	С	СЕГР
	3	Students are able to describe the above problems in English.	IS_K1_U 04	С	CEFP
Social Compet ence	1	Students understand need of continuous improvement in the range of applying of modern mathematics methods used in technology.	IS_K1_K 01	W	С
Matheologic	2				

	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)	15					
Calculation class (C)	15					
Laboratory class (L)	0	dr inż. Ścięgosz Hanna				
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)		15				

Laboratory class (L)	0
Project (P)	0
Seminar (S)	0
Preparation for classes	40
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	75
Number of contact hours (from the study plan)	30

dr Koziarska Anna Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology							
Faculty of Mechanical Engineering							
Course Description Card							
Field of study	Enviror	nmental Engii	neering				
Profile of Education	Genera	al Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tir	Full-Time Studies					
Semester	Sixth						
Course Title	Diploma work (engineering project)						
Nazwa przedmiotu	Praca o	dyplomowa (F	Projekt inżynierski)				
ECTS points	5		Subject type	W-K			
Language of lecture	angielsk i	Mode c	of completing the course	e Course credit			
Course code	Γ	D.16.	Subject related to scientific research/pract. profess. prepar. (Y/N)	N			

			Knowledge	1						
			Knowledge	2						
Preliminary	-	Skills	1							
requirem			JKIIIS	2						
of the co	bur	se	Social Competence	1	Competences acquired in t education.	Competences acquired in the current period of education.				
				2						
			The aim of the subjoint the thesis (enginee		is to perform a literature re g project).	view and	to collect	the		
Program	ne	C0	ntent Implementat	ion	of tasks resulting from the	Dissertati	on Topic	Card.		
Learning	Learning outcomes for the course - after completing the training cycle course is a set of the course									
Knowled	1	me	Student in advanced degree knows materials and nethods useful for the implementation of the liploma thesis (engineering project).				Ρ	D R		
ge	2	Stı	udent knows the pri	IS_K1_W 02	Р	D R				
	1	da	Student acquires information from literature, databases and other sources related to diploma vork (engineering project)							
Skills	2	as	Student is able to see systemic and non-technical aspects while formulating and solving engineering related to diploma work (engineering project)							
	3	(er	Student can collect data for the diploma thesis engineering project) and make their critical IS_K1_U P D R inalysis.							
Social	1	Stı	udent has a sense of responsibility for the resultsIS_K1_KPD Rnd consequences of their professional activity02PD R							
Compet ence	2	со			t a critical analysis of data of the diploma thesis	IS_K1_K 05	Ρ	D R		
Methods of v	veri	ficat	ion 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	dr hab. inż. Kłosok-Bazan Iwona				
Laboratory class (L)	0					
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)			0			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		0			
Preparation of a report/paper/ project/presentation			0			
Independent study of the course topics			125			
Examination or final	colloquium		0			
Additional contact ho	ours		0			
Total student worklo	ad		125			
Number of contact h	ours (from the	study plan)	0			
* have (alaga) magazina						

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering					
Profile of Education	General Academic					
Level of study	First Cycle Studies					
Specialization						
Form of Study	Full-Time Studies					
Semester	Seventh					
Course Title	Diploma work (engineering project)					
Nazwa przedmiotu	Praca dyplomowa (Projekt inżynierski)					
ECTS points	10	Subject type	W-K			

Language of	lecture	angielsk i		Mode o	of completing the cours	e	Examination
Course co	ourse code D.10		.16. re		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν
	Knowle	dae	1				
	KIIOWIE	uye	2				
Preliminary	Skills		1				
requirements	SKIIIS		2				
of the course	Social Competence		ce 1	Competences acquired in the current period of education.			t period of
			2				
Course Goals The aim of the subject is to prepare a diploma thesis (engineering project)							
Programme content Completion of tasks arising from the Dissertation Topic Sheet and not completed in semester IV.							

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	Student has advanced knowledge of methods and materials used for solving engineering tasks. do realizacji pracy dyplomowej (projektu inżynierskiego).	IS_K1_W 02	Р	BR
	2	Student has advanced knowledge of performing a diploma thesis (engineering project)	IS_K1_W 02	Р	B R
Knowled ge	3	Student has knowledge of electrical systems and thermodynamics, allowing for extensive understanding of the principles of operation of machines and devices in environmental engineering	IS_K1_W 05	Ρ	BR
	4	Student has knowledge of law, standards and guidelines used in the design of technical installations and their subsequent operation	IS_K1_W 13	Р	B R
³ engineering.		Student has knowledge of non-technical fields of engineering.	IS_K1_W 14	Р	B R
		Student defines and understands the fundamental problems of modern civilization.	IS_K1_W 15	Р	B R
	1	Student can accumulate and interpret obtained information, draw conclusions and formulate opinions.	IS_K1_U 01	Ρ	B R
	2	Student has skills that allow for efficient functioning in the national economy.	IS_K1_U 07	Р	B R
Skills	3	Student notices systemic and non-systemic actions in engineering work.	IS_K1_U 09	Р	B R
	4	Student can formulate simple engineering tasks related to environmental engineering.	IS_K1_U 11	Р	B R
	5	Student is able to design a simple device, object or installation used in environmental engineering.	IS_K1_U 12	Р	B R
	Student has a sense of responsibility and consequences of their professional activity, particularly in the context of its impact on the natural environment		IS_K1_K 02	Ρ	BR
Social Compet ence 2		Student is is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles	IS_K1_K 05	Р	R
	3	Student understands the need to provide the public with reliable information on engineering achievements	IS_K1_K 06	Ρ	BR

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.

	ŀ	lours in the	study plan		
The course format	Hours/sem. (h)	(tit	Tutor (coordinator) of the course cle/academic degree/professional title, name and surname		
Lecture (W)	0				
Calculation class (C)	0				
Laboratory class (L)	0	dr hab. inż	. Kłosok-Bazan Iwona		
Project (P)	0				
Seminar (S)	0				
		Student v	vorkload		
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)			0		
Preparation for class	es		0		
Preparation of a repo project/presentation			0		
Independent study o	f the course top	pics	250		
Examination or final	colloquium		0		
Additional contact he	ours		0		
Total student worklo	ad		250		
Number of contact h	ours (from the	study plan)	0		

* hour (class) means 45 minutes

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study		First C	First Cycle Studies					
Specialization								
Form of Study		Full-Tir	Full-Time Studies					
Semester		Second						
Course Title		Electiv	e module - I:	Basis of personal	dev	elopmen	t	
Nazwa przedm	iotu			: Podstawy rozwo				
ECTS poir		2	, ,	Subject type			W-HS	
Language of	lecture	angielsk i				rse	Course credit	
Course co	de	C.1. Subject rel scient research/ profess. pre			ct.		N	
	Knowle	dge			1 2			
Preliminary	CL:IL-				1			
requirements of the course	SKIIIS				2			
	Social	Comneter			1			
Social Competence				2				
Course Goals Developing skills in the field of personal development, development in interpersonal relationships, improving interpersonal skills and the ability to interact with other people								
Programme content The subject covers familiarization with content allowing the acquisition of knowledge and practical skills in the area of fundamental personal development.								

Learning	Learning outcomes for the course - after completing the training cycle				Methods of verificati on of learning outcome s
	1	A student has in-depth knowledge of selected departments of psychology in the scope needed to describe phenomena and processes related to human functioning		W	С
Knowled ge	2	S/He knows the rules of identification to an advanced degree hazards, health and safety at work, knows techniques coping with stress	IS_K1_W 03	W	С
	3	A student has advanced knowledge of the field of observation phenomena and processes taking place in groups social		W	С
Skills	1 2				
	2	A student understands the need for further education and is able to plan and implement the lifelong learning process on their own, and also critically evaluate its knowledge and skills	IS_K1_K 01	W	С
Social Compet ence	2	A student has a sense of responsibility for the results and effects of his professional and private activity, especially in the context of its impact on interpersonal relationships	IS_K1_K 02	W	С
		A student is able to think and act in a creative and innovative way and is ready to critically evaluate his knowledge, abilities and skills; cooperate and work in a group taking over various roles in it; understands the importance of team activities	IS_K1_K 05	W	С

	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. Klemens Brygida						
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 classes	10
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	18
Examination or final colloquium	2
Additional contact hours	0
Total student workload	60
Number of contact hours (from the study plan)	30

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

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

Course Description Card							
Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	l Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tin	ne Studies					
Semester	Second	Second					
Course Title	Elective module - I: Social Communication						
Nazwa przedmiotu	Moduł	Moduł wybieralny - I: Komunikacja społeczna					
ECTS points	2		Subject type		W-HS		
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit		
Course code	C.1.		Subject related to scientific research/pract. profess. prepar. (Y/N)		N		

							
		Knowledge	1				
Preliminary							
requirem		Skills	1				
of the co			2				
		Social Competence	1	A student is cap	able of te	amwork	
			2				
		The aim of the course is to pre d skills in communication	par	e students for th	e effectiv	e use of	
acquisitic	on of	ontent The subject includes far knowledge and practical skills in cation process, verbal and nonve	n th	ne field of social of	communic	ation, inc	
Learning outcomes for the course - after completing the trainin cycle				ting 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					IS_K1_W 14	W	CPR
	2						
Skills	1						
	2						
Social Compet ence	cr 1 th ur	student can communicate in a reative and innovative ways; con ne group by taking over differen nderstands the importance of go the implementation of team ac	IS_K1_K 05	W	P R		
	2						
		ation of learning outcomes: oral exam, C-written assessment, D-oral a	sses	sment. E-based on par	tial marks of	oral 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)	0					
Laboratory class (L)	0	dr inż. Klemens Brygida				
Project (P)	0	1				
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 classes	8					
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	50					
Number of contact hours (from the study plan)	30					

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

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card							
Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	al Academic					
Level of study	First Cy	ycle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Second	Second					
Course Title	Electiv	Elective module - II: Economics in micro-business					
Nazwa przedmiotu	Moduł	Moduł wybieralny - II: Ekonomia w mikrobiznesie					
ECTS points	2		Subject type		W-HS		
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit		
Course code		C.2.	Subject related to scientific research/pract. profess. prepar. (Y/N)		N		

			1	Fundamentals of	mathema	atics.	
		Knowledge	2				
Preliminary requirements		s Skills	1	Self-reliance in studying literature.			
of the co	ourse	e Social Competence	1	Communication s	skills, teai	mwork.	
	s of (Introducing students to select decision-making by economic el	ed				
price. Fui	ndar and	content Basics of economics, g mental issues regarding the con implementation of entrepreneu ration.	diti	ons for entrepren	eurship de	evelopme	ent,
Learning	out	comes for the course - after cor cycle	nple	eting the training	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Student has the knowledge of economics and					CPR		
Skills	2 1 2						
Social Compet ence	bocial ompet nce Student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork.					C P	
Mothoda of	2	nation of loarning outcomes:					
		cation of learning outcomes: 3-oral exam, C-written assessment, D-oral	asse	ssment, E-based on par	tial marks of	f oral 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)	0					
Laboratory class (L)	0	dr inż. Bors	suk Grzegorz			
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		5			
Preparation of a report project/presentation	ort/paper/		0			
Independent study o	f the course to	pics	15			
Examination or final	colloquium		2			
Additional contact ho	ours		0			
Total student worklo	ad		52			
Number of contact h	ours (from the	study plan)	30			

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	al Academic					
Level of study	First Cy	vcle Studies					
Specialization							
Form of Study	Full-Tir	Full-Time Studies					
Semester	Second	Second					
Course Title	Electiv	Elective module - II: History of science					
Nazwa przedmiotu	Moduł	Moduł wybieralny - II: Historia nauki					
ECTS points	2	2 Subject type W-HS					

Language	e of lecture	angielsk i	elsk Mode of completing the course					e credit		
Cours	e code	C	C.2. scientific research/pract.			1)	N			
	Knowle	dae	1	Basic kı	nowledge in the field	of exact	sciences			
	KIIUWIE	uye	2							
Prelimina	-		1		nt can collect and in sources, including n					
requireme of the cou		tence	2	and the	nt understands the r role of non-technica of an engineer					
	Compe	tence	2							
	als The air ent of techn		urse	is to pre	esent the role of scie	ntific disc	overies ir	n the		
cultural co acquire a c advancem for context historical f the historic	of scientific breakthroughs, examining pivotal discoveries, paradigm shifts, and the socio- cultural contexts shaping scientific progress over time. Through this module, students acquire a comprehensive understanding of the interconnectedness between scientific advancement and societal dynamics, fostering critical thinking and analytical skills essential for contextualizing contemporary scientific challenges and developments within their historical framework. Ultimately, students emerge equipped with a nuanced appreciation of the historical narrative of science, enabling them to navigate the complexities of scientific inquiry with insight and perspective.									
Learning c	cycle									
ge	The student has a deep knowledge necessary to understand the social, economic, legal, technical US_K1_W					N O				
	2									
Skille	2									
Social Compet	The stude	nt is aware of the importance of scientific IS_K1_K W N O s in the development of technology 04					NO			
				•						

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.

	ŀ	lours 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 inż. Ligu	s Grzegorz			
Project (P)	0					
Seminar (S)	0					
		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	es		5			
Preparation of a report project/presentation			0			
Independent study o	of the course top	pics	15			
Examination or final	colloquium		2			
Additional contact he	ours		0			
Total student worklo	ad		52			
Number of contact h	ours (from the	study plan)	30			

* hour (class) means 45 minutes

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
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Profile of Educa	ation	Genera	General Academic				
Level of study		First Cy	First Cycle Studies				
Specialization							
Form of Study		Full-Tim	ie Stu	ıdies			
Semester		Sevent	۱				
Course Title		Elective	e mod	ule - III	: Law and standards in	environ	mental protection
Nazwa przedm	iotu	Moduł v	vybie	ralny - I	II: Prawo i normy w ocl	nronie ś	rodowiska
ECTS poir	nts	1			Subject type		W-HS
Language of	lecture	angielsk i		Mode c	of completing the cours	e	Course credit
Course co	de	(2.3.		Subject related to scientific research/pract. profess. prepar. (Y/N)		N
	Knowle	dae	1	Gener	General knowledge of the basics of law		
	KIIUWIE	uge	2				
Preliminary	Skills		1	1 Ability to argue in discussions			
requirements of the course			2				
of the course	Social (Competen	ce 1		vareness of the benefits of continuous expansion of owledge, including non-technical knowledge		
		-	2				
Course Goals The aim of the course is to provide knowledge in the field of environmental law, including in particular the basics of the functioning and organisation of environmental protection in Poland, the institutional system of environmental protection, the principles of environmental law, familiarisation with basic terminology, as well as an indication of the differences between environmental decisions and other administrative decisions.							
Programme content The course imparts knowledge on issues related to binding legal norms for environmental protection. Within the framework of the module, students acquire knowledge of the basics of the legal system in terms of the existing and planned legislative and executive acts aimed at comprehensive and sustainable environmental management. The acquired knowledge in the field of implementation, required by law, of obligations and possible benefits for entities using the environment, allows Students to identify not only the objectives of implementation of provisions of environmental and nature protection law, but also problems arising from the manner of using the environment.							

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	Student has knowledge including environmental legislation	IS_K1_W 13	W	С
Knowled ge	2	Student knows the system of Polish environmental law, the existing links within this system and the relations and links between Polish environmental law and European Union and international law	IS_K1_W 13	W	С
	3	Student has knowledge of the quality of the environment (air, water, soil), knows the processes that shape it, knows the principles of sustainable development	IS_K1_W 06	W	С
Skills	1				
Skiiis	2				
Social Compet ence	1	Student is able to independently and critically complement the knowledge and skills in the field of environmental protection extended by the interdisciplinary dimension	IS_K1_K 01	W	С
	2	fication of learning outcomes:			<u> </u>

	Hours in the study plan				
The course format	Tutor (coordinator) of the course Hours/sem. (h) (title/academic degree/professional title name and surname				
Lecture (W)	15				
Calculation class (C)	0				
Laboratory class (L)	0	dr hab. inż. Olszowski Tomasz			
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)		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

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty	of Mec	hanical	Enginee	ering
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Course Description Card								
Field of study	1	nmental Engi	neering					
Profile of Education	Genera	General Academic						
Level of study	First Cy	cle Studies						
Specialization								
Form of Study	Full-Tin	Full-Time Studies						
Semester	Sevent	Seventh						
Course Title		Elective module - III: Social responsibility for environmental protection						
Nazwa przedmiotu		Moduł wybieralny - III: Społeczna odpowiedzialność w ochronie środowiska						
ECTS points	1		Subject type		W-HS			
Language of lecture	angielsk i	Mode o	of completing the cours	e	Course credit			
Course code	C.3.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν			

	Knowledge		1	A student has knowledge of regulations, standards and g operation of technical faciliti	juidelines		-		
			2						
Prelimir requirem of the co	ent		1	for Languages					
			2	The student respects people	nracanti	a diffora	nt		
		Social Competence	1	The student respects people opinions	presentii	ig antere	nt		
		competence	2						
	Course Goals Understanding the principles and legal aspects of environmental responsibility of society and industry								
	Programme content Concepts of Social Responsibility and Fundamentals of ISO 26000. Environmental impact assessment metods.								
Learning outcomes for the course - after completin 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		The student has know responsibility for the			IS_K1_W 06	W	С		
ge	2								
Skills	1								
Skiis	2								
Social Compet ence	1 i	mpact of human act	iviti	mpetences to assess the es on the environment and e the negative impact	IS_K1_K 06	W	С		
chee	2								
A-written ex on partial ma assessment implementat	am, E arks (from tion c	of written answers, G-term preparations for exercises, of the project, M-assessmen	ssme pape K-as	ent, D-oral assessment, E-based on par er, H-assessment from reports, I-assess sessment from the project implement defense of project, N-assessment of fo ss' activity, R-observation of the regula	sment from r ation, L-asse rm of presen	ealization of ssment of th	exercises, J- e written		

	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. Kłosok-Bazan Iwona						
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						

dr hab. inż. Kłosok-Bazan Iwona

Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card									
Field of study	1	Environmental Engineering							
Profile of Education	_	General Academic							
Level of study	First C	First Cycle Studies							
Specialization									
Form of Study	Full-Time Studies								
Semester	Fourth								
Course Title	Electrical engineering								
Nazwa przedmiotu	Inżynie	ria elektryczi	าล						
ECTS points	2		Subject type		К				
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit				
Course code	[D.15.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т				

	Knowledge		Basic information about current flow
Preliminary requirements	Ckille		Transforming equations
of the course		2	Solving systems of equations
		1	Ability to work in a group
	Social Competence		

Course Goals To acquaint students with basic knowledge of electrical engineering and electronics, and to acquire the ability to solve simple electrical systems

Programme content Study and application of physics and mathematics combined with elements of electricity, electronics, and electromagnetism to both large and small scale systems to process information.

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Learning	Learning outcomes for the course - after completing the training cycle				Methods of verificati on of learning outcome s					
	1	Knowledge of the basic laws of electrical engineering	IS_K1_W 05	W C	CDGO					
Knowled ge	2	Knowledge of building typical electrical devices	IS_K1_W 05	W	СDО					
	3	Basic information about electrical networks	IS_K1_W 05	W	CDO					
	1	Solving simple DC and AC circuits	IS_K1_U 12	С	G					
Skills	2	Solving simple DC and AC circuits	IS_K1_U 02	С	C D G N O					
	3	Determining the basic parameters of electrical devices		С	D G					
Social Compet	1	Consciousness of dangers related to electric current	IS_K1_K 02	W	NO					
ence	2									
Mothode of	Motheds of varification of learning outcomes:									

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)	15						
Calculation class (C)	15						
Laboratory class (L)	0	dr inż. Łukasiewicz 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)			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/		8				
Independent study o	f the course to	pics	0				
Examination or final	colloquium		2				
Additional contact ho	ours		0				
Total student worklo	ad		50				
Number of contact h	ours (from the	study plan)	30				

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental 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	Second	Second						
Course Title	Elemer	Elements of informatics and foundations of programming						
Nazwa przedmiotu	Elemer	Elementy informatyki i podstawy programowania						
ECTS points	5	Subject type	Р					

Langua	ge	of lecture angielsk Mode of com					f completing the cou	course Course credit		
Course code B.3.2.				Subject related to scientific research/pract. profess. prepar. (Y/N			1)	N		
		Knowle	dae			4tł	n level of the Polish C	Qualification	ons Frame	ework
Prelimir	nar		age		2	4.1				
requirem	requirements Skills				1 2	4tr	n level of the Polish C	Jualincatio	ons Frame	ework
of the co	ours					4tł	n level of the Polish C	Dualificatio	ons Frame	ework
		Social (Competen	ce	2					
							of development of r			cience
					<u> </u>		ents to programming			
				nt dee	pen	s k	nowledge in the field	ot compu	uter scien	ce and
	programming languages. The Methods of reference Form of Langificanti									
Learning outcomes for the course - after completing the trainin cycle						npleting the training	e to the	course (W, C, L,	verificati on of learning outcome s	
	1	Student k technolog						IS_K1_W 02	W	C D
Knowlod	2			-	rinciples of computer advanced level			IS_K1_W 02	WL	СНР
Knowled ge				the applications of computers in actice at the advanced level					WL	СНР
							an be useful during e at the advanced	IS_K1_W 02	WL	D P
	1	Student ca editor	an create	text do	ocur	ne	nts using a text	IS_K1_U 02	L	СН
Skills	2	Student ca	an do calc	ulatior	าร นะ	sin	g a spreadsheet	IS_K1_U 03	L	СН
JKIIIS	3	Student ca screen	an create	a pres	enta	atic	on displayed on the	IS_K1_U 05	L	C N
	4	Student ca	an create	n create simple programs					L	СН
Social Compet	T			nderstands the need for further training noting professional competence					WL	CDP
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 le/academic degree/professional title, name and surname				
Lecture (W)	30						
Calculation class (C)	0						
Laboratory class (L)	30	dr inż. Łuka	asiewicz 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)			30				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		30				
Preparation of a repo project/presentation			0				
Independent study o	of the course top	oics	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)	60				

* hour (class) means 45 minutes

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study		First Cy	cle s	Studies				
Specialization								
Form of Study		Full-Tin	ne St	tudies				
Semester		Sixth						
Course Title		Energetic efficiency of industrial processes						
Nazwa przedm	niotu	Energo	chło	nność pr	ocesów przemysłowycł	า		
ECTS poir	nts	3			Subject type		W-K	
Language of	lecture	angielsk i		Mode o	of completing the cours	e	Course credit	
Course code E		E.8.	8. Subject related to scientific research/pract. profess. prepar. (Y/N)		T			
	Knowle	dao	1	A student has knowledge of thermodynamic changes and principles of energy management. A student understands the basic principles of energy conversion.				
	KIIUWIE	uge	2					
Preliminary requirements of the course	Skills				Ident obtains information independently from able sources.			
of the course			2					
	Social	tonco	1	A student is aware of professional conduct in solving problems engineering problems.			duct in solving	
	Compe	lence	2					
					nergy balances of a wig gy-intensive areas of th			
consumption c and skills in th consumption c	of indust e field o of techno	rial proces f energy o plogical pr	sses consi oces	. As part umption sses in a	nowledge on issues related of the module, the stu- of various industries, a n industrial plant and e The acquired knowledg	dent ac issessm conomi	quires knowledge ent of energy c aspects in	

optimizing energy consumption in industry. The acquired knowledge allows you to calculate the energy consumption of complex production technology, including primarily energy balances of individual process stages.

