UI GreenMetric
World University Rankings

Al-Nahrain University

Annual report sustainability

University : Al –Nahrain University
Country : Iraq

INTRODUCTION:

Al-Nahrain University is an educational public university established in 1987 and located in Baghdad, Iraq. The university offers undergraduate and postgraduate education as well as research opportunities. Its current name "Nahrain" meaning The Two Rivers (as in the two rivers of Iraq: Tigris and Euphrates).

The vision ,message, goals, values are undergone exact revision and execution ,committees were started formulating to redetermine the priorities ,check and revision of the performance and outcomes of the aiming teaching, computerize the administrative work preparing to enter the University in the World Ranking.

Primary works cent rerate on encouraging the teaching body by using and adopting the multimedia means of teaching of the modern age ,and develop the infrastructure to achieve the goals of University according to the number of its students for pioneering careers to achieve the balance between the basic and practical researches, encouraging the practical side towards the invention, manufacture and marketing the researches , develop them by the means , procedures and tools .Besides ,it encourages the business incubators inside and outside the University and investing the scientific research to ensure an economic environment for the University to depend on its auto-spending in the future.

Al-Nahrain University remains a spring of the science and knowledge characterized by its serious work and openness to the new thoughts; and it is regarded as a light of society and a factory of creation, a laboratory of science and culture and it remains a title of renaissance and one of the outstanding Iraqi Universities.

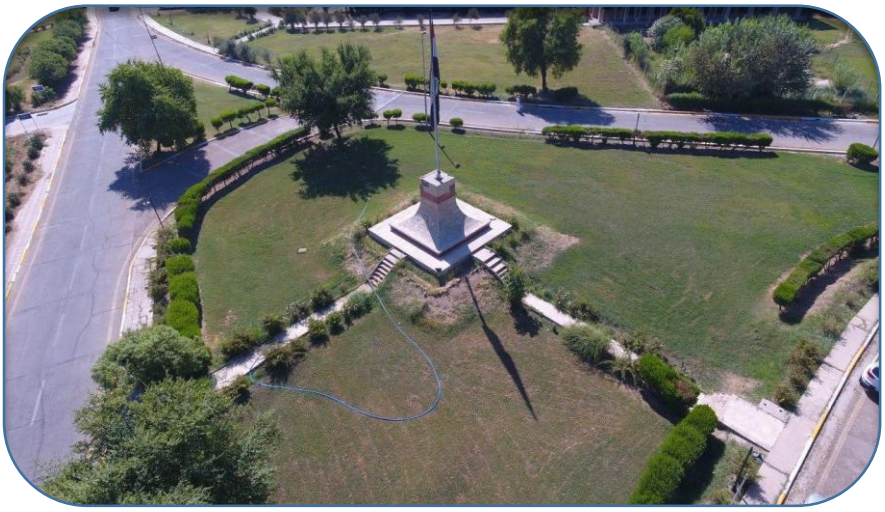
University : Al –Nahrain University
Country : Iraq

Setting and Infrastructure (SI)

University : Al –Nahrain University
Country : Iraq

1.3 Number of campus site

University : Al –Nahrain University
Country : Iraq



University : Al –Nahrain University
Country : Iraq

Al-Nahrain University has two sites, the first site is the Al-Jadriya campus in the Al-Jadriya area, with an area of (**669878.24 m sq**), with a distance of (**15.5689 km**), which is located in the heart of the capital, and the second site is the site of the Al-Kadhimiya campus, located in Al-Kadhimiya area, with an area of (**95339.79 m sq**) and a distance of (**8.493 km**).

University : Al –Nahrain University
Country : Iraq

1.4 Campus setting

University : Al –Nahrain University
Country : Iraq

Al-Nahrain University is one of the Iraqi universities that was established in Baghdad in 1987. The campus of Al-Nahrain University is one of the largest, most beautiful and attractive sites, as it is surrounded by wide green spaces in addition to the special location in the Iraqi capital (Baghdad).

University : Al –Nahrain University
Country : Iraq

1.5 Total campus area (m^2)

Total area of all campus in Al –Nahrain University

campus	Distance	Area
Southern campus	15.5689 km	669878.24 m sq
Northern campus	8.493 km	95339.79 m sq
Total	**24.062 km**	**765218.03 m sq**

Southern campus

Total Area of Southern campus = **669878.24 m sq**

Total distance/circumference of Southern campus = **15.5689 km**

University : Al –Nahrain University
Country : Iraq

Northern campus

Total Area of Northern campus = **95339.79 m sq**

Total distance/circumference of Northern campus = **8.493 km**

University : Al –Nahrain University
Country : Iraq

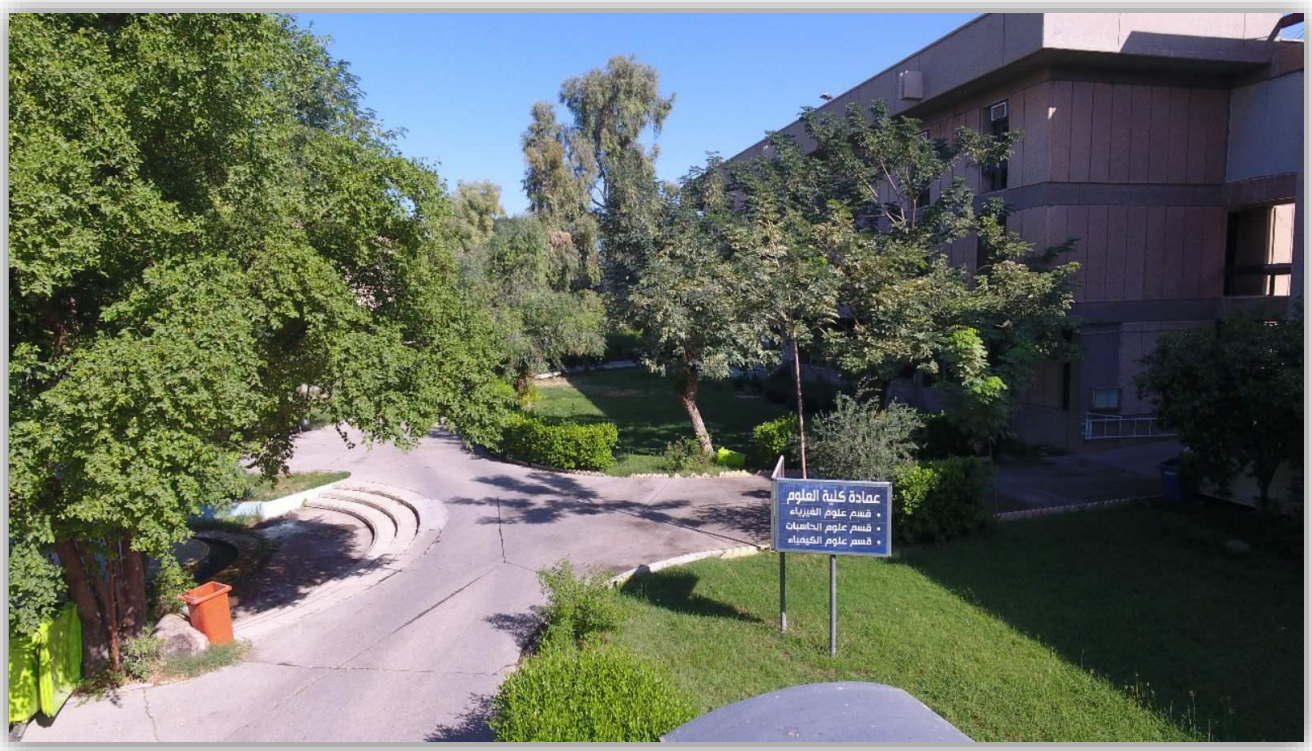
1.6 Total campus ground floor area of buildings (m^2)

Campus	Distance	Buildings
Southern campus	6.36594 km	546253.24 m sq
Northern campus	3.51228 km	26773.06 m sq
Total	**9.87822 km**	**573026.3 m sq**

