SAKARYA UNIVERSITY

UI GreenMetric World University Rankings

SAKARYA UNIVERSITY GREEN CAMPUS REPORT

2022

SAKARYA,TURKEY

SAKARYA UNIVERSITY

UI GreenMetric World University Rankings

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1. SETTING AND INFRASTRUCTURE

Sakarya University (SAU) is a public university settled in East Marmara which aims to train individuals with all kinds of equipments required by contemporary civilization. SAU is one of the most preferred universities for students because of its contemporary green campus, education and training facilities on an international level, diversity of education and training services, effective use of technology in its locations and processes, and importance of providing practical training. Managing its processes with its stakeholders, building its own network of collaborators, transferring the knowledge and technology it produces to the public have all enabled SAU to become an increasingly valuable asset for other actors in the industry, public institutions and society which benefit from its services.

SAU was founded in 1970 as Sakarya School of Engineering and Architecture and in 1971 was named Sakarya State Academy of Architecture and Engineering. In 1982, the academy continued its educational activities as an Engineering Faculty affiliated to Istanbul Technical University, and in 1992 it was transformed into Sakarya University.

There are 36 Research and Application Centers, six graduate schools, thirteen faculties, one state conservatory, three vocational schools, and a total of 473 programs are offered; 28 in associate degree, 190 in bachelor's degree, 172 masters and 86 Phd degree. Conventional, Evening-time and Distance Learning options are available for associate degree and bachelor's degree programs. In the graduate level, there are generalist, specialist master programs, with conventional and distance education alternatives, and doctoral programs.

Apart from the main campus of SAU, there are four campuses, Hendek Campus, where is Faculty of Education operates, Adapazarı Campus, where Faculty of Dentistry operates, Korucuk Campus for Faculty of Medicine and Dentistry Campus.

Main campus is widely regarded as one of the most green and attractive in the country. Set in extensive greenery with an excellent lake view, main campus is the focus of life for students, staff and visitors. Conveniently located only eight kilometers from the city center.

1.3. Number of Campus Sites

Figure 1: Main Campus

Figure 2: Korucuk Campus

Figure 3: Dentistry Campus

Figure 4: Hendek Campus

Figure 5: Health Services Campus

1.4. Campus Setting

Sakarya University campuses are located in the suburbs. As it is not located in the city center, the campuses are fascinating with their natural beauty and greenery. Especially the main campus is an oxygen paradise where blue and green meet. The main campus of the University has got lake view which is drinkable and swimmable one.

Figure 6: Campus Setting - Suburban

1.5. Total Campus Area

Table 1: Total Campus Area

CAMPUSES	TOTAL AREA (m²)
MAIN CAMPUS	1.712.775
DENTISTRY	10.996
KORUCUK	66.250
HENDEK	18.046
HEALTH SERVICES	16.833
GRAND TOTAL	**1.824.900**

Figure 7: Main Campus Area

Figure 8: Dentistry Campus Area

Figure 9: Health Services Campus Area

Figure 10: Korucuk Campus Area

Figure 11: Hendek Campus Area

1.7. Total campus buildings area

Sakarya University has a total of 109 buildings used for many different purposes in many different campuses. Since it will not be possible to use photos of all these buildings, you can see some of the buildings with the Sakarya University Virtual Campus from the link below.

The total number of campus buildings area as meter is 231.850.27 m²

Additional link
https://tanitim.sakarya.edu.tr/sanalkampus/

Figure 12: Total campus buildings area

Table 2: Total Campus Building Area

Building Name	Total Area
Engineering Faculty M2 Block	2,752.61
Engineering Faculty M3 Block	3,169.78
Engineering Faculty M4 Block	1,756.92
Engineering Faculty M5 Block	3,622.05
Faculty of Engineering M6	3,536,64
Faculty of Engineering M7	7,695.82
Faculty of Engineering M8	2,753.51
Mechanical Chemistry Laboratory	481.06
Machine Metal Laboratory	897.85
Metallurgical and Materials Eng. R& D Lab .	1.111.21
Construction Lab . (Mustafa Kazak)	756.77
Civil Engineering (Geotechnical lab .)	618.48
Energy Mechanics Lab .	1,139.76
Sakarya Energy Laboratory	127.75
Fire Application and Research Center	96.39
Automotive Lab .	1.091.05
Thermal Spray Lab .	1,296.26
Faculty of Arts and Sciences Block A	4,458.67
Faculty of Arts and Sciences B Block	4,533,51
Faculty of Arts and Sciences C Block	8.523.00
Faculty of Arts and Sciences D Block	4,117,03
Faculty of Arts and Sciences Greenhouse	177.50
Faculty of Arts and Sciences Department of Chemistry. warehouse	158.10
Faculty of Theology B Block	2,811.84
Faculty of Theology Block C	2,470.99
Faculty of Theology D Block	2,416.05
Faculty of Theology Block E	1,872.90
Faculty of Theology Remediation Center	280.00
Faculty of Law Classroom Block	3,066.82
Faculty of Business Classroom Block	5,511.43
Political Science. fac. Instructor _ See. block	3,432.45
Faculty of Political Sciences S1 Block	3.263.08
Faculty of Computer and Informatics A Block	3,629.73
Faculty of Computer and Informatics B Block	2,271.25
Institute Block	4,270,37
Faculty of Health Sciences	1,981.48
Faculty of Art, Design and Architecture	8,606.50

Building Name	Total Area
State Conservatory	3,126,99
Middle East Institute	1,459.58
Tömer (Old Building)	853.92
Saü Continuing Education Center (Sausem)	1,519.12
Central Computer Laboratory	439.73
Saü Faculty of Dentistry	2,359.63
Hendek Faculty of Education Block A	3,465,52
Hendek Faculty of Education Block B	3,628.35
Hendek Faculty of Education Block C	1,934.63
Hendek Faculty of Education Block E	1,530,30
Saü Experimental Medicine Application and Research Center	1.998.80
Faculty of Medicine Morphology Building	5,734.06
Health Services Myo	4,711.07
Tomer New Building	1.595,00
Dormitory Building B2 Block	1,336,62
Faculty of Art, Design and Architecture	8,606.50
Faculty of Engineering M1 Block Dean's Office	2,721.02
Faculty of Arts and Sciences Dean's Block	1,693.15
Faculty of Theology A Block	2,772.92
Faculty of Law Dean's Office	480.91
Faculty of Business A Block	3,952.78
Faculty of Business Dean's Block	1,467.58
Rectorate Building Administrative	5,710.91
Rectorate Administration Building	2,148.52
Distance Education Research and Application Center	1,882.14
Student affairs	1,012.15
Sakarya University Security Building	208.91
Construction and Technical Department Administrative Building	606.22
Construction Business And Single. In. President Electrical Workshop	108.90
Construction Business And Single. still . head . Carpenter Workshop	141.81
Construction Business And Single. still . head . Metal And Plumbing Workshop	151.50
Entrance Gate West	24.27
Entrance Gate East (Main Entrance)	68.17
Hendek Education Faculty D Block	756.32
Yurt C Block İsefam Building	2,523,49
Dormitory Building A2 Block	1,387.92

Building Name	Total Area
Dormitory Building A3 Block	1,349.28
Faculty of Engineering Cafeteria	181.19
Faculty of Theology Canteen	466.22
Institute Cafeteria Building	246.25
Campus Bazaar Building A Block	415.80
Campus Bazaar Building B Block	515.18
Stops Area Ticket Sales Offices	53.76
Stations Area Cafeteria Office Building	195.64
Stops Area Car Wash	102.40
Stops Area Wc	62.04
Walkway Cafe	363.22
Dentistry Canteen	153.00
Faculty of Theology Conference Hall	767.11
Culture and Congress Center	7.060.00
Central Library	6.662.31
Library Annex Building	3,145,70
Staff Dining Hall	2,286,47
Student Cafeteria And Dining Hall	8,251.74
Dormitory Building Cafeteria	816.21
Faculty of Dentistry Dining hall	174.00
Staff Dining Hall	2,286,47
Medico Social Center	547.41
Outdoor Sports Facilities Güney Mini Football Field	226.44
Outdoor Sports Tes . Northern Fields	231.86
Stadium	13.510
Ariston Housing (50x57)	2,487,50
Ariston Lodgings Meeting Hall	45.60
Steel Houses Housing A Block (12x55)	725.90
Steel Houses Housing Block B (12x55)	725.90
Steel Houses Lodgings Block C(12x59,5)	733.70
Esentepe Housing (52x103)	5,832.80
Esentepe Houses Rector's Residence	225.55
Terrace Houses Housing (12x79)+(24x92)	3,245,20
Valley Houses Housing (32x45)	1,898.90
Esentepe Houses Nursery Building	216.62
Dormitory Building B3 Block	1659.85
Total	**231.850.27**

1.9. Total Area on Campus Covered in Forest Vegetation (m²)

Table 3: Total Forest Vegetation Area

CAMPUSES	FOREST VEGETATION AREA
MAIN CAMPUS	520.807,57
KORUCUK	46.304,05
HENDEK	3.916,97
HEALTH SERVICES	1.313,17
GRAND TOTAL	572.341,76
FOREST RATIO	**31,36%**

