Politechnika Krakowska im. Tadeusza Kościuszki

Karta przedmiotu

obowiązuje studentów rozpoczynających studia w roku akademickim 2022/2023

Wydział Inżynierii Środowiska i Energetyki

Kierunek studiów: Environmental and Land Engineering — Profil: Ogólnoakademicki

Forma sudiów: stacjonarne — Kod kierunku: 14

Stopień studiów: II

Specjalności: bez specjalności

1 Informacje o przedmiocie

Nazwa przedmiotu	Circular economy and renewable energy
Nazwa przedmiotu w języku angielskim	Circular economy and renewable energy
Kod przedmiotu	WIŚIE ELE oIIS C5 22/23
Kategoria przedmiotu	Przedmioty kierunkowe
Liczba punktów ECTS	4.00
Semestry	1

2 Rodzaj zajęć, liczba godzin w planie studiów

Semestr	Wykład	Cwiczenia	Laboratoria	Laboratoria komputerowe	Projekt	Seminarium
1	24	11	0	0	0	10

3 Cele przedmiotu

Cel 1 Introduction to problems related to depletion of natural resources and methods of introducing some raw materials into the circular economy

Cel 2 Presentation of the economic development policy in Poland, the European Union and selected OECD countries based on the principles of the circular economy

Cel 3 Students learn to recognize basic conditions as well as difficulties in the implementation of the circular economy principle, especially in the area of municipal infrastructure

Cel 4 Presentation of alternative and renewable energy sources

4 Wymagania wstępne w zakresie wiedzy, umiejętności i innych kompetencji

5 Efekty kształcenia

EK1 Wiedza The student has practical and methodological understanding about the possibilities and limitations related to the application of the circular economy principle and has developed extensive knowledge about individual sectoral solutions for the use of municipal and industrial waste

EK2 Wiedza Student is familiar with the alternative energy sources, their advantages and disadvantages

EK3 Umiejętności After completing the module, the student will be able to analyze and present advantages and disadvantages of the some examples of practical application of circular economy and alternative energy sources

EK4 Kompetencje społeczne The student is aware of the role of the circular economy and alternative energy sources in the development of the modern society, especially the economy and municipal infrastructure

6 Treści programowe

Ćwiczenia		
Lp	Tematyka zajęć Opis szczegółowy bloków tematycznych	Liczba godzin
C1	Site visit - an example of a company implementing the principles of the circular economy	6
C2	In situ detailed description of alternative systems	5

Seminarium		
Lp	Tematyka zajęć Opis szczegółowy bloków tematycznych	Liczba godzin
S1	A presentation on one of the selected topics (e.g. water reuse, energy recovery, plastics reclamation, recycling of selected groups of devices, etc. in terms of circular economy)	5
S2	Detailed analysis of selected renewable energy sources Examples of zero-energy buildings	5

Wykład		
Lp	Tematyka zajęć Opis szczegółowy bloków tematycznych	Liczba godzin

Wykład		
Lp	Tematyka zajęć Opis szczegółowy bloków tematycznych	Liczba godzin
W1	Basic definitions. The evolution of economy from a linear to a circular / circular model	2
W2	Circular economy as a factor reducing barriers to urban development	2
W3	Circular economy in the European legal order and in the development strategy of the EU and Poland	2
W4	Circular economy in a water and sewage sector. Plans and possibilities of water reclamation from municipal wastewater	2
W5	Sewage sludge and municipal waste as products supporting the mineral fertilizer production sector	2
W6	Circulation and renewable systems as a tool for meeting the energy production needs of cities and housing units.	2
W7	Renewable energy sources	4
W8	Alternative systems (solar, heat pumps, PV)	4
W9	Advantages and disadvantages of selected alternative systems	4

7 Narzędzia dydaktyczne

N1 Lectures

N2 Site visit

N3 Presentation

8 Obciążenie pracą studenta

Forma aktywności	Średnia liczba godzin na zrealizowanie aktywności
Godziny kontaktowe z nauczycielem akademickim, w tym:	
Godziny wynikające z planu studiów	45
Konsultacje przedmiotowe	2
Egzaminy i zaliczenia w sesji	4
Godziny bez udziału nauczyciela akademickiego wynikające z nakładu pracy studenta, w tym:	
Przygotowanie się do zajęć, w tym studiowanie zalecanej literatury	29
Opracowanie wyników	0
Przygotowanie raportu, projektu, prezentacji, dyskusji	20
Sumaryczna liczba godzin dla przedmiotu wynikająca z całego nakładu pracy studenta	**100**
Sumaryczna liczba punktów ECTS dla przedmiotu	4.00

9 Sposoby oceny

Ocena formująca

F1 Assessment of the work presentation

Ocena podsumowująca

P1 Test

Kryteria oceny

Efekt kształcenia 1	
Na ocenę 2.0	During the credit the Student obtained less than 50% of the maximum number of points and / or worked dependent on the credit
Na ocenę 3.0	During the credit, the student obtained 51% -60% of the maximum number of points NOTE: The grade is issued jointly for effects 1 and 2 (at all grading levels)
Na ocenę 3.5	During the course the student obtained 61% -70% of the maximum number of points
Na ocenę 4.0	During the course the student obtained 71% -80% of the maximum number of points