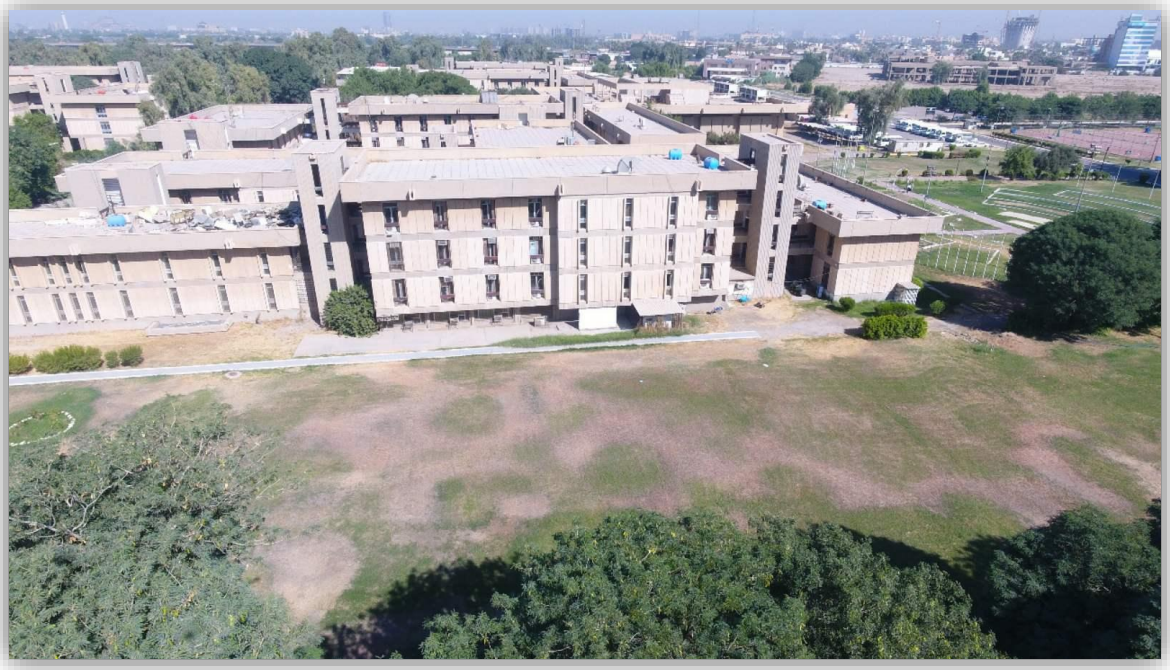
University : Al –Nahrain University
Country : Iraq

1.7 Total campus buildings area (m^2)

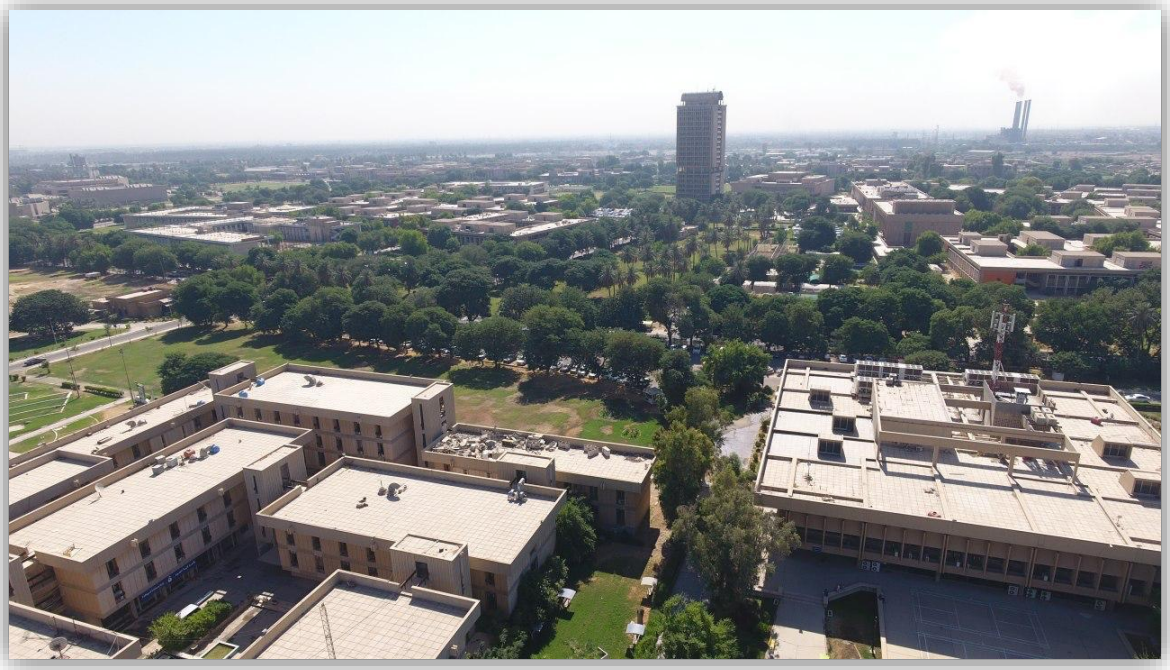
Buildings area
1719078. 9 m sq



University : Al –Nahrain University
Country : Iraq



University : Al –Nahrain University
Country : Iraq



University : Al –Nahrain University
Country : Iraq

Al-Nahrain University was established in 1987 and it includes two campus, one of them in Jadriya, which includes the College of Engineering, Science, Political Science, Information Engineering, Business Economics, Biology, Biotechnology Research Center, Forensic DNA Center for Research and Training, Al-Nahrain Research Center for Nano Renewable Energy, Electronic computer Center, and the other in Al-Kadhimiya includes Faculties of Medicine, Pharmacy and the Higher Institute for Infertility Diagnosis and Assisted Reproductive Technologies.

University : Al –Nahrain University
Country : Iraq

1.8 The ratio of open space to total area

Formula: ((1.5-1.6/1.5)*100%)

((765218.03 m sq -573026.3 m sq / 765218.03 m sq)*100%)

= (192191.73m sq/ 765218.03 m sq)*100%

=**25.1159%**

Where (765218.03 m sq) represent the total area of the Al-Nahrain university (southern and northern campus), (573026.3 m sq) represent the building area of the university. Finally, (**25.1159%)** represent the ratio of open space to total area of the Al –Nahrain University.

University : Al –Nahrain University
Country : Iraq

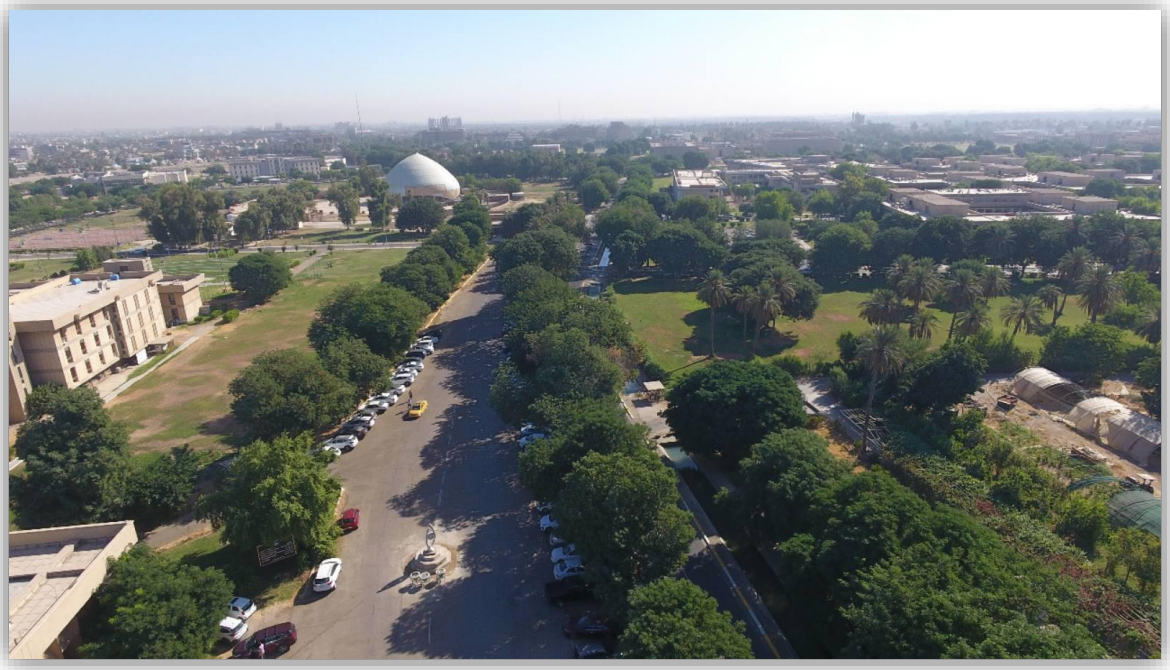
1.9 Total area on campus covered in forest vegetation