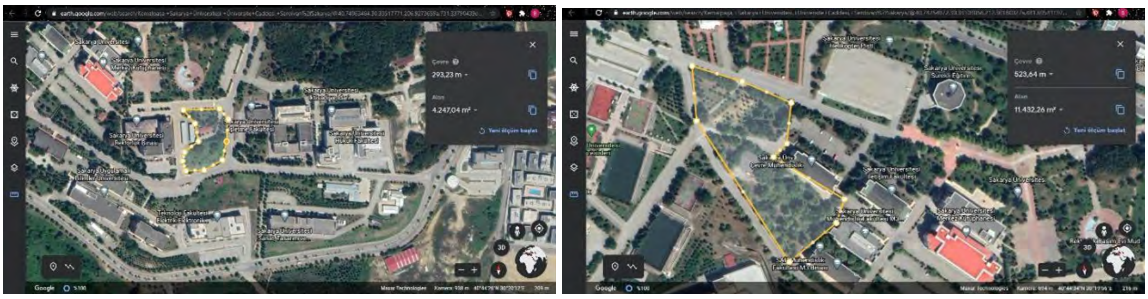


Figure 13: Total Forest Vegetation Area on Main Campus

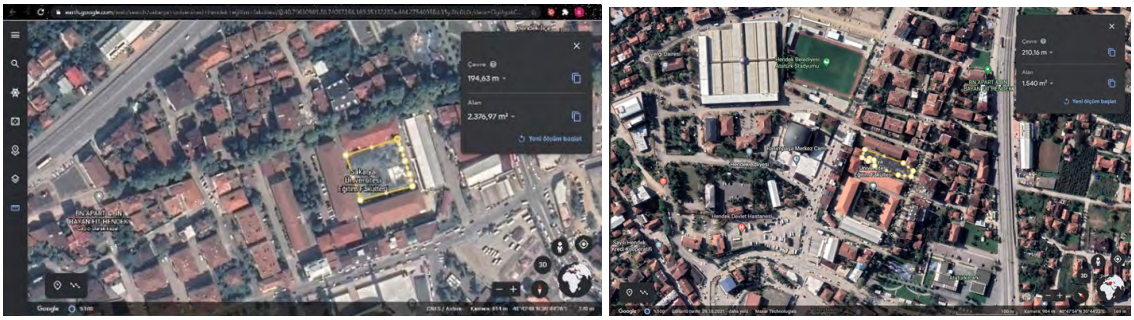


Figure 14: Forest Vegetation Area – Hendek Campus

Figure 15: Forest Vegetation Area – Health Services Campus

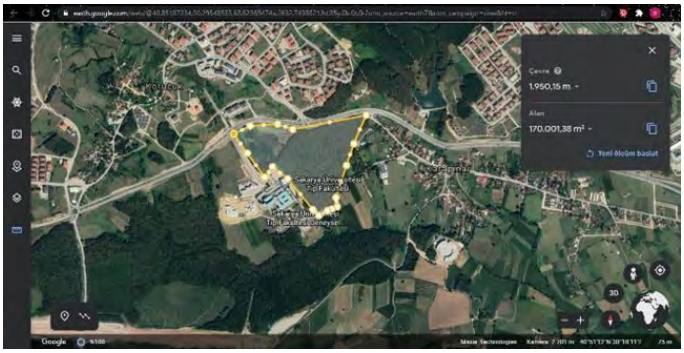


Figure 16: Forest Vegetation Area – Korucuk Campus

1.10. Total area on campus covered in planted vegetation (m²)

Figure 17: Total Planted Vegetation Area

Total planted vegetation area: 840.442,41 m²
Total Area: 1.824.900 m²
Percentage area: %46,05

1.11. Total area on campus for water absorption besides the forest and planted vegetation (m²)

Figure 18: Total area on campus for water absorption besides the forest and planted vegetation

Total **water absorption** area: 421.648 m²
Total Area: 1.824.900 m²
Percentage area: %23,11

1.18. University budget for sustainability effort (in US Dollars)

Table 4: University budget for sustainability effort (in US Dollars)

	2019	2020	2021	Average
Budget Total	$ 18.187.197	$ 20.416.460	$ 21.806.294	$ 20.136.650
Sustainability Budget	$ 1.539.365	$ 1.426.280	$ 2.562.904	$ 1.842.850
			Percentage	**9,15 %**

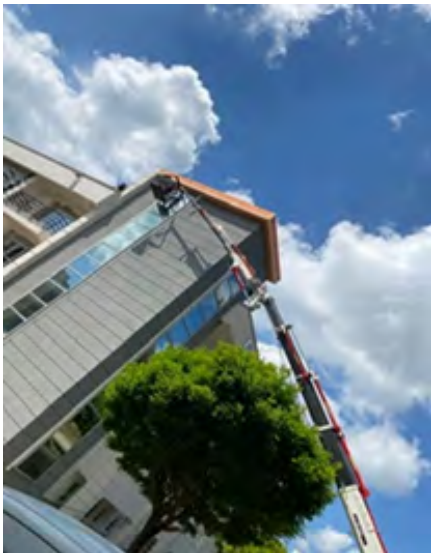
The average percentage university budget for our university is 9,15%

1.20. Percentage of operation and maintenance activities

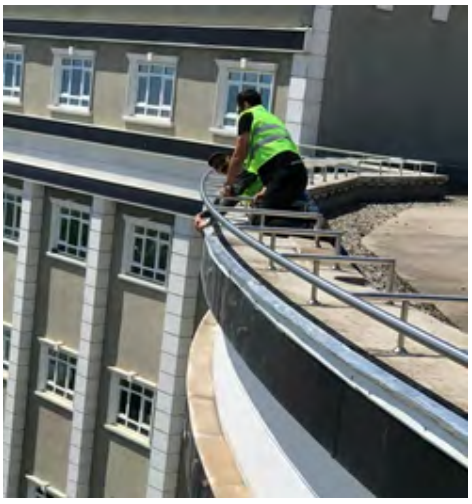
Sakarya University subjected all buildings, facilities and structures on campus to maintenance and repair work. All of the appliances has been changed with energy efficient appliances and the maintenance and repair activities are done with renewable or ecologically friendly sources. Therefore, the ratio of smart buildings has been increased and also the investment in sustainability efforts has been increased.

1. Total campus buildings area	231.850 m²
2. Total operated building	231.850 m²
Percentage building that operated and maintenanced	100%

Maintenance and insulation process of air conditioning system in the building



Exterior maintenance of the Faculty of Informatics



Maintenance and repair of buildings

Internal maintenance and repair work of building

The Green House was built

Figure 19: Example of operation and maintenance activities

1.21. Campus facilities for disable, special needs and or maternity care

Sakarya University closely cares about disabled people's rights. Therefore Sakarya University has so many facilities for disabled people.

1- There are a lot of lifts for disabled people. Sakarya University realized that it's so hard to use stairs for disables people and solved it quickly and put lifts next to stairs for disabled people.
2- Sakarya University uses Braille alphabets under the whole description tables in campus buildings.
3- Almost everywhere on campus we use sensible floors for visually disabled. And thanks to these floors visually disabled people can feel the ground and find their right way.
4- Photo is from the library of Sakarya University. There are elevated ways for disabled people to get rid of the stairs with their wheelchairs in the whole campus.
5- Sakarya University noticed one more issue for disabled. This issue is for disabled . It's really hard to use the toilet and it's really a problem for them. But in all WC on our campus there are WCs for disabled people.
6-(*)This unit caress about all problems and requests of disabled people. And maybe the most important thing is, there is a visually disabled employee in the Unit of Visually Disabled Persons.

Additional link
http://www.engelsiz.sakarya.edu.tr/
https://www.sakarya.edu.tr/engelsiz-sau-s63.html


1. Disabled Lift in Faculty of Law

2. Flood descriptions with Braille Alphabet in buildings

3. Sensible floor for the visually disabled

4. Wheelchair way around the whole campus

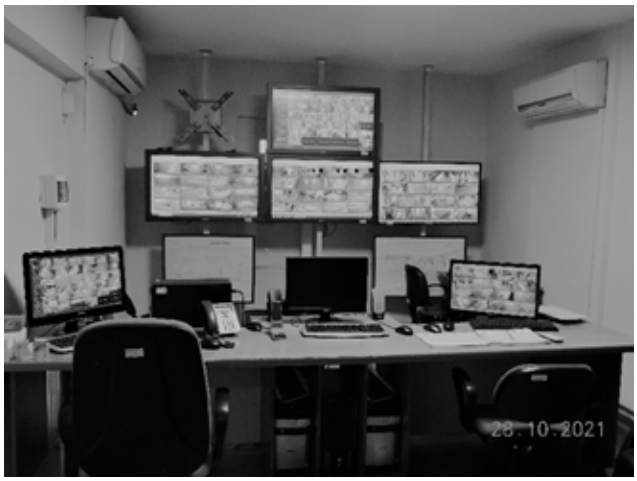
5. Eligible WC for disabled

6. Unit of people who are visually disabled.(*)

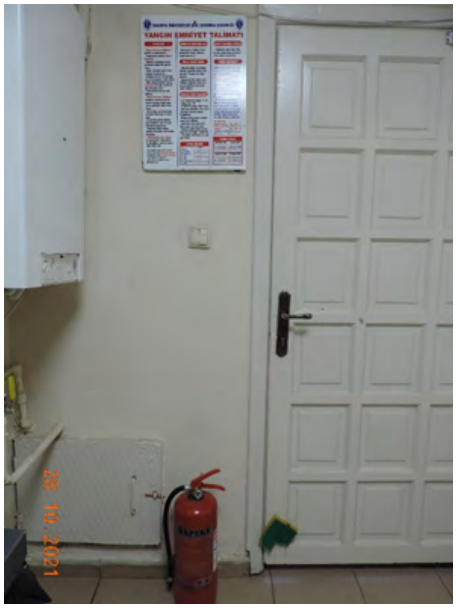
Figure 20: Campus facliities for disable, special needs and or maternity care

1.22. Security and safety facilities

1. The campus has got the general camera system to monitor whole of the campus in order to provide the security of the campus population.
2. The standard room in the buildings such as staff office, classrooms have got the fire instructions and precautions. 3. As well as there are fire sensors in buildings.
4. Sakarya University has got own special natural disaster search and rescue team. The disaster team not only supports those living on campus, but also provides support to other regions in case of natural disasters.
5. Fire extinguishing, first aid, occupational health and safety trainings and exercises were given to employees and students in all units within the Civil Defense Specialization in 2021



1. General camera system on campus



2. Standard Room with fire instructions and precautions

3. Fire sensors in buildings.

4. Sakarya University's natural disaster search and rescue team.

5. Civil defense training and exercises for staff and students

Figure 21: Security and safety facilites

1.23. Health infrastructure facilities for students, academics and administrative staffs' wellbeing

Sakarya University has its own healthcare center where students and university's staffs can go and benefit.
Especially students really need Mediko. Mediko is located on campus and it's close to many faculties and easy to reach there.
(*)Mediko also provided PCR test and Covid-19 vaccination service for free to students, teachers and all staff during pandemi time.

https://mediko.sakarya.edu.tr/

Sakarya University Mediko Healthcare Center
(*)