Learning	οι	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	-	Methods of verificati on of learning outcome s
Knowled	1	Students understand the principles guiding exploitation of machines and thermodynamic processes inherent in them.	IS_K1_W 05	W C P	CKL
ge		Students gain advanced knowledge of the principles of rational energy use, relevant in terms of the rational energy management in industrial processes.	IS_K1_W 12	W C P	CKL
Skills	1	Students are able to conduct an initial economic analysis of the realized technical activities with practical application.	IS_K1_U 10	СР	CKL
JKIIIS	2	Students gain the ability to comprehend technical and non-technical aspects during statement and solving of standard engineering tasks.	IS_K1_U 09	СР	CKL
Social 1		Students are prepared to act creatively and actively when performing tasks individually and in a team.	IS_K1_K 05	СР	CKL
Compet ence	2	Student understand the need to learn and are able to independently plan and implement the lifelong learning proces	IS_K1_K 01	W C P	CKL

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)	15		prof. dr hab. inż. Tic Wilhelm			
Laboratory class (L)	0	prof. dr hal				
Project (P)	15					
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)			15			

Seminar (S)	0
Preparation for classes	5
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	75
Number of contact hours (from the study plan)	60

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card							
Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	General Academic					
Level of study	First Cy	cle Studies/					
Specialization							
Form of Study	Full-Tin	ne Studies					
Semester	Sixth	Sixth					
Course Title	Energetic efficiency of municipal facilities						
Nazwa przedmiotu	Energo	chłonność ob	iektów komunalnych				
ECTS points	3		Subject type		W-K		
Language of lecture	angielsk i	ngielsk Mode of completing the course Course					
Course code		E.8.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		

		1								
		Knowledge	1	Student knows the basic conce of processes.	pts of ene	ergy cons	umption			
			2	The student knows the method	lology of e	energy ba	lancing.			
Skills Preliminary		1	The student is able to build ene	ergy balar	nces.					
		2	Student is able to analyze data energy intensity indicators.	, process	it and de	termine				
requirements of the course Social			1	The student is aware of the need to supplement knowledge throughout life and is able to select appropriate methods of learning for himself and others in the context of management of municipal facilities and their energy intensity.						
		Competence	etence 2 The student understands the non-technical aspects of the activity of the municipal energy manager, among other things, its social consequences and impact on the environment.							
facilities greenhou	in te Ise g	erms of reducing e gas emissions and	ener I ac	nts with the issue of energy cons rgy consumption in municipal fa hieving financial savings for loca of cities and municipalities.	cilities, re	educing				
				acteristics of municipal facilities n in municipal facilities. The mai						
consump resources	tion		_	the high energy intensity of must a strategies to improve energy ef	•					
consump resources facilities.	tion s. Op	oportunities to ap	ply	strategies to improve energy ef	ficiency in The	n municip Form of course (W, C, L,	al Methods			
consump resources facilities. Learning	tion s. Op out	comes for the cou	urse cycl	strategies to improve energy ef	The referenc e to the learning outcome	Form of course (W, C, L, P, S)	Al Methods of verificati on of learning outcome			
consump resources facilities.	tion s. Op out 1 ir 2 k	comes for the councert comes for the councert a student has an entensity of munic a student has suff	urse cycl	strategies to improve energy ef - after completing the training e anded knowledge of energy	ficiency in The referenc e to the learning outcome s IS_K1_W	Form of course (W, C, L, P, S) W P	Al Methods of verificati on of learning outcome s C K L M			
consump resources facilities. Learning Knowled ge	tion s. Op out 1 ir 2 k a 1 A	comes for the council comes for the council a student has an entensity of munic a student has suff conveledge of the source of t	urse cycl ipal iciel ope in t re a	e - after completing the training e - after completing the training e - anded knowledge of energy facilities and resources. Int for engineering purposes ration of municipal facilities cerms of their energy intensity. basic task on the analysis of	ficiency in The referenc e to the learning outcome s IS_K1_W 01 IS_K1_W	Form of course (W, C, L, P, S) W P	al Methods of verificati on of learning outcome s C K L M P			
consump resources facilities. Learning Knowled	tion s. Op out 1 ir 2 k a 1 e 2 ti	comes for the cou comes for the cou a student has an e ntensity of munic a student has suff mowledge of the and infrastructure a student can solv energy intensity o a student is able t	ply urse cycl ipal iciel ope in t re a f mu o cc the	e - after completing the training e anded knowledge of energy facilities and resources. Int for engineering purposes ration of municipal facilities cerms of their energy intensity. basic task on the analysis of unicipal facilities omplete simple analytical broad issues of energy	ficiency in The referenc e to the learning outcome s IS_K1_W 01 IS_K1_W 07 IS_K1_U	n municip Form of course (W, C, L, P, S) W P W C P	Al Methods of verificati on of learning outcome S C K L M P C K L M P C K L M			
consump resources facilities. Learning Knowled ge	tion s. Op out 1 ir 2 k a 1 e 2 ta ir 2 ta	comes for the cou comes for the cou a student has an e ntensity of munic a student has suff mowledge of the and infrastructure a student can solve energy intensity o a student is able t asks, concerning ntensity of munic	urse cycl expa ipal iciel ope in t re a f mu o cc the ipal o in	e - after completing the training e anded knowledge of energy facilities and resources. Int for engineering purposes ration of municipal facilities cerms of their energy intensity. basic task on the analysis of unicipal facilities omplete simple analytical broad issues of energy facilities. teract and work in a group	ficiency in The referenc e to the learning outcome s IS_K1_W 01 IS_K1_W 07 IS_K1_U 11 IS_K1_U	n municip Form of course (W, C, L, P, S) W P W C P C P C P	Al Methods of verificati on of learning outcome S C K L M P C K L M P C K L M P			

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)	15					
Laboratory class (L)	0	dr inż. Tańo	czuk Mariusz			
Project (P)	15					
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)			15			
Seminar (S)			0			
Preparation for class	es		5			
Preparation of a report project/presentation	ort/paper/		10			
Independent study o	f the course top	oics	5			
Examination or final	colloquium		0			
Additional contact ho	ours		0			
Total student workloa	ad		80			
Number of contact h	ours (from the s	study plan)	60			

* hour (class) means 45 minutes

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study		First Cycle Studies							
Specialization									
Form of Study				Studies					
Semester		Fourth	n						
Course Title		Enera	v n	nanagemen	t in industry				
Nazwa przedm	niotu	-			ergią w przemyśle				
ECTS poir		6			Subject type		W-K		
Language of	lecture	angielsk i	(Mode o	f completing the cours	е	Examination		
Course co	Course code		E.	2.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		
			1	Basic general knowledge of industrial processes.					
	Knowle	dge	2	Knowledge of the nature of useful energy and the use of fuels and energy resources.					
			3	Knowledge of energy units and energy balancing.					
			1	The skill of	f writing simple energy	balanc	es.		
Preliminary	Skills		2	Skill in det devices.	Skill in determining the efficiency of simple energy devices.				
requirements of the course			1	Student corectly identufies engineering problems and is able to determine the priorities of professional activities.					
Social Competence		tence	2	Student is aware of the importance and understands the non-technical aspects and effects of engineering activities, including their impact on the environment, and the associated responsibility for taken decisions					
		3	Student can interact and work in a group, assuming different roles in the group						
	taking p	olace in i	ndı	ustrial instal	h the issues of energy llations and systems, w				
Programme co	ntent	Energy b	ala	ncing of pro	ocesses in industrial pla				

industrial processes. Methods of determining the energy intensity of industrial processes. Evaluation of economic efficiency of rational energy management in industry.

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	Students knows the principles of operation of heat recovery units and devices and has knowledge about the development trends in their construction	IS_K1_W 05	W P	AKLM O
Knowled ge	2	Student knows the principles of rational energy management in industrial plants in an advanced degree.	IS_K1_W 12	W C	A C
	3	Student has the knowledge necessary to understand the social, economic, legal, technical and non- technical determinants of the energy economy in industry.	IS_K1_W 14	W	A
	1	Student is able to apply analytical, simulation and experimental methods to formulate and solve computational problems in energy management in industry.	IS_K1_U 06	С	С
Skills	2	Student is able to see systemic and non-technical aspects in the assessment of the energy economy in industry	IS_K1_U 09	С	С
	3	Student knows how to prepare prefeasibility studies and economic analysis of energy efficiency measures in industrial plants.	IS_K1_U 10	С	С
	1	Student has a sense of responsibility for the results and effects of his professional activity in the field of energy management in an industrial plant.	IS_K1_K 02	W C P	A C K L M O
Social Compet ence	2	Student correctly identifies problems related to improperly conducted energy management in industrial plants	IS_K1_K 03	W P	AKLM O
	3	Student is able to think and act in a creative, innovative and entrepreneurial way in terms of optimising energy management in industry.	IS_K1_K 05	W P	AKLM O

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)	15						
Laboratory class (L)	0	dr inż. Tańczuk Mariusz					
Project (P)	30						
Seminar (S)	0						
		Student v	vorkload				
Types of student activities*			Average number of hours* allocated on completed activities				
Lecture (W)			30				
Calculation class (C)			15				
Laboratory class (L)			0				
Project (P)			30				
Seminar (S)			0				
Preparation for classes			25				
Preparation of a report/paper/ project/presentation			30				
Independent study o	f the course to	pics	16				
Examination or final	colloquium		4				
Additional contact ho	ours		0				
Total student workload			150				
Number of contact hours (from the study plan)			75				
the unit (close) means (F minutes							

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature)

dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Κ

Opole University of Technology

Faculty of Mechanical Engineering **Course Description Card Environmental Engineering** Field of study Profile of Education **General Academic** Level of study **First Cycle Studies** Specialization **Full-Time Studies** Form of Study Semester First Energy production techniques Course Title Nazwa przedmiotu Techniki pozyskiwania energii **ECTS** points Subject type 4

Language of lecture angielsk		Mode of completing the course			Examination		
Course code		D.11.			Subject related to scientific research/pract. profess. prepar. (Y/N)		т
	Knowledge		1	Basic knowledge of technical thermodynamics and energy conversion.			dynamics and
			2				
Preliminary requirements	Preliminary requirements Skills		1	Understanding of a number of concepts in the field of energy and fuel management.			ots in the field of
of the course			2				
Social				1 A student is able to notice the effects of human activit in the context of its impact on the environment.			
	Compe	Competence		2			
Course Goals The aim of the course is for students to learn about energy generation							

techniques used in the national economy, which enable meeting the needs of humanity and industry.

Programme content The thermodynamic basis, conditions and limitations of energy acquisition will be presented. Classic techniques using non-renewable fuels such as classic power plants with power boilers, nuclear power plants and power plants with gas units will be discussed. Techniques using renewable energy sources such as wind, water energy, solar energy and geothermal energy will be discussed. Various aspects of the use of biomass as an energy source will be presented. Problems related to energy storage and transmission will be discussed.

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
	1	A student has knowledge about fossil fuel resources in Poland and worldwide and about the possibilities of their use.	IS_K1_W 08	W	APR
Knowled ge	2	A student understands the importance of the use of renewable energy sources for humanity's livelihood.	IS_K1_W 08	W	APR
	3	A student has an advanced knowledge of the principles, possibilities and limitations of energy efficiency.	IS_K1_W 12	W	APR
Skills	1	-			
	2				
Social Compet ence 2		A student the need for further training in the field of energy generation techniques	IS_K1_K 01	W	APR
		A student correctly identifies engineering and technical problems arising in the processes of energy generation techniques fication of learning outcomes:	IS_K1_K 03	W	APR

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)	45				
Calculation class (C)	0				
Laboratory class (L)	0	prof. dr hab. inż. Pospolita Janusz			
Project (P)	0				
Seminar (S)	0				
		Student workload			
Types of student act	ivities*	Average number of hours* allocated on completed activities			
Lecture (W)		45			
Calculation class (C)		0			
Laboratory class (L)		0			
Project (P)		0			
Seminar (S)		0			
Preparation for class	es	15			

Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	40
Examination or final colloquium	1
Additional contact hours	0
Total student workload	101
Number of contact hours (from the study plan)	45

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

Course Description Card							
Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	l Academic					
Level of study	First Cy	cle Studies/					
Specialization							
Form of Study	Full-Tin	ne Studies					
Semester	Third	Third					
Course Title	Engine	Engineering drawing with CAD I					
Nazwa przedmiotu	Zapis k	onstrukcji z v	wykorzystaniem CAD I				
ECTS points	1		Subject type		K		
Language of lecture	angielsk i	ngielsk Mode of completing the course			Course credit		
Course code	D.14.1.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		

		-	
	Knowlodgo	1	Understanding of Engineering Principles: Familiarity with fundamental engineering concepts such as dimensions, tolerances, scales, and engineering graphics is essential.
	Knowledge	2	Technical Drawing Skills: Proficiency in manual technical drawing techniques including sketching, orthographic projection, isometric drawing, and dimensioning.
		1	Computer Literacy: Basic computer skills are necessary, including file management, navigating software interfaces, and familiarity with operating systems like Windows
		2	Introduction to CAD Software: Basic understanding of Computer-Aided Design (CAD) software principles, functionalities, and interface navigation.
Preliminary requirements	Skills	3	Geometry and Mathematics: Understanding of basic geometry principles, angles, measurements, and mathematical calculations relevant to technical drawing and CAD design.
of the course		4	Visualization Skills: Ability to visualize three-dimensional objects from two-dimensional drawings and vice versa is important for interpreting engineering drawings accurately.
		5	English Language Proficiency: If the course is conducted in English, a sufficient level of English language proficiency is necessary to understand instructions, lectures, and technical documentation.
		1	A student is able to interact and work in a group taking over different roles in it; understands the importance of team activities
	Social Competence	2	A student correctly identifies engineering problems and can set priorities for professional activities
		3	A student can think and act in a creative, innovative and enterprising way

Course Goals The aim of the course is to familiarize students with the methods of computer-aided CAD design and, on the example of AutoCAD, the acquisition of the ability to use its standard capabilities in practice

Programme content a. Introduction to Engineering Drawing: Basic concepts and principles of engineering drawing. Importance of technical drawings in engineering design and communication. b. CAD Software Basics: Overview of CAD software functionalities and interface navigation. Introduction to drawing tools, commands, and settings in CAD software. c. Geometric Construction: Techniques for constructing geometric shapes, lines, and curves. Understanding geometric relationships and constraints in technical drawing. d. Orthographic Projection: Principles and methods of creating orthographic projections. Multiview drawings: front, top, side views, and their projections. e. Dimensioning and Tolerancing: Guidelines for dimensioning technical drawings accurately. Introduction to tolerances and their application in engineering drawings. f. Isometric Drawing: Techniques for creating isometric views of three-dimensional objects. Understanding isometric axes and scale in isometric drawing. g. Introduction to Assembly Drawings: Basics of assembly drawings, exploded views, and parts lists. Importance of assembly drawings in engineering design and manufacturing. h. Project Work: Practical exercises and assignments using CAD software to create engineering drawings. Real-world applications of technical drawing principles and CAD design skills.

Learning	OL	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s			
Knowled ge	1	Student has advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. Student knows the principles of engineering design.	IS_K1_W 02	L	K P R			
	2							
Skills	1	Student uses computer software to solve engineering tasks	IS_K1_U 03	L	KPR			
	2							
Social Compet ence	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge	IS_K1_K 01	L	KPR			
	2							
Methods of v	Methods of verification of learning outcomes:							

Hours in the study plan					
The course format	Hours/sem. (h)		Tutor (coordinator) of the course le/academic degree/professional title, name and surname		
Lecture (W)	0				
Calculation class (C)	0				
Laboratory class (L)	15	dr inż. Poch	iwała Sławomir		
Project (P)	0				
Seminar (S)	0)			
		Student w	vorkload		
Types of student activities*			Average number of hours* allocated on completed activities		
Lecture (W)			0		
Calculation class (C)			0		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for classes			0		
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	25
Number of contact hours (from the study plan)	15

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description CardField of studyEnvironmental EngineeringProfile of EducationGeneral AcademicLevel of studyFirst Curle Studies

Profile of Education	Genera	General Academic					
Level of study	First Cy	First Cycle Studies					
Specialization							
Form of Study	Full-Tin	ne Studies					
Semester	Fourth						
Course Title	Engine	Engineering drawing with CAD II					
Nazwa przedmiotu	Zapis k	Zapis konstrukcji z wykorzystaniem CAD II					
ECTS points	1		Subject type		К		
Language of lecture	angielsk i	Mode of completing the course			Course credit		
Course code	D	.14.2.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		

Preliminary requirements of the course	Knowledge	1	Proficiency in Basic CAD Skills: Students should have a solid understanding and proficiency in basic CAD skills, including software navigation, drawing creation, editing, and dimensioning.
		2	Knowledge of Advanced CAD Features: Familiarity with advanced features and tools of CAD software, such as parametric modeling, assembly design, advanced surface modeling, and simulation.
	Skills	1	Problem-Solving Skills: Strong problem-solving skills to tackle complex design issues and optimize designs for efficiency and functionality.
		2	Critical Thinking Abilities: Ability to analyze design problems critically, evaluate design solutions, and make informed decisions to improve designs.
		3	Communication Skills: Effective communication skills to convey design ideas, collaborate with team members, and present design solutions effectively.
		4	Attention to Detail: High level of attention to detail to ensure accuracy and precision in advanced CAD designs.
	Social Competence	1	A student is able to interact and work in a group taking over different roles in it; understands the importance of team activities
		2	A student correctly identifies engineering problems and can set priorities for professional activities
		3	A student can think and act in a creative, innovative and enterprising way
Ourse Goals The aim of the course is to familiarize students with the methods of			

Course Goals The aim of the course is to familiarize students with the methods of computer-aided CAD design and, on the example of AutoCAD, the acquisition of the ability to use its standard capabilities in practice

Programme content Advanced CAD Software Features: Exploration of advanced features and functionalities of CAD software. Parametric modeling techniques for creating complex and flexible designs. Advanced assembly modeling including assemblies with moving parts and constraints. Advanced 3D Modeling: Advanced techniques for solid modeling including lofting, sweeping, and blending. Surface modeling for creating complex shapes and freeform designs. Incorporating organic shapes and curvature continuity in 3D models. Design Optimization: Strategies for optimizing designs for performance, manufacturability, and costeffectiveness. Analysis tools for evaluating structural integrity, material usage, and assembly feasibility. Collaborative Design: Collaborative design processes and tools for multi-user environments. Version control and data management strategies for collaborative projects.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	Student has advanced knowledge of the principles of technical drawing and engineering graphics that enable solving technical problems in the field of environmental engineering	IS_K1_W 04	L	KPR
	2				
	1	Student uses computer software to solve engineering tasks	IS_K1_U 03	L	KPR
Skills	2	Student is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of environmental engineering in accordance with the provided specification	IS_K1_U 12	L	KPR
Social	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge	IS_K1_K 01	L	KPR
Compet ence	2	Student correctly identifies engineering problems and is able to prioritise professional activities and recognises the importance of knowledge in solving cognitive and practical problems	IS_K1_K 03	L	KPR

Hours in the study plan					
The course format	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)	15	dr inż. Pochwała Sławomir			
Project (P)	0				
Seminar (S)	0				
		Student w	vorkload		
Types of student act	ivities*		Average number of hours* allocated on completed activities		
Lecture (W)			0		

Calculation class (C)	0
Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	0
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	25
Number of contact hours (from the study plan)	15

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

eouise Description cura						
Field of study	Enviror	Environmental Engineering				
Profile of Education	Genera	I Academic				
Level of study	First Cy	cle Studies/				
Specialization						
Form of Study	Full-Tin	ne Studies				
Semester	Fifth	Fifth				
Course Title	Engine	Engineering drawing with CAD III				
Nazwa przedmiotu	Zapis k	onstrukcji z v	wykorzystaniem CAD III			
ECTS points	1		Subject type		К	
Language of lecture	angielsk i	Mode o	of completing the cours	e	Course credit	
Course code	D	.14.3.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	

			1	Elementary knowledge of de	scriptive	geometry	1			
		Knowledge	2	Knowledge of the principles	of technic	al drawin	g			
			3	General knowledge of standardized structural elements						
Prelimir requirem			1	Support standard computer functions						
of the co			2	Making technical drawings using traditional technique						
		Social Competence	1	Commitment to the process qualifications	of improv	ving profe	ssional			
		competence	2							
				to use computer-aided designetion of the equipments.	gn tools ir	the field	of			
supportin	ig t	he design of industri	al e	course, students acquire skills quipment. They will learn the nd visualization of 3D objects	functiona					
Learning	ou	tcomes for the cours cyc		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	The student knows the possibilities of using computer support in the design and construction of industrial equipment in the field of mapping the $IS_K1_W_{02}$ L G						G			
	2									
Skills	1	The student is able to develop models of machine and camera components, using the basic functions of the selected CAD software. $IS_K1_U_{03}$ L G					G			
	2									
Social Compet	1	The student demonstrates independence and creativity in solving simple engineering tasks.					G			
ence	2									
A-written ex	am,		essme	ent, D-oral assessment, E-based on par						

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)	0						
Calculation class (C)	0						
Laboratory class (L)	15	dr hab. inż.	. Dyga Roman				
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)			15				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		0				
Preparation of a report/paper/ project/presentation			8				
Independent study o	f the course to	pics	2				
Examination or final	colloquium		0				
Additional contact hours			0				
Total student worklo	ad		25				
Number of contact h	ours (from the	study plan)	15				
*1 (1)							

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course	Descrip	tion Ca	rd
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	G i						
Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	I Academic					
Level of study	First Cy	/cle Studies					
Specialization							
Form of Study	Full-Tir	Full-Time Studies					
Semester	Sixth	Sixth					
Course Title	Engine	Engineering drawing with CAD IV					
Nazwa przedmiotu	Zapis k	Zapis konstrukcji z wykorzystaniem CAD IV					
ECTS points	1	1 Subject type K					

Langua	ge of	lecture	angielsk Mode of completing the cou				ırse	Course	e credit
Cour	Course code D.1			14.4. profess. prepar. (Y/N		۱)	Ν		
		Knowle	dge	1	enginee	nt knows the principl pring graphics to solv mental engineering.			-
Prelimir requirem of the co	nents	SVIIIC		2 1 2		nt uses computer pro ring tasks.	ograms to	solve ba	sic
		Social Compe ⁻	tence	1		nt correctly identifies to determine prioritie	•	•	
computer	r-aide	ed desigi		, usi		o familiarize student CAD as an example,			
coordinat the skills modeling	to vi met	stem and ew a dra hod, and	d tools for wing in sp I practicall	moc ace y m	leling an , create odify sol	owledge and skills the d modifying 3D object advanced structures ids. As a result, they n their future profess	cts. Stude using the will be re	nts will a ASCI soli ady to eff	cquire d
Learning	Learning outcomes for the course - after completing the training learning (W, C, L, outcome P, S). Learning outcomes for the course - after completing the training outcome P, S). Method of verification of learning outcome P, S). Method of verification outcome P, S). Method S,						verificati		
Knowled ge	1 nı ar	student has an advanced understanding of numerical and computer methods, as well as tools and materials used in contemporary design in particular the use of AutoCAD software.							
	2	student		outo	r progra	ms in particular			
Skills			tudent uses computer programs, in particular IS_K1_U L G						G
Social Compet ence	A ec 1 in as ai	ducation nplemen s criticall	lent understands the need for further tion and is able to independently plan and ment the process of lifelong learning, as well ically evaluate the knowledge of computer- design in CAD environment.					G	
Methods of v	2 /erifica	ation of lear	ning outcome	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)	0					
Calculation class (C)	0					
Laboratory class (L)	15	dr inż. Mas	iukiewicz Maciej			
Project (P)	0					
Seminar (S)	0					
		Student v	vorkload			
Types of student activities*			Average number of hours* allocated on completed activities			
Lecture (W)			0			
Calculation class (C)			0			
Laboratory class (L)			15			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		0			
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			25			
Number of contact h	ours (from the	study plan)	15			

* hour (class) means 45 minutes

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Loval of study		First Cycle Studies					
Level of study		FIISLCY	cie :	Studies			
Specialization							
Form of Study		Full-Tim	ie St	tudies			
Semester		Seventh	۱				
Course Title		Enginee	ering	g drawing	g with CAD V		
Nazwa przedm	iotu	Zapis k	onst	rukcji z v	vykorzystaniem CAD V		
ECTS poir	nts	1			Subject type		К
Language of	lecture	angielsk i	Mode of completing the course		e	Course credit	
Course co	de	D.	D.14.5.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν
	Knowledge		1	enginee	nt knows the principles ring graphics to solve t mental engineering.		
Preliminary requirements of the course	Social		1	A student is able to use computer programs basic engineering tasks.		grams to solve	
			2				
			1	A student understands the need for further training and professional competence in the use of CAD programs.			
	Compe	lence	2				
Course Goals	The nu	nose of th		nurse is t	o familiarize students y	with the	methods of

Course Goals The purpose of the course is to familiarize students with the methods of computer-aided design CAD and, using AutoCAD as an example, to acquire the ability to use its standard capabilities in practice.

Programme content As part of the course, students will learn advanced techniques for designing, creating 3D models and documenting construction with this specialized tool. This module enables students to learn the principles of effective use of AutoCAD in the process of creating structural designs, which will allow them to effectively operate this tool in professional practice. In addition, the practical ability to analyze, modify and improve existing structural designs using AutoCAD will be provided, which will be an important competency for future engineers involved in design in the technical field.

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 an advanced understanding of numerical and computer methods, as well as tools and materials used in contemporary design. Knows the principles of computer-aided engineering design using AutoCAD.	IS_K1_W 02	L	G
	2				
Skills	1	A student uses CAD computer programs to solve basic engineering tasks.	IS_K1_U 03	L	G
	2				
Social Compet ence	1	A student understands the need for further education and is able to independently plan and implement the process of lifelong learning, as well as critically evaluate the knowledge of computer- aided design in the AutoCAD environment.	IS_K1_K 01	L	G
	2	fication of loarning outcomos:			

	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)	0					
Calculation class (C)	0					
Laboratory class (L)	15	dr inż. Masiukiewicz Maciej				
Project (P)	0					
Seminar (S)	0					
		Student workload				
Types of student act	ivities*		e number of hours* allocated on completed activities			
Lecture (W)			0			
Calculation class (C)			0			
Laboratory class (L)			15			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		0			

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	25
Number of contact hours (from the study plan)	15

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Descrip	Course Description Card							
Field of study		Enviror	nme	ental	Engir	neering		
Profile of Educa	ation	Genera	General Academic					
Level of study		First Cy	/cle	Stu	dies			
Specialization								
Form of Study		Full-Tin	ne S	Studi	ies			
Semester		First						
Course Title		Enviror	nme	ental	biolo	gy and basics of ecolog	ју	
Nazwa przedm	iotu	Biologi	a śr	odov	wiska	z podstawami ekologii		
ECTS poir	nts	3				Subject type		Р
Language of lecture angielsk				Mode of completing the course			Course credit	
Course code A.4.		.4.1	4.1. Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			
	Knowle	dae		1	Basic	knowledge of biology a	and mat	hematics
	KIIOWIE	uge		2				
Preliminary				1 /	Ability	to work both independ	dently a	nd in a team
requirements	Skills			2	Ability	to organize work well	during	laboratory classes
of the course	of the course			3 -	3 The ability to think creatively.			
	Social Competence			1	1 Willingness to further education.			
		Joinpeten		2				

Course Goals The aim of the course is to familiarize students with basic concepts related to ecology and selected aspects of environmental biology. The knowledge provided will include, among others: relations at the interface between biocenosis and biotope, the concepts of species, population, ecosystem, circulation of matter and energy flow, the role of producers, consumers and decomposers, as well as selected aspects of human-environment relations. Students will receive not only theoretical knowledge, but also improve their skills in planning work while performing laboratory classes. Independent analysis of problems related to relationships in the environment will develop the student's skills to more easily recognize various situations that may arise in a given habitat.

Programme content The subject provides knowledge regarding basic issues and problems of ecology and environmental biology. During the classes, the student acquires theoretical knowledge, but also practical skills in organizing work in the laboratory and in the field, including: observations and assessment of the impact of selected environmental factors on living organisms or organic matter, observations and characteristics of an example habitat.

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 extended knowledge of selected fields of ecology and environmental biology to the extent necessary to describe phenomena and processes occurring in the environment.	IS_K1_W 01	WL	CHPR
ge	2	The student has systematic knowledge about the role of the natural environment, phenomena occurring in ecosystems, is aware of disturbances in ecosystems, is able to identify.	IS_K1_W 06	WL	CHPR
Skills	1	Student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions.	IS_K1_U 01	L	HPR
	2	Student is able to perform simple research tasks regarding ecology and phenomena occurring in the environment.	IS_K1_U 12	L	HPR
Social Compet ence	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge	IS_K1_K 01	W L	CHPR
	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) 15 dr Ku			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)			15		
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/		15		
Independent study o	f the course top	pics	15		
Examination or final	colloquium		1		
Additional contact ho	ours		0		
Total student worklo	ad		76		
Number of contact h	ours (from the s	study plan)	30		
(hour (close) means (E minutes					

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card					
Field of study	Environmental Engineering				
Profile of Education	General Academic				
Level of study	First Cycle Studies				
Specialization					
Form of Study	Full-Time Studies				
Semester	Seventh				
Course Title	Environmental hazards in industrial processes				

Nazwa przedm	Nazwa przedmiotu Środowi			kowe zagrożenia w procesach przemysłowych					
ECTS poir	ECTS points 2		Subject type			W-K			
Language of	je of lecture angielsk			Mode of completing the course		Course credit			
Course code			E.6.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		
	Preliminary requirements of the course Skills Social Competence		A Student knows the components of the and the interdependencies between the						
Preliminary			2	A Studen has basic knowledge of technology and devices industrial.			nology and		
requirements			Skills				A Studen is able to assess the risk of individual components industrial processes.		
			2						
			1	A Studen understands the need for further education.			ther education.		
			2						
Course Goals	Course Goals The aim of the course is to familiarize students with environmental threats in								

industrial processes

Programme content The subject provides knowledge on issues related to environmental hazards in industrial processes. During the module, the student acquires knowledge and skills in the assessment and analysis of the harmfulness of industrial processes at the design stage, process approval and application for various industries. Acquired knowledge in identifying sources of ecological threats and ecological nuisance in industrial processes allows for determining the degree of harmfulness of an industrial process for various branches of the economy.