Forests	
Distance	Area
6.7155 km	**53010.77 m sq**

University : Al –Nahrain University
Country : Iraq

University : Al –Nahrain University
Country : Iraq

University : Al –Nahrain University
Country : Iraq



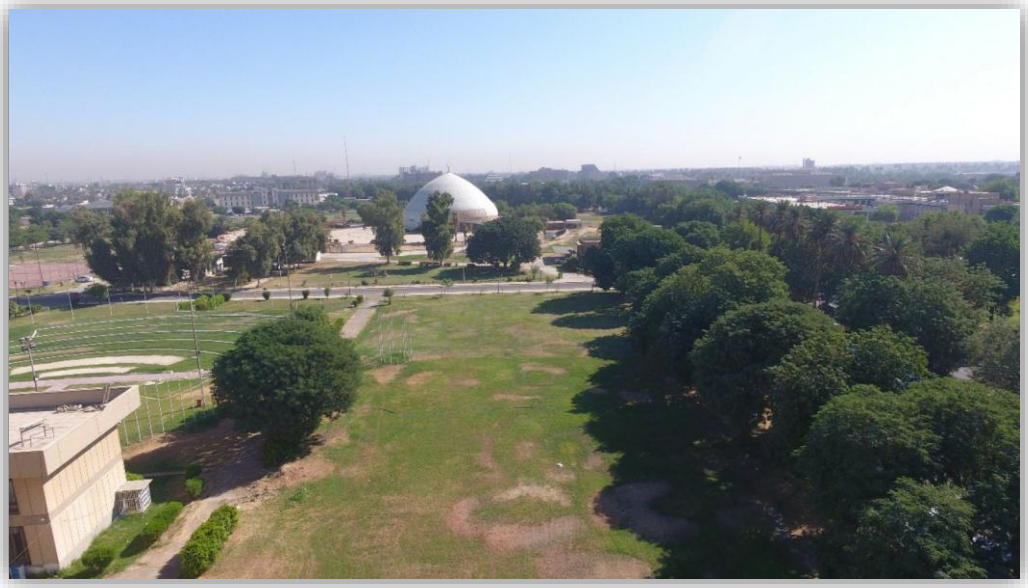
Where (**53010.77 m sq**) represent total area on campus covered in forest vegetation and (6.7155 km) represent Total distance/circumference of the Al-Nahrain university (Southern and Northern campus).

University : Al –Nahrain University
Country : Iraq

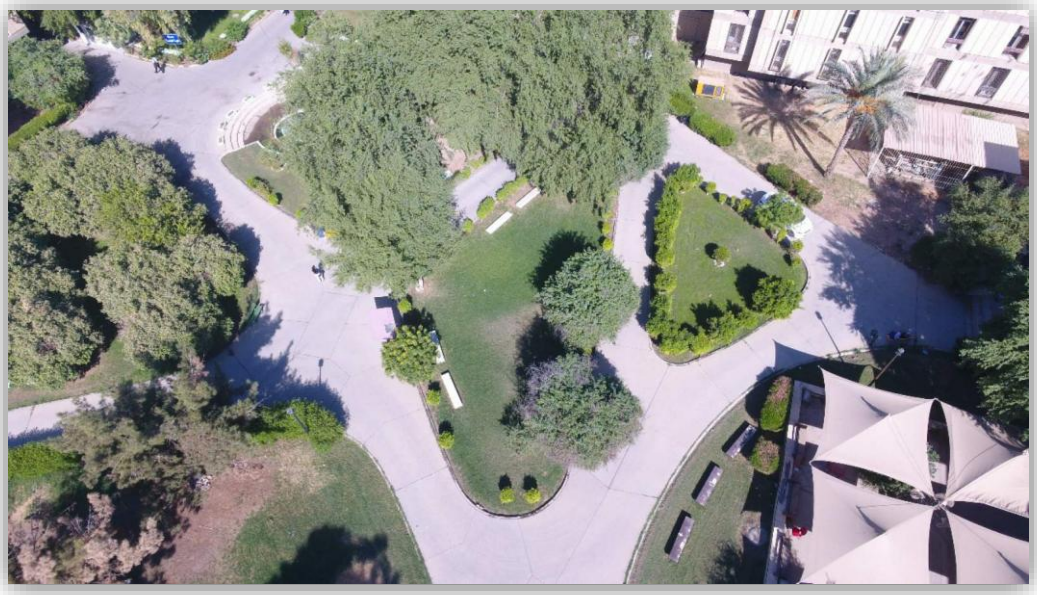
1.10 Total area on campus covered in planted vegetation

Planting	
Distance	Area
7.4682 km	**139180.96 m sq**

University : Al –Nahrain University
Country : Iraq



University : Al –Nahrain University
Country : Iraq



Where (139180.96 m sq) represent total area on campus covered in forest vegetation and (7.4682 km) represent Total distance/circumference of the Al-Nahrain university (Southern and Northern campus).

University : Al –Nahrain University
Country : Iraq

1.11 Total area on campus for water absorption be sided forest and planted vegetation

(1.11/ (1.9+1.10))*100

= (257.094.74 m sq/ (192191.73 m sq))*100

=0.13376%

Total	257.094.74 m sq

The southern campus of Al-Nahrain University is adjacent to the Tigris River on the southern side of the campus by a distance of (2.33 Km).while the area of the water that sided southern campus its equal to (257.094.74 m sq) in approximation.

University : Al –Nahrain University
Country : Iraq

1.12 Total number of regular students (part time and full time)

Total	5945

1.14 Total number of academic and administrative staff

Total	2519

1.15 The total open space area divided by total campus population

Formula: ((1.5-1.6)/(1.12+1.14))

((765218.03 m sq -573026.3 m sq)/ (5945+2519))

= 192191.73m sq/ 8464

= 22.706%

1.16 Total university's budget (in US Dollars)

Total	45170442 $

University : Al –Nahrain University
Country : Iraq

1.17 University's budget for sustainability effort (in US Dollars)

Total	43710653 $

This number of University's include (infrastructure, facilities, personnel cost, and others related to the sustainability efforts per annum over the last 3 years in US Dollars).

1.18 Percentage of University's budget for sustainability effort

96.768

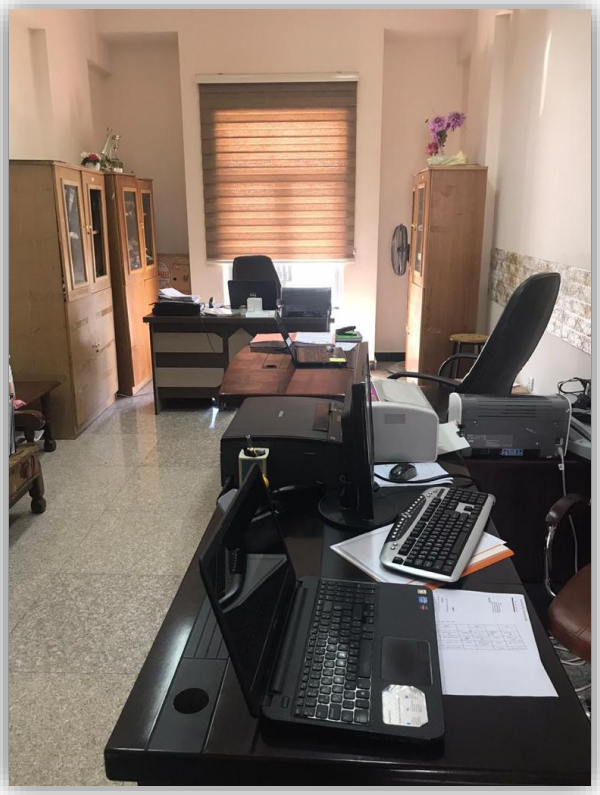
University : Al –Nahrain University
Country : Iraq

Energy and Climate Change (EC)

University : Al –Nahrain University
Country : Iraq

2.1 Energy efficient appliances usage

University : Al –Nahrain University
Country : Iraq



Al-Nahrain University seeks to save energy by use Energy efficient appliances usage at all buildings inside the campus (Southern and Northern).

University : Al –Nahrain University
Country : Iraq

No.	Details	Total Number	Total number energy Efficient appliances	Percentage
1	Standard air conditioner	580	193	0.33%
2	Standard air conditioner(inverter)			
3	Standard lamps	7156	1654	0.23%
4	Standard lamps(LED)			
5	Desktop computers	660	209	0.32%
6	Desk top computers(Laptop)			
Average Percentage				0.293%

University : Al –Nahrain University
Country : Iraq

2.2 Total campus smart building area (m2)

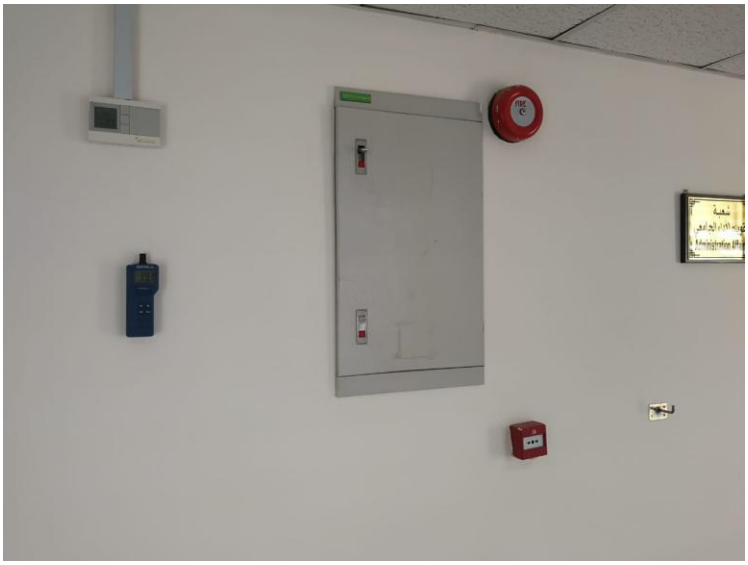
Total campus smart building area
507706.152 m sq

2.3 (EC.2) Smart Building implementation (percentage of the total floor area of smart building to the total all floors building area (smart and non-smart buildings area).