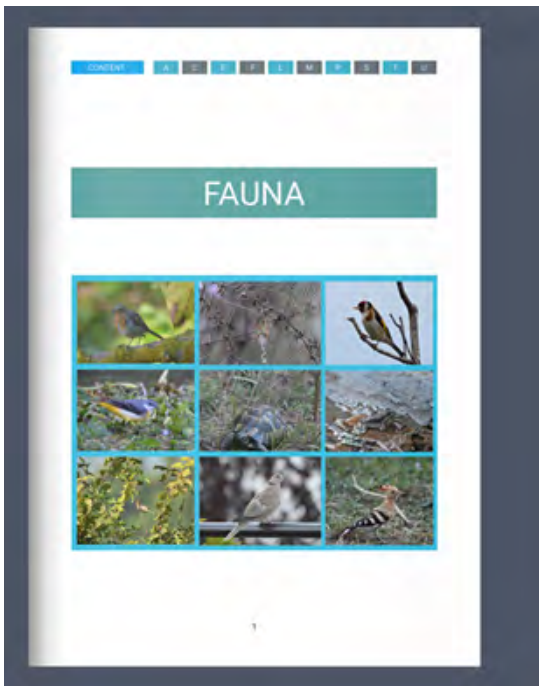
Figure 22: Health infrastructure facilities for students, academics and administrative staffs' wellbeing

1.24. Conservation: plant, animal, and wildlife, genetic resources for food and agriculture secured in either medium or long-term conservation facilities

1. The flora of the campus was recorded and cataloged. https://yesilkampus.sakarya.edu.tr/tr/icerik/20506/106669/flora
2. The fauna of the campus was recorded and cataloged. https://yesilkampus.sakarya.edu.tr/tr/icerik/20548/106867/fauna
3. Special shelters for campus animals are built by the department of Maintenance and Repair to protect them.
4. There is a special laboratory to reproduce many plant species in special environments in order to send to the areas where they are needed.

https://sargem.sakarya.edu.tr/tr/icerik/16094/82738/vizyon-ve-misyon
https://haber.sakarya.edu.tr/bitkiler-sakarya-universitesinde-filizleniyor-h83861.html

1-Record and catalog of the flora of the campus



2-Record and catalog of the fauna of the campus

3-Special shelters for campus animals are built to protect them.




4.Plants grown in the Plant and Tissue Research laboratory

Green House for Campus Area

Figure 23: Campus Flora and Fauna

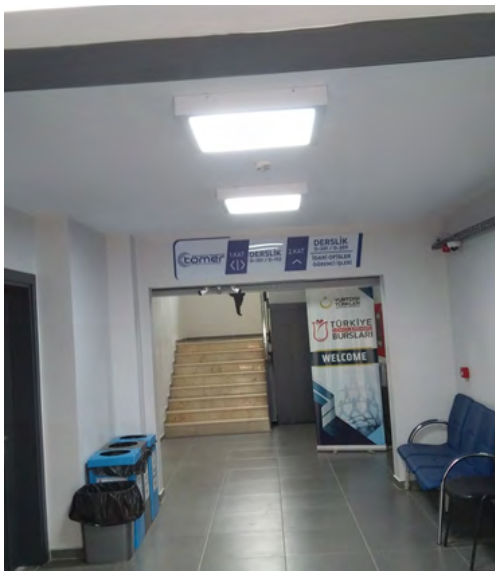
2. ENERGY AND CLIMATE CHANGE

2.1. Energy Efficient Appliances Usage

All new buildings at Sakarya University are equipped with energy efficient devices. In the renovation works of the existing buildings, completely energy-efficient devices are used, and the products that are due for renovation are replaced with energy-saving products.
In addition, many of the lights used for campus lighting are LED lights equipped with solar panels. In this way, we produce energy source by utilizing the sun.

Table 5: Energy Efficient Appliances Usage

Appliance	Total Number	Total number energy Efficient appliances	Percentage
LED Lamp	116.157	98.508	84,8%
		Average Percentage	**84,8%**



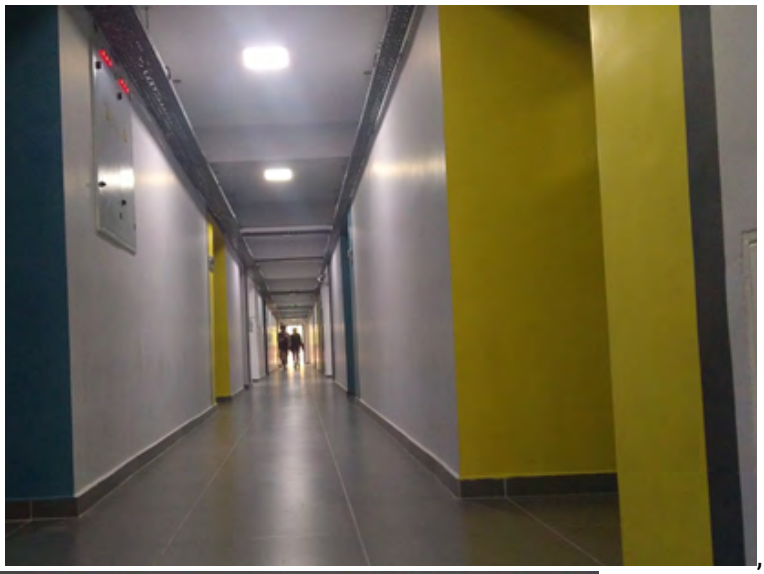


Figure 24: Energy Efficient Appliances Usage

2.3. Smart Building Implementation

Table 6: Smart Building Features

No.	Name	Place	automation		safety				energy		water		ndoor environment				lighting				Building Area (m²)
			B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4	
1	Sakarya University, Faculty of Theology	Sakarya, Turkey	X		X	X			X								X	X	X	X	13858
2	Sakarya University, Faculty of Computer and Information Sciences	Sakarya, Turkey	X		X	X			X								X	X		X	11275
3	Sakarya University, Congress Center	Sakarya, Turkey	X		X	X	X		X				X				X	X		X	9450
4	Sakarya University, Library Building	Sakarya, Turkey	X		X												X	X		X	10852
5	Sakarya University, School of Business	Sakarya, Turkey	X		X												X	X		X	12896
6	Sakarya University, Faculty of Engineering	Sakarya, Turkey	X		X												X	X		X	15042
7	Sakarya University, Continuing Education Center	Sakarya, Turkey	X		X												X	X		X	10485
8	Student Dining Hall	Sakarya, Turkey	X		X	X	X		X		X		X				X	X	X	X	12564
9	Cafeteria	Sakarya, Turkey	X		X	X	X		X		X		X				X	X	X	X	12252
		Total	**8**		**8**	**4**	**2**		**4**				**2**				**8**	**8**	**2**	**8**	**108674**

Smart building implementation
Total Building Area: 231850,27 m²

$$\frac{108674}{231850,27} \times 100 = 46,9\%$$

Faculty of Theology

Faculty of Computer and Information Sciences

Congress Center

Library Building

Faculty of Engineering

Continuing Education Center

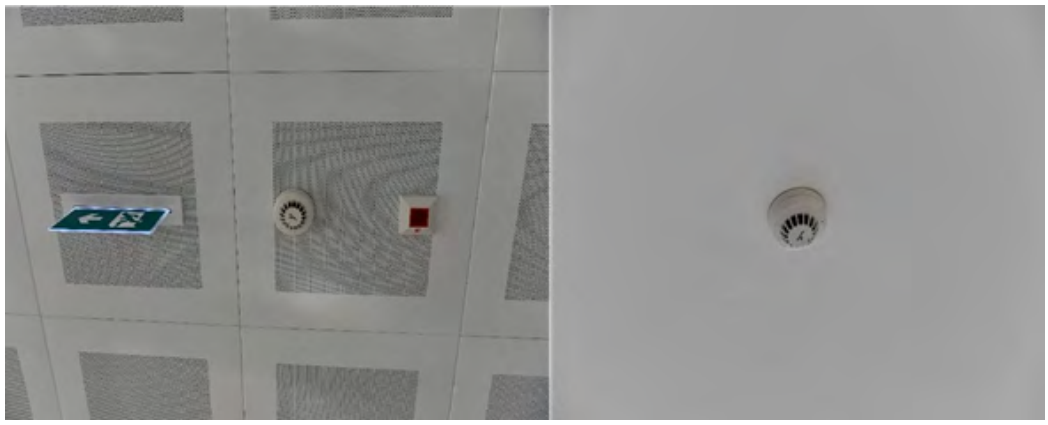
Cafeteria

Dining Hall

Figure 25: Smart Building Implementations

Fire Alarm Control Center

Automatic doors and sensors



Automatic Fire Alarm Sensor

Lighting Sensor

Figure 26: Smart Building Tools

2.5. Renewable Energy Sources in Campus

1.On roofs of administration building, library, laboratory building, school factories and other teaching buildings and dormitories, solar PV power station of total 175000 KWH is installed.
2.Wind turbine power is 7600 KWH in Energy Technologies Laboratory.

Sakarya University cares about the use of renewable energy sources. In this context, our university makes more than one application.

We are trying to use the Sun, the world's largest energy source, extremely efficiently. For this purpose, we have placed solar energy panels on the roofs of the faculties. In this way, we meet the energy needs of the faculty and campus by storing the energy from the sun. In addition, we use lighting with solar panels on campus roads and ornamental plants for lighting and solar street lamps in the campus. In addition, by placing solar panels on the renewed street lighting, we illuminate our campus at night with these lamps, thanks to the energy obtained from sunlight. These solar lamps are totally equipped with solar panels and LEDs.

Figure 27: Roof Solar Panels

Figure 28: Wind Turbine and Control Panel of Wind Turbine

2.6. Electricity Usage per Year (in Kilowatt-hour)

The total electricity usage of Sakara University in 2021 is 7.539.163,98 kWh. On the all buildings and campuses of Sakarya University electricity is used for lighting, cooling, heating and laboratory appliances.