Na ocenę 4.5	During the course the student obtained 81% -90% of the maximum number of points
Na ocenę 5.0	During the examination, the Student obtained more than 90% of the maximum number of points
Efekt kształcenia 2	
Na ocenę 2.0	During the credit the Student obtained less than 50% of the maximum number of points and / or worked dependent on the credit
Na ocenę 3.0	During the credit, the student obtained 51% -60% of the maximum number of points NOTE: The grade is issued jointly for effects 1 and 2 (at all grading levels)
Na ocenę 3.5	During the course the student obtained 61% -70% of the maximum number of points
Na ocenę 4.0	During the course the student obtained 71% -80% of the maximum number of points
Na ocenę 4.5	During the course the student obtained 81% -90% of the maximum number of points
Na ocenę 5.0	During the examination, the Student obtained more than 90% of the maximum number of points
Efekt kształcenia 3	
Na ocenę 2.0	The student will present a seminar paper with material errors that will not be corrected within the set deadline and / or will present a seminar paper after the deadline and / or will present a seminar paper with unauthorized borrowing
Na ocenę 3.0	During the handing over of the work, the student will prove that he / she has the ability to properly assess issues, will present a correct presentation in accordance with the standards given in the introduction. Graphically legible work, submitted after no more than 3 refusals of acceptance (due to the need for corrections)
Na ocenę 3.5	The student will present a seminar paper with material errors that will not be corrected within the set deadline and / or will present a seminar paper after the deadline and / or will present a seminar paper with unauthorized borrowing During the handing over of the work, the student will prove that he / she has the ability to properly assess issues, will present a correct presentation in accordance with the standards given in the introduction. Graphically legible work, submitted after no more than 2 refusals of acceptance (due to the need for corrections)
Na ocenę 4.0	During the handing over of the work, the student will prove that he / she has the ability to properly assess issues, will present a correct presentation in accordance with the standards given in the introduction. Graphically legible work, given after no more than one refusal (due to the need for corrections)
Na ocenę 4.5	During the return of the seminar work, the student will prove that he / she has the ability to properly evaluate the proposed technology in accordance with the standards given in the introduction. The work is clearly legible, given without the need for corrections

Na ocenę 5.0	During the return of the seminar thesis, the student will demonstrate the ability to correctly assess the proposed technology in accordance with the standards given at the beginning. The work is at a high level, given without the need for correction
Efekt kształcenia 4	
Na ocenę 2.0	-
Na ocenę 3.0	The student is aware of the role of the circular economy and alternative energy sources in the development of the modern society and during the credit, the student obtained 51% -60% of the maximum number of points
Na ocenę 3.5	The student is aware of the role of the circular economy and alternative energy sources in the development of the modern society and during the credit, the student obtained 61% -70% of the maximum number of points
Na ocenę 4.0	The student is aware of the role of the circular economy and alternative energy sources in the development of the modern society and during the credit, the student obtained 71% -80% of the maximum number of points
Na ocenę 4.5	The student is aware of the role of the circular economy and alternative energy sources in the development of the modern society and during the credit, the student obtained 81% -90% of the maximum number of points
Na ocenę 5.0	The student is aware of the role of the circular economy and alternative energy sources in the development of the modern society and during the credit, the student obtained more than90% of the maximum number of points

10 Macierz realizacji przedmiotu

Efekt kształcenia	Odniesienie danego efektu do szczegółowych efektów zdefiniowanych dla programu	Cele przedmiotu	Treści programowe	Narzędzia dydaktyczne	Sposoby oceny
EK1		Cel 1 Cel 2 Cel 3	C1 W1 W2 W3 W4 W5 W6	N1 N2	P1
EK2		Cel 4	C2 W7 W8 W9	N1 N2	P1
EK3		Cel 3 Cel 4	S1 S2	N3	F1
EK4		Cel 3 Cel 4	C1 C2 S1 S2 W1 W2 W3 W4 W5 W6 W7 W8 W9	N1 N2 N3	F1 P1

11 Wykaz literatury

Literatura podstawowa

[1] Autor — *Materials provided to students by lecturers on a regular basis*, Miejscowość, 2022, Wydawnictwo

12 Informacje o nauczycielach akademickich

Osoba odpowiedzialna za kartę

dr hab. inż. , prof. PK Małgorzata Cimochowicz-Rybicka (kontakt: smrybicki@interia.pl)

Osoby prowadzące przedmiot

1 dr hab inż., prof. PK Małgorzata Cimochowicz-Rybicka (kontakt: mcrybicka@pk.edu.pl)

2 dr inż. Jarosław Muller (kontakt: jmuller@pk.edu.pl)

13 Zatwierdzenie karty przedmiotu do realizacji

(miejscowość, data) (odpowiedzialny za przedmiot) (dziekan)

Przyjmuję do realizacji (data i podpisy osób prowadzących przedmiot)

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