University : Al –Nahrain University
Country : Iraq

University : Al –Nahrain University
Country : Iraq

Humidity *Temperature in centigrade* *Temperature in Fahrenheit*



University : Al –Nahrain University
Country : Iraq

No.	Name	Place	automation		Safety				energy		water		Indoor environment				lighting				Building Area (m^2)
			B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4	
1	University of AL-Nahrain; sothren campus buildings	**Jadriah,Iraq**	x		x	x	x		x			x	x	x			x		x	x	491627.916 m2
2	University of AL-Nahrain; northern campus buildings	Kadhmiya,Iraq	x		x	x	x		x			x	x	x			x		x	x	16078.236 m2
	Total																				**507706.152 m2**

total building area=1719078. 9 m sq

total smart building area=507706.152 m2

(***total smart building area/total building area***)×**100**%

(507706.152 m2/1719078. 9 m2)*100

= **0.295**

=29.5%

University : Al –Nahrain University
Country : Iraq

2.5 Renewable energy sources in campus and provide capacity produced in kilowatt-hour

Biodiesel=656 kilowatt-h

Biodiesel

University : Al –Nahrain University
Country : Iraq

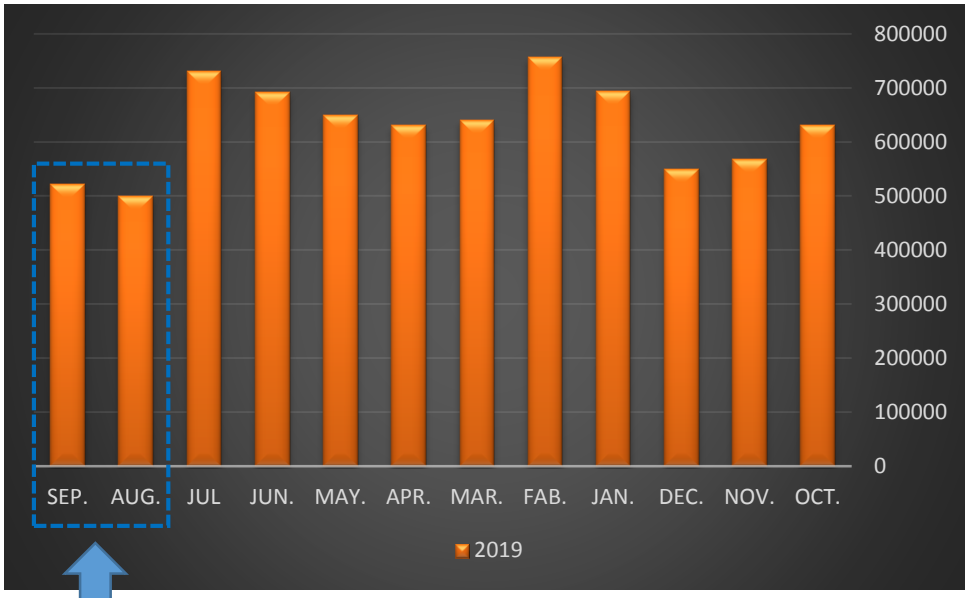
Solar Power

The refrigeration, heating and power unit at Al-Nahrain University that uses biodiesel as fuel the heat can be used to heat water that used daily in campus.

University : Al –Nahrain University
Country : Iraq

2.6 Electricity usage per year (in kilowatt-hour)

Electricity usage per year	7560000 kilowatt-hour



Where in these two months there is a holiday for the under graduate students only

University : Al –Nahrain University
Country : Iraq

2.7 (EC.4) The total electricity usage divided by total campus population (kWh per person).

Formula: (2.6) / (1.12+1.14)

7560000 kWh / (5945+2519)

=7560000 kwh/8464

=**893.19 (kwh per person)**

2.8 (EC.5) The ratio of renewable energy production divided by total energy usage per year

(7560000 kw-5667840 kw)/7560000 kw

= 1892160kw/7560000 kw

=0.25

University : Al –Nahrain University
Country : Iraq

2.9 (EC.6) Elements of green building implementation as reflected in all construction and renovation policies

There are future plans to create green buildings that are consistent with sustainable development standards, and this will be implemented within the strategic plan of Al-Nahrain University for the next five years.

University : Al –Nahrain University
Country : Iraq

2.11 total carbon footprint (CO2 emission in the last 12 months, in metric tons)

CO_2 (electricity)

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

=(7560000 kW/1000)*0.84
=6350.4metric tons

CO_2 (bus)

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

=((20*2*2 km*240)/100)*0.01
=(19200/100)*0.01
=1.92 metric tons

CO_2 (cars)

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

=((500*2*2 km*240)/100)*0.02
=(480000/100)*0.02
=96 metric tons

CO_2 (motorcycle)

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

=((10*2*2 km*240)/100)*0.01
=(9600/100)*0.01
=0.96 metric tons

CO_2 (total)

$= 6350.4 + 1.92 + \mathbf{96} + \mathbf{0.96}$
$= 6449.288$ metric tons

Carbon footprint in 2019 = 6449.288 metric tons

University : Al –Nahrain University
Country : Iraq

2.12 (EC.8) The total carbon footprint divided by total campus population (metric tons per person).

Formula: (2.11)/ (1.12+1.14)

=6449.288/ (5945+2519)

=6449.288/8464

=0.76

University : Al –Nahrain University
Country : Iraq

Waste (WS)

University : Al –Nahrain University
Country : Iraq

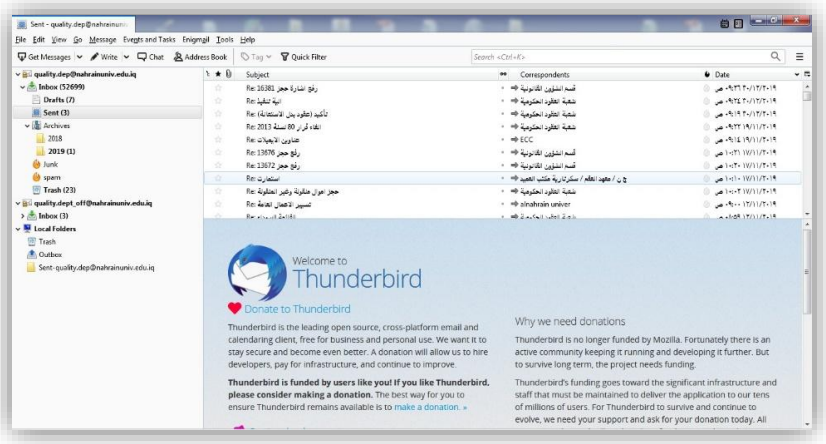
3.1 (WS.1) Recycling program for university waste

University : Al –Nahrain University
Country : Iraq

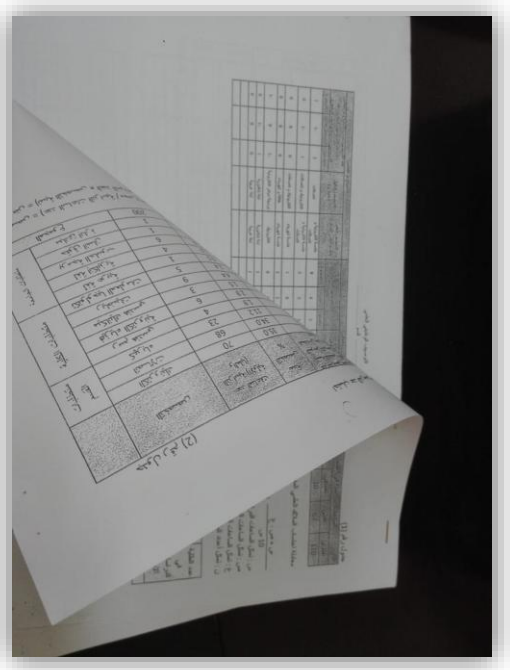
Al-Nahrain University, on its campus, seeks to encourage students, employees and academics not to throw waste except in the places designated for it by starting to establish an integrated waste recycling program, and publishing educational advertisements on how to recycle and provide waste containers. . Such as paper, plastic, electronic and chemical materials on campus.