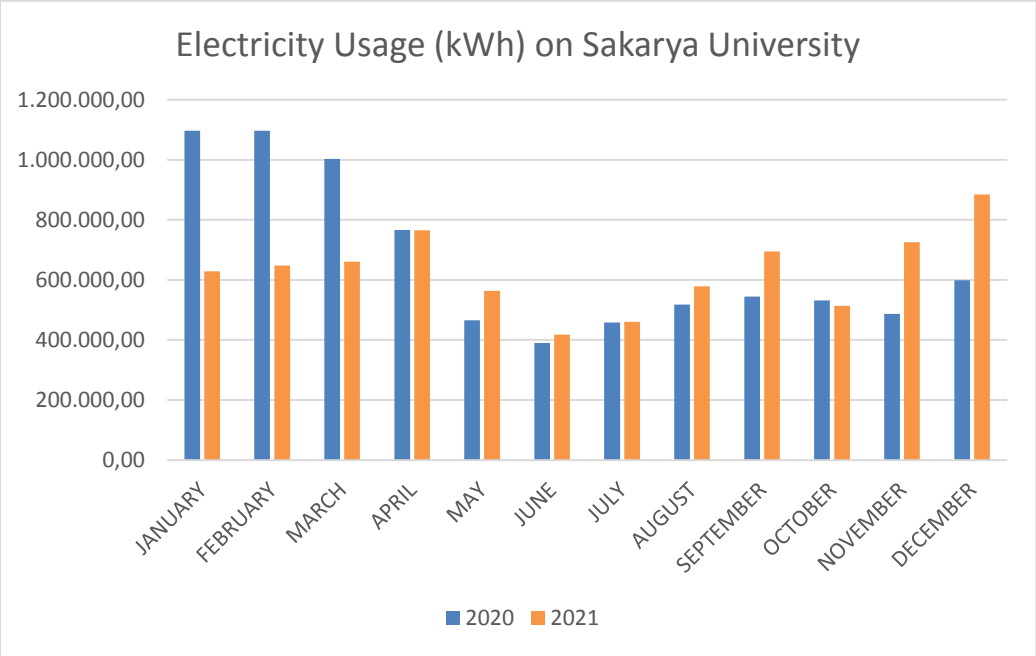


Figure 29: Electricity Usage (kWh) on Sakarya University

2.8. The ratio of renewable energy production divided by total energy usage per year

Figure 30: Renewable Energy

Table 7: Electricity Usage

No	Renewable Energy	Production (in kWh)
1	Solar panel	175.000
2	Windmill	7.600
	Total	182.600

182.600/ 7.539.163,98 (Electricity usage) = 2,42 %

2.9. Elements of Green Building Implementation as Reflected in All Construction and Renovation Policies

Sakarya University campus renewal is made in terms of reaching smarter and greener buildings. For now, 80% of the buildings are designed for taking advantage of natural day lighting. 85% of the buildings have energy management centers and related staff for controlling and monitoring.

Figure 31: Natural Day Lighting

Figure 32: Energy Management Tools

2.10. Greenhouse gas emission reduction program

1. Sakarya University is reducing GHG within Scope 1 by using natural gas for heating purposes. In addition, the use of electricity for cooling is reduced by common ventilation systems. The usage of electric vehicles in campus and the limited permission of campus vehicle traffic with badrol program is intended to reduce GHG originating from transportation vehicles. On the other hand, there are solar energy panels in the campus to produce some of the energy for the campus needed.

2. Sakarya University is located in the region where a large-scale electricity generation facility, which produces electricity from natural gas, provides electricity. For this reason, some of the electricity purchased by the university is produced from natural gas. (Scope 2) https://www.enka.com/portfolio-item/turkey-boo-projects-gebze-adapazari-natural-gas-combined-cycle-power-plants/

3. Within the scope of the zero waste program implemented at the university, it is also aimed to reduce the emission of sources from solid waste. The drinking water used in the campus is provided by the Metropolitan Municipality Water and Sewerage Administration General Directorate from Sapanca Lake, where the university is located. Preferring public transportation via buses and minibuses for campus transportation and providing campus vehicle traffic in a controlled manner also reduce transportation-related emissions. (Scope 3)

1.Examples of electric vehicles used at the campus

1.Solar Energy Panels

2.Electricity generation plant from natural gas combined cycle in Sakarya

3.Zero Waste Program of Sakarya University

3.Facilities of the Metropolitan Municipality Water and Sewerage Administration General Directorate which is the water supplier plant of campus

Figure 33: Greenhouse gas emission reduction

2.11. Total Carbon Footprint

Total Carbon footprint in 2021 is measured as 6.575,78 metrictons according to the recommended calculation

Calculation method recommended by UI GreenMetric

CO2 (electricity)

$$= \frac{\text{(electricity usage per year (kWh)}}{1000} \text{ x } 0{,}84$$

$$= \frac{7.539.163,98\text{kWh}}{1000} \text{ x } 0{,}84$$

= 6332,90 metric tons

CO2 (bus)*

$$= \frac{\text{(number of shuttle bus in your university} \times \text{total trips for shuttle bus service each day} \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240)}{100} \text{ x } 0{,}01$$

$$= \frac{10 \times 3 \times 4 \times 240}{100} \text{ x } 0{,}01$$

= 2,88 metric tons

CO2 (cars)

$$= \frac{\text{(number of cars entering your university} \times 2 \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240)}{100} \text{ x } 0{,}02$$

$$= \frac{600 \times 2 \times 4 \times 240}{100} \text{ x } 0{,}02$$

= 230,40 metric tons

CO2 (motorcycle)

$$= \frac{\text{(number of motorcycle entering your university} \times 2 \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240)}{100} \text{ x } 0{,}01$$

$$= \frac{50 \times 2 \times 4 \times 240}{100} \text{ x } 0{,}01$$

= 9,6 metric tons

CO_2 (total)

= 6332,90 +2,88 +230,40 +9,60

= 6.575,78

2.13. Number of innovative program(s) in Energy and Climate Change

Solar Energy Panels

Air purifier as “Soft Air”

Use of led bulbs

Insulation application on building exteriors

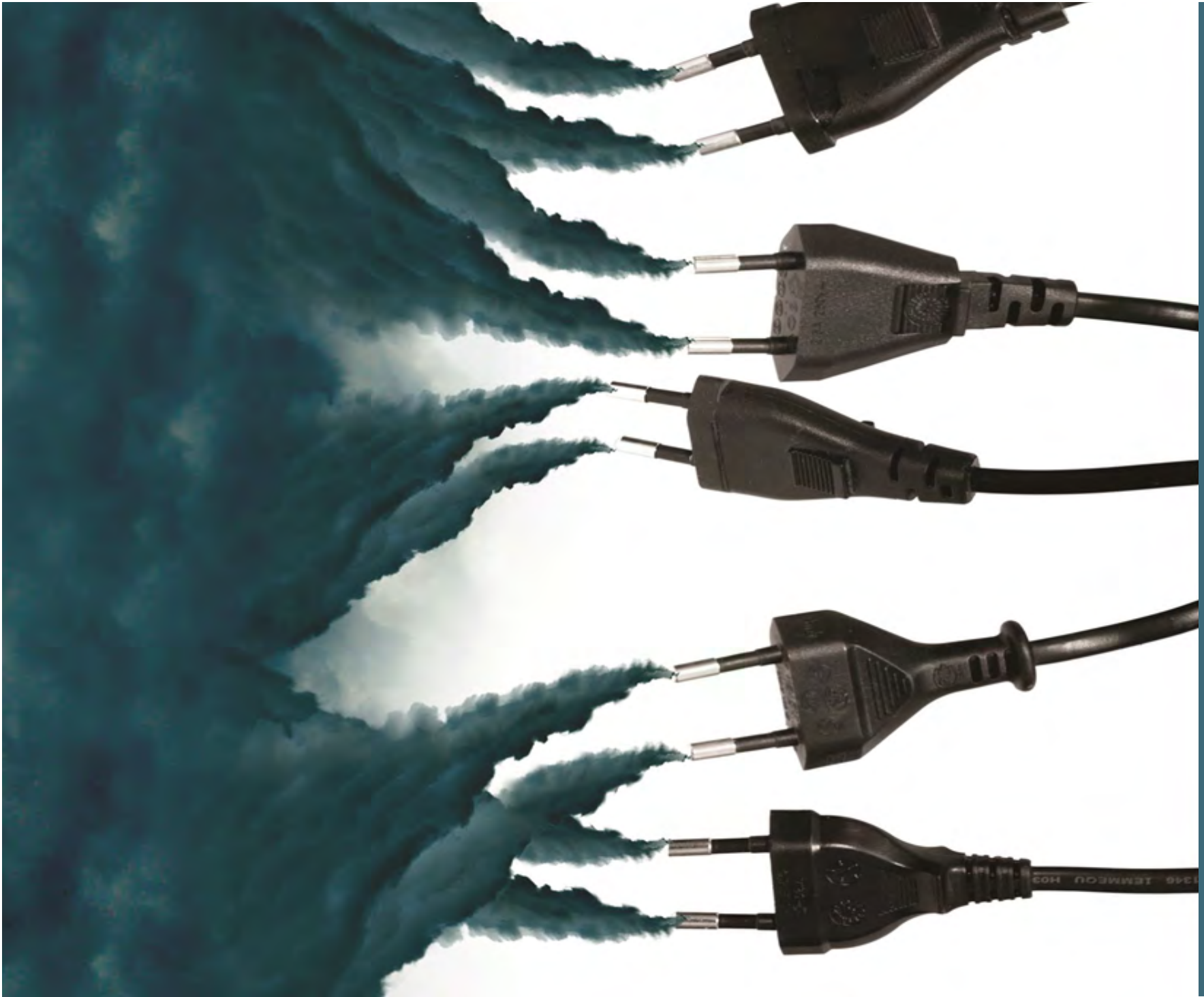
Figure 34: Innovative program(s)

2.14. Impactful university program(s) on climate change

Table 8: Impactful university program(s) on climate change

No	Programs	Scope (international / regional / national / local / etc)	Total Participants	Photo	URL	Short Description
1	Zero Waste Program	Local	All campus population		https://sifiratik.sakarya.edu.tr/tr	An application covering all campuses in order to ensure the separation and recycling of all kinds of wastes generated within the campus at the source. The trainings for students and staff are carried out within this program. Also the competition for students is organized by university to enhance the awareness of the students.
2	Zero Waste Coordination Board	Local	All departmens and stakeholders		https://sifiratik.sakarya.edu.tr/tr/personel-liste/20386/105142/sifir-atik-koordinasyon-kurulu	Zero Waste Coordination Board is the responsible organisation of the university in order to manage the wastes. They plan the related policies of the university and implement the Zero Waste Program by coordinating all units of the university in lien with this program. There is the Zero Waste Coordinatorship which supports the Board for the implementation and secretary.
3	Zero Waste Directive	Local	All departmens and stakeholders		https://sifiratik.sakarya.edu.tr/tr/icerik/20829/108025/sakarya-universitesi-sifir-atik-yonergesi	The university has got the zero waste directive which covers all processes, from the prevention, reduction, reuse, recycling and final disposal of wastes arising as a result of use or consumption in Sakarya University units. The directive determines the provisions regarding the duties, powers and responsibilities of the commissions and officers assigned to this scope and the way they work.
4	Waste Management	Local	All campus population		https://sifiratik.sakarya.edu.tr/tr/icerik/20019/102641/sakarya-universitesinde-atik-uygulamasi	Special waste collection boxes are used on campus and the collected wastes are sent for recycling on a registered basis within the scope of the Zero Waste Program.