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 knows the principles of identification of hazards in environmental engineering	IS_K1_W 03	W P	CKLR
Knowled ge	2	Student has specialist and systematic knowledge of the role of the natural environment, is aware of hazards in industrial porcesses and knows how to identify and reduce them	IS_K1_W 06	W P	CKLR
Skills	1	Student is able to critically analyze how things work and evaluate existing solutions techniczne, stosowane w procesach przemysłowych	IS_K1_U 10	Ρ	KLR
SKIIIS	2	Student is able to conduct a critical analysis of functioning and evaluate the existing technical solutions used in environmental engineering	IS_K1_U 12	Ρ	KLR
Social	1	Student correctly identifies engineering problems	IS_K1_K 03	W P	CKLR
Compet ence	2	Student is able to think and act in a creative way	IS_K1_K 05	Р	KLR

	Hours in the study plan						
The course format Hours/sem. (h)		(titl	Tutor (coordinator) of the course e/academic degree/professional title, name and surname				
Lecture (W)	15						
Calculation class (C)	0						
Laboratory class (L)	Laboratory class (L) 0 c		dr hab. inż. Guziałowska-Tic Joanna				
Project (P)	15						
Seminar (S)	0						
		Student w	orkload				
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 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

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Car	Description Card							
Field of study	Enviror	Environmental Engineering						
Profile of Education	Genera	al Academic						
Level of study	First Cy	cle Studies						
Specialization								
Form of Study	Full-Tir	ne Studies						
Semester	Third	Third						
Course Title	Enviror	Environmental metrology						
Nazwa przedmiotu	Metrolo	Metrologia środowiska						
ECTS points	3		Subject type		К			
Language of lecture	angielsk i	Mode c	of completing the course		Course credit			
Course code	D	.13.2.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			

	Knowledge		A student has knowledge about thermodynamic transformations
Preliminary		2	A student understands the basic principles of energy conversion
requirements of the course		1	A student is able to analyze existing technical solutions applied in environmental engineering
		2	A student has the ability to self-study
	Social		A student correctly identifies engineering problems
	Competence	2	

Course Goals The aim of the course is to provide basic knowledge about the technology and equipment for measuring selected environmental properties and RES equipment.

Programme content The course provides detailed knowledge of measurement methods, instruments and techniques used in monitoring the state of the environment. The student gains competence in the design and implementation of environmental surveys, assessment of the quality of air, water, soil, and the level of noise, radiation and other factors affecting the environment and human health. Emphasis is placed on understanding legal norms and quality standards, as well as learning how to interpret the results of measurements and their application in planning protective and corrective measures. The course curriculum also includes the use of modern IT tools for data analysis and presentation. By combining the theoretical foundations of metrology with the practical aspects of environmental measurement, the course aims to prepare students to effectively solve environmental problems in both the public and private sectors, promoting a responsible and informed approach to environmental issues.

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 extensive knowledge of selected fields of mathematics, physics, chemistry, biology and earth sciences to the extent necessary to measure environmental properties and describe phenomena and processes related to environmental engineering technologies.	IS_K1_W 01	WL	С
	2	A student has advanced knowledge of conventional and renewable energy sources, technical and technological possibilities of their acquisition, conversion and application.	IS_K1_W 04	W L	С
	3	A student has knowledge of process, phenomena and equipment modelling; he knows numerical and IT methods and tools useful from the point of view of solving engineering tasks in the field of renewable energy sources.	IS_K1_W 05	WL	С
	4	To an advanced degree a student has a structured, theoretically based knowledge covering key issues in the field of renewable energy sources and innovative technologies. He has knowledge about the role of humans in the natural environment, is aware of the risks and knows the methods of their identification and mitigation.	IS_K1_W 12	WL	С
	1	A student is able to use the achievements of other authors with respect for copyright; using literature, databases and other sources related to technical sciences, is able to integrate information obtained, interpret it, draw conclusions and formulate opinions.	IS_K1_U 01	L	С
Skills	2	A student is able to use RES measuring equipment with the ability to estimate errors, plan and carry out experiments, interpret results and formulate conclusions.	IS_K1_U 07	L	С
	3	A student is able to carry out analysis of RES engineering tasks and apply simulation methods leading to their solution, interpret the obtained results and draw conclusions, test hypotheses.	IS_K1_U 08	L	С

	1	A student understands the need for further training in the field of renewable energy sources, improving professional competences; is able to inspire and organize the learning process of others.	IS_K2_K 01	WL	С
Social Compet ence	2	A student can interact and work in a group, taking on different roles; understands the importance of teamwork and can plan, implement and direct others in lifelong learning. Understands the social role of an engineer and understands the need to provide the public with reliable information on engineering achievements in the field of RES.	IS_K2_K 04	L	С

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)	30	dr inż. Anw	eiler Stanisław				
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)			30				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		8				
Preparation of a repo project/presentation			0				
Independent study o	of the course top	oics	20				
Examination or final	colloquium		2				
Additional contact he	ours		0				
Total student worklo	ad		75				
Number of contact h	ours (from the	study plan)	45				
* hour (class) means 45 minutes							

* hour (class) means 45 minutes

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

Course Descrip		u						
Field of study		Environ	mer	ntal Engir	neering			
Profile of Educa	ducation General Aca				Idemic			
Level of study		First Cy	cle :	Studies	tudies			
Specialization								
Form of Study		Full-Tim	ne S	tudies				
Semester		Sevent	h					
Course Title		Environ	mer	ntal moni	toring			
Nazwa przedm	iotu	Monitor	ring	środowis	ka			
ECTS poir	nts	2			Subject type		W-K	
Language of	lecture	angielsk i				Course credit		
Course code		l	E.4.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	
	Knowle	dge	1		lent possesses knowled environment.	lge abo	ut the role of the	
			2					
Preliminary			1	The student is familiar with methods and equip investigating basic physical phenomena.				
requirements of the course	SKIIIS	kills		The student is capable of interpreting physical phenomena.				
	Social		1	Student has a sense of responsibility for the environment				
	Compet	tence	2	The student understands the societal role of an engineer.				
	n is to fam	 niliar	The student understands the societal role of an					

Programme content The course content includes discussing the scope of environmental monitoring and the methods used to monitor individual environmental components.

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	Student has specialist and systematic knowledge of the role of the natural environment, is aware of hazards and knows how to identify and reduce them	IS_K1_W 06	W	С
Knowled ge	2	Student has knowledge in the observation of phenomena and knows the methods of making measurements of characteristic quantities that are important from the point of view of environmental monitoring	IS_K1_W 09	L	НР
Skills		Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions	IS_K1_U 01	W	С
		Student is able to carry out simple research tasks concerning broadly understood environmental protection in accordance with the provided specification	IS_K1_U 12	L	СНР
Social Compet	1	Student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment	IS_K1_K 02	W L	СНР
ence		Student understands the social role of the engineer and understands the need to provide reliable information to the public.	IS_K1_K 06	L	СНР

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. inż. Wzorek Małgorzata					
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	5
Preparation of a report/paper/ project/presentation	8
Independent study of the course topics	5
Examination or final colloquium	2
Additional contact hours	0
Total student workload	50
Number of contact hours (from the study plan)	30

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card								
Field of study	Enviror	Environmental 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	Enviror	Environmental protection						
Nazwa przedmiotu	Ochror	na środowiska	1					
ECTS points	2		Subject type		Р			
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit			
Course code		A.5.	Subject related to scientific research/pract. profess. prepar. (Y/N)		т			

-									
		Knowledge	1	A student has general knowledge of selected areas of chemistry, biology and science about land at the high school level.					
			2						
Prelimir requirem of the co	nen	ts	1	A student obtains informatio and others sources related to					
	uis		2						
		Social	1	A student understands the n and competence developme			ication		
		Competence	2						
Course Goals The aim of the course is to familiarize students with the basic concepts related to environmental protection									
Programme content The subject provides knowledge on basic issues related to environmental protection. As part of the module, the student acquires knowledge of a set of ideas, measures and activities aimed at maintaining the environment in a condition that ensures optimal living conditions, guaranteeing the continuity of the most important processes in the biosphere. They also acquire knowledge about preventing or counteracting the harmful effects of human activity on the environment.									
Learning outcomes for the course - after completing the training cycle Cycle C							Methods of verificati on of learning outcome s		
Knowled	1	the role of the natura natural and anthropo	Student has specialist and systematic knowledge of the role of the natural environment, is aware of natural and anthropogenic hazards and knows how to identify and reduce them						
ge	2	Student has knowledge in the observation of phenomena and processes that is appropriate with 09 W C 09 W C							
Skills	1								
	2								
Social Compet ence	1	and consequences o	se of responsibility for the results of their professional activity, context of its impact on the 02 W C nt and its protection						
	2								
Methods of y	/orifi	ication of learning outcome	<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)	(tit	Tutor (coordinator) of the course itle/academic degree/professional title, name and surname			
Lecture (W)	30					
Calculation class (C)	0					
Laboratory class (L)	0	dr hab. inż.	. Guziałowska-Tic Joanna			
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		10			
Preparation of a report project/presentation			0			
Independent study o	f 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			
* hour (class) means 45 minutes						

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card						
Field of study	Environmental Engineering					
Profile of Education	General Academic					
Level of study	First Cycle Studies					
Specialization						
Form of Study	Full-Time Studies					
Semester	First					
Course Title	Ergonomics and industrial safety and hygiene					

•	zwa przedmiotu Ergonomia oraz bezpieczeństwo i higiena pracy								
ECTS	ECTS points 1			Subject type				K	
Language of lecture angielsk			Mode c	of completing the cou	irse	e Course credit			
Cour	se c	code		B.4.	B.4. B.4. Subject related to scientific research/pract. profess. prepar. (Y/N)		1)	N	
		Knowle	dge	1	working conditions and ergonomics.				
Prelimin requirem of the co	ent	Skille		2 1 2		has the ability to bas ns contained in the L	•		flegal
				1	Paving a	ttention to various e	meraina t	hreats.	
		Social Compe	tence	2	Student understands the importance of safety in				
Course Goals To acquaint students with the issues of occupational health and safety and									
ergonomi				ents					Ly and
health an	d sa	afety and	ergonomi	cs ii	n constru	nowledge on issues r ction. During the lect at may occur during	ture, the s	student a	cquires
Learning	out	comes fo		se - ⁄cle	after con	npleting the training	e to the	(W, C, L,	Methods of verificat on of learning outcome s
Knowled ge		A student knows the principles of identification of hazards and occupational health, safety and IS_K1_W ergonomics during the construction and operation of 03 W C installations used in environmental engineering.							
	2								
Skills	1 i	ndustry a	student has the preparation necessary to work in dustry and knows the rules of occupational safety 07 W C 07						
	2								
Social Compet ence	1 t	o indeper	dent understands the need to learn and is able ependently plan and implement the lifelong ng process and critically assess their own 01 W C edge.						
	2								
Methods of v	erific	ation 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)	15						
Calculation class (C)	0						
Laboratory class (L)	0	dr inż. Tata	ira Marcin				
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)			0				
Project (P)			0				
Seminar (S)			0				
Preparation for class	es		10				
Preparation of a report project/presentation			0				
Independent study o	of the course top	oics	0				
Examination or final	colloquium		0				
Additional contact he	ours		0				
Total student worklo	ad		25				
Number of contact h	ours (from the	study plan)	15				

* hour (class) means 45 minutes

dr hab. inż. Górski Piotr Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

lovel of study		Eirct C		tudica				
Level of study								
Specialization								
Form of Study		Full-Tin		ıdies				
Semester		Sevent	h					
Course Title		Excava	tion w	vorks				
Nazwa przedm	iotu	Ziemne	e robo	ty insta	lacyjne			
ECTS poir	nts	4			Subject type		W-K	
Language of	lecture	angielsk i		Mode o	f completing the cours	e	Course credit	
Course code			E.7.	.7. Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		
	Knowledge		1 u	Indersta	nt has basic knowledge ands principles of opera used in environmental	ation of	machines and	
Preliminary requirements of the course	Skills			A student is able to make a critical analysis of the functioning and assess existing technical solutions			-	
			2					
	Social		⊥ w	1 A student understands the importance of providing safe working conditions.			of providing safe	
Competence			2					
Course Goals related to eart					technologies used in t	he desi	gn and works	
investment pro	ocess, ir	cluding: d	compo	onents c	with the procedure and of the construction (exe	ecutive)	design, design	

documentation as the basis for organizing installation works, types and selection of construction machines and devices for the project, measurements of works and guidelines for carrying out installation works in relation to the water supply network, gas and sewage.

Learning	OL	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	A student has sufficient knowledge for engineering purposes on the construction and operation of municipal infrastructure.	IS_K1_W 10	W P	CKL
_	2				
Skills	A student obtains information from literature, databases and other sources related to technical sciences			Р	KL
	2				
Social Compet	1	A student understands the need to learn and improve professional skills	IS_K1_K 01	Р	KL
ence	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)	0	dr inż. Prażnowski Krzysztof				
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	30				
Preparation of a report project/presentation	ort/paper/	0				
Independent study o	f the course top	pics 25				

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. Augustynowicz Andrzej Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Field of study		Enviror	Environmental Engineering				
Profile of Education	ation	Genera	General Academic				
Level of study		First Cy	First Cycle Studies				
Specialization							
Form of Study		Full-Tin	ne St	udies			
Semester		Sevent	h				
Course Title		Final se	emina	ary - the	environmental area		
Nazwa przedm	iotu	Semina	arium	dyplom	owe - obszar środowisk	cowy	
ECTS poir	nts	3			Subject type		W-K
Language of	lecture	ecture angielsk		Mode of completing the course		e	Course credit
Course co	se code E.1		5.13.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowle	dge	1				
Preliminary			1	-			
requirements	Skills						
of the course	Social Competence		1	A stud	A student understands the need for further training, raising professional competences		
2							
Course Goals Preparing students for the final exam, tutoring on professional issues							
Programme content Students' own presentations related to the development of issues related to the diploma exam and realisation of the diploma thesis.							

Learning	οι	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	Student has extensive knowledge in selected fields of mathematics, physics, chemistry, biology and earth sciences	IS_K1_W 01	S	ΕP
	2				
Skills	1	Student acquires information from literature, databases and other sources related to technical sciences	IS_K1_U 01	S	ΕP
	2				
Compet 1 raising profession		Student understands the need for further education, raising professional competences, can inspire and organize the learning process	IS_K1_K 01	S	ΕP
ence	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)	0	dr hab. inż. Kłosok-Bazan Iwona					
Project (P)	0						
Seminar (S)	30						
	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)		30					
Preparation for class	es	30					
Preparation of a report project/presentation		20					
Independent study o	f the course top	pics 0					

Examination or final colloquium	0
Additional contact hours	0
Total student workload	80
Number of contact hours (from the study plan)	30

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

Field of study		Environmental Engineering								
Profile of Educa	ation	Genera	al Academic							
Level of study		First Cy	cle Studies							
Specialization										
Form of Study		Full-Tir	Full-Time Studies							
Semester		Sevent	h							
Course Title		Final se	eminary - the	industrial area						
Nazwa przedm	iotu	Semina	arium dyplom	owe - obszar prze	emys	słowy				
ECTS poir	nts	3		Subject type			W-K			
Language of	lecture	angielsk i	Mode of completing the course		Course credit					
Course code		E	5.13.	Subject related to scientific research/pract. profess. prepar. (Y/N)		т				
	Knowlo	dao			1					
	Knowle	uge			2					
Preliminary requirements	Skille									
of the course		JKIIIS								
	Social (omneter			1					
Social Competence 2										
Course Goals Preparing students to write a diploma thesis and a summary of general knowledge in the field of study, taking into account the industrial aspect										
Programme content Students' own presentations related to the development of issues related to the diploma exam and realisation of the diploma thesis.										

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	• • • •	Methods of verificati on of learning outcome s		
Knowled ge	1	Student has the knowledge necessary to understand the social, economic, legal, technical and non- technical aspects of engineering activity	IS_K1_W 14	S	ΝΟΡ		
	2						
Skills	1	Student is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of environmental engineering with particular emphasis on the industrial sphere	IS_K1_U 12	S	ΝΟΡ		
	2						
Social Compet ence		Student is aware of the importance of professional conduct, adherence to professional ethics and respecting the diversity of views and opinions; is also ready to cherish the achievements and traditions of the engineering profession	S	Р			
	2						
Methods of v	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.	nż. Kłosok-Bazan Iwona			
Project (P)	0					
Seminar (S)	30					
		Student w	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)			0			

Seminar (S)	30
Preparation for classes	30
Preparation of a report/paper/ project/presentation	20
Independent study of the course topics	0
Examination or final colloquium	0
Additional contact hours	0
Total student workload	80
Number of contact hours (from the study plan)	30

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card								
Field of study	Enviror	Environmental Engineering						
Profile of Education	Genera	al Academic						
Level of study	First Cy	cle Studies						
Specialization								
Form of Study	Full-Tir	ne Studies						
Semester	Fourth	Fourth						
Course Title	Fluid mechanics							
Nazwa przedmiotu	Mecha	nika płynów						
ECTS points	5		Subject type		Р			
Language of lecture	angielsk i	Mode o	of completing the course		Examination			
Course code	A.9.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			

						-			
Knov		Knowledge	1	Knowledge of the basic laws					
		Kilowicuge	2						
Preliminary	Skills	1	Ability to balance forces, moments of mass, momentum and energy						
requirem			2	Ability to solve simple integr	als and al	gebraic e	quations		
		Social Competence	1	A student is aware of the importance of engineering activities					
		competence	2	Ability to work as a team and	l indyvidu	ıal			
Course Goals Knowledge of the phisical properties of fluids. Knowledge of elements of statics, kinematics and fluid dynamics. Acquiring the ability to calculate pressure drop and design of simple flow systems. The ability to measure selected thermal and flow quantities and to choice of measurement methodology									
				rties of fluids, elements of flu phenomena, ideal gas, heat		, kinemat	ics, and		
Learning outcomes for the course - after completing the training e to the course (W, C, L, course cycle R S)						Methods of verificati on of learning outcome s			
		A student has extens ohenomena govering		IS_K1_W 01	WCL	АСН			
Knowled ge	2 a	A student has appripriate knowledge allowing to analyze phenomena and processes related to the operation of flow systems and processes in Environmental Engineering							
Skills		A student is able to p and critically interpre		basic flow measurements	IS_K1_U 06	L	ніј		
3KIII5		A student can handle basic measuring devices and IS_K1_U C L H I assess uncertainty of measurements 08							
Social Compet ence	1 e	A student understands the need for further education and can independently plan and mplement the lifelong learning process, as well as critically evaluate knowledge							
	2								
A-written ex	am, B		essm	ent, D-oral assessment, E-based on par er, H-assessment from reports, I-assess					

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)	15	dr inż. Bors	suk Grzegorz		
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)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		18		
Preparation of a report project/presentation	ort/paper/		15		
Independent study o	f the course to	pics	15		
Examination or final	colloquium		2		
Additional contact ho	ours		0		
Total student worklo	ad		125		
Number of contact h	ours (from the	study plan)	75		
* have (alaga) was a was					

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental 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	Third	Third					
Course Title	Foreigr	Foreign language					
Nazwa przedmiotu	Język o	Język obcy					
ECTS points	2	Subject type W					

Language of	age of lecture angielsk			Mode of completing the cour	Course credit			
Course code E		3.2.1	Subject related to scientific research/pract. profess. prepar. (Y/N)	N			
	Preliminary requirements of the course Skills		e The student has lexical and grammar knowledge a level accordiing to the Common European Framew Reference for Languages (CEFR).			5		
			2					
requirements			Skills		1	The student can use the Englis according to the Common Euro Reference for Languages (CEF	opean Fr	-
			2					
	Social		1	The student understands the need for self-study				
	Competence		2	The student can collaborate w various roles.	ne student can collaborate with a group accepting arious roles.			
Course Goals To acquire language ski				skills in the field of science and	d discipli	nes 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 Environmental 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	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	The student knows and understands foreign language theory and terminology well enough to use the English language at C level of the Common European Framework of Reference for Languages	IS_K1_W 17	L	CEFP
	2				
	1	The student can use the English language at C level of European Language Level scale (CEFR)	IS_K1_U 04	L	CEFP
Skills	2	The student is able to prepare and make an oral presentation on specific engineering issues in English	IS_K1_U 05	L	СЕГР
Social Compet ence	1	The student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge	IS_K1_K 01	L	Ρ
	2				

	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)	0					
Calculation class (C)	0					
Laboratory class (L)	30	mgr Kowal	ngr Kowalczyk 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		12			

Preparation of a report/paper/ project/presentation	6
Independent study of the course topics	12
Examination or final colloquium	0
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. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

Course Description Card							
Field of study	Enviror	Environmental 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	Fourth	Fourth					
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		e	Course credit		
Course code	B.2.2		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν		

Learning outcomes for the course - after completing the training cycleIne referenc to the learning outcomeForm of course learning outcomeof verificat on of learning outcomeKnowled ge1The student knows and understands foreign language theory and terminologywell enough to use The English language at C level of the Common European Framework of Reference for LanguagesIS_K1_W 04LC E F P2Image: C E F P1Iset to the Common European Framework of Reference for LanguagesIS_K1_U 04LC E F PSkillsImage: C E F P1Iset to the Common European Framework of Reference for LanguagesIset to the Common European Framework of 04LC E F PSkills1Inte student is able to use the English language at C I level of the Common European Framework of Reference for LanguagesIset to the C E F PC E F PSkills1Inte student is able to prepare and make an oral 2 presentation on specific engineering issues in EnglishIset to independently plan and implement the lifelong learning process and critically assess their own knowledge.Iset to independently plan and implement the lifelong learning process and critically assess theirIset to independently plan and implement the lifelong learning process and critically assess theirIset to independently plan and implement the lifelong learning process and critically assess theirIset to independently plan and implement the lifelong learning process and critically assess theirIset to independently plan and implement the lifelong learning process and critically assess theirIset to independent												
Preliminary requirements of the course 2 Skills 1 The student can use the English language at B2 level Reference for Languages (CEFR) Social Competence 1 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 Environmental 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. Knowledg 1 The student knows and understands foreign languages IS_K1_W L C E F P 2 2 1 The student is able to use the English language at C level of the Common European Framework of Reference for Languages C E F P Knowledg 1 The student knows and understands foreign language at C level of the Common Euro			Knowledge	1	level according to the the Cor	mmon Eu	•					
requirements of the course Skills 1 according to the Common European Framework of Reference for Languages (CEFR) 2 Social Competence 1 The student understands the need for self-study. 2 The student can collaborate with a group accepting Various roles. 1 The student can collaborate with 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 Environmental 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 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 1 The student knows and understands foreign language theory and terminologywell enough to use gen language theory and teropare and make an oral goresentation on specific engine				2								
Social Competence 1 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 Environmental Engineering as well as the language of work environment (conducting meetings, concluding contracts, negotiations 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 get the English language at C level of the Common European Framework of Reference for Languages Is_K1_W 17 L C E F P Skills 1 The student is able to use the English language at C level of the Common European Framework of Reference for Languages Is_K1_U 04 L C E F P Skills 1 The student is able to use the English language at C Is_K1_U 05 L C E F P	requirem	nen	ts		according to the Common Eu	ropean Fr						
Social Competence 2 The student can collaborate with 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 Environmental 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 foreign language theory and terminologywell enough to use Learning outcome for the course of Reference for Languages IS_K1_W 17 L C E F P Skills 1 The student is able to use the English language at C level of the Common European Framework of Reference for Languages IS_K1_U 04 L C E F P Skills 1 The student understands the need to learn and is able to independently plan and implement the ence					The student understands the	need for	self-studv	<i>'</i> .				
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 Environmental 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 languages 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 outcome for the course - after completing the training outcome s or the course and the minologywell enough to use is cource is a select tinformation on flearning outcome s and the english language at C level of the Common European Framework of Reference for Languages Image: Select the select and the select					The student can collaborate v							
Environmental 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 $ \begin{array}{c} The student knows and understands foreignlanguage theory and terminologywell enough to useThe English language at C level of the CommonEuropean Framework of Reference for Languages Skills 1 The student is able to use the English language at C Level of the Common European Framework of Reference for Languages 1 The student is able to prepare and make an oral 2 The student is able to prepare and make an oral Presentation on specific engineering issues in English 1 The student understands the need to learn and is able to independently plan and implement the linglish C E F P C E F P C C E F P C C E F P C C E F P C C E F P C C E F P C C C E F P C C C $	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											
Learning Learning geUnder reference sForm of reference to the language theory and terminologywell enough to use European Framework of Reference for LanguagesInte reference to the language theory and terminologywell enough to use The English language at C level of the Common European Framework of Reference for LanguagesIS_K1_W utLC E F P2Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P2Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E F PImage: C E F P3Image: C E F PImage: C E F PImage: C E F PImage: C E	meetings giving pro job offers the stude speaking from diffe	s, co ese s, p ent , re ere	oncluding contracts, entations, solving pro reparing job applica acquires real-world ading and writing, a nt sources .The cour	neg oble tion kno ind se i	gotiations and conversations w ms and conflicts, arguing, pre s – curriculum vitae, cover let wledge, develops four basic la extends the ability to seek, us s focused on active implemen	vith partn senting o ter) . As p anguage s e and sel ting tech	ers and c ffers, ana part of the skills - listo ect tinforn nical and	lients, lyzing module, ening, mation				
Knowled ge1language theory and terminologywell enough to use The English language at C level of the Common European Framework of Reference for LanguagesIS_K1_W 17LC E F P22	Learning	ou			after completing the training	referenc e to the learning outcome	course (W, C, L,	verificati on of learning outcome				
Skills1The student is able to use the English language at C level of the Common European Framework of Reference for LanguagesIS_K1_U 04LC E F PSkills2The student is able to prepare and make an oral presentation on specific engineering issues in EnglishIS_K1_U 05LC E F PSocial Compet ence1The student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess theirIS_K1_K 01LP		T	language theory an The English languag	rminologywell enough to use t C level of the Common		L	СЕГР					
Skills1level of the Common European Framework of Reference for LanguagesIS_K1_U 04LC E F PSkills2The student is able to prepare and make an oral presentation on specific engineering issues in EnglishIS_K1_U 05LC E F PSocial Compet ence1The student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess theirIS_K1_K 01LP		2										
Social Compet ence1The student is able to prepare and make an oral presentation on specific engineering issues in EnglishIS_K1_U 05LC E F PSocial Compet ence1The student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess theirIS_K1_K 01LP	Skille		level of the Commo	n Eu	ropean Framework of		L	CEFP				
Social Compet ence1able to independently plan and implement the lifelong learning process and critically assess theirIS_K1_K 01LP	JKIIIS	2	presentation on spe		•		L	CEFP				
	Compet	T	able to independently plan and implement the lifelong learning process and critically assess theirIS_K1_K 01L									
Methods of verification of learning outcomes:		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.