University : Al –Nahrain University
Country : Iraq

3.2 (WS.2) Program to reduce the use of paper and plastic on campus



Correspondence via internet



Print on two sides of the paper

University : Al –Nahrain University
Country : Iraq

Use a glass cup

Al-Nahrain University supports systems that reduce paper use by:

1- Print on two sides of the paper.
2- Using of e-mail for correspondence over the Internet or via social media site.
3- Reuse of plastic bags and use a glass cup instead of a plastic cup to reduce waste.

University : Al –Nahrain University
Country : Iraq

3.3 (WS.3) Organic waste treatment

Al-Nahrain University manages organic waste by using organic waste containers to be collected and transported to private quarries belonging to the capital.

University : Al –Nahrain University
Country : Iraq

Water (WR)

University : Al –Nahrain University
Country : Iraq

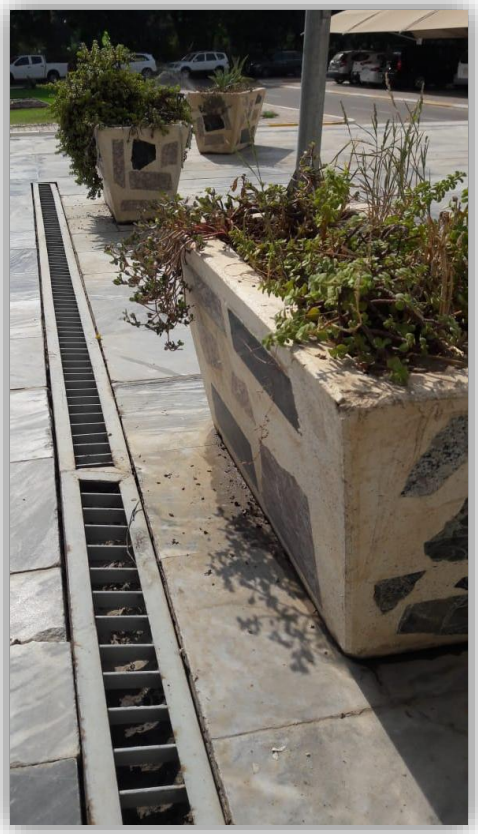
4.1 (WR.1) Water conservation program and implementation

Tank to store rainwater

Al-Nahrain University exploits rain water and uses it to irrigate and wash cars by providing a large tank to store rainwater and distribute it through water channels on the campus for use at any time during the year.

University : Al –Nahrain University
Country : Iraq

4.3 (WR.3) Water efficient appliance usage



Among the systems used to exploit rainwater at no cost is by providing drift that helps water flow into trees and herbs on the campus of Al-Nahrain University.

University : Al –Nahrain University
Country : Iraq

Transportation (TR)

University : Al –Nahrain University
Country : Iraq

5.1 Number of cars actively used and managed by University

61 cars

5.2 Number of cars entering the university daily

500 cars

5.3 Number of motorcycles entering the university daily

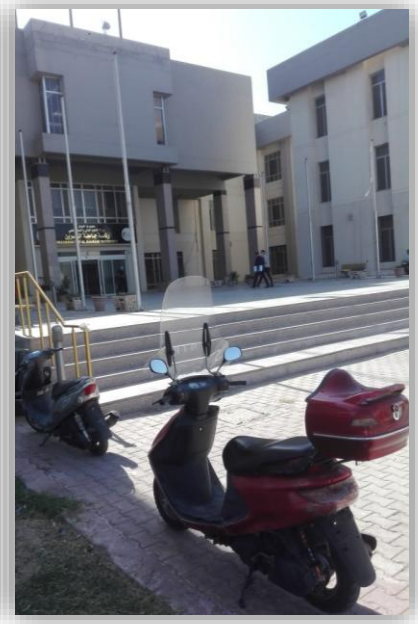
10 motorcycles

University : Al –Nahrain University
Country : Iraq

5.4 The total number of vehicles (cars and motorcycles) divided by total campus population.

Formula: (5.1+5.2+5.3)/ (1.12+1.14) = (61+500+10)/ (5945+2519)

= 571/ 8464 = 0.0674



University : Al –Nahrain University
Country : Iraq

5.5 (TR.2) Shuttle service

Al-Nahrain University provides special buses to transport its students on campus, in addition to providing an external means of transportation for employees to their homes.

University : Al –Nahrain University
Country : Iraq

5.6 Number of shuttles operated in your university

20

5.7 Average number of passengers of each shuttle

20

5.8 Total trips of shuttle services each day

2

University : Al –Nahrain University
Country : Iraq

5.12 Total ground parking area (m2)

Total ground parking area = 16572.29 sq m

5.13 (TR.5) Ratio of parking area to total campus area.

Formula: ((5.12/1.5) x 100%)

= ((16572.29 sq m/**765218.03 m sq**)*100%)

= 0.0216*100

= 2.16

Southern campus in Al-nahrain University
Total area=11544 sq m

University : Al –Nahrain University
Country : Iraq

Northern campus in Al-nahrain University
Total area=5028.29 sq m

University : Al –Nahrain University
Country : Iraq

University : Al –Nahrain University
Country : Iraq

5.15 (TR.7)Number of transportation initiatives to decrease private vehicles on campus (e.g. car sharing, charging high parking fees, metro / tram / bus services and etc)

University : Al –Nahrain University
Country : Iraq

Al-Nahrain University is working to reduce the number of vehicles on campus by implementing initiatives, including:

1. Shuttle/bus campus inside campus

3. Walking

4. Car sharing

University : Al –Nahrain University
Country : Iraq

5.16 (TR.8) Pedestrian path on campus

University : Al –Nahrain University
Country : Iraq

Al-Nahrain University provides paths separating vehicles and pedestrians and the presence of night lighting for campus residents.

University : Al –Nahrain University
Country : Iraq

Education (ED)

University : Al –Nahrain University
Country : Iraq

6.1 Number of courses/subjects related to sustainability offered

Number of courses (2019) = 42

Department: Chemical Engineering

courses
Renewable and nonrenewable energy
Solar energy
Wind energy
Geothermal energy
Ocean energy
Hydropower energy
Energy from Biomass
Production of hydrogen and storage
Fuel cell

Department of Biotechnology

courses
Plant physiology
Bio fuel
Phytoremediation

University : Al –Nahrain University
Country : Iraq

Republic of Iraq

The Ministry of Higher Education

& Scientific Research

University: Al Nahrain

College: Engineering college

Department: Architecture

Stage: Master

Instructor name: Shaimaa Hameed Hussein

Academic status: Assistant Professor

Qualification: Doctorate

Place of work: Architectural Engineering Dep

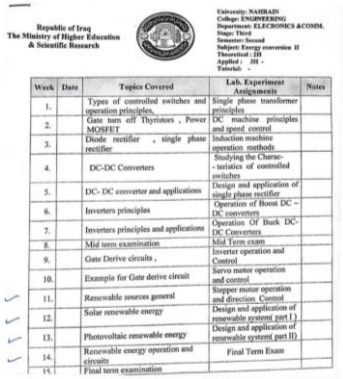
Urban Sustainability

Course Weekly Outline

Week	Topics Covered	Note
1	Sustainable Urban Design Strategies.	
2	Tactical Urbanism	books review
3	Green & Sustainable Cities	books review
4	Smart City Design Principles	books review
5	Resilient Design Principles & compact cities	books review
6	Sustainable Urban Dynamics	books review
7	Sustainable urban form& good city form	books review
8	Public good in the city	books review
9	LEED for Neighborhood Development	books review
10	Urban sprawl & high density	books review
11	Sustainable Urban Landscape - Theory and Method	books review
12	Biomimicry and urban design	books review
13	Exam	
14	Social responsibility	books review
15	Vibrant city	
16	Final exam	

University : Al –Nahrain University
Country : Iraq

Department: Electronic and Communication Engineering



Republic of Iraq
The Ministry of Higher Education & Scientific Research

University: NAHRAIN
College: ENGINEERING
Department: ELECTRONICS &COMM.
Stage: Third
Semester: Second
Subject: Energy conversion II
Theoretical : 2H
Applied : 3H -
Tutorial: -