5	Renewable Energy Implemen-tations	Local	182.600 kwt-h			The University has got solar energy panels and wind türbine to produce some of used energy. The university also has a policy on the use of renewable energy in new buildings.
6	Sustainabil-ity Courses	National	Students		https://ebs.sakarya.edu.tr/Ders/Detay/530881	There are several courses related with sustainability. The University also started to link all courses with SDG to ensure the Training of students.



3. WASTE

3.1. Recycling Program for University Waste

Sakarya University has got recycling program (Zero Waste Program) for university's different kind of wastes through the different processes. The Zero Waste Program is in charge of Zero Waste Coordination Board which manages the wastes of the university and they plan the related policies of the university. The Board implement the Zero Waste Program by coordinating all units of the university in lien with this program. There is the Zero Waste Coordinatorship which supports the Board for the implementation and secretary. The university has got the zero waste directive which covers all processes, from the prevention, reduction, reuse, recycling and final disposal of wastes arising as a result of use or consumption in Sakarya University units. The directive determines the provisions regarding the duties, powers and responsibilities of the commissions and officers assigned to this scope and the way they work. University promotes the recycling of glass, plastic, metal, battery and electronic, organic waste and ink-cartridges from printers. E-waste items should not be disposed of in the normal trash due to their high concentrations of toxic chemicals and heavy metals. Besides toxic waste storage has been built on the main campus.

*Sakarya University has been given a Zero Waste Certificate by the Ministry of Environment and Urbanization due to these practices.

Figure 35: Zero Waste Program of the university

Figure 36: Zero Waste Certificate by the Ministry of Environment and Urbanization *

Figure 37: Flyer for Recycling Program for University Waste

Figure 38: Digital Waste Gathering

Figure 39: Gathering Units for Recycling Awareness Program

Figure 40: Waste bins for paper, plastic, metal, glass, medical waste

Figure 41: Toxic Waste Storage

Figure 42: The process of recycling and converting waste green plants into fertilizers

3.2. Program to Reduce the Use of Paper and Plastic on Campus

Four programs are implemented in order to reduce the use of paper and plastic by Sakarya University.

1. The Electronic Document Management System enables all official correspondence to be made completely electronically without printing. This program ensures that correspondence, which holds thousands of pages per year, is stored electronically safely and efficiently and accessed when necessary.
2. The second application is a two-way printing policy. All academic and administrative staff are encouraged to make two-way printouts and it is aimed to save 50% paper.
3. The third program is to reduce the number of printers and direct those who need it to a common printer in order to print out only when necessary. In addition, output quota is applied for all administrative and academic staff and statistics are monitored by senior management.
4. Sakarya University aims to reduce the use of disposable products. For this purpose, the special program is implemented to prefer reusable thermoses instead of plastic cups among students and staff.
5. Special waste collection boxes are used on campus and the collected wastes are sent for recycling on a registered basis within the scope of the Zero Waste Program. The amount of all kinds of collected waste in 2021 are presented in the following table

Waste Type	Total Amount (kg)
Paper	17.857,5
Plastic/glass/metal	5.085,0
Organic	253.386,5
Battery	128
Inorganic	9.660

6. Sakarya University has implemented the project which aims to reach those in need with the project called “The Shop is Yours” on a voluntary basis. New or lightly used clean clothes, shoes, jewelry, scarves, etc. A shop was opened on the ground floor of the campus hotel for the social project with products.

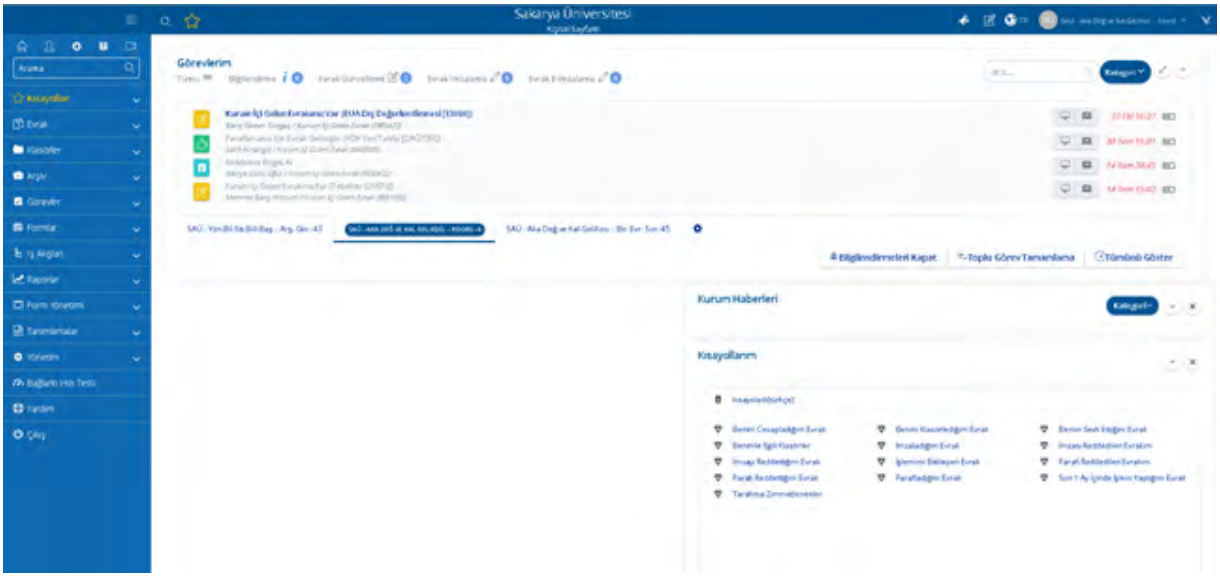


Figure 43: 1.Electronic Document Management System

Figure 44: 2.two-way Printing

Figure 45: 3.Common Usage Of Printersr

Figure 46: 4.Program to Reduce The Use of Plastic in Campus

Figure 47: 5.Recycling Boxes

Figure 48: 6.Recycling of the Clothes

3.3. Organic Waste Treatment

In Sakarya University, the only structures that produce organic waste are dining halls, canteens and cafes, which manage in complete autonomy this kind of waste. The wastes in the dining hall pass through the oil filter and go to the sewer. The dining halls, canteens and the cafes manage the organic waste trough contracts with the Environmental Services Unit of Sakarya Metropolitan Municipality. The Municipality staff collect the organic waste and deliver them at Sakarya Metropolitan Municipality waste treatment plant that processes the material through anaerobic digestion. In 2021, the amount of collected organic waste was 253.386,5 kg.

Bough shredder are used in our university. In this way, waste boughs are ground and turned into fertilizer. These fertilizers are used to fertilize the plants in the campus.

Figure 49: Organic Waste Treatment

Figure 50: Oil filter for organic waste

Figure 51: Bough shredder

3.4. Inorganic Waste Treatment

Inorganic Waste treatment in Sakarya University aims to gather plastic, glass, metal, paper, digital, contaminated and medical waste and deliver them to waste treatment areas for recycling and also for the classification of valuable materials for reuse.

Sakarya University works with Sakarya Metropolitan Municipality. The staff gathers the waste from the campus regularly. The faculty may also call the environmental services office for gathering the batteries or the digital waste when enough amount of waste is collected. In 2021, collected digital waste was 9.660 kg, and battery waste was 128 kg.

Several programs are implemented to create awareness for classifying and delivering the waste for recycling, these are referred under the heading for recycling programs.

Figure 52: Inorganic Waste Treatment

Figure 53: Digital Waste Treatment

3.5. Toxic Waste Treatment

Toxic and hazardous wastes of Sakarya University are stored in a special collection area, given to İZAYDAŞ at regular intervals, thus ensuring that they are disposed of without any harm to the environment. All toxic wastes of the university are necessarily disposed of in the determined ways. In addition, hazardous waste such as batteries and printer cartridges are also collected and recycled.The hazardous and medical wastes are picked up by the authorized company.

Figure 54: Toxic Waste Storage

Figure 55: Instruction for toxic waste at the laboratories

Figure 56: Printer Cartridge and Battery Gathering

Figure 57: Delivery of Hazardous and Medical Wastes

3.6. Sewage Disposal

All sewage wastes of Sakarya University are processed in the wastewater treatment facility of Sakarya Metropolitan Municipality. It is ensured that no untreated sewage waste is discharged into the sea. The treated wastewater is discharged to green areas and reused with the aim of irrigation.

Figure 58: Sewage Disposal

Additional link:
https://www.sakarya-saski.gov.tr/media/gallery/62ec9344-c604-435d-95e6- e216fb9857f2.pdf

4. WATER

4.1. Water Conservation Program Implementation

1. All buildings of Sakarya University have a separate sewerage system, for wastewater and for clean water (rainwater). Rainwater is thus collected from the roofs of the buildings and is then discharged into the water channels around the buildings.
2. The water arrives at water tanks placed underground and it is used for several purposes as irrigation or cleaning.
3. We have implemented our extended rainwater collection project. Several academic papers have been published by the experience gained through the implementation processes. This project reveals the potential of rainwater collected from the building roofs for irrigation of green areas located within the campus of Sakarya University. For this purpose, due to large area and location difference of the buildings, campus area is divided into 8 regions. In each zone, building roof area was calculated and amounts of rainwater are collected from each building. Also the area of greenland and amount of required rainwater was calculated in each region to direct the water for irrigation.

Additional Link:
https://www.isites.info/PastConferences/ISITES2016/ISITES2016/papers/A18-ISITES2016ID66.pdf

Figure 59: Water Conservation – Rainwater Collection

Figure 60: Eight regions of Sakarya University - Feasibility Studies

4.2. Water Recycling Program Implementation

As a result of the storage of rain water at Sakarya University, water containers for stray animals are filled automatically. In this way, rain water is not wasted and we meet the water needs of our friends on campus.

Used handwater are reused in toilet flushes. Accordingly all water used at sinks, reused at flush tanks.

The water recycling program implementation processes continue to develop natural irrigation capabilities.