	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				
		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		12		
Preparation of a report project/presentation			6		
Independent study o	of the course top	oics	12		
Examination or final	colloquium		0		
Additional contact he	ours		0		
Total student worklo	ad		60		
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. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

		1.					
Level of study	First Cy	First Cycle Studies					
Specialization							
Form of Study		Full-Tin	ne S	Studies			
Semester		Fifth					
Course Title		Foreigr	ı lar	iguage			
Nazwa przedm	niotu	Język o	bcy				
ECTS poir	nts	2			Subject type		W
Language of	lecture	angielsk i		Mode c	f completing the cours	e	Course credit
Course co	E	B.2.3		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	
	Knowledge		1	of Reference for Languages (CEFR)			
Preliminary requirements of the course	Skills	Skills		The student can use the English language at B2 level according to the Common European Framework of Reference for Languages (CEFR)			
			2				
	Social		1		ent understands the ne		
	Competence		2	2 The student can collaborate with 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 co	ntent l	n the cou	rse	students	acquire technical vocal	bulary i	n the area of

Programme content In the course students acquire technical vocabulary in the area of Environmental 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	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s				
Knowled ge	1	The student knows and understands foreign language theory and terminology well enough to use the English language at C level of the Common European Framework of Reference for Languages	IS_K1_W 17	L	CEFP				
	2								
Skills	1	The student is able to use a foreign language at C level of the Common European Framework of Reference for Languages	IS_K1_U 04	L	СЕГР				
SKIIIS	2	The student is able to prepare and make an oral presentation on specific engineering issues in English	IS_K1_U 05	L	СЕГР				
Social Compet ence	1	The student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge	IS_K1_K 01	L	Ρ				
	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, 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)	(titl	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 Kowalc	zyk Bogusława					
Project (P)	0							
Seminar (S)	0							
		Student w	orkload					
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 classes	12
Preparation of a report/paper/ project/presentation	6
Independent study of the course topics	12
Examination or final colloquium	0
Additional contact hours	0
Total student workload	60
Number of contact hours (from the study plan)	30

* hour (class) means 45 minutes

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

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card									
Field of study	Enviror	nmental Engi	neering						
Profile of Education	Genera	l Academic							
Level of study	First Cy	cle Studies							
Specialization									
Form of Study	Full-Tir	ne Studies							
Semester	Sixth								
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			Examination				
Course code	E	3.2.4	Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν				

			-								
		Knowledge	1	The student has lexical and g level according to the the Cor of Reference for Languages (mmon Eu	-					
			2								
Prelimir requirem of the co	nen	ts	1	The student can use the Engl according to the Common Eu Reference for Languages (CE	ropean Fr						
			1	The student understands the	nood for	colf_ctudy	,				
		Social Competence	2	The student can collaborate v various roles.		-					
studied fa	acu	Ity in accordance wi	th r	skills in the field of science ar equirements specified for C le for Languages (CEFR)	•						
Environm meetings giving pro job offers the stude speaking from diffe	ien s, co ese s, pi ent , re erei	tal Engineering as w oncluding contracts, entations, solving pro- reparing job applicat acquires real-world eading and writing, a nt sources .The cour	ell a neg ble tion kno nd o se i	students acquire technical voc as the language of work enviro gotiations and conversations v ms and conflicts, arguing, pre s – curriculum vitae, cover let wledge, develops four basic la extends the ability to seek, us s focused on active implemen of students' future business a	onment (c vith partn senting o ter) . As p inguage s e and sel ting tech	conducting ers and c ffers, ana part of the skills - liste ect tinform nical and	g lients, lyzing module, ening, mation				
Learning	ou		se - cle	after completing the training	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s				
Knowled ge	1	The student knows a language theory and the English languag European Framewor	L	A B C E F P							
	2										
Skille	1			oreign language at C level of Framework of Reference for	IS_K1_U 04	L	A B C E F P				
Skills	2	The student is able		repare and make an oral c engineering issues in	IS_K1_U 05	L	A B C E F P				
Social Compet ence	1	able to independent	tudent understands the need to learn and is o independently plan and implement the og learning process and critically assess their nowledge								
2											
Methods of v	verif	ication of learning outcome	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.

	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				
		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 project/presentation			6		
Independent study o	of the course top	pics	12		
Examination or final	colloquium		2		
Additional contact he	ours		0		
Total student worklo	ad		60		
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. Wydrych Jacek Dean of Faculty (stamp/signature)

Politechnika Opolska Wydział Mechaniczny Karta Opisu Przedmiotu Kierunek studiów Environmental Engineering Profil kształcenia Ogólnoakademicki

Poziom studió	Studia	pierw	szeg	go s	topnia					
Specjalność										
Forma studiów	1	Studia	Studia stacjonarne							
Semestr studio	ów	Trzeci	Trzeci							
Nazwa przedm	iotu	Foreigr	Foreign language							
Subject Title		Język o	bcy							
Liczba punktó	w ECTS	2				Typ przedmiotu		W		
Język wykła	idowy	polski		Tryk	o zal	liczenia przedmiotu (E/	Z)	Zaliczenie na ocenę		
Kod przedm	B.2.1				Przedmiot powiązany z badaniami naukowymi/ prakt. przygot. zawodowym (T/N)		N			
	Wiedza	Viedza Imiejętności		1	1 In accordance with the recommendations of PRK level 4.					
Octobinenia				2						
Oczekiwania wstępne w	Umieiet			1 In accordance with the recommendations of PRK level 4.			ndations of PRK			
zakresie przedmiotu				2	2					
przedmiota	Kompet społecz	Kompetencje		1 In accordance with the recommendations of PRK level 4.						
	ne		2	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										

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 foreign language theory and terminology enough to use a foreign language at the B2 level of the Common European Framework of Reference for Languages	IS_K1_W 05	L	CEFP			
	2							
	1	A student has self-study skills	IS_K1_U 02	L	СЕГР			
Umiejęt ności	2	A student is able to use a foreign language at the B2 level of the Common European Framework of Reference for Languages.	IS_K1_U 03	L	СЕГР			
Kompet encje społeczn	1	A student is aware of the need to improve their knowledge throughout life and is able to select the appropriate learning methods for themselves and others.	IS_K1_K 01	L	Ρ			
e	2	A student understands the importance of teamwork and is able to take responsibility for the results of joint activities	IS_K1_K 04	L	Р			
Formy weryfikacji efektów uczenia się: A-egzamin pisemny, B-egzamin ustny, C-zaliczenie pisemne, D-zaliczenie ustne, E-na podstawie ocen czastkowych z								

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 pra	cy studenta					
Rodzaje zajęć	studenta*	Średnia liczba godzin* przeznaczonych na zrealizowane aktywności					
Wykład		0					
Ćwiczenia		0					
Laboratorium		30					
Projekt		0					

Seminarium	0
Przygotowanie do zajęć	10
Przygotowanie sprawozdania/referatu/ projektu/prezentacji	0
Samodzielne studiowanie tematyki zajęć	10
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. Wydrych Jacek Dziekan Wydziału (pieczęć/podpis)

Politechnika Opolska Wydział Mechaniczny

wyuziai Mechaniczny								
Karta Opisu Przedmiotu								
Kierunek studiów	Enviror	Environmental Engineering						
Profil kształcenia	Ogólno	akademicki						
Poziom studiów	Studia	pierwszego s	topnia					
Specjalność								
Forma studiów	Studia	stacjonarne						
Semestr studiów	Czwart	у						
Nazwa przedmiotu	Foreigr	n language						
Subject Title	Język o	bcy						
Liczba punktów ECTS	2		Typ przedmiotu		W			
Język wykładowy	polski	polski Tryb zaliczenia przedmiotu (E/Z) Zaliczenie n ocenę						
Kod przedmiotu	B.2.2		Przedmiot powiązany z badaniami naukowymi/ prakt. przygot. zawodowym (T/N)		Ν			

	Wiedza		In accordance with the recommendations of PRK level 4.
		2	
Oczekiwania wstępne w zakresie	Umiejętności	1	In accordance with the recommendations of PRK level 4.
przedmiotu		2	
p:	Kompetencje społeczne	1	In accordance with the recommendations of PRK level 4.
		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 uczenia się dla przedmiotu - po zakończonym cyklu studiów				Formy realizacj i (W, C, L, P, S)	Formy weryfika cji efektów uczenia się
Wiedza	1	A student knows and understands foreign language theory and terminology enough to use a foreign language at the B2 level of the Common European Framework of Reference for Languages	IS_K1_W 05	L	CEFP
	2				
Uminiat	1	A student has self-study skills	IS_K1_U 02	L	CEFP
ności	Umiejęt ności 2 level of the Common European Framework of Reference for Languages.		IS_K1_U 03	L	CEFP
Kompet encje	1	A student is aware of the need to improve their knowledge throughout life and is able to select the appropriate learning methods for themselves and others.	IS_K1_K 01	L	Ρ
społeczn– e		A student understands the importance of teamwork and is able to take responsibility for the results of joint activities	IS_K1_K 04	L	Р
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 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	10				
Przygotowanie sprawozdania/referatu/ projektu/prezentacji		0				
Samodzielne studiowanie tematyki zajęć		10				
Egzamin lub kolokwium zaliczeniowe		0				
Dodatkowe godziny kontaktowe		0				
Łączny nakłac	l pracy studenta	50				
Liczba godzin	kontaktowych (z planu studiów)	30				
* andzina (lakevina) oznacza 45 minut						

* godzina (lekcyjna) oznacza 45 minut

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

Politechnika Opolska

Wydział Mechaniczny

Karta Opisu Przedmiotu

Kierunek studiów	Environmental Engineering
Profil kształcenia	Ogólnoakademicki

Poziom studiów Studia pierwszego stopnia								
Specjalność					,			
Forma studiów Studia stacjo				nar	ne			
Semestr studio	ów	Piąty						
Nazwa przedm	niotu	Foreigr	n lang	uag	e			
Subject Title		Język o	bcy					
Liczba punktó	w ECTS	2				Typ przedmiotu		W
Język wykła	idowy	polski		Tryt	o zal	liczenia przedmiotu (E/	Z)	Zaliczenie na ocenę
Kod przedmiotu B.2		3.2.3	.2.3		Przedmiot powiązany z badaniami naukowymi/ prakt. przygot. zawodowym (T/N)		Ν	
	Wiedza			1	In accordance with the recommendations of PRK level 4.			
Oczekiwania				2				
wstępne w zakresie	Umiejęt	ności	ności			In accordance with the recommendations of PRK level 4.		
przedmiotu				2				
	Kompet	•		1	1 In accordance with the recommendations of PRK level 4.			
	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								

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 uczenia się dla przedmiotu - po zakończonym cyklu studiów				Formy realizacj i (W, C, L, P, S)	Formy weryfika cji efektów uczenia się	
Wiedza	1	A student knows and understands foreign language theory and terminology enough to use a foreign language at the B2 level of the Common European Framework of Reference for Languages	IS_K1_W 05	L	CEFP	
	2					
Uminiat	1	A student has self-study skills	IS_K1_U 02	L	СЕГР	
Umiejęt – ności 2		A student is able to use a foreign language at the B2 level of the Common European Framework of Reference for Languages.	IS_K1_U 03	L	СЕГР	
Kompet encje	1	A student is aware of the need to improve their knowledge throughout life and is able to select the appropriate learning methods for themselves and others.	IS_K1_K 01	L	Ρ	
społeczn e	2	A student understands the importance of teamwork and is able to take responsibility for the results of joint activities	IS_K1_K 04	L	Р	
Formy weryfikacji efektów uczenia się: A-egzamin pisemny, B-egzamin ustny, C-zaliczenie pisemne, D-zaliczenie ustne, E-na podstawie ocen cząstkowych z						

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 pra	cy studenta					
Rodzaje zajęć	studenta*	Średnia liczba godzin* przeznaczonych na zrealizowane aktywności					
Wykład		0					
Ćwiczenia		0					
Laboratorium		30					
Projekt		0					

Seminarium	0
Przygotowanie do zajęć	10
Przygotowanie sprawozdania/referatu/ projektu/prezentacji	0
Samodzielne studiowanie tematyki zajęć	10
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. Wydrych Jacek Dziekan Wydziału (pieczęć/podpis)

Politechnika Opolska Wydział Mechaniczny

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Karta Opisu Przedmiotu							
Kierunek studiów	Enviror	nmental Engii	neering				
Profil kształcenia	Ogólno	akademicki					
Poziom studiów	Studia	pierwszego s	topnia				
Specjalność							
Forma studiów	Studia	stacjonarne					
Semestr studiów	Szósty						
Nazwa przedmiotu	Foreign language						
Subject Title	Język o	bcy					
Liczba punktów ECTS	2		Typ przedmiotu		W		
Język wykładowy	polski	Tryb za	liczenia przedmiotu (E/Z	Z)	Egzamin		
Kod przedmiotu	E	3.2.4	Przedmiot powiązany z badaniami naukowymi/ prakt. przygot. zawodowym (T/N)		N		

	Wiedza		In accordance with the recommendations of PRK level 4.
		2	
Oczekiwania wstępne w zakresie	Umiejętności Kompetencje	1	In accordance with the recommendations of PRK level 4.
przedmiotu		2	
		1	In accordance with the recommendations of PRK level 4.
	społeczne		

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 foreign language theory and terminology enough to use a foreign language at the B2 level of the Common European Framework of Reference for Languages	IS_K1_W 05	L	A B C E F O P
	2				
Uminint	1	A student has self-study skills	IS_K1_U 02	L	A B C E F O P
2 level of the Common European Framework of		A student is able to use a foreign language at the B2 level of the Common European Framework of Reference for Languages.	IS_K1_U 03	L	A B C E F O P
Kompet encje społeczn	1	A student is aware of the need to improve their knowledge throughout life and is able to select the appropriate learning methods for themselves and others.	IS_K1_K 01	L	Ρ
e		A student understands the importance of teamwork and is able to take responsibility for the results of joint activities	IS_K1_K 04	L	Р
Formy wery	fika	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.

Forma zajęćLiczba godzin zajęć w semestrzeOpiekun (koordynator) przedmiotu (tytuł/stopień naukowy/ tytuł zawodowy, imię i nazwisko)Wykład00Ćwiczenia00Laboratorium30dr Świerczewska BeataProjekt00Seminarium00Kład pracy studenta0Rodzaje zajęć studenta*Średnia liczba godzin* przeznaczonych na zrealizowane aktywnościWykład0Cwiczenia0Laboratorium30Projekt0Seminarium0Projekt0Seminarium0Projekt0Seminarium2Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0Łączny nakład pracy studenta50		Godziny w p	lanie studiów
Ćwiczenia0Laboratorium30Projekt0Seminarium0Nakład pracy studentaRodzaje zajęć studenta*Średnia liczba godzin* przeznaczonych na zrealizowane aktywnościWykład0Ćwiczenia0Laboratorium30Projekt0Seminarium0Projekt0Seminarium0Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Forma zajęć	• •	(tytuł/stopień naukowy/ tytuł zawodowy,
Laboratorium30 Odr Świerczewska BeataProjekt0Seminarium0Nakład pracy studentaRodzaje zajęć studenta*Średnia liczba godzin* przeznaczonych na zrealizowane aktywnościWykład0Ćwiczenia0Laboratorium30Projekt0Seminarium0Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Wykład	0	
Projekt0Seminarium0Nakład pracy studentaRodzaje zajęć studenta*Średnia liczba godzin* przeznaczonych na zrealizowane aktywnościWykład0Ćwiczenia0Laboratorium30Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Ćwiczenia	0	
Seminarium0Nakład pracy studentaRodzaje zajęć studenta*Średnia liczba godzin* przeznaczonych na zrealizowane aktywnościWykład0Ćwiczenia0Laboratorium30Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Laboratorium	30	dr Świerczewska Beata
Nakład pracy studentaRodzaje zajęć studenta*Średnia liczba godzin* przeznaczonych na zrealizowane aktywnościWykład0Ćwiczenia0Laboratorium30Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Projekt	0	
Rodzaje zajęć studenta*Średnia liczba godzin* przeznaczonych na zrealizowane aktywnościWykład0Ćwiczenia0Laboratorium30Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Seminarium	0	
Rodžaje zajęć studenta**na zrealizowane aktywnościWykład0Ćwiczenia0Laboratorium30Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0		Nakład pra	cy studenta
Ćwiczenia0Laboratorium30Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Rodzaje zajęć	studenta*	
Laboratorium30Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Wykład		0
Projekt0Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Ćwiczenia		0
Seminarium0Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Laboratorium		30
Przygotowanie do zajęć8Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Projekt		0
Przygotowanie sprawozdania/referatu/ projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Seminarium		0
projektu/prezentacji2Samodzielne studiowanie tematyki zajęć8Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0	Przygotowanie	e do zajęć	8
Egzamin lub kolokwium zaliczeniowe2Dodatkowe godziny kontaktowe0			2
Dodatkowe godziny kontaktowe 0	Samodzielne s	studiowanie tematyki zajęć	8
	Egzamin lub k	olokwium zaliczeniowe	2
Łączny nakład pracy studenta 50	Dodatkowe go	odziny kontaktowe	0
	Łączny nakłac	l pracy studenta	50
Liczba godzin kontaktowych (z planu studiów) 30	Liczba godzin	kontaktowych (z planu studiów)	30

* godzina (lekcyjna) oznacza 45 minut

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

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study First Cycle Studies							
Specialization							
Form of Study Full-Time				tudies			
Semester		Fourth					
Course Title		Gas sys	stem	design			
Nazwa przedm	iotu	Projekt	owai	nie instal	acji gazowych		
ECTS poir	nts	3			Subject type		К
Language of	lecture	angielsk i		Mode o	of completing the cours	e	Course credit
Course code		D	D.5.1.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowle	dge	1	fluid mechanics and mechanical engineering.			
Preliminary requirements of the course	Skills		1	 2 1 Student is able to analyze information from various sources and conduct process calculations. 			
of the course			2				
	Social		1		understands the need		
Competence			2	2 Student understands the social role of an engineer.			
Course Goals The aim of the subject is to provide knowledge on gas system design and construction, as well as technical equipment selection for gas installations. Students will acquire essential skills in identifying operational and safety concerns associated with gas installations.							
systems. Withi gas systems a	n the m nd selec	odule, stu ting equi	iden omer	ts acquir nt for ins	nowledge on issues rela e essential knowledge tallations. Additionally,	and ski they le	lls for designing arn to identify

operational and safety concerns associated with gas flow. The knowledge acquired enables students to apply a systemic approach to ensure the continuity and safety of gas system processes and fosters a sense of responsibility for the reliable operation of the designed installations.

Learning outcomes for the course - after completing the training cycle (W, C, L, outcome s)						
Knowled	1	The student possesses advanced knowledge of the principles of designing gas installations.	IS_K1_W 02	W P	CL	
ge	2	Student knows the construction and operation of basic gas appliances.	IS_K1_W 07	W P	CL	
1		Student can solve the basic engineering task related to gas installations.	IS_K1_U 11	Р	М	
Skills	2	Student is able to solve the basic problem concerning gas installations.	IS_K1_U 12	Р	М	
Social	1	Student recognizes the importance of learning and enhancing their professional skills in design and operating gas system installations.	IS_K1_K 01	W P	MPR	
Social Compet ence 2 Student has a sense of responsibility for the consequences of their professional actions, 2 particularly regarding their impact on the natural environment and human life within the realm of gas installation design.						
A-written ex	am	, fication of learning outcomes: , B-oral exam, C-written assessment, D-oral assessment, E-based on par s of written answers, G-term paper, H-assessment from reports, I-assess				

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)	0	dr inż. Płacz	zek Małgorzata			
Project (P)	30					
Seminar (S)	0					
		Student w	vorkload			
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 classes	15
Preparation of a report/paper/ project/presentation	15
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)	45

* hour (class) means 45 minutes

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card							
Field of study		Enviror	nmen	tal Engi	neering		
Profile of Education	ation	Genera	l Aca	demic			
Level of study		First Cy	vcle S	tudies			
Specialization							
Form of Study		Full-Tin	ne St	udies			
Semester		First					
Course Title		Genera	l che	mistry			
Nazwa przedm	iotu	Chemia	a ogó	lna			
ECTS poir	nts	3			Subject type		Р
Language of	lecture	angielsk i		Mode of completing the course Co			Course credit
Course co	de	Δ	3.1.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν
	Knowlo	daa	1	Gene	General knowledge of chemistry at high school level.		
	Knowle	uge	2				
Preliminary	Preliminary Skills		1	Ability	Ability to use professional literature.		
requirements	SKIIIS		2				
of the course Social C		Competen	ce 1		A student understands the need for continuous training.		
			2				
Course Goals The a	aim of the	course is to f	amiliar	ize studer	its with the basic concepts and	calculatio	ns in general chemistry.

Programme content The subject provides knowledge about basic issues in chemistry inorganic. During the module, the student acquires knowledge and skills, among others basic concepts and chemical laws, types and types of chemical reactions, preparation and structure of inorganic compounds and the periodic table of elements. Acquired knowledge in in the field of basic issues in inorganic chemistry allows you to perform calculations in scope of molar calculations, molar and percentage concentrations and concentration conversions and stoichiometric calculations.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	Student has extensive knowledge in selected fields of general chemistry to the extent necessary to describe phenomena and processes related to environmental engineering technologies	IS_K1_W 01	W C	СIJ
	2				
Skills	1	Student acquires information from literature, databases and other sources related to general chemistry	IS_K1_U 01	С	СIJ
	2	Student is able to identify and formulate practical engineering tasks in general chemistry related to environmental engineering	IS_K1_U 11	С	CIJ
Social Compet ence	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process	IS_K1_K 01	W C	CIJ
	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, 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)	15				
Laboratory class (L)	0	r hab. inż. Guziałowska-Tic Joanna			
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)	15
Laboratory class (L)	0
Project (P)	0
Seminar (S)	0
Preparation for classes	25
Preparation of a report/paper/ project/presentation	0
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

* hour (class) means 45 minutes

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	General Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tin	ne Studies					
Semester	First						
Course Title	Genera	General Mathematics					
Nazwa przedmiotu	Matem	Matematyka ogólna					
ECTS points	5		Subject type		Р		
Language of lecture	angielsk i	Mode c	of completing the cours	e E	xamination		
Course code	Δ	1.1.	Subject related to scientific research/pract. profess. prepar. (Y/N)	·	N		

Knowledg		Knowledge	1	Students have knowledge on secondary school level.	mathema	atics at th	e		
			2						
Preliminary		1	Students are prepared to acquire knowledge ndependently.						
requirem of the co			2	Students are able to apply ba techniques.	asic math	ematical	tools and		
		Social Competence	1	Students are able to use mod computers, multimedia) and (manuals, encyclopedias, net	informati	on source			
			2						
Course G courses.	oal	s Providing the bac	kgr	ound for more advanced math	nematical	and tech	nical		
equations emphasis	s, a s or	analytic geometry in	R3, garit	bers, matrix calculus, determi fundamental one variable fur tmic functions, limits continui xercises.	nctions, w	ith particu	ular		
			after completing the training	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s			
	1	Students know the c	ept of complex numbers.	IS_K1_W 01	W	AFP			
Knowled	2		sic ı	c concepts of operations on methods of solving of ions.	IS_K1_W 01	w	AFP		
ge	3	Students know the b the vectors.	asi	c concepts of operations on	IS_K1_W 01	w	AFP		
	4		tion	erties of fundamental s of the limit, continuity of	IS_K1_W 01	w	AFP		
		Students are able to numbers. solve com		ke operations on complex square equations.	IS_K1_U 06	С	EFP		
Skills				ke operations on matrices, nts and solve the system of	IS_K1_U 06	С	EFP		
		Students are able to make operations on vectors in 3-D space.			IS_K1_U 06	С	EFP		
	4 Students are able to calculate limits of functions ar check their continuity.				IS_K1_U 06	С	EFP		
Social Compet ence	1		r, ir	he need for continued methods of modern e technology.	IS_K1_K 01	W C	Р		
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, 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)	/sem. (h) Tutor (coordinator) of the course (title/academic degree/professional title, name and surname 30				
Lecture (W)						
Calculation class (C)	30					
Laboratory class (L)	0	dr inż. Ścię	gosz Hanna			
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		55			
Preparation of a report project/presentation			0			
Independent study o	of the course top	pics	8			
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			

* hour (class) means 45 minutes

dr Koziarska Anna Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Field of study Environmental Engineering

Profile of Educ	ation	General Academic					
Level of study				Studies			
Specialization							
Form of Study		Full-Tin	ne S	tudies			
Semester		First	First				
Course Title		Genera	General Physics				
Nazwa przedm	iotu	Fizyka	ogó	Ina			
ECTS poir	nts	1			Subject type		Р
Language of	lecture	angielsk i		Mode c	f completing the cours	e	Course credit
Course co	Course code		A.2.1.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν
	Knowle	dae	1 Students have basic knowledge of physic and chemistry at a level of secondary school.				
	KIIUWIE	uge	2	Students have the knowledge of mathematics that enables them to analyze and interpret physical formu			
Preliminary requirements of the course	Skills		1	physical	The student is able to perform a preliminary analysis of physical tasks and use familiar mathematical methods to solve them.		
			2				
	Social	tonco	aroups.		can think and act indi	and act individually and work in	
Competence 2							
Course Goals	Familiri	zing stude	ents	s with usir	ng physical laws at wor	k and ir	n everyday life.
motion of a ma description of acquires know phenomena, ir of kinematic, d	aterial p the kine ledge al icluding lynamic d analys	oint and t tics of pho pout the la cause an descriptions is of wave	he r enor aws d ef on o e ph	otational mena and of dynam fect relat f vibratio enomena	knowledge of the kine motion of a rigid body, processes occurring in nics and physical quant ionships. 3. The acquire n and wave motion allo necessary in characte	, necess n nature ities us ed knov ows for f	sary in the e. 2. The student ed to describe vledge in the field the quantitative

devices in environmental processes.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
	1	A student knows and understands the kinematic description of various types of movements of material points and rotational movements of a rigid body necessary in the quantitative description of the kinetics of processes.	IS_K1_W 01	W	С
Knowled ge 2	2	A student knows and understands the laws of dynamics allowing for a cause-and-effect description of physical phenomena.	IS_K1_W 01	W	С
	3	A student has knowledge of wave motion and vibrations necessary to characterize processes in which vibrations, resonances or wave phenomena affect environmental processes.	IS_K1_W 01	W	С
Skills	1				
	2				
Social Compet ence	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge	IS_K1_K 01	W	CPR
Mathadaac	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, 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)	0	dr Kostrzewa Marek				
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)		0				

Project (P)	0
Seminar (S)	0
Preparation for classes	14
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	0
Examination or final colloquium	1
Additional contact hours	0
Total student workload	30
Number of contact hours (from the study plan)	15

* hour (class) means 45 minutes

dr hab. Kozdraś Andrzej Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

	Faculty of Mechanical Engineering								
ion Car	d								
	Enviror	nmental	Eng	gin	neering				
tion	Genera	l Acade	mic						
	First Cy	First Cycle Studies							
	Full-Tin	ne Studi	ies						
	Fifth								
	Geodes	sy with g	geo	gra	aphic information elem	ents			
otu	Geodez	zja z ele	me	nta	ami informacji przestrz	ennej			
S	3				Subject type		К		
Language of lecture angielsk M			Mode of completing the course			Course credit			
Course code D.9.		D.9.			Subject related to scientific research/pract. profess. prepar. (Y/N)		т		
nowlog	dao		1	In	In the field of modern computer technologies				
liowiet	uge		2						
Skille			1	Computer skills					
			2						
Social C	omneton		1	No requirements					
	omperen		2						
	ion otu s octure e nowled kills	Enviror ion Genera First Cy Full-Tin Fifth Geodes otu Geodez s 3 octure angielsk i e finowledge kills	Environmental ion General Acade First Cycle Stur Full-Time Stud Fifth Geodesy with g otu Geodezja z ele s 3 octure angielsk M e D.9.	Environmental English ion General Academic First Cycle Studies First Cycle Studies Fifth Geodesy with geod otu Geodezja z elements S 3 ecture angielsk Mode e D.9. inowledge 1 kills 1 coial Competence 1	Environmental Engir ion General Academic First Cycle Studies First Cycle Studies Full-Time Studies Fifth Geodesy with geogra otu Geodezja z elementa S 3 Acture angielsk Mode o e D.9. nowledge Anowledge Mode o 1 In 2 c 1 Cr 2 c 1 N	Environmental Engineering ion General Academic First Cycle Studies Full-Time Studies Fifth Geodesy with geographic information elementation elementation elementation informacji przestrz Studies Studies Geodesy with geographic information elementation elementa	Environmental Engineering ion General Academic First Cycle Studies Full-Time Studies Fifth Geodesy with geographic information elements otu Geodezja z elementami informacji przestrzennej s 3 Subject type octure angielsk i D.9. Subject related to scientific research/pract. profess. prepar. (Y/N) nowledge 1 kills 1 Computer skills 2 ocial Competence 1		

Course Goals The general purpose and scope of the subject includes geodetic methods regarding measurements and inventory studies; situational, altitude and situational-height as well as measurements and implementation studies, resulting from project and investment tasks carried out in the field of environmental engineering. It also includes familiarizing the student with the basic geodetic and photogrammetric-remote sensing methods and spatial information systems in the field of acquiring, processing and cartographic and digital sharing of spatial geoinformation about the Earth and its environment, necessary for the needs of environmental engineering.