Week	Date	Topics Covered	Lab. Experiment Assignments	Notes
1.		Types of controlled switches and operation principles.	Single phase transformer principles	
2.		Gate turn off Thyristors , Power MOSFET	DC machine principles and speed control	
3.		Diode rectifier , single phase rectifier	Induction machine operation methods	
4.		DC-DC Converters	Studying the Characteristics of controlled switches	
5.		DC- DC converter and applications	Design and application of single phase rectifier	
6.		Inverters principles	Operation of Boost DC – DC converters	
7.		Inverters principles and applications	Operation Of Buck DC-DC Converters	
8.		Mid term examination	Mid Term exam	
9.		Gate Derive circuits ,	Inverter operation and Control	
10.		Example for Gate derive circuit	Servo motor operation and control	
11.		Renewable sources general	Stepper motor operation and direction Control	
12.		Solar renewable energy	Design and application of renewable systems(part I)	
13.		Photovoltaic renewable energy	Design and application of renewable systems(part II)	
14.		Renewable energy operation and circuits	Final Term Exam	
15.		Final term examination		

Alnahrain University	Study Plan for the B.Sc.
College of Engineering	Academic year 2018-2019
Department of Electronic and Communications Engineering	The Third Year

The First Semester

No.	Code	Subject	Hours per Week			Units
			Theory	Applied	Tutorial	
1	ECER310	Engineering Statistics and Probability	3	-	1	3
2	ECER311	Energy Conversion I	3	-	_	3
3	ECER312	Communication Systems I	3	3	1	4
4	ECER313	Electronics III	3	3	1	4
5	ECER314	Wave Propagation	2	-	_	2
6	ECER315	Microprocessor	2	3	-	3
7						
8						
Total			16	9	3	19
			28			
The total number of hours for the first semester is			420	hour.		

Department: Mechanical Engineering

Mechanical engineering Department

Courses In sustainability

First: B.Sc.

Fourth Year Elective courses

1- Introduction to Renewable Energy

Introduction to renewable Energy, Photovoltaics, Wind power, Micro hydropower, Biomass energy, Waste power, Solar thermal power, Geothermal power, Ocean energy (tidal, tide-flow and wave), Ocean energy, Comparison of characteristics and cost of renewables, method of using the sun, wind, biomass, geothermal resources, and water to generate more sustainable energy., Energy from the sun is transferred and stored; used for heating, cooling, and lighting; collected and concentrated; and converted into electricity

2- Solar energy

Sun radiation measurements, Properties of photovoltaic devices, open circuit voltage and short circuit current, maximum power point (MPP), The efficiency of solar cells, parallel and series solar cells, shadow, temperature and dust effect, battery charging and control, off grid connection. on grid connection.

Second: M.Sc. Elective courses

1- Design of wind turbines

Historical applications of wind energy , Electrical Power from the Wind and the batteries ,Wind energy system (rotor blades, the tower, Mechanical Drive, Electrical System, etc) , Physical Principles of Wind Energy Conversion 9, 10 Basic concepts of wind energy Converters (turbines) , Aerodynamics of turbines , Using computer software for wind energy analysis, Electrical Power from wind energy, Electrical aspects of wind turbines, Wind turbine design, Wind turbine control. Wind turbine installation, siting, system design, integration and operation

2- Renewable Energy Sources

- INTRODUCTION: Energy demand growth and supply : Historical Perspectives ; Fossil fuels: Consumption and Reserve ; Environmental Impacts of Burning of Fossil fuels ; Sustainable Development and Role of 2- Renewable Energy
- SOLAR ENERGY BASICS: Solar geometry; Primary and Secondary Solar energy and Utilization of Solar Energy. Characteristic advantages and disadvantages. Low temperature applications: solar water heating, space heating, drying.
- SOLAR THERMAL ELECTRICITY GENERATION: Solar concentrators and tracking ; Dish and Parabolic trough concentrating generating systems, Central tower solar thermal power plants ; Solar Ponds.
- SOLAR PHOTOVOLTAIC SYSTEMS: Basic principle of power generation in a PV cell ; Band gap and efficiency of PV cells ; Manufacturing methods of mono- and polycrystalline cells ; Amorphous silicon thin film cells, Single and multi junction cells ; Application of PV ; Brief outline of solar, PV stand-alone system design ; Storage and Balance of system.
- WIND Energy Systems: Types of turbines, Coefficient of Power, Betz limit, Wind electric generators, Power curve; wind characteristics and site selection; Windfarms for bulk power supply to grid; Potential of wind electricity generation in India and its current growth rate.
- BIOMASS ENERGY: Biomass: Sources and Characteristics; Wet biogas plants ; Biomass gasifiers: Classification and Operating characteristics; Updraft and Downdraft gasifiers; Gasifier based electricity generating systems; Maintenance of gasifiers.
- OCEAN ENERGY: Tidal power plants : single basin and two basis plants, Variation in generation level ; Ocean Thermal Electricity Conversion (OTEC) ; Electricity generation from Waves : Shoreline and Floating wave systems.
- GEOTHERMAL ENERGY: Geothermal sites in India ; High temperature and Low temperature sites ; Conversion technologies-Steam and Binary systems ; Geothermal power plants.

University : Al –Nahrain University
Country : Iraq

The number of sustainability-related courses that Al-Nahrain University studies for students during the academic year, which includes the following departments:

Chemical Engineering

Biotechnology

Architecture Engineering

Electronic and Communication Engineering

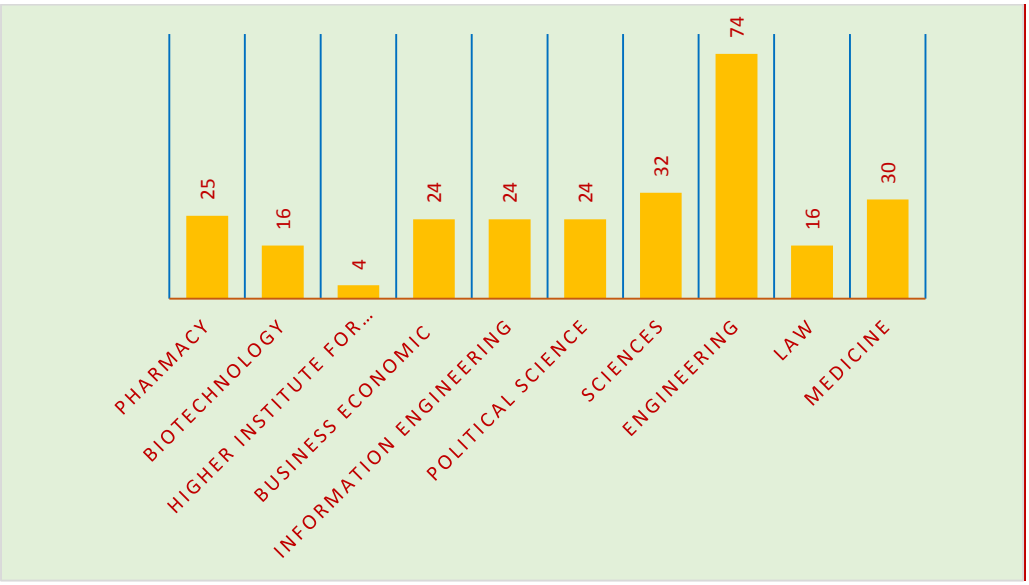
Mechanical Engineering

University : Al –Nahrain University
Country : Iraq

6.2 Total number of courses/subjects offered

Total number=269

Number of colleges	Number of Dep.	Courses
medicine	1	30
Law	2	16
engineering	9	74
Sciences	4	32
political science	3	24
Information engineering	3	24
business Economic	3	24
Higher Institute for Infertility Diagnosis and ARTs	1	4
Biotechnology	2	16
Pharmacy	1	25
Total	29	269



University : Al –Nahrain University
Country : Iraq

6.4 Total research funds dedicated to sustainability research (in US Dollars)

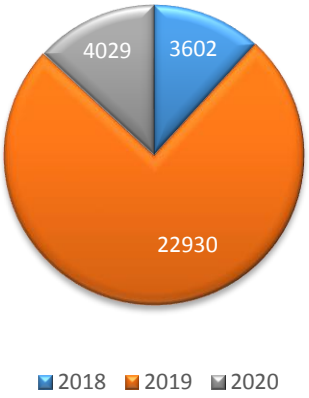
Total research fund dedicated to sustainability research in 2018 = **3602 US Dollars**

Total research fund dedicated to sustainability research in 2019 = **22930 US Dollars**

Total research fund dedicated to sustainability research in 2020 = **4029 US Dollars**

Total = 30561

The averaged annum last 3 years of research fund dedicated to sustainability research = 10187 US Dollars