Figure 61: Water Recycling Programs

4.3. Water Efficient Appliances Usage

In Sakarya University, a comprehensive water saving program is implemented. In many buildings, water saving is achieved by widespread equipment such as photocell faucets, photocell flusher and urinals. In addition, water-efficient spray filters are used at the ends of the taps. For efficient waste of water, cistermisers (automatic control of urinal flushing), waterless urinals, low flush WC's and low flo taps and automatic taps are used in the majority of the buildings. The waste water flowing from the taps goes to the flushes for reuse of water, and in this way, we both save water and protect the water.

Table 9: Water Efficient Appliances Usage

Appliance	Total Number	Total number water Efficient appliances	Percentage
Faucet	1350	430	30%
Flush	550	250	45%
Spray taps	120	120	100%
		Average Percentage	**58%**

Figure 62: Water Efficient Appliances Usag

4.4. Consumption of treated water

Sakarya University also carries out studies on the storage of rain water. Rain water is stored in storage vehicles and this water is used in cafeterias, watering flowers, feeding stray animals or, if necessary, for the needs of students and employees. In this way, we protect the water by ensuring the circulation of water.

Figure 63: Consumption of treated water

4.5. Water pollution control in campus area

The water used in the campus is provided by the Metropolitan Municipality Water and Sewerage Administration General Directorate (SASKİ) from Sapanca Lake, where the university is located. The quality of water is regularly monitored by SASKİ and published on the web page of the institution (https://www.sakarya-saski.gov.tr/icerik/detay.aspx?Id=1391).

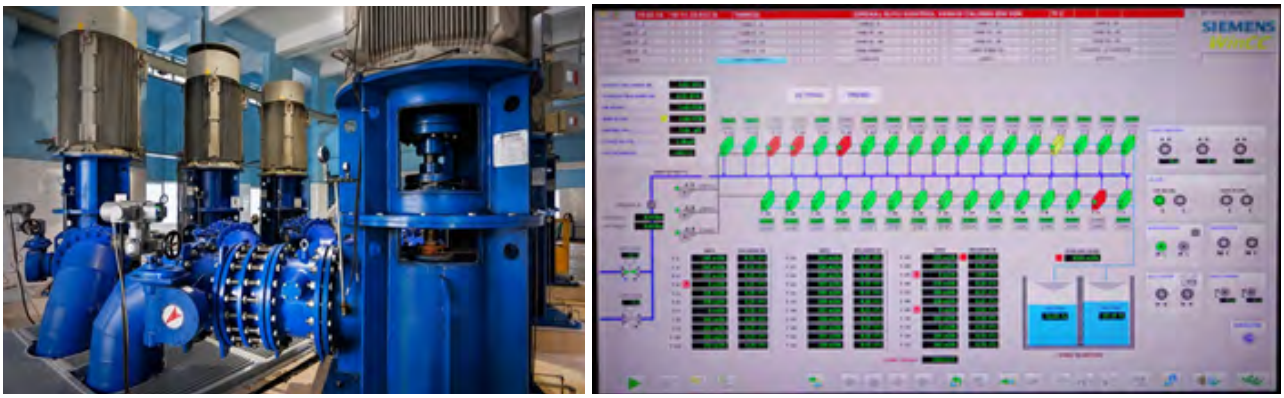


Figure 64: Water quality sampling and monitoring by SASKİ

5.TRANSPORTATION

5.5. Shuttle Services

Sakarya University is served by local buses and minibuses run by the Sakarya Metropolitan Municipality. These busses serve as shuttle in the campus area. They do not take any charge from the individuals, they are free for the people who get into the bus after the bus enters the campus area. This is also the same for the minibuses. There is no need for shuttle services instead.

Figure 65: Shuttle Services

Figure 66: Ring Road Signs

5.9. Zero-Emission Vehicles (ZEV) Policy on Campus

Sakarya University Supports zero emission on campus as well. There are many electric scooters called “BinBin” in Sakarya University Campus. People on campus can use these scooters to reach any part of campus. In addition, there are some electric vehicles in Sakarya University Campus to distribute materials to departments and offices.

Electric Scooter on Campus

Bike Parking Area

Electric Vehicle to Distribute Materials

Figure 67: Zero Emission Vehicles

5.13. The ratio of Parking Area to Total Campus Area

Table 10: Total Parking Area

CAMPUSES	TOTAL AREA (m²)	PARKING AREA (m²)
MAIN CAMPUS	1.712.775	15.865,14
DENTISTRY	10.996	215,13
KORUCUK	66.250	801,97
HENDEK	18.046	307,44
HEALTH SERVICES	16.833	375,34
GRAND TOTAL	**1.824.900**	**17.565,02**

Ratio = 0.963 %

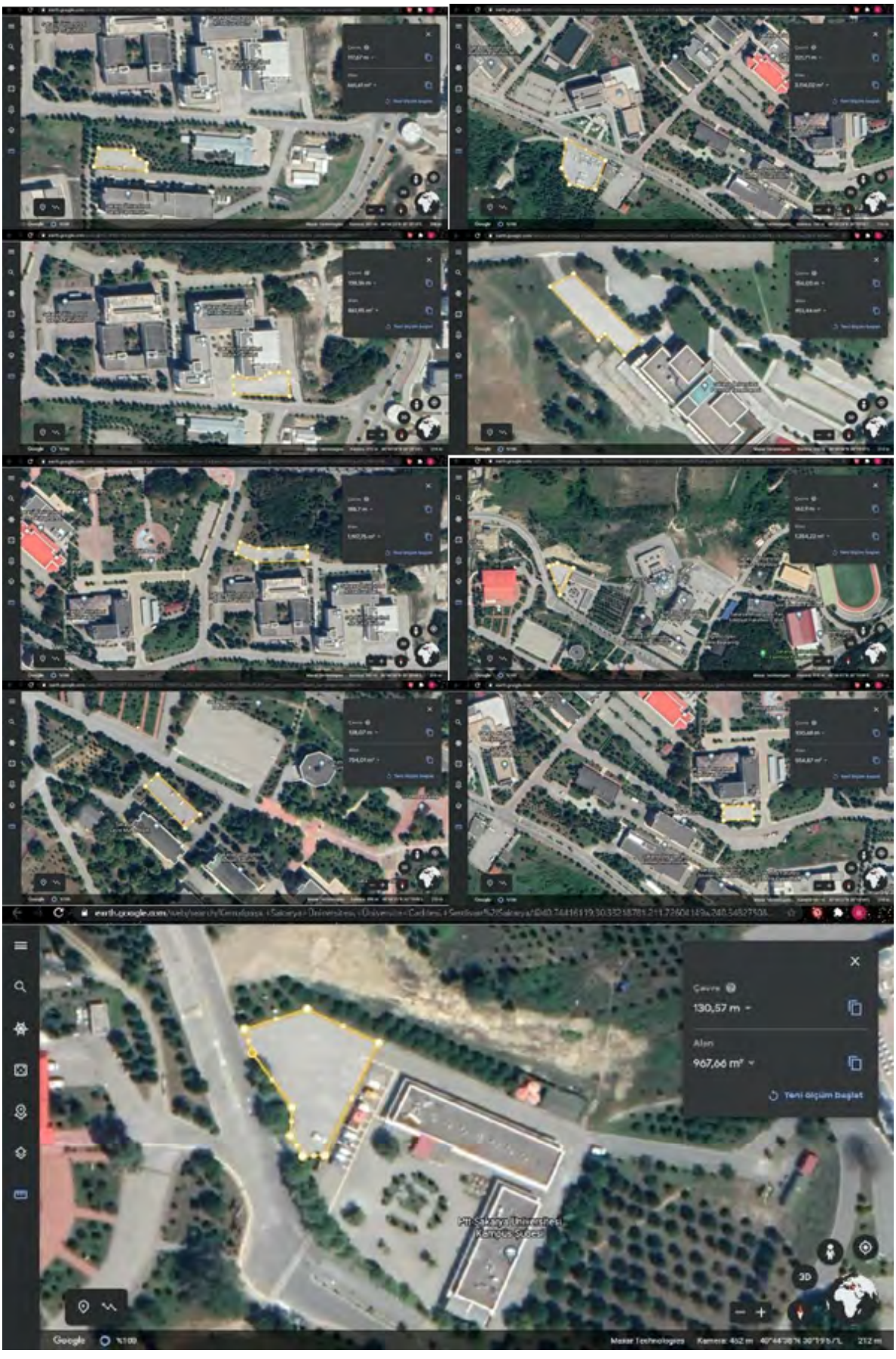


Figure 68: Parking Areas - Main Campus

Figure 69: Parking Area - Health Services Campus

Figure 70: Parking Area - Dentistry Campus

Figure 71: Parking Area - Hendek Campus

Figure 72: Parking Area - Korucuk Campus

5.14. Program to limit or decrease the parking area on campus

Vehicles that do not have a banderol to enter Sakarya University cannot enter the campus. At the entrances of Sakarya University campus, vehicles with banderol are constantly checked. These inspections are carried out both automatically and by security guards.

Sakarya University is making many applications to reduce the number of vehicles. For example, there are many electric scooters at every point in the campus in order to reduce vehicle entrances. In this way, vehicle usage is reduced.