Programme content Geodesy. Geodetic documentation. Maps. Spatial data. Cartographic mappings. Projections.Spatial analysis. Network models. Application of spatial information systems. GPS.

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
	1	Student knows IT tools useful for the spatial presentation of simple engineering tasks in an advanced level	IS_K1_W 02	W	С
Knowled ge 2	2	Student knows the principles of spatial computer programming supporting the design of environmental infrastructure	IS_K1_W 03	WLP	C H I J K L M
	3	The student has appropriate knowledge about basic geodetic measurements	IS_K1_W 09	WL	СНІЈ
	1	The student uses computer programs for spatial presentation of environmental issues	IS_K1_U 03	LP	HIJKL M
Skills	2	Student can use a variety of maps and surveying studies	IS_K1_U 01	LP	HIJKL M
3		The student is prepared to cooperate with geodesists	IS_K1_U 02	WLP	C H I J K L M
Social Compet	1	Student can think and act in a creative way during the implementation of thematic maps	IS_K1_K 05	L	ніј
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, 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 inż. Wydrych Jacek				
Project (P)	15					
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)			15			
Seminar (S)			0			
Preparation for class	es		3			
Preparation of a report project/presentation	ort/paper/		20			
Independent study o	f the course to	pics	6			
Examination or final	colloquium		1			
Additional contact ho	ours		0			
Total student worklo	ad		75			
Number of contact h	ours (from the	study plan)	45			

* hour (class) means 45 minutes

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental 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	Geoteo	hnics and soil mechanics					
Nazwa przedmiotu	Geoteo	Geotechnika i mechanika gruntów					
ECTS points	1	Subject type	К				

Language of lecture a		angielsk i		Mode of completing the course		Course credit		
Course code		D.8.2.			Subject related to scientific research/pract. profess. prepar. (Y/N)	Т		
			1		A student knows the basics of algebra, geometry and mathematical analysis, as well as statics and mecha			
Preliminary requirements			2	A student knows and understands strength cases, methods of analysis of statically determinate and indeterminate systems, the basics of the theory of elasticity.				
of the course	Skills				student can determine the state of stress and strain in trength tasks			
			2	A student has the skills of independent and team work				
	Social		1	A student can think and act in a creative way				
	Compe	tence	2	Correctly identifies engineering problems				
Course Goals The aim of the s				ect is to pr	ovide students with the	eoretica	al foundations	

allowing for solving geotechnical tasks related to the design and construction of engineering structures

Programme content Geological processes. Geological and engineering documentation. Soil classification and properties. Stresses and strains in the ground. Strengthening of slopes and excavations.

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 knows the structure of the soil, its physical and mechanical features.	IS_K1_W 11	W	С
Knowled ge	2	A student has advanced knowledge of soil substrate modeling, analysis of the stress state in the substrate, settlement and bearing capacity ground and rules of slope stability testing.	IS_K1_W 02	W	С
	1	A student can determine the type of soil based on physical and mechanical features of the ground, and - to present their impact on the strength of the soil.	IS_K1_U 12	W	С
Skills	2	A student is able to determine the state of stress in the loaded substrate ground, determine its subsidence and carrying capacity as well to check the slope stability.	IS_K1_U 11	W	С
Social	1	A student understands the need to learn and lifting professional competences	IS_K1_K 01	W	С
Compet ence		A student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of geotechnics	IS_K1_K 02	W	С

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	Tutor (coordinator) of the course The course format Hours/sem. (h) (title/academic degree/professional title, name and surname						
Lecture (W)	15						
Calculation class (C)	0						
Laboratory class (L)	0	dr inż. Kokocińska-Pakiet Elżbieta					
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)			0				
Project (P)			0				

Seminar (S)	0
Preparation for classes	2
Preparation of a report/paper/ project/presentation	0
Independent study of the course topics	8
Examination or final colloquium	0
Additional contact hours	0
Total student workload	25
Number of contact hours (from the study plan)	15

* hour (class) means 45 minutes

dr hab. inż. Górski Piotr Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Car	d						
Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	l Academic					
Level of study	First Cy	cle Studies/					
Specialization							
Form of Study	Full-Tin	ne Studies					
Semester	Sixth	Sixth					
Course Title	Heating, ventilation and air - conditioning						
Nazwa przedmiotu	Ogrzewnictwo, wentylacja i klimatyzacja						
ECTS points	2		Subject type		К		
Language of lecture angielsk		Mode o	Mode of completing the course Course crea				
Course code		D.4.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		

	Knowledge		Students have basic knowledge of thermodynamics and understand the principles of equipment operation.
		2	
Preliminary requirements	Skills	1	Students can apply analytical methods to formulate and solve engineering problems.
of the course		2	
	Social		Students have the feeling of responsibility for the effects of their activity.
	Competence	2	

Course Goals The objective of the course involves the basic knowledge needed to conduct analysis concerned with the hygiene, climate and engineering aspects related to the development of heating, ventilation and air-conditioning installations in building objects.

Programme content Within the course, knowledge is conveyed regarding the construction and operation of heating, ventilation, and air conditioning installations. The acquired knowledge will enable students to develop design skills, and the acquired social competencies will enable them to conduct engineering activities in a creative manner while maintaining full responsibility for their consequences.

Learning	OL	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
	1	Student has advanced knowledge of numerical and computerised methods and tools and materials used for solving engineering tasks. Student knows the principles of engineering design	IS_K1_W 02	W P	СКМ
Knowled	2	Student has knowledge of electrical systems and thermodynamics, allowing for extensive understanding of the principles of operation of machines and devices	IS_K1_W 05	W P	СКМ
ge3	3	Student has advanced knowledge of the principles of rational energy, waste and wastewater management as well as heat transfer and energy conversion	IS_K1_W 12	W	СК
	4	Student has knowledge of the application of legal regulations, standards and guidelines in the design and operation of technical facilities	IS_K1_W 13	W P	СКМ
	1	Student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences.	IS_K1_U 01	Р	KLM
	2	Student uses computer software to solve engineering tasks.	IS_K1_U 03	Р	KLM
Skills	3	Student is able to identify and formulate practical engineering tasks related to environmental engineering	IS_K1_U 11	Р	KLM
		Student is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of heating, ventilation and air - conditioning	IS_K1_U 12	Ρ	KLM
	1	Student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment.	IS_K1_K 02	W P	C K L M R
Social Compet ence 2		The student is capable of thinking and acting in a creative, innovative, and entrepreneurial manner in the field of heating, ventilation, and air conditioning. They are prepared to critically evaluate their knowledge, collaborate and work effectively in groups, assuming various roles, and understand the importance of teamwork.	IS_K1_K 05	Ρ	K L M R

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)	0	dr hab. inż.	. Szmolke Norbert				
Project (P)	30						
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)			0				
Project (P)			30				
Seminar (S)			0				
Preparation for class	es		5				
Preparation of a report project/presentation	ort/paper/		6				
Independent study o	f the course top	oics	3				
Examination or final	colloquium		1				
Additional contact ho	ours		0				
Total student worklo	ad		60				
Number of contact h	ours (from the s	study plan)	45				

* hour (class) means 45 minutes

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study First		First C	rst Cycle Studies					
Specialization								
Form of Study Full-Tir			ne S	Studies				
Semester		Fifth						
Course Title		Hydrol	ogy	, meteoro	logy and climatology			
Nazwa przedm	iotu	Hydrol	ogia	a, meteoro	ologia i klimatologia			
ECTS poir	nts	3			Subject type		K	
Language of lecture angi		angielsk i		Mode of completing the course		Examination		
Course code		Γ	D.8.1.		Subject related to scientific research/pract. profess. prepar. (Y/N)		T	
			1	Understa chemical	nding the fundamental laws	s of phy	vsical and	
	Knowle	Knowledge		Using of mathematics to describe selected phenomena occurring in nature				
Duslinsing			3	Understanding the fundamentals of ecology				
Preliminary requirements of the course Skills			1		Distinguish between basic physical and chemical processes occurring in nature			
	JKIIIS	5		Description of physical and chemical phenomena and processes occurring in nature				
	Social		1	Identification of basic meteorological and hydro-logical phenomena				
	Compe	lence	2	The ability to verify received information			n	

course Goals The purpose of the course is to familiarize Students with the problems of earth sciences. As part of the course, Students will learn about the most important factors determining the circulation of heat, water and energy, and hear about the most important conditions affecting atmospheric circulation, weather condition and the climate.

Programme content The course imparts knowledge on issues related to climatic factors and atmospheric circulation with particular emphasis on radiation balance and water balance. Within the framework of the module, the student acquires knowledge of the basics of climate system operation and planetary heat circulation. The acquired knowledge allows students to understand the effects of mechanisms and processes of heat, water and air circulation in the natural environment. The student acquires knowledge of atmospheric and natural phenomena and develops competence in the study of water balance.

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	Student has a structured knowledge of the role of the environment; is aware of the risks and knows the methods to identify and reduce them	IS_K1_W 06	W P	ΑΚΝΟ
Knowled ge	2	Student has knowledge of meteorological, hydrological and climatic phenomena and processes and is familiar with the methods and apparatus for studying the basic quantities characterising these phenomena	IS_K1_W 01	W P	ΑΚΝΟ
	1	Student has self-education skills. Acquires information from literature, databases and other sources related to technical sciences. Is able to integrate information obtained, interpret it, draw conclusions and formulate opinions	IS_K1_U 01	Ρ	КNО
Skills	2	Students is able to carry out a hydro-logical analysis of a selected area.	IS_K1_U 06	Р	ΚΝΟ
	3	Student is able to observe phenomena and processes and will be able to carry out calculations of characteristic physical quantities describing the water cycle.	IS_K1_U 09	Р	ΚΝΟ
Social Compet	1	Student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment	IS_K1_K 02	W P	ΑΚΝΟ
ence	2	Student understands the social role of an engineer and understands the need to provide the public with reliable information on engineering achievements	IS_K1_K 06	W P	ΑΚΝΟ
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)	30					
Calculation class (C)	0					
Laboratory class (L)	0	dr hab. inż. Olszowski Tomasz				
Project (P)	15					
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)	15				
Seminar (S)	0				
Preparation for classes	2				
Preparation of a report/paper/ project/presentation	14				
Independent study of the course topics	10				
Examination or final colloquium	4				
Additional contact hours	0				
Total student workload	75				
Number of contact hours (from the study plan)	45				

dr hab. inż. Kłosok-Bazan Iwona

Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card						
Field of study	_	<u></u>	neening			
Profile of Education	Genera	al Academic				
Level of study	First Cy	cle Studies				
Specialization						
Form of Study	Full-Tir	ne Studies				
Semester	Sixth	Sixth				
Course Title	Impact	Impact assessment of the enterprises on the environment				
Nazwa przedmiotu	Ocena	Ocena oddziaływania przedsiębiorstw na środowisko				
ECTS points	4	Subject type			W-K	
Language of lecture angielsk Mode of lecture angielsk			of completing the course		Course credit	
Course code		E.9.	Subject related to scientific research/pract. profess. prepar. (Y/N)		т	

			1	A student has knowledge a	f the proc	huction pr			
		Knowledge		A student has knowledge of A student knows the pollut					
Preliminar	har	_	2	A student knows the pollutants affecting the quality of the environment					
requirem			1 A student is able to analyz						
of the co			2						
		Social Competence	1	A student understands the	social rol	e of an er	ngineer		
impact of	F pr	s Providing knowledg ojects. Developing the degrade the environm	ronmenta						
activity. A	٩s	part of the module, the	stu	vides knowledge on issues r udent acquires knowledge a rocess and the resulting env	nd skills i	n analyzir	ng		
Learning outcomes for the course - after completing the training e to the course cycle (W, C, L, outcome P, S)						Methods of verificati on of learning outcome s			
Knowled	1	about possible risk to t	tudent has specialized and systematic knowledge bout possible risk to the natural environment and nows methods for their reduction.				CL		
ge	2	Student has knowledge environmental impact design and operation o	IS_K1_W 13	W P	CL				
Skills	1	documents and databa	tudent can obtain the information from strategic ocuments and databases to assess the nvironmental impact of projects.						
2			Student can make a critical technical analysis of the realization and operation of the investment.						
Social	1		e as	sponsibility for his analyzes spect of the effects they it and economy.	IS_K1_K 02	W P	CL		
Compet ence	2	Student understands t information and under environmental impact	star		IS_K1_K 06	W P	CL		

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)	Laboratory class (L) 0 dr hab. inż. Król 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		10			
Preparation of a report project/presentation	ort/paper/		10			
Independent study o	f the course to	pics	20			
Examination or final	colloquium		0			
Additional contact ho	ours		0			
Total student worklo	ad		100			
Number of contact h	ours (from the	study plan)	60			
* hour (class) maans 45 minutes						

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering Course Description Card

Environmental Engineering Field of study Profile of Education **General Academic** Level of study **First Cycle Studies** Specialization **Full-Time Studies** Form of Study Semester Seventh Course Title Industrial pollutions Nazwa przedmiotu Zanieczyszczenia przemysłowe **ECTS** points Subject type 2 W-K

Language of	angielsk i	Mode of completing the course			Course credit			
Course code		E			Subject related to scientific research/pract. profess. prepar. (Y/N)		T	
	Knowledge		1		dent has knowledge of technical solutions and mental protection processes			
			2					
Preliminary				Student	Student is able to gather information from literature			
requirements of the course	Skills		2	Student conclus	can analyze presented	d issues	and draw	
	Social		1	1 Students understands lifelong learning education		g education		
	Competence		2	2 Student understands the social role of the engineer			f the engineer	
Course Goals The aim of the course is to familiarize students with the environmental impact								

of various industries and methods to protect against the negative impact of industry on the environment.

Programme content The content of the lectures encompasses the understanding of technologies aimed at reducing industrial pollution introduced into the environment. Case studies will be analyzed to practically illustrate the discussed issues.

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	Student knows the principles of identification of hazards during the construction and operation of different type of industry	IS_K1_W 03	WL	С
ge	2	Student has specialist and systematic knowledge of the role of the natural environment, is aware of hazards and knows how to identify and reduce them	IS_K1_W 06	L	CPR
Skills	1	Student is able to see systemic and non-technical aspects while formulating and solving engineering tasks	IS_K1_U 09	L	С
	2	Student is able to carry out simple research tasks concerning with environmental engineering	IS_K1_U 12	L	CPR
Social	1	Student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment	IS_K1_K 02	L	CPR
Compet ence	2	Student is aware of the importance of professional conduct, adherence to professional ethics and respecting the diversity of views and opinions; is also ready to cherish the achievements and traditions of the engineering profession	IS_K1_K 04	W	С

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. inż. Wzorek Małgorzata				
Project (P)	0					
Seminar (S)	0					
		Student wor	rkload			
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	5
Preparation of a report/paper/ project/presentation	8
Independent study of the course topics	5
Examination or final colloquium	2
Additional contact hours	0
Total student workload	50
Number of contact hours (from the study plan)	30

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card							
Field of study	1	nmental Engi	neering				
Profile of Education	Genera	I Academic	J				
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tir	Full-Time Studies					
Semester	Sixth	Sixth					
Course Title	Industry water management						
Nazwa przedmiotu	Gospoo	Gospodarka wodna w przemyśle					
ECTS points	3		Subject type	W-K			
Language of lecture	angielsk i	Mode of completing the course		e	Course credit		
Course code		E.1.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		

	Knowledge		
Preliminary requirements		1	
		2	
of the course	Social Competence		Student understands the need for further training, raising professional competences
		2	

Course Goals To acquaint students with the principles of water management and technologies for water treatment in industry.

Programme content Principles of water and wastewater management in selected industrial plants.

Learning	Form of course (W, C, L, P, S)	Methods of verificati on of learning outcome s			
Knowled	1	To an advanced degree, the student has knowledge of water management, knows the basics of water circulation in industry	IS_K1_W 12	W P	CKL
ge	2	The student knows the principles of rational management of water and wastewater and legal guidelines applicable to the	IS_K1_W 13	W	С
Skills	1	The student acquires information from literature, databases and other sources related to technical sciences; can integrate the obtained information, make their interpretation, draw conclusions and formulate opinions	IS_K1_U 01	W	С
2		The student can recognize systemic and non- technical aspects when formulating and solving engineering tasks	IS_K1_U 09	Р	ΚL
Social Compet	1	The student correctly identifies engineering problems and can set the priorities of professional activities	IS_K1_K 03	Ρ	ΚL
ence	2	The student is aware of the proper conduct of water and sewage management in industrial plants.	IS_K1_K 02	W	С

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	dr hab. inż. Kłosok-Bazan Iwona				
Laboratory class (L)	0					
Project (P)	15					
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)			15			
Seminar (S)			0			
Preparation for class	es		20			
Preparation of a report project/presentation	ort/paper/		0			
Independent study o	f the course to	pics	8			
Examination or final	colloquium		2			
Additional contact ho	ours		0			
Total student worklo	ad		75			
Number of contact h	ours (from the	study plan)	45			

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	Il Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tir	Full-Time Studies					
Semester	Second	Second					
Course Title	Inform	Information technology					
Nazwa przedmiotu	Techno	Technologie informacyjne					
ECTS points	2	2 Subject type P					

Language of lecture		angielsk i	ngielsk Mode c		of completing the course		Course credit		
Course co	de		В.	3.1. p	Subject related to scientific research/pract. profess. prepar. (Y/N)		N		
			1	operations is with tasks suc	ter Skills: Proficiency essential. Students sl ch as file managemer Windows or macOS, a lications.	hould be nt, navig	e comfortable gating operating		
	Knowle	dge	2	Knowledge of Text Editing Software: Familiarity with t					
			3	graphic editin or GIMP is ber manipulating	g of Graphic Editing S ng software like Adobe neficial. Students sho images, creating gra h as layers and filters	e Photo: uld hav phics, a	shop, Illustrator, e basic skills in		
Preliminary requirements of the course			1	require collab ability to worl	nd Communication Ski poration with others. S k effectively in teams collaborate on projects	Student: , comm	s should have the		
	Skills	Skills	Skills		2	English, a suf	uage Proficiency: If the ficient level of English understand lectures, umentation.	n langua	age proficiency is
			3		Attention to Detail: Information Technology often involves working with complex systems where attention to detail is crucial for accurate problem-solving and programming.				
			4	thinking skills information, a	inking: Students shou to understand and ir analyze data, and ma ated scenarios.	nterpret	technical		
	Social			it is not requi	red				
	Compe		2		information tochnolog				

Course Goals Providing basic information on information technology

Programme content Introduction to IT Fundamentals: Understanding the basic concepts and principles of Information Technology, including hardware, software, networks, and cybersecurity. Computer Systems and Software Applications: Learning about computer systems architecture, operating systems, and common software applications used in various fields. Data Management and Analysis: Exploring techniques for data organization, storage, retrieval, and analysis using databases and spreadsheet software.

Learning outcomes for the course - after completing the training cycle c									
	1	A student has an advanced knowledge of the construction of computers and computer networks 02 W							
Knowled ge	2	A student he knows electronic documents and has knowledge about their construction.	IS_K1_W 02	WL	CDLP				
	3	Knowledge of legal aspects of using information	IS_K1_W 15	W	DO				
	1	Creating, presenting, transmitting, acquiring information	IS_K1_U 02	L	NO				
Skills	2	The ability to select IT tools to perform their own tasks	IS_K1_U 03	L	NO				
	3	A student can use internet services. He can search for information	IS_K1_U 01	L	NO				
Social Compet	1	A student understands the need for continuous training, raising professional competences and can organize the learning process of other people	IS_K1_K 01	W	C D				
	ence 2								
		fication of learning outcomes:	t's base also a f		- Elisa d				

	Hours in the study plan					
The course format	Hours/sem. (h)	(title/academi	rdinator) of the course c degree/professional title, ne and surname			
Lecture (W)	15					
Calculation class (C)	0					
Laboratory class (L)	15	lr inż. Pochwała Sławo	r inż. Pochwała Sławomir			
Project (P)	0					
Seminar (S)	0					
		Student workload				
Types of student act	ivities*		ge number of hours* allocated on completed activities			
Lecture (W)			15			
Calculation class (C)			0			
Laboratory class (L)			15			
Project (P)			0			
Seminar (S)			0			

10
5
4
1
0
50
30

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit

(stamp/signature)

dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Cal	urse Description Card					
Field of study	Enviror	Environmental Engineering				
Profile of Education	Genera	al Academic				
Level of study	First Cy	ycle Studies				
Specialization						
Form of Study	Full-Tir	ne Studies				
Semester	First					
Course Title	Materia	als science				
Nazwa przedmiotu	Materia	ałoznawstwo				
ECTS points	2	Subject type			Р	
Language of lecture	angielsk i	Mode o	of completing the cours	e	Course credit	
Course code	A.10		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	

		Knowledge	1	Student has basic knowledge of physics and chemistry				
		Kilowieuge	2					
		1	Student an obtain information	on from lit	terature			
Prelimir	nar	y Skills	2					
requirem			1	Student understands the ne	ed to lear	'n		
of the cc	our	se Social Competence	2	A student is aware of the ne knowledge throughout life a appropriate learning methoo others	nd is able	e to select	the	
Course G	oa	s To acquaint stude	nts	with the construction of mate	erials			
mechanic	al			is aspects such as crystal str erials, plastics, ceramic mate	•	-		
Learning outcomes for the course - after completing th cycle					The referenc e to the learning outcome s		Methods of verificati on of learning outcome s	
Knowled	1			nowledge of the structure of		W	С	
ge	_	materials and its effe	ect c	on properties	07	•••	<u> </u>	
J -	2							
Skills	1							
	2							
Social Compet ence	1	A student understands the need for further training and is able to plan and implement lifelong learning independently and to critically appraise his/her knowledge US_K1_K 01 V C					С	
	2							
A-written ex on partial m assessment implementa	am, arks fror tion	of written answers, G-term n preparations for exercises of the project, M-assessmer	ssme pape , K-as	ent, D-oral assessment, E-based on par r, H-assessment from reports, I-assess resesment from the project implement defense of project, N-assessment of for s' activity, R-observation of the regula	sment from r ation, L-asse rm of presen	ealization of ssment of th	exercises, J- e written	
			Н	ours in the study plan				

	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 Project (P) 0		dr Andrzejewski Dariusz				
Seminar (S)	0					
Student workload						

Average number of hours* allocated on completed activities
30
0
0
0
0
10
0
10
0
0
50
30

dr hab. inż. Małecka Joanna Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card						
Field of study	Enviror	Environmental Engineering				
Profile of Education	Genera	General Academic				
Level of study	First Cy	cle Studies				
Specialization						
Form of Study	Full-Tir	Full-Time Studies				
Semester	Second	1				
Course Title	Mather	natics for eng	gineers			
Nazwa przedmiotu	Matem	atyka dla inż	ynierów			
ECTS points	3	Subject type			Р	
Language of lecture	angielsk i	Mode o	Mode of completing the course		Examination	
Course code	A	A.1.2.	Subject related to scientific research/pract. profess. prepar. (Y/N)		N	