University : Al –Nahrain University
Country : Iraq

6.5 Total research funds (in US Dollars) (average per annum over the last 3 years)

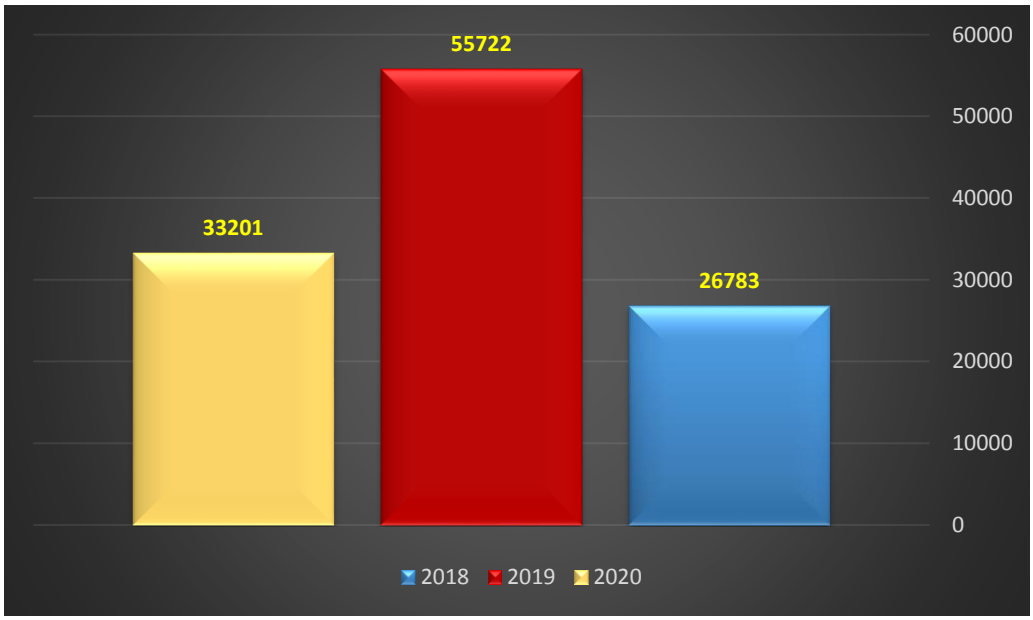
Total research fund in 2018 = **26783 US Dollars**

Total research fund in 2019 = **55722 US Dollars**

Total research fund in 2020 = **33201 US Dollars**

Total = 115706

The averaged annum last 3 years of research fund = **38568 US Dollars**



University : Al –Nahrain University
Country : Iraq

6.7 (ED.3) Number of scholarly publications on sustainability published.

Research number=19

No	Title	Authors' name(s)	Journal's name	Scopus
2020				
1	High performance thermal coating comprising (CuO:NiO) nanocomposite/c spectrally selective to absorb solar energy	Abed, R.N. Abed‹A.R.N. Khamas, F.A Abdallh, M. Yousif, E.	Progress in Color‹Colorants and Coatings 13(4), pp. 275-284	Yes
2	Synthesis, characterization and environmental remediation applications of polyoxometalatesbased magnetic zinc oxide nanocomposites (Fe3O4@ZnO/PMOs)	Ammar, S.H. Abdulnabi, W.A. kader, H.D.A.	Environmental Nanotechnology, Monitoring and Management	Yes
3	The effect of low rise residential buildings design formation on energy performance (Iraq hot desert climate as an example)	Hassan, S.A.	Test engineering and management	Yes
4	Spectrally selective coating of nanoparticles (Co O :Cr O) incorporated in carbon to captivate solar energy	Abed, R.N. Abdallh, M.	Heat Transfer -	Yes

University : Al –Nahrain University
Country : Iraq

		Adnan Rashad, A. Al- Mohammedawi, H.C. Yousif, E.	Asian Research	
5	Design of wind catcher for earth air heat exchangers to rationalize energy consumption	Jassim, J.A.A.W. Hassan, S.A. Maula, B.H	Journal of Advanced Research in Fluid Mechanics and Thermal Sciences 65(2), pp. 286-294	Yes
2019				
1	Electrocoagulation technique for refinery wastewater treatment in an internal loop split-plate airlift reactor	Ammar, S.H. Ismail, N.N. Ali, A.D. Abbas, W.M.	Journal of Environmental Chemical Engineering 7(6),103489	Yes
2	Using Treated sewage water for irrigation to Reduce Environmental Pollution	Al-Hadithy, A.H. Gh Al-Qaysi, W. Hashim, L.Q.	Journal of Physics: Conference Series 1294(5),052065	Yes
3	Impact of stabilizer on the environmental behavior of PVC films reinforced 1,2,4-triazole moiety	Yousif, E. Ahmed, D.S.	Environmental Science and	Yes

University : Al –Nahrain University
Country : Iraq

		Ahmed, A. Yusop, R.M. Mohammed, S.A.	Pollution Research 26(25), pp. 26381-26388	
4	Induction motor rotor: Energy efficiency improvement on economic and environment	Rahmat, M.K. Yahya, Y.B. Suffer, K.H	AIP Conference Proceedings 2129,020052	Yes
5	Biodiesel from fresh and waste sunflower oil using calcium oxide catalyst synthesized from local limestone	Qasim, D. Abdul- Aziz, Y.I. Alismaeel, Z.T.	Research Journal of Chemistry and Environment 23(Special Issue I), pp. 111-119	Yes
6	The role of multi-story structural building systems on reducing embodied energy consumption and carbon emissions	Hassan, S.A. Al Wahid Jassim, J.A.	IOP Conference Series: Materials Science and Engineering 518(2),022031	Yes
7	Biomineralization based remediation of cadmium and nickel contaminated wastewater by ureolytic bacteria isolated from barn horses	Khadim, H.J. Ammar, S.H. Ebrahim, S.E.	Environmental Technology and	Yes

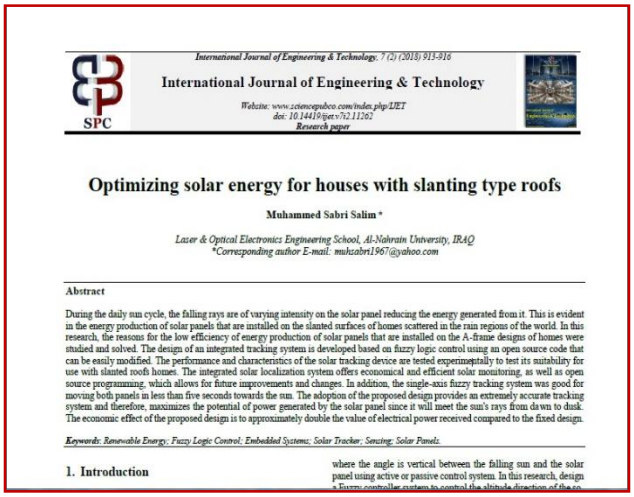
University : Al –Nahrain University
Country : Iraq

			Innovation 14,100315	
8	The effect of high UV radiation exposure environment on the novel PVC polymers	Yousif, E. Ahmed, D.S. Ahmed, A.A. Amamer Redwan Mohammed, S.A.	Environmental Science and Pollution Research 26(10), pp. 9945-9954	Yes
9	Regional cooperation of states on the issue of protection of the world ocean ecosystems from pollution	Valiullina, K.B. Hashim, S.J. Kurdyukov, G.I.	Journal of Environmental Treatment Techniques 7(Special Issue), pp. 966-969	Yes
2018				
1	Cultivation of Nannochloropsis oculata and Isochrysis galbana microalgae in produced water for bioremediation and biomass production	Ammar, S.H. Khadim, H.J. Mohamed, A.I.	Environmental Technology and Innovation 10, pp. 132-142	Yes
2	Optimizing solar energy for houses with slanting type roofs	Salim, M.S.	International Journal	Yes

University : Al –Nahrain University
Country : Iraq

			of Engineering and Technology(UAE) 7(2), pp. 913-916	
3	The Role of Environment and Biodiversity in Sustainable Development	ا. م. د. وفاء غازي فاضل	مجلة الهندسة والتكنولوجيا	مجلة محلية
4	Design and Implementation of a Telemetry System for Environmental Applications	ا.د. جابر سلمان عزيز	Al-Khwarizmi Engineering Journal	مجلة محلية
5	Produce an Analytical Map for the Distribution of Air Pollution by Toxic Gases in Baghdad City by Geographic Information System	م.م. وسن عبد الله حسن	مجلة النهرين للعلوم	مجلة محلية

University : Al –Nahrain University
Country : Iraq



International Journal of Engineering & Technology, 7 (2) (2018) 913-916

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET
doi: 10.14419/ijet.v7i2.11262
Research paper

SPC

Optimizing solar energy for houses with slanting type roofs

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Abstract

During the daily sun cycle, the falling rays are of varying intensity on the solar panel reducing the energy generated from it. This is evident in the energy production of solar panels that are installed on the slanted surfaces of homes scattered in the sun regions of the world. In this research, the reasons for the low efficiency of energy production of solar panels that are installed on the A-frame designs of homes were studied and solved. The design of an integrated tracking system is developed based on fuzzy logic control using an open source code that can be easily modified. The performance and characteristics of the solar tracking device are tested experimentally to test its suitability for use with slanted roofs homes. The integrated solar localization system offers economical and efficient solar monitoring, as well as open source programming, which allows for future improvements and changes. In addition, the single-axis fuzzy tracking system was good for moving both panels in less than five seconds towards the sun. The adoption of the proposed design provides an extremely accurate tracking system and therefore, maximizes the potential of power generated by the solar panel since it will meet the sun's rays from dawn to dusk. The economic effect of the proposed design is to approximately double the value of electrical power received compared to the fixed design.