All of the parking areas covered with water absorption floor

Vehicle bander control

'BinBin' electricity scooters for rent

Figure 73: Program to limit or decrease the parking area on campus

5.15. Number of Transportation Initiatives to Decrease Private Vehicles on Campus

1. Shuttle/bus inside campus
2. Shuttle/minibus inside campus
3. Charging high banderole fees and extra expensive banderole fee for your second vehicle.
4. There are many electric scooters called “BinBin” in Sakarya University Campus. People on campus can use these scooters to reach any part of campus.
5. In addition, there are more than 10 electric vehicles in the Sakarya University Campus for the distribution of some necessary materials to the departments and offices. Sakarya University has improved itself a lot in transportation. Sakarya University, which constantly innovates in every subject, also attaches great importance to transportation within the campus and aims to protect the environment by reducing carbon emissions

Additional link:
http://guvenlik.sakarya.edu.tr/tr/duyuru/goster/95582/bandrol

Figure 74: 1.Shuttle Bus inside Campus

Figure 75: 2.Campus Minibus

Figure 76: 3.Electricity Scooter on Campus

Figure 77: 4.Car Control Point at the Main Gate of Campus

Figure 78: 5.Electricity Vehicle to Distribute Materials

5.16. Pedestrian Path Policy on Campus

1. Separator between road for vehicle and pedestrian path.
2. Pedestrian path in green area
3. Ramps and guiding blocks which have suitable design for pedestrians having physical disabilities.
4. There are special road for bicycles.
5. There are lots of pedestrian crossings on campus. And this year all of pedestrian crossings were renewed

Figure 79: 1.Separator between Road for vehicle and Pedestrian Path

Figure 80: 2.Pedestrian Path in Green Area

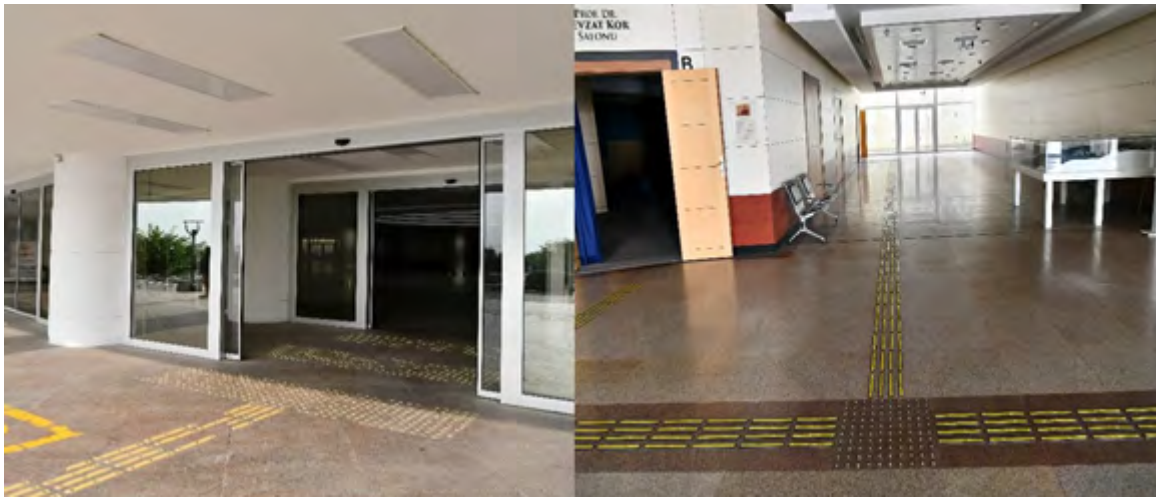


Figure 81: 3.Path for Disabled Pedestrians

Figure 82: 4.Special Road for Bicycles

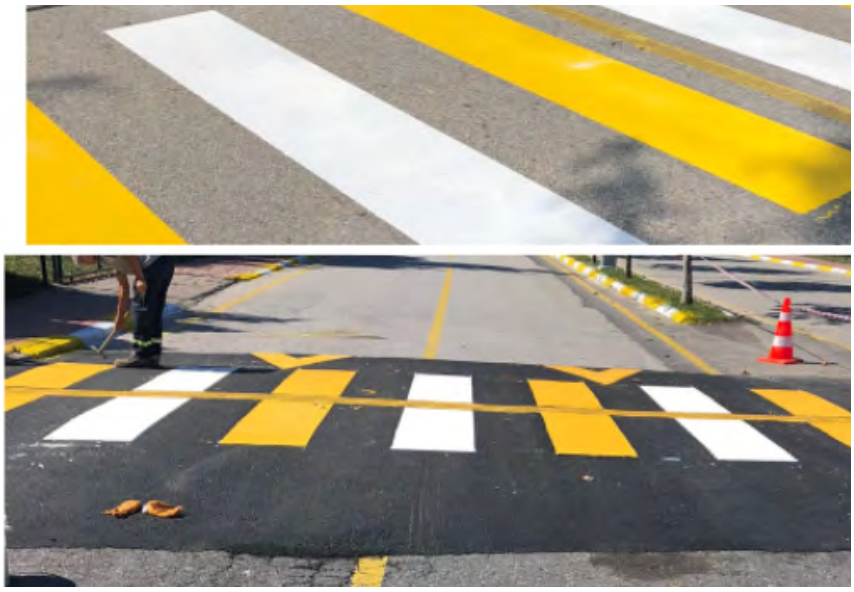


Figure 83: 5.Pedestrian crossings

6. EDUCATION & RESEARCH

6.1. Number of Courses/Subjects Related to Sustainability Offered

Below is a list of the courses offered to embed sustainability into curriculum content.

Total number of courses with sustainability embedded for courses running in 2021/22: 1382

Table 11: Example of Courses Related to Sustainability

LessonID	CourseName	UnitName	Contents
49236	AIR POLLUTION AND CONTROL	BA in ENVIRONMENTAL ENGINEERING	Physical and Chemical Structure of Atmosphere; National Legal Basis and Legislation Related to Air Pollution; Types of air pollution control equipment; Introduction to air pollution control; Air Pollution Modeling; Air Pollution Modeling; Pollutant Measurement Techniques and Methods in Air Pollution; Effect of Meteorology on Air Pollution; Pollutants that Cause Air Pollution; Effects of Air Pollution on Human and Environment; Sources of Air Pollution; Structure of Air and Atmosphere; International Conventions and Declarations on Global Air Pollution and Environment; Particle (Powder) and gas separation techniques
51768	INTRODUCTION TO ENVIRONMENTAL ENGINEERING	BA in ENVIRONMENTAL ENGINEERING	Problems of the age, pollution, purification techniques, solutions; Problems of the age, pollution, purification, solutions; Presentation of environmental engineering research and applications (presentation by students); Environmental engineering fields of study, Laws, standards and regulations related to environmental engineering; Environmental engineering studies and applications (Technical trip); Environmental Engineering practices, innovative approaches; Environmental impact, sustainability; Vocational career planning seminar-1; Vocational career planning seminar-2; Vocational career planning seminar-3; Vocational career planning seminar-4; Definition of engineering, engineering ethics, environmental ethics; Basic definitions, cycles, balance of matter and separations, reactions, reactors; Basic definitions, cycles, balance of matter and separations, reactions, reactors
66449	ENVIRONMENTAL ENGINEERING DESIGN	BA in ENVIRONMENTAL ENGINEERING	Design of Wastewater Treatment Systems; Safety and Economic Analysis and Evaluation in Environmental Engineering Design; Statistical Data Analysis in Environmental Engineering Design; Computer Applications in Environmental Engineering Design and Process Selection; Design of Regular Solid Waste Storage Systems; Group Project Design Final Report and Presentation; Design of Air Pollution Control Systems; Design of Sewer Systems; Design of Solid Waste Collection, Transfer and Transportation Systems; Design of Solid Waste Incineration and Composting Systems; Design of Urban Air Pollution Control Systems; Concepts in Engineering Design, Ethics and Project Management; Design of Water Treatment Systems; Design of Water Distribution Network Systems
67645	ENVIRONMENTAL BIOTECHNOLOGY	BA in ENVIRONMENTAL ENGINEERING	Biodegradation kinetics; Biodegradation and enzymes; Overview of biotechnology applications; Applications to fermentation reactions; McCarty theorems; removal of metals; Methane production reactions; Energy in microbial reactions; Microbial reactions and growth; Nitrification and denitrification; Organic substances and biodegradation; Decomposition reactions of petrochemical wastes; Sulphate reduction reactions; Biotechnological processes in the removal of hazardous and harmful waste
67650	SOLID WASTE AND CONTROL	BA in ENVIRONMENTAL ENGINEERING	Introduction, Definition of Solid Waste, Solid Waste Management, Integrated Solid Waste Management; Determination of Solid Waste Disposal Methods and Cost; Solid Waste Sources, Amount and Characterization; Analysis of Solid Waste Regulations; Separation and Recovery of Solid Wastes; Biological Treatment Technologies of Solid Wastes (Compost and Biomethanization); Solid Waste Storage-Storage Storage 1; Solid Waste Storage-Storage Storage 2; Solid Waste Storage-Regular-Irregular (Wild) Storage 3; Physical, Chemical and Biological Properties of Solid Wastes; Solid Waste Transportation and Transfer Stations; Thermal Treatment Technologies of Solid Wastes (Incineration, Pyrolysis, Gasification); Solid Waste Collection and Collection Methods; Seminar
67651	ENVIRONMENTAL MODELING	BA in ENVIRONMENTAL ENGINEERING	Modeling applications in systems such as activated sludge; Explaining the main principles used in modeling studies in environmental engineering. Explaining the principles of mass balance and control volume; Examples of general assessments and groundwater modelling; Modeling of reactions in batch reactors; Explaining linear and geometric increase equations and making some applications; Population, energy needs, etc. with mathematical modeling. Making future predictions of data. Making forward calculations using the data of the State Institute of Statistics and creating an MS-Excel infrastructure; Making an overview of mathematical modeling and giving examples from different disciplines; Key points for modeling microbial reactions; Modeling applications in piston flow reactors such as rivers; Explaining modeling principles in reciprocating flow reactors; Introduction to reactors and reactions; Modeling applications in reactors with water inlet and outlet; Modeling of reactions in continuous reactors; tube, beaker, lake, etc. modeling applications in reactors
67658	TREATMENT SLUDGE CONTROL	BA in ENVIRONMENTAL ENGINEERING	Stabilization requirement and applied stabilization methods in treatment sludge; On-site disposal alternatives of sewage sludge, advantages and limiting factors; Disposal alternatives of treatment sludge and legal regulations required for each alternative; Disposal of treatment sludge in landfills; Physical and chemical properties of sewage sludge, chemical pollutants; Methods and technologies used in drying treatment sludge; Methods and technologies used in drying treatment sludge; Microbiological properties of sewage sludge and pathogens; Laboratory analyzes to determine the properties of sewage sludge; The use of sewage sludge in agricultural areas, its effects on soil and limiting factors; Disposal of treatment sludge by incineration, heat treatments; Emergence of sewage sludge in wastewater treatment systems, definition and properties of sewage sludge; Wastewater treatment plant visit; Technologies and methods used in cleaning contaminated areas
67958	ENVIRONMENTAL IMPACT ASSESSMENT	BA in ENVIRONMENTAL ENGINEERING	Application Authorities; Ways of Handling Impacts in the EIA Process; EIA and EIA Application in Turkey; Environment, Environment and Domains; Environmental Impact Assessment Regulation; Activity, Activity Owner and Activity Stages; Formats, Decisions; Presentation of the prepared EIA reports; Presentation of the prepared EIA reports; Administrative and Technical Procedures and Principles; Work Flow Charts and Report; Commissions, Boards, Institutions and Organizations; Selection and Screening Process and EIA Report; Obligations and Duties
67961	ENVIRONMENTAL HEALTH MANAGEMENT	BA in ENVIRONMENTAL ENGINEERING	Transmission and transmission ways of communicable diseases, General factors affecting the health of employees; Effects of working environments on occupational and worker health; The approach and responsibilities of environmental engineers to the above problems; Introduction to environmental health, concept of health, definition of healthy people and healthy environment; Protective measures in environmental health, Organizations related to environmental health in the world and in Turkey; Effects of noise on health; Public health, worker health, Social Security Institution, employer's responsibilities; Effects of air pollution on health; Environmental factors affecting human health, preventive and social medicine approach; Effects of solid waste on health; Occupational diseases, poisonings; Effects on health caused by radiation and micropollutants; Effects of water pollution on health, water-borne diseases and ways of protection,