Preliminary requirements of the course 3 sequence, the limit of a function and continuity of a function. Skills 1 The ability to abstractional and logical thinking. Social Competence 1 The ability to perform basic algebraic calculations. Social Competence 1 The ability to co-work in a group. 2 Understanding of need for self-education. 3 Student's responsibility for his own work. Course Goals Providing the background for more advanced mathematical and technical courses. Programme content Differential calculus of one variables functions and its applications, indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises. Learning outcomes for the course - after completing the training cycle The s Students have knowledge with regard to differential 1 1 1 calculus of one variable functions. 3 Students have knowledge with regard to integral application. 2 Students know English terminology used in application. 15_K1_W application. W 3 Students know English terminology used in athematics. 15_K1_U application. C C E F application. 3										
Preliminary requirements of the course Knowledge Students know the definition of the limit of a numerical sequence, the limit of a function and continuity of a function. Skills 1 The ability to abstractional and logical thinking. Social Competence 2 The ability to perform basic algebraic calculations. 1 The ability to co-work in a group. 2 2 Understanding of need for self-education. 3 3 Student's responsibility for his own work. 2 Course Goals courses. Providing the background for more advanced mathematical and technical courses. application. Programme content Differential calculus of one variables functions and its applications, indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises. Form of course is to the ioarning outcome s Methor of course is to the ioarning outcome s Knowledg 1 Students have knowledge with regard to differential 1 IS_K1_W of calculus of one variable functions. IS_K1_W 01 W A 2 Students have knowledge with regard to integral calculus of one variable functions. IS_K1_W 01 W A 3 Students have knowledge with regard to integral calculus of one variable functions.								bols of		
Preliminary requirements of the course 3 Students know the definition of the limit of a numerical sequence, the limit of a function and continuity of a function. Skills 1 The ability to abstractional and logical thinking. Social Competence 1 The ability to perform basic algebraic calculations. Social Competence 1 The ability to co-work in a group. 2 Understanding of need for self-education. 3 Student's responsibility for his own work. Course Goals courses. Providing the background for more advanced mathematical and technical courses. Programme content Differential calculus of one variables functions and its applications, indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises. Learning outcomes for the course - after completing the training cycle The application. 4 Students have knowledge with regard to differential application. IS_K1_W 01 W A 2 Students know English terminology used in mathematics. IS_K1_W 01 W A 3 Students are able to calculate the derivative of a calculus of one variable functions. IS_K1_W 01 W A 3 Students know English terminology used			Knowladaa	2	Students know fundamental fu	unctions.				
of the course Skills 1 The ability to abstractional and logical thinking. 2 The ability to perform basic algebraic calculations. Social Competence 1 The ability to co-work in a group. 2 Understanding of need for self-education. 3 Student's responsibility for his own work. Course Goals courses. Providing the background for more advanced mathematical and technical courses. Programme content Differential calculus of one variables functions and its applications, indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises. Learning outcomes for the course - after completing the training geometric acculus of one variable functions and its application. Is <u>K1_W</u> 01 Methor course is to the learning outcome s 1 Students have knowledge with regard to differential calculus of one variable functions and its application. Is <u>K1_W</u> 01 W A 2 Students know English terminology used in function. IS_K1_W 17 W A 3 Students are able to calculate the derivative of a function. Is <u>K1_U</u> 2 C C E E F Skills 3 Students are able to calculate indefinite integrals and function. Is <u>K1_U</u> 2 C<	Preliminary		y	3						
Social Competence 1 The ability to perform basic algebraic calculations. Social Competence 1 The ability to co-work in a group. 2 Understanding of need for self-education. 3 Student's responsibility for his own work. Course Goals Providing the background for more advanced mathematical and technical courses. Programme content Differential calculus of one variables functions and its application, indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises. Form of course (W, C, L, P, S) Methor or or course (W, C, L, P, S) Learning outcomes 1 Students have knowledge with regard to differential calculus of one variable functions and its application. IS_K1_W 01 W A 1 Students have knowledge with regard to integral calculus of one variable functions. IS_K1_W 01 W A 3 Students know English terminology used in function. IS_K1_W 17 W A 3 Students are able to calculate the derivative of a function. IS_K1_U 06 C C E F Skills 2 Students are able to calculate indefinite integrals and calculus of one variable functions. IS_K1_U 06 C C E F				1	The ability to abstractional and logical thinking.					
Social Competence 2 Understanding of need for self-education. 2 Understanding of need for self-education. 3 Student's responsibility for his own work. Course Goals Providing the background for more advanced mathematical and technical courses. Programme content Differential calculus of one variables functions and its applications, indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises. Learning outcomes for the course - after completing the training cycle The reference to the learning outcome s Form of course (W, C, L, P, S) Methor of course (W, C, L, P, S) Knowled ge 1 Students have knowledge with regard to differential calculus of one variable functions and its application. IS_K1_W 01 W A 2 Students know English terminology used in function. IS_K1_W 01 W A 3 Students are able to calculate the derivative of a function. IS_K1_U 06 C C E F Skills 2 Students are able to calculate indefinite integrals and function. IS_K1_U 06 C C E F			Skills	2	The ability to perform basic al	gebraic ca	alculation	S.		
Competence 2 Understanding of need for self-education. 2 Understanding of need for self-education. 3 Student's responsibility for his own work. Course Goals Providing the background for more advanced mathematical and technical courses. Programme content Differential calculus of one variables functions and its applications, indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises. Learning outcomes for the course - after completing the training goutcome s The ference for the course - after completing the training outcome s Form of course (W, C, L, P, S) outcome s Knowled ge 1 Students have knowledge with regard to differential calculus of one variable functions and its application. IS_K1_W 0 W 2 Students have knowledge with regard to integral calculus of one variable functions. IS_K1_W 01 W A 3 Students know English terminology used in mathematics. IS_K1_W 01 W A 3 Students are able to calculate the derivative of a function. IS_K1_U 0 C C E F Skills 2 Students are able to calculate indefinite integrals and IS_K1_U 0 C C E F				1	The ability to co-work in a gro	up.				
Student's responsibility for his own work.Course GoalsProviding the background for more advanced mathematical and technical courses.Programme contentDifferential calculus of one variables functions and its applications, indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises.Learning outcomes for the course - after completing the training cycleThe referenci e to the learning outcome sMetho of outcome sKnowled ge1Students have knowledge with regard to differential calculus of one variable functions and its application.IS_K1_W 01WA2Students have knowledge with regard to integral calculus of one variable functions.IS_K1_W 01WA3Students have knowledge with regard to integral calculus of one variable functions.IS_K1_W 01WA4Students are able to calculate the derivative of a function.IS_K1_U 06CC E F2Students are able to calculate indefinite integrals andIS_K1_U 06CC E F3Students are able to calculate definite integrals andIS_K1_U 06CC E F2Students are able to calculate definite integrals andIS_K1_U 06CC E F				2	Understanding of need for self	f-educatio	on.			
courses. Programme content Differential calculus of one variables functions and its applications, indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises. Learning outcomes for the course - after completing the training outcome for the course - after completing the training outcome s for the course - after			competence	3	Student's responsibility for his	s own wor	k.			
indefinite integrals and methods of their calculation, definite integrals and their application to solving geometric problems, and improper integrals will be discussed during the lecture and exercises. Method of verification of the course - after completing the training cycle Learning outcomes for the course - after completing the training geometric problems, and improper integrals and their application. The reference course - after completing the training outcome and exercises. Method of verification of the course - after completing the training outcome and exercises. Knowled ge 1 Students have knowledge with regard to differential calculus of one variable functions and its application. IS_K1_W 01 W A 2 Students have knowledge with regard to integral calculus of one variable functions. IS_K1_W 01 W A 3 Students know English terminology used in mathematics. IS_K1_W 17 W A 4 Students are able to calculate the derivative of a function. IS_K1_U 06 C C E E F Skills 2 Students are able to calculate indefinite integrals and IS_K1_U 06 C C E E F		oal	s Providing the ba	ckg	round for more advanced math	nematical	and tech	nical		
Learning Learning geStudents have knowledge with regard to differential cycleIs reference cycleForm of course learning outcome sForm of course learning outcome sof reference to the learning outcome sIs SK1_W WA1Students have knowledge with regard to differential calculus of one variable functions and its application.IS SK1_W 01WA2Students have knowledge with regard to integral calculus of one variable functions.IS 01WA3Students know English terminology used in mathematics.IS 17WA3Students are able to calculate the derivative of a function.IS 06CC E F2Students are able to calculate indefinite integrals by selecting appropriate calculation methods.IS SK1_U 06CC E F	indefinite to solving	e in g ge	tegrals and method eometric problems,	s of	their calculation, definite integ	grals and	their app	lication		
Knowled ge1calculus of one variable functions and its application.IS_KI_W 01WA2Students have knowledge with regard to integral calculus of one variable functions.IS_K1_W 01WA3Students know English terminology used in mathematics.IS_K1_W 01WA1Students are able to calculate the derivative of a function.IS_K1_U 06CC E F2Students are able to calculate indefinite integrals by selecting appropriate calculation methods.IS_K1_U 06CC E F	Learning outcomes for the course - after completing the training cycle					verificati on of learning outcome				
ge 2 Students have knowledge with regard to integral calculus of one variable functions. IS_K1_W 01 W A 3 Students know English terminology used in mathematics. IS_K1_W 17 W A 1 Students are able to calculate the derivative of a function. IS_K1_U 06 C C E F 2 Students are able to calculate indefinite integrals by selecting appropriate calculation methods. IS_K1_U 06 C C E F 3 Students are able to calculate definite integrals and IS_K1_U 06 IS_K1_U 06 C C E F		1	calculus of one variable functions and its $\begin{bmatrix} IS_KI_W \\ 01 \end{bmatrix} W = A$							
3 mathematics. -17 W A 1 Students are able to calculate the derivative of a function. IS_K1_U C C E F 2 Students are able to calculate indefinite integrals by selecting appropriate calculation methods. IS_K1_U C C E F 3 Students are able to calculate definite integrals and IS_K1_U C C E F		2	Students have knowledge with regard to integral IS_K1_W					А		
I function. $\overline{06}^-$ C C E F 2 Students are able to calculate indefinite integrals by selecting appropriate calculation methods. IS_K1_U C C E F 3 Students are able to calculate definite integrals and IS_K1_U C C E F			-	Students know English terminology used in IS_K1_W A						
Skills 2 selecting appropriate calculation methods. 06 CEF 3 Students are able to calculate definite integrals and IS_K1_U CEF		1	Students are able to calculate the derivative of a IS_K1_U							
Students are able to calculate definite integrals and STATU	Ckille									
	SKIIIS	5	Students are able to calculate definite integrals and IS_K1_U							
4 Students are able to use mathematical terminology $\begin{vmatrix} S_K1_U \\ 04 \end{vmatrix}$ C C F		4	Students are able to use mathematical terminology IS_K1_U				CEFP			
Social CompetStudents are even more aware of the need for continued training, in particular, in methods of modern mathematics used in the technology.IS_K1_K 01WA	Compet		tudents are even more aware of the need for ontinued training, in particular, in methods of $IS_{01}K W A$							
2		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 le/academic degree/professional title, name and surname			
Lecture (W)	15					
Calculation class (C)	15					
Laboratory class (L)	0	dr inż. Ścię	gosz Hanna			
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)			15			
Laboratory class (L)			0			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		35			
Preparation of a report project/presentation			0			
Independent study o	of the course top	pics	8			
Examination or final	colloquium		2			
Additional contact he	ours		0			
Total student worklo	ad		75			
Number of contact h	ours (from the	study plan)	30			

* hour (class) means 45 minutes

dr Koziarska Anna Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study First Cycle Studies								
Specialization	pecialization							
Form of Study Full-T				Full-Time Studies				
Semester		Fourth						
Course Title		Mecha	nica	al operatio	ns in industrial installa	tions		
Nazwa przedm	iotu	Operad	cje r	mechanicz	ne w instalacjach prze	mysłow	ych	
ECTS poir	nts	4			Subject type		W-K	
Language of	lecture	angielsk i		Mode o	of completing the cours	e	Course credit	
Course code			E.11	1. Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		
	Knowle	dge	1	, The student has knowledge regarding industrial				
Preliminary requirements			1	 technologies and equipment The student acquires information from literature, databases, and other sources, and analyzes them to draw conclusions 				
of the course			2	, , , , , , , , , , , , , , , , , , , ,				
	Social		1		ent understands the ne nhancement of profess			
Competence 2 The student has the ability to work in teams and communicate effectively								
Course Goals The aim of the course is to familiarize students with mechanical operations used in industrial installations.								
Programme content The course content includes learning about mechanical operations such as size reduction, separation, filtration, fluidization, and mixing. Physical properties of single and multicomponent real substances will be discussed, along with the scope and methodology of calculating industrial pipelines.								

Learning	OL	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled	1	Student has knowledge in processes of environmental engineering	IS_K1_W 09	WCLP	CHIKL P
ge	2	Student has advanced knowledge of design and calculation of process apparatuses	IS_K1_W 02	WCLP	CHIKL P
Skille	1	Student is able to identify and formulate practical engineering tasks related to process engineering	IS_K1_U 11	СР	CHIKL P
Skills	2	Student is able to carry out simple research tasks, calculation connected with process engineering	IS_K1_U 12	L	ΗР
Social Compet	1	Student understands the need to learn and implement the lifelong learning process and critically assess their own knowledge	IS_K1_K 01	WCLP	CHIKL P
ence	2	Student correctly identifies engineering problems and can solve practical problems	IS_K1_K 03	LP	HKLP

	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)	15					
Laboratory class (L)	15	dr hab. inż. Wzorek Małgorzata				
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)		15				
Laboratory class (L)		15				
Project (P)		15				
Seminar (S)		0				
Preparation for class	es	8				
Preparation of a report project/presentation		7				

Independent study of the course topics	8
Examination or final colloquium	2
Additional contact hours	0
Total student workload	100
Number of contact hours (from the study plan)	75

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Field of study		Enviro	Environmental Engineering				
Profile of Educ	ation	_		cademic	······································		
Level of study		First C	First Cycle Studies				
Specialization			<u> </u>				
Form of Study		Full-Tir	Full-Time Studies				
Semester		Fourth					
Course Title		Mecha	nica	al operatio	ns in sanitary installati	ons	
Nazwa przedm	iotu	Opera	cje i	mechanicz	ne w instalacjach sanit	tarnych	
ECTS poir	nts	4			Subject type		W-K
Language of	lecture	angielsk i		Mode of completing the course		Course credit	
Course co	Course code		E.11	E.11. Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	
	Knowle	Knowledge		The stude	ent has knowledge in th ent has knowledge rega jies and equipment		
Preliminary requirements	Skills		1		ent acquires informatio s, and other sources, a ns		
of the course			2	The stude	ent accurately identifie	s engine	eering problems
	Social		1		ent understands the ne nhancement of profess		
	Compe	tence	2		ent has the ability to we cate effectively	ork in te	eams and

Course Goals The aim of the course is to familiarize students with mechanical operations used in sanitary installations.

Programme content The course content includes learning about mechanical operations such as gravitational phase separation, filtration, and liquid phase mixing. Principles of slurry and suspension pumping, hydraulic transport, as well as the scope and methodology of calculating flow installations will be discussed.

Learning	οι	utcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	• • • •	Methods of verificati on of learning outcome s
Knowled	1	Student has knowledge about methods and devises used in process engineering	IS_K1_W 09	WCLP	CHIKL P
ge	2	Student has advanced knowledge of methods and tools used for engineering design	IS_K1_W 02	WCLP	CHIKL P
	1	Student is able to identify and formulate practical engineering tasks related to process engineering	IS_K1_U 11	СР	CHIKL P
Skills	2	Student is able to carry out simple research tasks concerning with methods typical of process engineering in accordance with the provided specification	IS_K1_U 12	L	НР
Social	1	Student understands the need to learn and lifelong learning	IS_K1_K 01	WCLP	CHIKL P
Compet ence	2	Student correctly identifies engineering problems can solve it	IS_K1_K 03	LP	HKLP

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)	15				
Laboratory class (L)	15	dr hab. inż. Wzorek Małgorzata			
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)	15
Laboratory class (L)	15
Project (P)	15
Seminar (S)	0
Preparation for classes	8
Preparation of a report/paper/ project/presentation	7
Independent study of the course topics	8
Examination or final colloquium	2
Additional contact hours	0
Total student workload	100
Number of contact hours (from the study plan)	75

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Course Description cu	u	A				
Field of study	Enviror	Environmental 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	Mechanics					
Nazwa przedmiotu	Mechai	Mechanika ogólna				
ECTS points	3		Subject type		Р	
Language of lecture	angielsk i	Mode o	of completing the cours	e	Course credit	
Course code	A	.11.1.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	

			1				
	Knowledge		1	A student knows the fundan vector analysis	nentals of	mathem	atics and
			2	Fundamentals of Physics			
Prelimir			1	A student is able to apply kr	nowledge	of mathe	matics
requirem			2				
		Social	1	A student recognizes the ne engage in life-long learning	ed for, an	id an abili	ty to
		Competence	2	A student is able to think inc	dependen	tly.	
		s The aim of subject problems.	t is a	apply the principles of mecha	anics to pr	ractical	
		content Problems o d internal forces in s		tics. Equations of equilibriun tural members.	n. Determ	inations o	of
Learning outcomes for the course - after completing the training cycle cycle c						verificati	
Knowled	A student is able to use FBD concept to define 1 equilibrium equations and find the unknown reaction $IS_{07}K1_W$ W C C I						
ge	2	A student is able to define fundamental concepts of mechanics and apply fundamental equations of 07 W C C I equilibrium.					
Skills		A student is able to s structures subjected		e standard engineering tatic loads.	IS_K1_U 11	С	CI
	2						
Social Compet	1	student is able to analyse engineering problems IS_K1_K W C C I nd solve them effectively.					
ence	2						
A-written ex	am,		ssme	nt, D-oral assessment, E-based on par r, H-assessment from reports, I-assess			

	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. Marciniak Zbigniew					
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	20					
Preparation of a report/paper/ project/presentation	0					
Independent study of the course topics	23					
Examination or final colloquium	2					
Additional contact hours	0					
Total student workload	75					
Number of contact hours (from the study plan)	30					

dr hab. inż. Kluger Krzysztof Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card							
Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	al Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Sixth	Sixth					
Course Title	Methods of the impact of industry on the environment						
Nazwa przedmiotu	Metody	/ oceny oddzi	aływania przemysłu na	środow	<i>i</i> sko		
ECTS points	4		Subject type		W-K		
Language of lecture	angielsk i	Mode c	of completing the cours	e	Course credit		
Course code		E.9.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		

	Knowledge								
	Kilowicuge	2							
	Skills	1	A student has the ability to analyze data						
	y	2							
	se	1							
	Competence	2	and the need providing the p	oublic with	n reliable				
on isk	the environment. De factors, and selectin	velo ig re	oping the ability to analyze da esearch methods for the corre	ata on env	vironment	al			
Programme content The subject provides knowledge on issues related to environmental assessment methods. As part of the module, the student acquires knowledge and skills in analyzing available data about the production process and methods of assessing the impact on individual environmental components. The acquired knowledge allows to identify industrial threats and select the best possible technologies to reduce the impact of industry on the environment.									
Learning outcomes for the course - after completing the training e to the course or cycle (W, C, L, outcome P, S)						Methods of verificati on of learning outcome s			
1						CKL			
2	complexity of engine	Student has knowledge necessary to understand the IS_K1_W W P C k							
1	communicate in a pr	Student finds methods and arguments to Communicate in a professional and social IS_K1_U P K L							
2	enterprises' operatio	tudent can critically analyze the methods of nterprises' operation and assess technical solutions IS_K1_U P K L							
		rudent is able to think and act in an innovative way and looks for methods of assessing the impact of 05 W P C K L dustry on the environment.							
1			e .	05					
	oal on sisk on a lua three out o	als Providing knowled on the environment. De- isk factors, and selecting impact on the environ ne content The subject ent methods. As part of available data about the lual environmental com threats and select the vironment. outcomes for the cours cyde 1 Student has knowled related to the impact complexity of engine factors affecting it. 2 Student finds metho factors affecting it. 1 Student can critically enterprises' operation used in environment	Image 2 Image Skills 1 Skills 2 Skills 1 Social 2 Competence 2 Image: Social 3 Image: Social 3 Image: Social 3 Image: Social <t< td=""><td>Knowledge 2 arry eents urse Skills 1 A student has the ability to a 2 Social Competence 1 A student understands the manual and improvement of professi and the need providing the p information regarding engine Dals Providing knowledge regarding methods used to a on the environment. Developing the ability to analyze da isk factors, and selecting research methods for the correct impact on the environment. ne content The subject provides knowledge on issues r available data about the production process and method lual environmental components. The acquired knowledg threats and select the best possible technologies to red vironment. outcomes for the course - after completing the training cycle 1 Student has knowledge of legal acts and rules related to the impact of objects on the environment. 2 Student has knowledge necessary to understand the complexity of engineering activities and many factors affecting it. 1 Student finds methods and arguments to communicate in a professional and social environment. 2 Student can critically analyze the methods of enterprises' operation and assess technical solutions used in environmental engineering.</td><td>Knowledge 2 arry ents urse Skills 1 A student has the ability to analyze date and improvement of professional comestion and improvement of professional comestion and improvement of professional comestion and improvement of professional comestication and assess technologies to reduce the improvement. The subject provides knowledge on issues related to improvemental components. The acquired knowledge allows the threats and select the best possible technologies to reduce the improvement. outcomes for the course - after completing the training courcomes for the course - after completing the training outcome s The reference is to the impact of objects on the environment. 1 Student has knowledge of legal acts and rules complexity of engineering activities and many factors affecting it. IS_K1_W 14 2 Student finds methods and arguments to communicate in a professional and social environment. IS_K1_U 02 2 Student can critically analyze the methods of enterprises' operation and</td><td>Knowledge 2 arry ents urse Skills 1 A student has the ability to analyze data Skills 1 A student understands the need for further edu and improvement of professional competences. Social Competence A student understands the social role of an eng and the need providing the public with reliable information regarding engineering achievement bals Providing knowledge regarding methods used to assess the impact on the environment. Developing the ability to analyze data on environment isk factors, and selecting research methods for the correct assessment of to impact on the environment. ne content The subject provides knowledge on issues related to environment environmental components. The acquired knowledge allows to identify threats and select the best possible technologies to reduce the impact of i vironment. outcomes for the course - after completing the training related to the impact of objects on the environment. Form of e to the learning outcome s 1 Student has knowledge of legal acts and rules related to the impact of objects on the environment. IS_K1_W 13 W P 2 Student has knowledge necessary to understand the complexity of engineering activities and many factors affecting it. IS_K1_U 14 W P 2 Student can critically analyze the methods of environment. IS_K1_U 10 P 2 Student can critically analyze the</td></t<>	Knowledge 2 arry eents urse Skills 1 A student has the ability to a 2 Social Competence 1 A student understands the manual and improvement of professi and the need providing the p information regarding engine Dals Providing knowledge regarding methods used to a on the environment. Developing the ability to analyze da isk factors, and selecting research methods for the correct impact on the environment. ne content The subject provides knowledge on issues r available data about the production process and method lual environmental components. The acquired knowledg threats and select the best possible technologies to red vironment. outcomes for the course - after completing the training cycle 1 Student has knowledge of legal acts and rules related to the impact of objects on the environment. 2 Student has knowledge necessary to understand the complexity of engineering activities and many factors affecting it. 1 Student finds methods and arguments to communicate in a professional and social environment. 2 Student can critically analyze the methods of enterprises' operation and assess technical solutions used in environmental engineering.	Knowledge 2 arry ents urse Skills 1 A student has the ability to analyze date and improvement of professional comestion and improvement of professional comestion and improvement of professional comestion and improvement of professional comestication and assess technologies to reduce the improvement. The subject provides knowledge on issues related to improvemental components. The acquired knowledge allows the threats and select the best possible technologies to reduce the improvement. outcomes for the course - after completing the training courcomes for the course - after completing the training outcome s The reference is to the impact of objects on the environment. 1 Student has knowledge of legal acts and rules complexity of engineering activities and many factors affecting it. IS_K1_W 14 2 Student finds methods and arguments to communicate in a professional and social environment. IS_K1_U 02 2 Student can critically analyze the methods of enterprises' operation and	Knowledge 2 arry ents urse Skills 1 A student has the ability to analyze data Skills 1 A student understands the need for further edu and improvement of professional competences. Social Competence A student understands the social role of an eng and the need providing the public with reliable information regarding engineering achievement bals Providing knowledge regarding methods used to assess the impact on the environment. Developing the ability to analyze data on environment isk factors, and selecting research methods for the correct assessment of to impact on the environment. ne content The subject provides knowledge on issues related to environment environmental components. The acquired knowledge allows to identify threats and select the best possible technologies to reduce the impact of i vironment. outcomes for the course - after completing the training related to the impact of objects on the environment. Form of e to the learning outcome s 1 Student has knowledge of legal acts and rules related to the impact of objects on the environment. IS_K1_W 13 W P 2 Student has knowledge necessary to understand the complexity of engineering activities and many factors affecting it. IS_K1_U 14 W P 2 Student can critically analyze the methods of environment. IS_K1_U 10 P 2 Student can critically analyze the			

	ŀ	lours 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 hab. inż.	. Król Anna		
Project (P)	30				
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)			0		
Project (P)			30		
Seminar (S)			0		
Preparation for class	es		10		
Preparation of a report/paper/ project/presentation			10		
Independent study of the course topics			20		
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		
(class) means 15 minutes					

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature)

dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

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

Course Title Municipal energy management								
Nazwa przedmiotu Komu			nal	alna gospodarka energetyczna				
ECTS poir	nts	6			Subject type		W-K	
Language of	lecture	angielsk i		Mode o	f completing the cours	e	Examination	
Course code			E.2.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	
			1		epts related to energy, nsumption, energy effic			
	Knowledge			 Basic knowledge of the structure and functioning of t public sector, including local government bodies and role in energy management. 				
Preliminary requirements	Skille		1	Student is able to think logically and analyze data related to energy consumption and energy efficiency.				
of the course	JKIIIS		2	Student knows how to identify various energy resources, technologies and systems used in the public sector.				
	Social		1		operly identifies enging priorities for professio			
	Compe	tence	2	non-techni	aware of the importance cal aspects and effects as impact on the function	of eng	ineering activities,	
					ractical problems of en nunicipal resources ma			
municipalities. analyzing and interpretation	The rol monitor of data c transp	e of the pring ener related to portation,	pub gy o e , ar	olic sector in consumptic nergy cons	gement in the context in the efficient use of er on in the municipal sec umption in public build eas. Analysis of specific	nergy. M tor. Coll ings, st	lethods for lection and reet lighting	

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	Student has sufficient knowledge about the construction and operation of residential buildings, industrial facilities and municipal infrastructure for engineering needs.	IS_K1_W 10	W	A
Knowled ge	2	Student knows the principles of rational energy management in the municipality to an advanced degree.	IS_K1_W 12	W	А
	3	Student has the knowledge necessary to understand the social, economic, legal, technical and non- technical determinants of energy management in municipal resources.	IS_K1_W 14	W C P	A C G K L M O
	1	Student has the necessary preparation to work in the municipal energy sector.	IS_K1_U 07	СР	KLMO
Skills	2	Student understands system and non-technical aspects in formulating and solving energy management issues in the municipality and its resources.	IS_K1_U 09	Ρ	G K L M O
	3	Student is able to identify and formulate simple engineering tasks of a practical nature related to energy resources in the municipality.	IS_K1_U 11	Ρ	KLMO
Social	1	Student has a sense of responsibility for the results and effects of his professional activity, especially in the context of its impact on the proper management of energy in municipal resources.	IS_K1_K 02	W P	A K L M O
Compet ence	2	Student understands the importance of teamwork in the municipal economy.	IS_K1_K 05	W P	AKLM O
		Student thinks and act creatively, innovatively and practically in the field of energy management in the municipal sector,	IS_K1_K 05	W P	KLMP

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)	15							
Laboratory class (L)	0	dr inż. Tańczuk Mariusz						
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)			15					
Laboratory class (L)			0					
Project (P)			30					
Seminar (S)			0					
Preparation for class	es		25					
Preparation of a report project/presentation	ort/paper/		30					
Independent study o	f the course to	pics	16					
Examination or final	colloquium		4					
Additional contact ho	ours		0					
Total student worklo	ad		150					
Number of contact h	ours (from the	study plan)	75					

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering Course Description Card

Environmental Engineering Field of study Profile of Education **General Academic** Level of study **First Cycle Studies** Specialization **Full-Time Studies** Form of Study Semester Seventh Municipal recycling Course Title Recykling w gospodarce komunalnej Nazwa przedmiotu **ECTS** points 4 Subject type W-K

Language of	Language of lecture angielsk			Mode of completing the course			Course credit	
Course co	Course code E.10		.10	-		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowle	edge		1		dent has knowledge of the basics of waste gement		
Preliminary requirements	Skills			2 1 2	A stud	lent has the ability to analyze data		
of the course	Social Competence		ce	1	Readiness for comprehensive analysis and effective implementation of assigned tasks			
				2				
Course Goals Providing knowledge about waste recycling processes. Getting to know the basic methods of assessing the properties of waste and developing the ability to search for and select appropriate recycling methods.								
Programme content The subject provides knowledge about waste recycling processes. During the module, the student acquires knowledge and skills in the field of waste identification and selection of recycling methods. The acquired knowledge allows it to be applied in engineering practice.								