Keywords: Renewable Energy; Fuzzy Logic Control; Embedded Systems; Solar Tracker; Sensing; Solar Panels.

1. Introduction

where the angle is vertical between the falling sun and the solar panel using active or passive control system. In this research, design

PROGRESS IN COLOR, COLORANTS AND COATINGS

available online @ www.pccc.icrc.ac.ir

Prog. Color Colorants Coat. 13 (2020), 275-284

Ministry of Science, Research and Technology
Institute for Color Science and Technology

High performance Thermal Coating Comprising (CuO:NiO) Nanocomposite/C Spectrally Selective to Absorb Solar Energy

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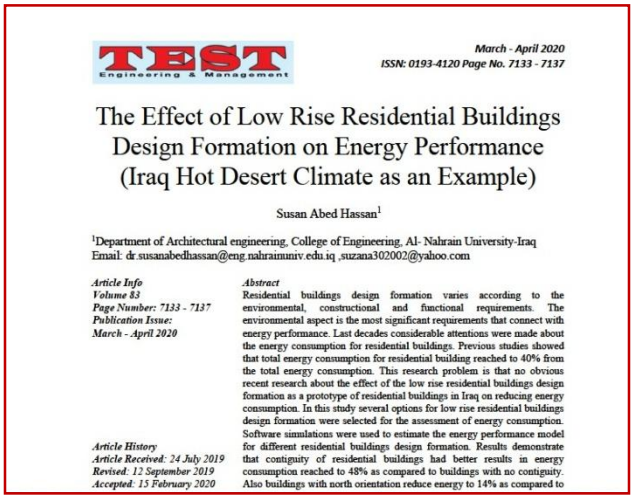
Copper oxide
Nickel oxide
Optical properties
Energy band gap
Heat absorbed by coating
Emissivity.

ABSTRACT

A novel nanocomposite consisted of nanomaterials as (CuO:NiO) and carbon (fuel ash) were designed to absorb solar energy. Thin films were made via casting and spin coating of the dopants nanocomposite thin films, containing different concentration ratios of CuO:NiO. These thin films are precipitated on a glass and copper substrates. The optical properties of the doped fuel ash films with nanoparticles were measured in the range of 250-1300 nm. The intensity of solar radiation was measured too. The data were analyzed and interpreted in terms of the theory of phonon-assisted direct electronic transitions. The E_g of the doped C was measured with different concentration ratios of (CuO:NiO) (A=0.5:2.5, B=1:2, C=1.5:1.5, D=2:1, E=2.5:0.5) wt. %, with a fixed concentration of C of (7) wt.%. The results of the doped samples revealed an energy gap of (2.5-3.9 eV) and the absorptivity ranged from (85-99 %) for all nanocomposites. The energy gap of this nanocomposite system is very



TEST Engineering & Management

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The Effect of Low Rise Residential Buildings Design Formation on Energy Performance (Iraq Hot Desert Climate as an Example)

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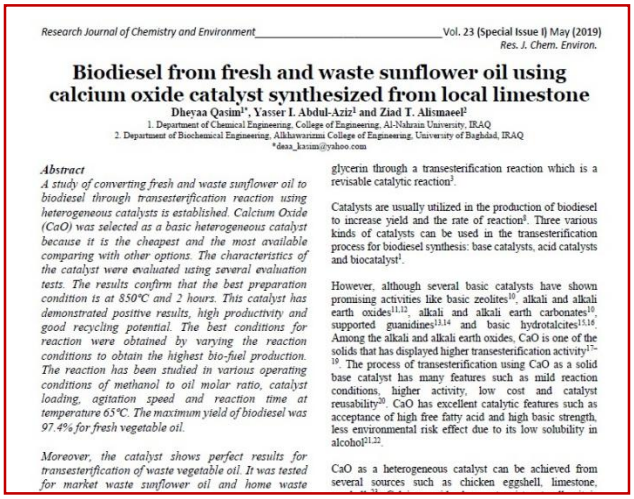
Abstract
Residential buildings design formation varies according to the environmental, constructional and functional requirements. The environmental aspect is the most significant requirements that connect with energy performance. Last decades considerable attentions were made about the energy consumption for residential buildings. Previous studies showed that total energy consumption for residential building reached to 40% from the total energy consumption. This research problem is that no obvious recent research about the effect of the low rise residential buildings design formation as a prototype of residential buildings in Iraq on reducing energy consumption. In this study several options for low rise residential buildings design formation were selected for the assessment of energy consumption. Software simulations were used to estimate the energy performance model for different residential buildings design formation. Results demonstrate that contiguity of residential buildings had better results in energy consumption reached to 48% as compared to buildings with no contiguity. Also buildings with north orientation reduce energy to 14% as compared to



Research Journal of Chemistry and Environment Vol. 23 (Special Issue I) May (2019)
Res. J. Chem. Environ.

Biodiesel from fresh and waste sunflower oil using calcium oxide catalyst synthesized from local limestone

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Abstract
A study of converting fresh and waste sunflower oil to biodiesel through transesterification reaction using heterogeneous catalysts is established. Calcium Oxide (CaO) was selected as a basic heterogeneous catalyst because it is the cheapest and the most available comparing with other options. The characteristics of the catalyst were evaluated using several evaluation tests. The results confirm that the best preparation condition is at 850°C and 2 hours. This catalyst has demonstrated positive results, high productivity and good recycling potential. The best conditions for reaction were obtained by varying the reaction conditions to obtain the highest bio-fuel production. The reaction has been studied in various operating conditions of methanol to oil molar ratio, catalyst loading, agitation speed and reaction time at temperature 65°C. The maximum yield of biodiesel was 97.4% for fresh vegetable oil.

Moreover, the catalyst shows perfect results for transesterification of waste vegetable oil. It was tested for market waste sunflower oil and home waste

glycerin through a transesterification reaction which is a revisable catalytic reaction[3].

Catalysts are usually utilized in the production of biodiesel to increase yield and the rate of reaction[8]. Three various kinds of catalysts can be used in the transesterification process for biodiesel synthesis: base catalysts, acid catalysts and biocatalyst[4].

However, although several basic catalysts have shown promising activities like basic zeolites[10], alkali and alkali earth oxides[11,12], alkali and alkali earth carbonates[10], supported guanidines[13,14] and basic hydrotalcites[15,16]. Among the alkali and alkali earth oxides, CaO is one of the solids that has displayed higher transesterification activity[17–19]. The process of transesterification using CaO as a solid base catalyst has many features such as mild reaction conditions, higher activity, low cost and catalyst reusability[20]. CaO has excellent catalytic features such as acceptance of high free fatty acid and high basic strength, less environmental risk effect due to its low solubility in alcohol[21,22].

CaO as a heterogeneous catalyst can be achieved from several sources such as chicken eggshell, limestone,

University : Al –Nahrain University
Country : Iraq

6.8 (ED.4) Number of events related to sustainability.

Total number=19 events

No	Activity type	Activity name
2018		
1	Symposium	Using renewable energy to reduce environmental pollution in the marshes of southern Iraq
2	Symposium	Renewable energy and its future prospects in Iraq
3	Workshop	Biofuels... Importance... Achievement and Future Applications
4	Symposium	Environmental problems from mercury pollution
2019		
1	Symposium	The health impact of arsenic on society resulting from environmental pollution
2	Symposium	Environmental pollution caused by wars, causes, problems and solutions
3	Symposium	Noise pollution
4	Symposium	Economic analysis of solar panel projects
5	Workshop	Clean energy sources and their impact on the environmental reality in Iraq
6	Symposium	Clean and renewable energy
7	Symposium	Renewable energy in Iraq future and usage prospects
8	Symposium	Occupational safety requirements in handling nanomaterial in a laboratory environment
9	Symposium	Air pollution in Baghdad and the provinces and possible ways to control it
2020		
1	conference	Sustainable development of the Marshlands
2	Symposium	Biomass as an alternative source of energy
3	Symposium	Prospects for Sustainable Energy in Iraq - A Outlook
4	Workshop	Renewable energy is an effective model in developing the agricultural sector and supporting the Iraqi economy
5	Workshop	Installation, operation and maintenance of solar energy systems
6	Symposium	Irrigation and fertilization technology