6.2. Total Number of Courses/Subjects Offered

Figure 84: Total Courses Offered in 2019-2021

2019	497
2020	582
2021	1382

Total number of courses offered in 2021/2022 = 12.935 courses

Ratio: 10,68%

6.4. Total Research Funds Dedicated to Sustainability Research

Total research fund dedicated to sustainability research in 2019= 181.994,99 US Dollars
Total research fund dedicated to sustainability research in 2020 = 234.784,07 US Dollars
Total research fund dedicated to sustainability research in 2021 = 262.515,00 US Dollars
The averaged annum last 3 years of research fund dedicated to sustainability research = 226.431,4 US Dollars

6.5. Total Research Funds

Total research fund in 2019 = 388.882,84 US Dollars
Total research fund in 2020 = 297.892,57 US Dollars
Total research fund in 2021 = 371.908,00 US Dollars
The averaged annum last 3 years of research fund = 352.894,47 US Dollars

6.8. Number of Events Related to Sustainability

1- Sakarya University Faculty of Engineering students produced an electric vehicle for two people that can reach 80 kilometers per hour with the engine they developed using only composite materials. Sakarya University Energy Technologies Community (SETT) students have produced an environmentally friendly electric vehicle called “Generation V3”. In order to reduce the effects of various gases and wastes emitted to nature as a result of the combustion of petroleum and petroleum-derived fuels on the ecosystem, the trend towards alternative energy sources has gained great momentum in recent years.
2- Seminar series on environmental legislation were held at Sakarya University.

Total number of sustainability/environment related events in:
2019: 32
2020: 94
2021: 148
A total average per annum over the last 3 years of 91 events

Figure 85: Events Related to Sustainability

6.9. Number of student organizations related to sustainability

Sakarya University attaches great importance to student organizations. In particular, it closely follows the activities of organizations related to sustainability and supports them in every sense. There are 186 student organizations in total at Sakarya University, and 51 of these organizations carry out activities related to sustainability.

Figure 86: Student organizations related to sustainability

6.13. Number of cultural activities on campus

Sakarya University regularly organizes cultural and artistic events. These events are usually held in Sakarya University Congress Center Event Halls.

SAU International Short Film Festival award night :
http://sakaryafilmfestivali.com/

Commemoration of the 17 August 1999 earthquake:SAÜ'de 17 Ağustos Depremi Anıldı #17ağustos
https://haber.sakarya.edu.tr/saude-17-agustos-depremi-anildi-h100797.html

Other cultural activities examples of Art School:
https://stmf.sakarya.edu.tr/tr/duyuru/goruntule/liste/96601/8

https://haber.sakarya.edu.tr/sauden-saglik-calisanlarina-vefa-konseri-h99772.html#:~:text=Bitlisin%20Tatvan%20il%C3%A7esinde%20askeri%20helikopter,ak%C5%9Fam%C4%B1%20saat%2020.00'de%20ger%C3%A7ekle%C5%9Ftirilecek

Sakarya International Short Film Festival award night.

Some cultural activities of Art School

Commemoration of the 17 August 1999 earthquake

Artificial Fair of SAU and YOK (Council of Higher Education)

Commemoration of Yunus Emre and Turkish Year events

Concert of gratitude to healthcare workers

Figure 85: Cultural Activities

6.14. Number of university program(s) to improve teaching and learning

Sakarya University was so effective during the pandemic. When the Turkish Government announced that all schools in the whole country were closed due to the pandemic, Sakarya University developed their own platform which is called UZEP (Online Education Platform) and started to use this platform. It was a big success because our university and our university's students and teachers adapted to this platform quickly. And thanks to this platform our education period hasn't stopped much.

UZEP: https://uzep.sakarya.edu.tr/

Artificial Intelligence Summer School: This year it was held online:
http://www.yazsum.sakarya.edu.tr/index.php

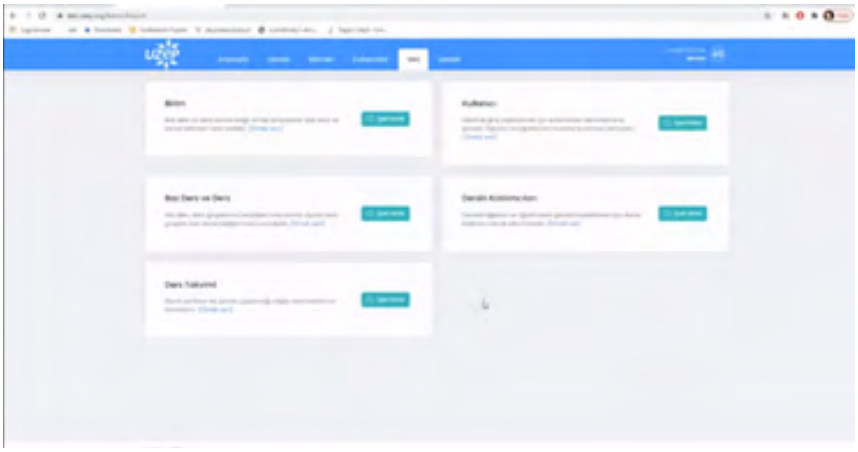


Figure 86: UZEP- Uzaktan Eğitim Platformu (Online Education Platform)

Figure 87: Artificial Intelligence Summer School

6.15. Number of sustainability community services project organised and/or involving students

Table 12: Number of sustainability community services project organised and/or involving students

Project name	Participants	Project duration	Project area
1- SAITEM	60	1 years	EC
2- Hayr'ola	40	3 years	WS
3- Green Buildings and Ecological Cities Against Climate Changes	25	2 years	TR
4- Determination of Tectonic and Environmental Impacts on Upwelling Coasts by Comparative Evaluation of the Black Sea Coast (Turkey and Bulgaria) Sediment Records	20	2 year	EC

1-SAITEM (Sakarya University Advanced Technology Student Society) participated in the 3rd Teknofest (Turkey technology festival) events this year in the Robotaksi Autonomous Vehicle Races category. We became the champion in the race we participated with our vehicle named "EVrim 3 SAUTO".
http://www.saitem.org/tr/4842-robotaksinin-rakipsiz-sampiyonu-saitem.saitem

2- The social responsibility project "Hayr'ola" was started at Sakarya University. With this project, scholarships are provided to students in need. The name of the project "Hayr'ola" is a Turkish idiom. It means "Let's Do a Favor" in English.
https://haber.sakarya.edu.tr/sauden-hayrola-projesi-ile-geri-donusume-destek-h93895.html

3- Sakarya University aims to reduce the use of disposable products within Zero Waste Program. The special program is implemented to prefer reusable thermoses instead of plastic cups among students.

4- Sakarya University supports a cleaner, more livable and sustainable environment with a zero waste approach. In this direction, Sakarya University organized a project to learn and spread the concept of "Zero Waste". In this project, the definition of "Zero Waste", its importance and methods were explained and the participants were informed.


1- SAİTEM

2- Hayr'ola Project

3- Zero Waste Program to reduce the use of plastic in campus

4- Zero Waste Training for students

Figure 88: Sustainability Community Services

6.16. Number of sustainability-related startups

Table 13: Exaple of Number of sustainability-related startups

No.	Information
1	**Startup name:** İklim Değişikliğinin Etkilerinin Azaltılması İçin Gençlik Politikalarının Oluşturulması (Establishing Youth Policies for Mitigating the Impacts of Climate Change) **Startup area in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** EC **URL:** https://akademik.yok.gov.tr/AkademikArama/ **Description:** The project shared below are the projects made by the faculty members of our university. All details of the projects are not published publicly due to plagiarism rules. 1- Click on the link "https://akademik.yok.gov.tr/AkademikArama/" . 2- Then copy the name of the project and paste it to searching area to access more detail.  Associate Professor MAHNAZ GÜMRÜKÇÜOĞLU YİĞİT SAKARYA UNIVERSITY/FACULTY OF ENGINEERING/ENVIRONMENTAL ENGINEERING/ENVIRONMENTAL ENGINEERING DEPARTMENT/ Engineering Core Field Environmental Sciences and Engineering Climate Change , Ecology , Air Pollution and Control one **Establishing Youth Policies for Mitigating the Impacts of Climate Change** MAHNAZ GUMRUKCUOGLU YIGIT Other public institutions (except Higher Education Institutions) Completed , 01.07.2020 -30.12.2020 , 14.500 TURKISH LIRA
2	**Startup name:** Investigation of the fracture energy of hot mixtures asphalt incorporating metallic wastes via semi-circular bending test. Construction and Building Materials, 300, 124006. **Startup area in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** WS **URL:** https://www.sciencedirect.com/science/article/abs/pii/S0950061821017669 **Description:** In this project, aluminum shavings and metal powders, an industrial waste product, were used in hot asphalt concrete. As a result, the fracture energies and load carrying capacities of this new composite produced using waste materials were improved.
3	**Startup name:** Zeolit İkameli Geopolimer Betonlarda Kür Şartlarının Etkileri (Effects of Curing Conditions on Zeolite Substituted Geopolymer Concretes) **Startup area in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** EC **URL:** https://dergipark.org.tr/tr/download/article-file/1113176 **Description:** In this project, the evaluation of natural zeolite in the production of alkali-activated mortar was studied. In this way, cement consumption, which is one of the main problems in terms of sustainability, was reduced to zero (production of cementless concrete), and a high compressive strength value of 88 MPa was achieved with a low carbon footprint.
4	**Startup name:** An experimental study on cyclic behavior of aerated concrete block masonry walls retrofitted with different methods. Construction and Building Materials, 200, 226-239 **Startup area in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** WS **URL:** https://www.sciencedirect.com/science/article/abs/pii/S0950061818331210?via%3Dihub **Description:** In this project, plaster mortars using expanded glass beads obtained from the expansion of waste glass materials were used as earthquake fabric in wall elements.