Learning	ou	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 appropriate knowledge of mechanics, fluid mechanics, material science and theory of machines and strength of materials to a degree needed to understand the principles of operation and construction of devices.	IS_K1_W 07	W	CIJ
	2				
1 Skills		Student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions	IS_K1_U 01	С	IJ
	2	Student has the preparation necessary to work in industry and knows the rules of occupational safety and health	IS_K1_U 07	С	IJ
Social Compet ence	1	Student correctly identifies engineering problems and is able to prioritise professional activities and recognises the importance of knowledge in solving cognitive and practical problems	IS_K1_K 03	W C	СIJ
	2				

Hours in the study plan					
The course format	Hours/sem. (h)	Tutor (coordinator) of the course Iours/sem. (h) (title/academic degree/professional title, name and surname			
Lecture (W)	30				
Calculation class (C)	15				
Laboratory class (L)	0	dr hab. inż. Król 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)		15			
Laboratory class (L)		0			

0
15
20
20
0
0
100
45

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical I	Ity of Mechanical Engineering							
Course Description Card								
Field of study	Enviror	Environmental Engineering						
Profile of Education	Genera	l Academic						
Level of study	First Cy	cle Studies						
Specialization								
Form of Study	Full-Tin	Full-Time Studies						
Semester	Fourth							
Course Title	Physical education							
Nazwa przedmiotu	Wycho	Wychowanie fizyczne						
ECTS points	0		Subject type		W			
Language of lecture	angielsk i	Mode o	of completing the cours	e Cred	lit unrated			
Course code	B.1.2		Subject related to scientific research/pract. profess. prepar. (Y/N)	N				

	Knowledge		Student has knowledge of individual and team sports.
			Student has knowledge about recreational forms of physical activity.
Preliminary requirements of the course	Skills		Student can perform basic elements of the technique of a selected sport.
		2	
	Social		Student is capable to co-work in an exercising group
	Competence	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	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	A 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	A 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 1 Compet		A student understands the need for lifelong learning, broadening knowledge, and knows the possibilities of further education.		С	R
ence	2	A student is ready to interact and cooperate in a group, taking on different roles in it.		С	R

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 itle/academic degree/professional title, name and surname			
Lecture (W)	0					
Calculation class (C)	30					
Laboratory class (L)	0	dr inż. Tata	aruch Magdalena			
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)			30			
Laboratory class (L)			0			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		0			
Preparation of a report project/presentation	ort/paper/		0			
Independent study o	f the course top	pics	0			
Examination or final	colloquium		0			
Additional contact he	ours		0			
Total student worklo	ad		30			
Number of contact h	ours (from the s	study plan)	30			
* hour (close) means 45 minutes						

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

Opole University of Technology Faculty of Mechanical Engineering

Course Description Cara						
Field of study	Environmental Engineering					
Profile of Education	General Academic					
Level of study	First Cycle Studies					
Specialization						
Form of Study	Full-Time Studies					
Semester	Third					
Course Title	Physical education					

Nazwa pr	zedm	niotu	Wycho	chowanie fizyczne					
ECT	S poir	nts	0	Subject type W				V	
Langua	ge of	lecture	angielsk i	Mode of completing the cour			irse	Credit unrated	
Cour	se co	ode	E	3.1.1		Subject related to scientific research/pract. profess. prepar. (Y/N	1)	N	
		Knowle	dge	1	Studer	nt has knowledge of i nt has knowledge abo al activity.			-
Prelimin requirem of the co	ents	Skills		1	Studer of a se	nt can perform basic elected sport.	elements	of the te	chnique
		Social Compe ⁻	tence	2 1 2	Studer	nt is capable to co-wo	ork in an e	exercising	group
as well as	s edu	cating a		/ing p		dating active attitude skills in the field of a		• •	
sport as v selected	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 outcomes for the course - after completing the training e to the course - after completing the training (W,					course (W, C, L,	Methods of verificati on of learning outcome s			
Knowled ge	wled A student has the knowledge of professional ethics, necessary to make moral decisions, respecting C 1 human rights, taking into account the categories of justice in everyday life, sport and physical recreation. C					R			
Skills	1 int ef ab	terperso fects of	has the ability to understand and analyze onal relationships, including the causes and conflict situations in the workplace, and is opose preventive actions.						R
Social Compet	1 br	oadenin	dent understands the need for lifelong learning, dening knowledge, and knows the possibilities C R ther education.						R
ence			e is ready ing on dif			nd cooperate in a n it.		С	R

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.

	ŀ	lours 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)	0					
Calculation class (C)	30					
Laboratory class (L)	0	dr inż. Tata	aruch Magdalena			
Project (P)	0	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)			30			
Laboratory class (L)			0			
Project (P)			0			
Seminar (S)			0			
Preparation for class	es		0			
Preparation of a report project/presentation			0			
Independent study o	of the course top	pics	0			
Examination or final	colloquium		0			
Additional contact he	ours		0			
Total student worklo	ad		30			
Number of contact h	ours (from the	study plan)	30			

* hour (class) means 45 minutes

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

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Field of study Environmental Engineering

Profile of Education		General Academic						
Level of study		First	First Cycle Studies					
Specialization								
Form of Study		Full-1	Full-Time Studies					
Semester		Seco	Second					
Course Title		Phys	Physics for engineers					
Nazwa przedmiotu		Fizyk	Fizyka dla inżynierów					
ECTS points		4	4 Subject type		Р			
Language of lecture		angiels i	angielsk Mod		of completing the course		Examination	
Course code			A.2.2.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Ν	
Preliminary requirements of the course	Knowledge		1	The student has knowledge of physics from secondary school, knows the concepts and quantities used to describe physical phenomena, knows methods of solving simple problems using physical laws and relationships.				
			2	The student has well-established knowledge of secondary school mathematics and knowledge of mathematical analysis and analytical geometry (1-st year of studies), including vector calculus, geometry, differential and integral calculus.				
	Skills		1	The student is able to discuss and describe the phenomenon using previously learned physical concepts and terms, and is able to plan and carry out a simple experiment using physical laws, principles and a mathematical apparatus that does not take into account differentiation and integration.				
			2	Performs basic operations on vectors on a plane using geometric devices and is able to perform them independently using analytical methods, is able to integrate functions of one variable, differentiate functions of many variables, provide geometric interpretation of results and uses basic software for serial calculations, e.g. Excel.				
	Social Competence			The student understands the need for his/her own development, including expanding knowledge of physics, as a science that shapes the skills of an engineering perspective on tasks and processes in environmental engineering.				
			2					
environmental	engine	ering. 2	. D	eveloping pra	selected physical phen actical skills in using kinn nting the results in the	nowledg	ge of physics by	

environmental engineering. 2. Developing practical skills in using knowledge of physics by performing laboratory exercises and documenting the results in the form of reports. 3. Ability to verify results, estimate and calculate the uncertainty of physical quantities obtained directly and indirectly. Programme content The course provides knowledge on methods for estimating the uncertainty of physical quantities determined directly and indirectly. The acquired knowledge in the field of sound waves allows for the quantitative description and analysis of phenomena necessary in characterizing acoustic processes, including noise. Learning the basics of gravity and elements of the theory of relativity allows for a proper assessment of the factors that determine the functioning of the environment. Understanding some quantum-optical phenomena and the basics of the structure of matter at the microscopic level provides the opportunity to understand the operation of devices using these phenomena, e.g. nuclear power plant (in the production of energy from the atom) or the laser beam modul (in the production of computer processors).

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
	1	A student knows and understands the laws of gravity allowing for the cause-and-effect characterization of phenomena.	IS_K1_W 01	WL	A P
	2	A student has knowledge of how to characterize the loudness level of sounds.	IS_K1_W 01	W	А
	3	A student knows selected quantum-optical phenomena and understands the basics of the structure of microscopic matter.	IS_K1_W 01	WL	A P
Knowled ge	4	A student knows the phenomena underlying the production of energy from the atom. It properly assesses the advantages and disadvantages of producing this type of energy.	IS_K1_W 01	W	A
	5	A student has knowledge of international standards for estimating measurement uncertainty.	IS_K1_W 01	WL	ΑH
	6	A student knows methods of measuring some physical quantities.	IS_K1_W 01	L	Р
	7	A student knows the principles of work organization and health and safety regulations typical for multi- team laboratory rooms.	IS_K1_W 03	L	Р
	1	A student is able to characterize physical processes describing physical phenomena, as well as identify cause and effect relationships.	IS_K1_U 01	L	ΗP
	2	A student is able to plan and carry out physical experiments.	IS_K1_U 01	L	ΗР
Skills	3	A student able to operate selected measuring instruments.	IS_K1_U 01	L	Р
	4	A student is able to prepare a report on the measurements performed, verifying the obtained results and estimating uncertainties.	IS_K1_U 06	L	Н
Social Compet ence	1	A student understands the need to expand knowledge and skills in the field of physics to describe selected engineering issues in energy and environmental engineering.	IS_K1_K 01	W	A
ence	2	A student recognizes the advantages of teamwork and the need to assume different roles.	IS_K1_K 05	L	Р

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)	0							
Laboratory class (L)	30	dr Kostrzev	va Marek					
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)			30					
Project (P)			0					
Seminar (S)			0					
Preparation for class	es		13					
Preparation of a report project/presentation	ort/paper/		50					
Independent study o	f the course top	oics	10					
Examination or final	colloquium		2					
Additional contact he	ours		0					
Total student worklo	ad		120					
Number of contact h	ours (from the s	study plan)	45					
* hour (class) moons 15 minutos								

dr hab. Kozdraś Andrzej Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

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

Course Title		Professional practice							
Nazwa przedm	iotu	Prakt	tyk	a zawodowa					
ECTS poir	6			Subject type		W-PR			
Language of	angiels i	sk	Mode o	of completing the cours	e	Course credit			
Course co		G.1.		Subject related to scientific research/pract. profess. prepar. (Y/N)		N			
			1		ing of risk assessment for identifying, assessi Ital risks.				
	Knowledge		2	including po	Knowledge of fundamental environmental concepts including pollution, sustainability, conservation, and environmental regulations.				
			3	environmen	Familiarity with methods and instruments used for environmental monitoring such as air quality monitoring, water quality analysis, soil sampling, and noise monitoring.				
			4	Understanding of waste management principles, including waste reduction, recycling, treatment, and disposal methods.					
Preliminary requirements		-	5	processes, t	Basic knowledge of water and wastewater treatment processes, technologies, and systems for pollution control and water resource management.				
of the course	Skills		1	environmen	Ability to communicate effectively and prepare reports on environmental issues, findings, and recommendations for diverse audiences.				
			2						
			1	stakeholder	Ability to collaborate effectively with colleagues, stakeholders, and professionals from diverse background to achieve common goals in environmental projects.				
	Social Compe ⁻	tence	2	ideas, discu	al and written commur ss findings, and preser iences clearly and effe	nt proje	- 1		
			3	Flexibility and willingness to adapt to changing work environments, project requirements, and emerging challenges in the field of environmental engineering.					

Course Goals The aim of the practice is to get acquainted with the way of functioning and the business profile of an enterprise (institution) in the area of solving technical problems resulting from planning and conducting real industrial processes related to the broadly understood environmental engineering. The scope of the practice includes familiarization with design and construction issues and conditions for the operation of machines and devices in connection with the problems of designing technological systems, as well as learning the techniques and ways of processing raw materials, substances and energy in the aspects of environmental engineering.

Programme content Internships within studies primarily focus on the role of environmental engineers, ethical standards, regulations, advanced monitoring techniques, project management, communication, case studies, ethics, professional development, and career planning in environmental engineering.

plaining		environmental engineering.			
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	Student knows the principles of identification of hazards and occupational health, safety and ergonomics during the construction and operation of installations used in environmental engineering	IS_K1_W 03	Ρ	ΗR
	2	Student has specialist and systematic knowledge of the role of the natural environment, is aware of environmental hazards	IS_K1_W 06	Р	H R
_	3	Student has appropriate knowledge in the field of process observation and knows methods of quality control and issues of standardization of installation and network components, important from the point of view of environmental engineering	IS_K1_W 09	Ρ	H R
	4	Student has knowledge sufficient for engineering needs about the construction and operation of equipment and industrial apparatus used in environmental engineering	IS_K1_W 10	Р	ΗR
	1	Student is able to use various techniques to communicate in professional and social environments	IS_K1_U 02	Р	H R
Skills	2	Student has the preparation necessary to work in environmental engineering field and knows the rules of occupational safety and health	IS_K1_U 07	Ρ	ΗR
	3	Student is able to use measuring apparatus in environmental engineering	IS_K1_U 08	Р	ΗR
	1	Student has a sense of responsibility for the results and consequences of their professional activity in environmental engineering	IS_K1_K 02	Р	H R
Social Compet	2	Student is able to prioritise professional activities	IS_K1_K 03	Р	HR
ence	3	Student is aware of the importance of professional conduct	IS_K1_K 04	Р	H R
	Δ	Student understands the social role of an engineer	IS_K1_K 06	Р	HR

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)	0							
Calculation class (C)	0							
Laboratory class (L)	0	dr inż. Pocł	nwała Sławomir					
Project (P)	160							
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			0					
Independent study o	f the course top	oics	0					
Examination or final	colloquium		0					
Additional contact he	ours		0					
Total student worklo	ad		160					
Number of contact h	ours (from the s	study plan)	160					
* hour (class) means 15 minutes								

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering Course Description Card

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

Course Tit	Protect	ection of intelectual property										
Nazwa prz	Ochror	Ochrona własności intelektualnej										
ECTS	2	Subject type					HS					
Language of lecture angielsk				Ν	Mode o	f completing the cou	irse	Course	e credit			
Cours	se (code		B.5.			Subject related to scientific research/pract. profess. prepar. (Y/N	Ν				
		Knowle	dge		1 2							
Prelimina	-				1 2							
requireme of the cou		e	Competen	ce	1	and is		ent understands the need for further education able to plan and implement the learning s on their own				
Course Go intellectua				ents		ith the	principles of legal p	rotection	of various	forms of		
objects of	inc acti	dustrial pr ivities, the	operty ar	d wo	ork	s, the	ic knowledge concer non-infringement of property and copyri	others' ex	clusive ri	ghts in		
Learning	Learning outcomes for the course - after completing the training cycle cycle c								verificati			
Knowled ge	1	Student knows and understands copyright and patent concepts and principles; knows and understands the fundamental dilemmas of modern 15 W D civilisation										
	2											
Skills	1 i	A student ndustry ir					ecessary to work in ction	IS_K1_U 07	W	D		
Social Compet ence	1 5 5	engineer a situation i	tudent understands the social role of the jineer and in the correct way can assess the lation in the field of protection of intellectual perty rights US_K1_K UK D							D		
Methods of ve	2 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, 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)	0	dr hab. inż.	. Kłosok-Bazan Iwona							
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)			0							
Project (P)			0							
Seminar (S)			0							
Preparation for class	es		10							
Preparation of a report project/presentation			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	study plan)	30							

* hour (class) means 45 minutes

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study		First Cy	First Cycle Studies						
Specialization		,							
Form of Study		Full-Tin	Full-Time Studies						
Semester		Third	Third						
Course Title		Sanitar	y Che	mistry					
Nazwa przedm	iotu	Chemia	a sanit	arna					
ECTS poir	nts	4			Subject type		К		
Language of	angielsk i		Mode c	of completing the cours	e	Examination			
Course co	D	D.12.2.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т			
	Knowle	dge	1						
Preliminary	Skills								
requirements			2						
of the course	Social (Competen	ce 1		udent understands the tion and competence d				
			2						
Course Goals Prepare students to work in chemical laboratories associated with the identification of contaminants in water and wastewater									
Programme content Sources, forms of occurrence, causes of anomalous concentrations and methods of determining admixtures and contaminants in water and wastewater and their toxicity and effects on water quality and human health.									

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	Student has knowledge in the observation of phenomena and processes that is appropriate for their studies and knows the methods of making measurements of characteristic quantities that are important from the point of view of environmental engineering from the point of view of sanitary chemistry	IS_K1_W 09	WL	A E J
	2				
Skills	1	Student is able to carry out simple research tasks concerning broadly understood environmental protection technologies and design and construct a device, facility, system or process typical of environmental engineering in accordance with the provided specification	IS_K1_U 12	WL	A E J
	2				
Social Compet ence	1	Student has a sense of responsibility for the results and consequences of their professional activity, particularly in the context of its impact on the natural environment	IS_K1_K 02	WL	A E J
	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)	15				
Laboratory class (L)	15	dr hab. inż. Kłosok-Bazan Iwona			
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)		15			

Laboratory class (L)	15
Project (P)	0
Seminar (S)	0
Preparation for classes	20
Preparation of a report/paper/ project/presentation	10
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)	60

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering							
Course Description Card							
Field of study	Enviror	nmental Engi	neering				
Profile of Education	Genera	l Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Third	Third					
Course Title	Streng	th of materia	ls				
Nazwa przedmiotu	Wytrzy	małość mate	riałów				
ECTS points	4		Subject type		Р		
Language of lecture	angielsk i	Mode o	of completing the cours	e Cour	se credit		
Course code	А	.11.2.	Subject related to scientific research/pract. profess. prepar. (Y/N)	N			

				A student knows mathema	tice nhưc	ics and				
		Knowledge	1	mechanics.						
			2							
Prelimin			1	A student is able to apply knowledge of mechanics						
requirem			2	A student is able to apply k	nowledge	e of math				
	ur.		1	A student is able to describe and identify physic						
		Social Competence	<u>_</u>	phenomena						
			2							
				o give an ability to apply the and design problems.	knowled	ge of stre	ngth of			
Programr elements		content Problems re	late	d to calculating stresses and	d deforma	itions of s	tructural			
Learning	Learning outcomes for the course - after completing the training outcomes for the course - after completing the training outcome cycle Cycle									
Knowled	1	A student is able to a of materials to desigr	IS_K1_W 07	WCL	СН					
ge	2									
Skills		A student is able to d properties using expe strain state.		mine materials basic ental tests, and stress and	IS_K1_U 01	WCL	СНЈ			
	2	Student is able to del properties of structur		ine the basic mechanical aterials	IS_K1_U 06	L	СНЈ			
Social Compet	A student recognizes the need for, and an ability to engage in life-long learning. Student is able to select IS_K1_K the appropriate learning methods for themselves 04 W C L J P									
ence	2	A student provokes to critical analysis in the solution IS_K1_K W L H J of a problem and application to engineering.								
A-written exa on partial ma assessment implementat	Of a problem and application to engineering.O1Methods 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-basedon 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 writtenimplementation of the project, M-assessment of defense of project, N-assessment of form of presentation, O-assessment ofcontent 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)	15				
Laboratory class (L)	15	dr inż. Mar	ciniak Zbigniew		
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)			15		
Laboratory class (L)			15		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		18		
Preparation of a report/paper/ project/presentation			15		
Independent study o	f the course to	pics	20		
Examination or final	colloquium		2		
Additional contact ho	ours		0		
Total student worklo	ad		100		
Number of contact h	ours (from the	study plan)	45		

dr hab. inż. Kluger Krzysztof Head of the organizational unit (stamp/signature)

dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course	Descripti	ion Card

Field of study	Enviror	nmental Engineering					
Profile of Education	Genera	al Academic					
Level of study	First Cy	ycle Studies					
Specialization							
Form of Study	Full-Tir	Full-Time Studies					
Semester	First	First					
Course Title	Techni	Technical metrology					
Nazwa przedmiotu	Metrolo	Metrologia techniczna					
ECTS points	3	Subject type	K				

Language of lecture angielsk			Mode of completing the course			Course credit			
Course code D.			.13.1. Bubject related to scientific research/pract. profess. prepar. (Y/N)		1)	т			
				1	Mathema and stati	itics covering algebra stics.	a, mather	natical ar	alysis,
		Knowle	age	2	Physics c	overing optics.			
Ducking				3	Basic kno	wledge of technical	drawing.		
Prelimir requirem				1	A studen	t has the ability for s	elf-educa	tion.	
of the co				2		t can gather informa s, and other sources		literature	·,
		Casial		1	A studen	t is aware of the nec	essity for	lifelong le	earning.
		Social Compe	tence	2		t can collaborate and y various roles within		within a g	group,
Course G	oal	ls Introdu	cing stude	ents	to measu	urement methods.			
						ation, observation, r ues, units of measure		le and	
Learning outcomes for the course - after completing the training e to the course - after completing the training e to the learning (W, C, L, outcome P, S)					Methods of verificati on of learning outcome s				
	1	A student	has appro	opria	ate knowl	edge of metrology	IS_K1_W 09	W C	CI
Knowled ge						measuring the e construction of	IS_K1_W 09	W C	CI
	3		cudent knows the calculation methods necessary IS_K1_W W C C I analyze the measurement results 09					CI	
Skills	1	A student measuren			nods to es	timate	IS_K1_U 08	С	CI
Social Compet		A student is aware of the need for lifelong learning $\begin{bmatrix} IS_K1_K \\ 01 \end{bmatrix}$ W C I P							
ence	2								
		fication of lea B-oral exam,	-		nent. D-oral a	assessment, E-based on pai	rtial marks of	f oral answer	s. F-based

The course format	Hours/sem. (h)	(tit	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. Bors	suk Grzegorz			
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			10			
Independent study o	f the course top	pics	18			
Examination or final	colloquium		2			
Additional contact ho	ours		0			
Total student worklo	ad		75			
Number of contact h	ours (from the s	study plan)	30			
* hour (class) maans (E minutes						

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card						
Field of study	Environmental Engineering					
Profile of Education	General Academic					
Level of study	First Cycle Studies					
Specialization						
Form of Study	Full-Time Studies					
Semester	Third					
Course Title	Technical thermodynamics					

Nazwa przedm	iotu	Termo	dyr	amika tec	hniczna			
ECTS points		5		Subject type			Р	
Language of lecture		angielsk i		Mode of completing the course Examination		completing the course		
Course code			A.8.		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	
			1		ntals of chemistry topic chemical bonds, chem nces, etc.			
	Knowled	age	2	Basic knowledge of thermal physics				
Preliminary			3	Good understanding of mathematics, including algebra, and differential and integral calculus				
requirements of the course			1	-	quations, systems of ec ral equations	quations	s, and differential	
	Skills		2	2 Balancing chemical equations				
			3	Solving basic problems in work and energy				
	Social		1	Clear and	effective communicati	on		
	Compe	tence			hinking and action			
3 Ability to work effectively in a team								
Course Goals - broadening knowledge of fundamental laws of thermodynamics, - mastering and understanding topics related to the analysis of energy transformations in heat engines, - ability to apply thermodynamic principles to practical applications and solve engineering								

problems.

Programme content The course includes an introduction to fundamental concepts and principles of thermodynamics, analysis of thermodynamic cycles, and their applications in selected devices and energy systems. The subject will focus on applying thermodynamic principles to analyze and evaluate the efficiency of energy systems, considering environmental aspects and energy efficiency.

Learning	οι	itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s		
Knowled ge	1	The student has extended knowledge of thermodynamics, including the knowledge necessary for modelling and analysis of thermal and flow phenomena.	IS_K1_W 01	WCL	A H J P R		
	2						
Skills	Is The student is able to obtain information from literature and databases. The student is able to integrate them, as well as draw conclusions concerning thermodynamic phenomena.		IS_K1_U 01	CL	A H J P R		
	2						
Social Compet ence	1	The student understands the role of an engineer as a person who is required to have appropriate knowledge of technical phenomena.	IS_K1_K 06	WCL	A H J P R		
	2						
Methods of v	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)	30			
Laboratory class (L)	15	dr inż. Jung	a Robert	
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)			15	
Project (P)			0	
Seminar (S)			0	
Preparation for class	es		12	

Preparation of a report/paper/ project/presentation	18
Independent study of the course topics	18
Examination or final colloquium	2
Additional contact hours	0
Total student workload	125
Number of contact hours (from the study plan)	75

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Descrip	tion Car	d	-					
Field of study	Enviror	Environmental Engineering						
Profile of Educ	ation	Genera	General Academic					
Level of study		First Cy	ycle	Stu	ıdies			
Specialization								
Form of Study		Full-Tir	ne S	Stud	lies			
Semester		First						
Course Title		Techno	ologi	es a	and in	dustrial apparatus		
Nazwa przedm	iotu	Techno	ologi	еi	urządz	zenia przemysłowe		
ECTS poir	nts	2				Subject type		К
Language of	lecture	angielsk i	Mode of completing the course		Course credit			
Course co	Course code		D.12.1			Subject related to scientific research/pract. profess. prepar. (Y/N)		Т
	Knowle	dge			He has a general knowledge of the world, the environment and the processes occurring in it.			
Dualinainanu				2				
Preliminary requirements of the course	Skills	Skills			The student acquires information from literature and other sources related to technical sciences.			
				2				
	Social			1	The st	udent can think and ac	t in a ci	reative way.
	Compe	tence		2				

Course Goals The purpose of the course is to provide students with knowledge of technologies used in various industries, and to familiarize them with the principle of operation, areas of application and operational parameters of industrial equipment.

Programme content In the course, students gain knowledge of the technologies used in various industries, as well as the principles of operation and areas of application of selected industrial equipment. Students are familiarized with examples of devices used in mechanical operations, heat and mass transfer processes across various industries. Additionally, it aims to impart knowledge about devices used for storing, transporting, and processing different substances. This subject enables students to learn about the latest technological developments and to understand organisational and operational issues related to industrial systems.

Learning	οι	Itcomes for the course - after completing the training cycle	The referenc e to the learning outcome s		Methods of verificati on of learning outcome s
Knowled	1	Student has appropriate knowledge of mechanics, fluid mechanics, material science and theory of machines to a degree needed to understand the principles of operation and construction of devices used in industry.	IS_K1_W 07	W	С
ge	2	A student has the knowledge necessary to understand technical and non-technical aspects of engineering activity in relation to technology and industrial apparatus.	IS_K1_W 14	W	С
Skills	1				
	2				
Social Compet	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge in the field of technology and industrial devices.	IS_K1_K 01	W	С
ence	2	The student recognizes the significance of professional conduct, adherence to ethical standards, and respect for diverse views and opinions regarding technology and industrial equipment.	IS_K1_K 04	W	С

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)	0	dr inż. Płac	zek Małgorzata		
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 report project/presentation	ort/paper/		0		
Independent study o	f the course to	pics	0		
Examination or final	colloquium		2		
Additional contact ho	ours		0		
Total student worklo	ad		52		
Number of contact h	ours (from the	study plan)	30		
* hour (alaga) maaama	4				

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental Engineering				
Profile of Education	Genera	al Academic				
Level of study	First Cy	vcle Studies				
Specialization						
Form of Study	Full-Tir	Full-Time Studies				
Semester	Fifth	Fifth				
Course Title	Therma	Thermal and diffusion processes in industrial installations				
Nazwa przedmiotu	Procesy cieplne i dyfuzyjne w instalacjach przemysłowych					
ECTS points	4	Subject type W-K				

Language of	angielsk i		Mode of completing the course		Examination		
Course co	E.5.			Subject related to scientific research/pract. profess. prepar. (Y/N)	Т		
	Knowle				ne student has a basic knowledge of thermodynamics, uid mechanics and mechanical engineering.		
			2				
Preliminary	Skills		1	Student is able to analyze information obtained from various sources and conduct process calculations.			
requirements			2				
of the course	Social Competence		1	Student u	nderstands the need for	or furth	er education.
			2	recognizir needs, co	e student understands the social role of an engineer, ognizing their responsibility in addressing societal eds, contributing to the advancement of technology, d promoting sustainable development.		ssing societal t of technology,

Course Goals The aim of the course is to provide comprehensive knowledge regarding the utilization of thermal and diffusion processes within various devices and industrial installations.

Programme content The subject provides knowledge on thermal and diffusion processes, as well as operational parameters for equipment commonly used in various branches of industry. Within this module, students acquire knowledge and skills essential for calculating, designing installations and selecting proper equipment, identifying operational issues in industrial systems operating under thermal and diffusion regimes. The knowledge acquired allows students to apply a systemic approach to ensure the continuity and safety of processes, thereby fostering a sense of responsibility for the reliable operation of designed devices and installations.

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 concerning heat and mass transfer processes used in industry.	IS_K1_W 01	W C P	ACL
ge	2	Student knows the construction and operation of basic industrial devices where heat and mass transfer operations takes place.	IS_K1_W 07	W C P	ACL
	1	Student is able to analyze a typical engineering task in the field of heat and mass transfer.	IS_K1_U 11	СР	CL
Skills	2	Student is able to design a simple device in which the process of heat and mass transfer is carried out.	IS_K1_U 12	СР	CL
	3	Student uses computer tools and methods to solve engineering tasks in the field of heat and mass transfer operations.	IS_K1_U 03	C P	CL
Social	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge.	IS_K1_K 01	W C P	LPR
Compet ence	2	Student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork.	IS_K1_K 05	W C P	LPR

	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	dr inż. Płaczek Małgorzata			
Laboratory class (L)	0				
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)	15
Laboratory class (L)	0
Project (P)	15
Seminar (S)	0
Preparation for classes	25
Preparation of a report/paper/ project/presentation	25
Independent study of the course topics	5
Examination or final colloquium	2
Additional contact hours	0
Total student workload	102
Number of contact hours (from the study plan)	45

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental Engineering				
Profile of Education	Genera	l Academic				
Level of study	First Cy	cle Studies				
Specialization						
Form of Study	Full-Tin	ne Studies				
Semester	Fifth					
Course Title	Therma	Thermal and diffusion processes in sanitary installations				
Nazwa przedmiotu	Proces	y cieplne i dy	fuzyjne w instalacjach	sanitarr	iych	
ECTS points	4		Subject type		W-K	
Language of lecture	angielsk i	ngielsk Mode of completing the course Examina				
Course code		E.5.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	

	Knowledge	1	The student has a basic knowledge of thermodynamics, fluid mechanics and mechanical engineering.
		2	
Preliminary	Skills	1	Student is able to analyze information obtained from various sources and conduct process calculations.
requirements		2	
of the course		1	The student recognizes the necessity for continuous education and personal development.
	Social Competence	2	The student understands the social role of an engineer, recognizing their responsibility in addressing societal needs, contributing to the advancement of technology, and promoting sustainable development.

Course Goals The aim of the course is to provide comprehensive knowledge regarding the use of thermal and diffusion processes in various industrial devices and installations.

Programme content The subject provides knowledge on thermal and diffusion processes, as well as operational parameters for equipment commonly used in various branches of industry. Within this module, students acquire knowledge and skills essential for calculating, designing installations and selecting proper equipment, identifying operational issues in industrial systems operating under thermal and diffusion regimes. The knowledge acquired allows students to apply a systemic approach to ensure the continuity and safety of processes, thereby fostering a sense of responsibility for the reliable operation of designed devices and installations.

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	The student has knowledge concerning heat and mass transfer processes used in industry.	IS_K1_W 01	W C P	ACL
ge	2	Student knows the construction and operation of basic industrial devices where heat and mass transfer operations takes place.	IS_K1_W 07	W C P	ACL
	1	Student is able to analyze a typical engineering task in the field of heat and mass transfer.	IS_K1_U 11	СР	CL
Skills	2	Student is able to design a simple device in which the process of heat and mass transfer is carried out.	IS_K1_U 12	СР	CL
	3	Student uses computer tools and methods to solve engineering tasks in the field of heat and mass transfer operations.	IS_K1_U 03	C P	CL
Social	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge.	IS_K1_K 01	W C P	LPR
Compet ence 2		Student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork.	IS_K1_K 05	W C P	LPR

	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. Płaczek Małgorzata					
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)	15
Laboratory class (L)	0
Project (P)	15
Seminar (S)	0
Preparation for classes	25
Preparation of a report/paper/ project/presentation	25
Independent study of the course topics	5
Examination or final colloquium	2
Additional contact hours	0
Total student workload	102
Number of contact hours (from the study plan)	45

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental Engineering				
Profile of Education	Genera	l Academic				
Level of study	First Cy	cle Studies/				
Specialization						
Form of Study	Full-Tin	ne Studies				
Semester	Sevent	h				
Course Title	Underg	Underground infrastructure				
Nazwa przedmiotu	Infrastr	Infrastruktura podziemna				
ECTS points	4		Subject type		W-K	
Language of lecture	angielsk i	ngielsk Mode of completing the course Course c				
Course code		E.7.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	

	Knowledge		A student has basic knowledge of thermodynamics and understands principles of operation of machines and devices used in environmental engineering.
		2	
Preliminary requirements of the course	Skills	1	A student is able to make a critical analysis of the functioning and assess existing technical solutions.
		2	
	Social		A student understands the importance of providing safe working conditions.
	Competence	2	

Course Goals Preparing students to use the technologies used in the design and works related to earthwork installation works.

Programme content Familiarizing students with the stages of the investment process, including: components of the construction (execution) design, design documentation as the basis for organizing installation works. Discussion of technology and legal procedures related to carrying out underground installation works in relation to water, gas and sewage networks.

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	A student has sufficient knowledge of engineering and construction of municipal infrastructure.	IS_K1_W 10	W P	CKL
ge	2				
Skills		A student obtains information from literature, databases and other sources related to technical sciences.	IS_K1_U 01	Ρ	ΚL
	2				
Social Compet	1	A student understands the need to learn and improve professional skills.	IS_K1_K 01	Р	ΚL
ence	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)	0	dr inż. Prażnowski Krzysztof				
Project (P)	15					
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)			15			
Seminar (S)			0			
Preparation for class	es		30			
Preparation of a report/paper/ project/presentation			0			
Independent study o	f the course to	pics	25			
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. Augustynowicz Andrzej Head of the organizational unit (stamp/signature)

dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental Engineering				
Profile of Education	Genera	General Academic				
Level of study	First Cy	ycle Studies				
Specialization						
Form of Study	Full-Tir	Full-Time Studies				
Semester	Sevent	Seventh				
Course Title	Vehicle	Vehicle recycling				
Nazwa przedmiotu	Recykl	Recykling w motoryzacji				
ECTS points	4	4 Subject type W-K				

Language of lecture and		angielsk i		Mode of completing the course		e	Course credit	
Course code I		Ξ.1().	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т		
	Knowledge		1	natural er	student has basic knowledge about the role of the atural environment, is aware of hazards and knows the nethods of their identification.			
			2					
Preliminary			1	A student can prepare and present an oral presentation in Polish concerning the issues of vehicle recycling				
requirements of the course	Skills	2	A student is able to make an initial analysis of the functioning and evaluation of existing technical solutions used in recycling vehicles					
	Social		¹ and can s		student correctly identifies basic engineering problems nd can set priorities for professional activities			
	Compe	tence	2	· ·				
Course Goals To acquaint students with the problems of proper, material and energy recovery on the example of motor vehicles.								
Programme content As part of the course, knowledge is provided in the field of materials used in the construction of the vehicle, their life cycle and the possibility of reuse. The student acquires knowledge in the field of material identification, selection and processing methods. They will also learn about the economic side of the issue of disposal of motor vehicles.								

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	Student knows the principles of identification of hazards and occupational health, safety and ergonomics during the construction and operation of installations used in environmental engineering	IS_K1_W 03	W C	C D
ge	2	Student has specialist and systematic knowledge of the role of the natural environment, is aware of hazards and knows how to identify and reduce them	IS_K1_W 06	W C	CDO
	3	Student has advanced knowledge of the principles of rational energy, waste and wastewater management as well as heat transfer and energy conversion	IS_K1_W 12	W C	CDO
	1	Student is able to see systemic and non-technical aspects while formulating and solving engineering tasks	IS_K1_U 09	С	DO
Skills	2	Student is able to conduct a critical analysis of functioning and evaluate the existing technical solutions used in environmental engineering and conduct preliminary economic analysis for undertaken engineering activities	IS_K1_U 10	С	DO
Social Compet ence	1	Student is able to think and act in a creative, innovative and entrepreneurial way and is ready to critically assess their own knowledge, cooperate and work in a team while taking on different roles; understands the importance of teamwork	IS_K1_K 05	С	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)	30					
Calculation class (C)	15					
Laboratory class (L)	0	dr inż. Hetmańczyk Ireneusz				
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)	15
Laboratory class (L)	0
Project (P)	0
Seminar (S)	0
Preparation for classes	30
Preparation of a report/paper/ project/presentation	15
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. Augustynowicz Andrzej Head of the organizational unit (stamp/signature)

dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card							
Field of study	Enviror	Environmental Engineering					
Profile of Education	Genera	General Academic					
Level of study	First Cy	cle Studies					
Specialization							
Form of Study	Full-Tir	ne Studies					
Semester	Fifth	Fifth					
Course Title	Title Waste management						
Nazwa przedmiotu	Gospoo	Gospodarka odpadami					
ECTS points	3		Subject type		K		
Language of lecture	angielsk i	Mode o	of completing the cours	e	Examination		
Course code		D.3.	Subject related to scientific research/pract. profess. prepar. (Y/N)		т		

		Knowledge	1	The student knows and understands waste management basic problems.					
			2						
Prelimir requirem			1	The student is able to identify problems in engineering field.					
of the co			2						
		Social Competence	1	The student is able to analy waste management proble		lex data a	affecting		
			2						
technique	es a	and strategic objective	s in	e students with basics of wa waste management. Devel ste management planning.		-	basic		
Programme content The subject provides knowledge on issues related to waste management. During the module, the student acquires knowledge and skills in planning waste management activities. The acquired knowledge in the identification of processes and systems allows its application in engineering practice.									
Learning outcomes for the course - after completing the training e to the course (W, C) (W, C)						Methods of verificati on of learning outcome s			
Knowled ge					IS_K1_W 06	W C	AIJ		
		Student has advanced out the multi-faceted		owledge necessary to carry ineering activities.	IS_K1_W 14	W C	AIJ		
	1	Student can obtain the literature, analyze the			IS_K1_U 01	С	IJ		
Skills		functioning of technica	Student is able to critically analyze the method of functioning of technical solutions and knows their application in environmental engineering.			С	IJ		
Social 1 Student has a sense of resp				sponsibility for engineering	IS_K1_K 02	W C	AIJ		
Compet ence 2 Student correctly identifies engineering problems in waste management and can determine the prioritie of professional activities.			IS_K1_K 03	W C	AIJ				
Methods of	verif	ication of learning outcomes:				. <u> </u>	. <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)	(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. inż.	. Król 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)			15		
Laboratory class (L)			0		
Project (P)			0		
Seminar (S)			0		
Preparation for class	es		5		
Preparation of a report project/presentation	ort/paper/		10		
Independent study o	f the course top	pics	13		
Examination or final	colloquium		2		
Additional contact he	ours		0		
Total student worklo	ad		75		
Number of contact h	ours (from the s	study plan)	45		

dr hab. inż. Hapanowicz Jerzy Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology Faculty of Mechanical Engineering

Course Description Card					
Field of study	Environmental Engineering				
Profile of Education	General Academic				
Level of study	First Cycle Studies				
Specialization					
Form of Study	Full-Time Studies				
Semester	Sixth				
Course Title	Wastewater technology				

Nazwa przedm	Techno	logia	a ściekóv	V			
ECTS points		2		Subject type k		К	
Language of	angielsk i	Mode of completing the course			Examination		
Course co	D	.2.2		Subject related to scientific research/pract. profess. prepar. (Y/N)		Т	
	Knowle	vledae		basic concepts in biology and chemistry			
		5	2				
Preliminary	Skills		 basic skills in solving mathematical equations basic skills in analysing engineering solutions 				
requirements							
of the course	Social	Social Competence		A student has ecological awareness and is able to 1 interact and work in a group, and understands the importance of team activities			
	Compe			2 A student the importance of the problem of wastewater treatment			
	Course Goals The aim of the subject is to acquire knowledge and skills in the field of wastewater treatment methods and processes.						
Programme content Basic qualitative and quantitative wastewater characteristics. Factors affecting the quantity and quality of wastewater production. Calculation of the basic parameters and indicators. Basics of sewage treatment plant design. Conventional biological treatment plants and enhanced removal of biogenic compounds. Theoretical basics of biological removal of nitrogen and phosphorus. The efficiency of operation and pollution removal. Impact on water recipient.							

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	Student has specialist and systematic knowledge of the role of the natural environment, is aware of hazards and knows how to identify and reduce them	IS_K1_W 06	W	А
Knowled ge	2	Student has the knowledge about wastwater treatment processes and he principles of identification of hazards and occupational health, safety and ergonomics during the construction and operation of installations used in environmental engineering	IS_K1_W 04	WL	A F I
	1	Student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions	IS_K1_U 01	L	Н
Skills	2	Student is able to use various techniques to communicate in professional and social environments. Student is able to use the information and communication technologies necessary to carry out typical engineering activities	IS_K1_U 02	L	FΗ
	3	Student is able to plan and conduct experiments, interpret the obtained results and formulate conclusions using analytical and simulation methods.	IS_K1_U 06	L	FH
Social Compet	1	Student understands the need to learn and is able to independently plan and implement the lifelong learning process and critically assess their own knowledge	IS_K1_K 01	W	А
ence		Student understands the social role of an engineer and understands the need to provide the public with reliable information on engineering achievements fication of learning outcomes:	IS_K1_K 06	L	F

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)	30	dr inż. Boguniewicz-Zabłocka Joanna			
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)		30			
Project (P)		0			
Seminar (S)		0			
Preparation for classes		3			
Preparation of a report/pape project/presentation	r/	3			
Independent study of the co	urse topics	3			
Examination or final colloqui	um	2			
Additional contact hours		0			
Total student workload		56			
Number of contact hours (fro	om the study plan)	45			
the unit (close) means (F minutes					

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Enviror	Environmental Engineering				
Profile of Education	Genera	al Academic				
Level of study	First C	ycle Studies				
Specialization						
Form of Study	Full-Tir	Full-Time Studies				
Semester	Sixth	Sixth				
Course Title	Water	Water management and water protection				
Nazwa przedmiotu	Gospodarka wodna i ochrona wód					
ECTS points	3	3 Subject type W-K				

Langua	ge	of lecture	angielsk i	Course	e credit								
Coui	rse	code		E.1.			Subject related to scientific research/pract. profess. prepar. (Y/N	1)	Т				
		Knowle	dae		1								
					2								
Prelimir requirem				┢	1 2								
of the co	our		Competen	ice	1		nt understands the n g professional compe		rther trai	ning,			
					2								
		s To acqu s for water					principles of water r	nanagem	ent and				
Program	ne		Regulatio	ns, r	ne	thods a	and measures for the	e rational	use and p	rotection			
Learning	OL	itcomes fo		se - vcle	af	ter con	npleting the training	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s			
Knowled	1		nanageme	ent,			lent has knowledge e basics of water	IS_K1_W 12	W P	CKL			
ge	2		ent of wa	ter a	anc	d waste	s of rational ewater and legal	IS_K1_W 12	W	С			
Skills	1	databases sciences;	and othe can integr r interpre	er so rate	ouro th	ces rela e obtai	n from literature, ated to technical ined information, conclusions and	IS_K1_U 10	W	С			
	2	The stude technical engineerir	aspects w	-	IS_K1_U 01	Ρ	ΚL						
Social Compet	1	The stude problems activities	IS_K1_K 02	Р	ΚL								
ence	2						er conduct of water ustrial plants.	IS_K1_K 03	W	С			

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)	0	dr hab. inż.	Kłosok-Bazan Iwona										
Project (P)	15												
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)			15										
Seminar (S)			0										
Preparation for class	es		20										
Preparation of a repo project/presentation	ort/paper/		0										
Independent study o	f the course top	oics	8										
Examination or final	colloquium		2										
Additional contact ho	ours		0										
Total student worklo	ad		75										
Number of contact h	ours (from the s	45											

* hour (class) means 45 minutes

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Card

Field of study	Environmental Engineering
Profile of Education	General Academic

Level of study		First	Cy	cle Studies					
Specialization			,						
Form of Study		Full-	Tim	e Studies					
Semester		Sixth	۱						
Course Title		Wate	er s	ystem desigi	n				
Nazwa przedm	iotu	_			acji wodnych				
ECTS poir		3			Subject type		К		
Language of	lecture	angiels i	sk	Mode o	Examination				
Course co	de		D	.5.2.	Subject related to scientific research/pract. profess. prepar. (Y/N)		т		
		-	1		nics: Understanding of ernoulli's equation, pip s essential.		•		
			2		ity: Familiarity with wa processes, and regulati portant.	•			
	Kasula	al au a	3	pressure dis	Knowledge of hydrauli stribution, pipe networ designing efficient wa	ks, pum	ps, and valves, is		
	Knowle	age	4	based on flo	and Design: Ability to s ow rates, pressure requ onsiderations.				
Preliminary requirements of the course			5	Water Distribution Networks: Familiarity with network					
			6		stems: Understanding ves, pump efficiency, a systems.		•		
	Skills		1	statistical sl	s and Statistics: Basic kills for analyzing data eting results in water s	, perfori	ming calculations,		
	JKIIIS		2	for drafting	uter-Aided Design): Ab and designing water d nd related infrastructu	istributi			
	Social		1	Ability to wo	ork in an interdisciplina	ary tean	n.		
	Compe	tence	2						
Course Goals	Familia	rizing s	stuc	lents with the	e basic principles of op	eration	of sanitary		

installations. Acquiring the skills of designing simple sanitary installations in buildings.

Programme content Introduction to Water Systems: Understanding the principles and components of water systems, including sources of water, distribution networks, treatment processes, and quality standards. Hydraulic Analysis: Learning about hydraulic principles, pipe flow, pressure distribution, pump selection, and design calculations for efficient water distribution.

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 advanced knowledge of the principles of technical drawing and engineering graphics that enable solving technical problems in the field of environmental engineering	IS_K1_W 04	W	A
ge	2	Student has knowledge of the construction and operation of civil and municipal structures that is sufficient for engineering needs	IS_K1_W 10	Р	К
Skills	1	Student has self-education skills. Student acquires information from literature, databases and other sources related to technical sciences. Student is able to integrate obtained information, interpret it, draw conclusions and formulate opinions	IS_K1_U 01	Р	К
	2	Student uses computer software to solve engineering tasks	IS_K1_U 03	Р	К
Social	1	The student understands the need for further education and is able to independently plan and implement the lifelong learning process, as well as critically evaluate their knowledge	IS_K1_K 01	W	A
Compet ence	2	The student is aware of the importance of professional conduct, adherence to the principles of professional ethics and respect for diversity of views and opinions, and is ready to take care of the achievements and traditions of the engineering profession	IS_K1_K 04	Р	К

	ŀ	lours 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. Pochwała Sławomir
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 classes	14
Preparation of a report/paper/ project/presentation	15
Independent study of the course topics	0
Examination or final colloquium	1
Additional contact hours	0
Total student workload	75
Number of contact hours (from the study plan)	45

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature) dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

Opole University of Technology

Faculty of Mechanical Engineering

Course Description Car	rd										
Field of study	Enviror	nmental Engi									
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	Water	Water Technology									
Nazwa przedmiotu	Techno	Technologia wody									
ECTS points	3		Subject type		K						
Language of lecture	angielsk i	Mode c	e	Examination							
Course code	D).2.1.	Subject related to scientific research/pract. profess. prepar. (Y/N)		Т						

			Knowledge	1				
			Knowledge	2				
Prelimir	nar	y	Chille	1				
requirem			Skills	2				
of the co	ours	se		1	A student is able to think c	reatively	and indep	endently
			Social Competence		draw conclusions.			
				2				
Course G	oal	S	To acquaint student	s w	ith technological problems	of water p	oroductio	า
selection	of	me			skills in water treatment teo uipment for the removal of			y for the
Learning	ou	itco	omes for the course cycle		ter completing the training	The referenc e to the learning outcome s	course (W, C, L,	Methods of verificati on of learning outcome s
Knowled ge	1	ph the me im	eir studies and know easurements of char	sse s th act	the observation of s that is appropriate for ne methods of making eristic quantities that are of view of environmental	IS_K1_W 09	WL	ВE
	2							
Skills	T	the sui	e ability to estimate	erro eth	ods and tools used to	IS_K1_U 08	W L	ΒE
	2							
Social Compet ence		Stu inr cri wo un	IS_K1_K 05	WL	ВE			
	2							
			ion of learning outcomes:					
A-written ex	am,	B-o	ral exam, C-written assess	men	t, D-oral assessment, E-based on pai	tial marks of	f oral answer	s, F-based

	Н	lours 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)	30	dr hab. inż.	. Kłosok-Bazan Iwona
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)			30
Project (P)			0
Seminar (S)			0
Preparation for class	es		20
Preparation of a report project/presentation	ort/paper/		0
Independent study o	f the course to	pics	10
Examination or final	colloquium		0
Additional contact ho	ours		0
Total student worklo	ad		75
Number of contact h	ours (from the	study plan)	45
* have (alaga) maaama	4		

dr hab. inż. Kłosok-Bazan Iwona Head of the organizational unit (stamp/signature)

dr inż. Wydrych Jacek Dean of Faculty (stamp/signature)

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symbol		of tl	tasics of technical drawing	Buildings structures Chemistry for engineers	Circular economy	computer Aided Design computer control techniques	computer measurement techniques	Costing Descriptive geometry	allation)esign work - the environmental area Desian work - the industrial area	Differential and integral calculus)iploma work (engineering project))iploma work (engineering project)	<pre>:lective module - I: Basis of personal development :lective module - I: Social Communication</pre>	lective module - II: Economics in micro-business	Elective module - II: History of science Elective module - III: Law and standards in environmental protection	Elective module - III: Social responsibility for environmental protection electrical engineering	Elements of informatics and foundations of programming	inergetic efficiency of industrial processes inergetic efficiency of municipal facilities	inergy management in industry	ingineering drawing with CAD I	ingineering drawing with CAD II Ingineering drawing with CAD III	ingineering drawing with CAD IV	ingineering drawing with CAD V	invironmental hazards in industrial processes	invironmental metrology	invironmental protection	rgonomics and industrial safety and hygiene	:xcavation works inal seminary - the environmental area	inal seminary - the industrial area	luid mechanics oreign language	oreign language	oreign language	oreign language	oreign language	oreign language oreign language	as system design	General chemistry	ieneral Mathematics ieneral Physics	Geodesy with geographic information elements	èeotechnics and soil mechanics leating. ventilation and air - conditioning		mpact assessment of the enterprises on the environment	Industrial pollutions Industry water management	nformation technology	lathematics for engineers	1echanical operations in industrial installations 1echanical operations in sanitary installations	Aechanics	Aethods of the impact of industry on the environment	Aunicipal recycling	hysical education	hysics for engineers	brofessional practice	rotection of intelectual property anitary Chemistry	itrength of materials	ecnnical metrology echnical thermodynamics	echnologies and industrial apparatus	Thermal and diffusion processes in muustrial installations Thermal and diffusion processes in sanitary installations	Underground infrastructure Vehicle recycling	Vaste management	Wastewater technology Water management and water protection	Water system design	Vater Technology
	 ₹	<u> </u>																																		. 0	0	00			╞┥╼╴┥	<u> </u>		<u> </u>	Σ	<u> </u>	ΞΣ	<u> </u>	ΞΣ				r v	ίΟ Ι	- -		-	<u>> ></u>	<u>></u>	<u> </u>		1
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IS_K1_W17	_ <u> </u> .		<u> </u> .		<u> .</u>		ŀŀ	. .	ŀ	. .	X .			<u> . </u>	<u> . </u>			<u> </u> .	<u>. .</u>	ŀ	. .			<u> </u> .	<u> . .</u>	<u> </u>	<u> . </u>	<u> </u>	Х	<u>x x</u>	<u> </u>	<u> . .</u>	<u> </u>	<u> </u> .			<u> .</u>	. .	<u> </u> .		<u> </u> .		X	. .	.	<u>. </u> .	.		<u> </u> .	<u>. </u> .	<u> </u>	. .	<u> </u>					. .	<u>ŀ</u> . I∙	
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IS_K1_U01 IS_K1_U02		· /^		x I.	<u> </u>	•	· /	^ ^ . X		^ ^	· ′ . ′					· ·	<u>.</u> Х	•		<u> </u>		╎		•			$\left \frac{1}{2} \right ^2$	<u>\</u>	<u>+</u> · +· . ·		· .	· ·	Х		x x	<u> </u> .	<u> </u>	•			<u> ^</u>	<u>^</u> .		Λ. Χ			╞	· · x		$\left \begin{array}{c} \cdot \\ \cdot \end{array} \right $	^	 х і	·	^ .	<u> </u>	ŀ ŀ	•	<u>^ -</u>	 	<u>Λ</u> Λ χ Ι.	$\left \begin{array}{c} & & \\ & & \\ & & \\ & & \end{array} \right $	\dashv
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Wiedza - efekty nie pokryte: Brak

Umiejętności - efekty nie pokryte: Brak

Wydział Mechaniczny - lista przedmiotów na kierunku Environmental Engineerin

Kompetencje - efekty nie pokryte: Brak