Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Lama Idrees
Student number	5137330

Studio	
Name / Theme	Building technology graduation studio/ façade and products design- urban façade
Teachers / tutors	Aljandro Prieto – Main mentor Marc Ottele' – Second mentor
Argumentation of choice of the studio	First, I am interested in innovation façade solutions to improve the urban environment. Especially that the world is now urbanized and in order to be able to live in our cities we need to step up and take measurements. Furthermore, Damascus as a metropolitan city is suffering from a lot of problem and facing many challenges among them is the urban heat island effect (UHI) which led to an excessive energy consumption for cooling purposes during the summer, in addition to other associated consequences from air pollution to thermal discomfort and health problem. However, few researchers discussed this problem. None provides a strategy to mitigate this effect. Even though, it is affecting all aspect of life in Damascus. Therefore, this research focuses on introducing Living wall system as a strategy to mitigate UHI for the context of Damascus

Graduation project	
Title of the graduation project	Living wall system as a strategy to mitigate urban heat island effect in Damascus, Syria
Goal	
Location:	Damascus City, Syria
The posed problem,	Intensive urbanization has led to vegetation degradation and air pollution resulting in the accumulation of heat in urban areas. In other words, cities demonstrate higher temperature than surrounding rural suburbs, which is known as Urban Heat Island effect (UHI). UHI has substantial consequences on the energy consumption for cooling purposes, air quality as well as human health. Damascus as a metropolitan city experiences high UHI intensity as a result of high population, anthropogenic heat, using low albedo material, vegetation degradation and other factors related to the urban geometry of the city. However, this phenomenon has not been widely

	studied and as a result no measurements were taken in order to mitigate this effect. Even though, the UHI effect in Damascus is higher than most American and Turkish cities. It is even higher than UHI in Riyadh, KSA. An effective method to mitigate the UHI effect is to increase Vegetative Green Spaces (VGS). However, in such high-density city like Damascus, it is hard to increase the vegetated spaces. An alternative solution could be by integration vertical greenery system into buildings. In recent decades, Living Wall System (LWS) as a vertical greenery system. Despite the benefits of living wall system, the implementation of it is still limited due to different factors, such as the complexity of the system. Furthermore, the efficiency of this system in reducing the impact of UHI has not been widely studied. Therefore, this research's main objective is: To design a living wall system for the context of Damascus and evaluate the efficiency of the proposed design in mitigate the urban heat island effect.
research questions and	How can Living Wall System be integrated into the built environment to mitigate the urban heat island effect in Damascus?
design assignment in which these results.	Designing a Living Wall System and evaluate the efficiency of the proposed design as an UHI mitigation strategy

Process

Method description

In order to achieve the research objectives and answer the research questions the following methodology has been followed,

First a theoretical research has been conducted in order to provide a background information about the UHI phenomenon and its associated consequences in general. Then, an analysis on the UHI effect in Damascus and its key causes has been conducted and an urban area with the highest UHI intensity had been chosen as the urban context of the research.

In parallel, a study had been carried out on Living Wall System and Vertical greenery system in order to learn about its cooling impact on the UHI effect, system requirements, (plant selection, growing medium, supporting system, irrigation system and drainage), and the challenges involved in this system. Research Gate and TU Delft repository were the main source of information in this phase.

Then, the output of the previous phase is going to be utilized in the designing phase in which a fully detailed LWS design is going to be developed.

As a mean of evaluation and to determine the efficiency of the proposed design in mitigating the UHI, a simulation using software called ENVI-met is going to be conducted using the suggested urban context. The main factors that are utilized in the evaluation are ambient air temperature and surface temperature as these parameters have a direct relation with Urban heat island formation.

Literature and general practical preference

As mentioned above most of the literature that will be consulted consists of master's thesis and scientific researches obtain from research gate and TU Delft repository,
Then for design phase, 3D and 2d drawing is going to be developed based on the output of the theoretical research. And for the evaluation a simulation program is going to be utilized

Reflection

Relevance

Living wall system is still in development and there are many drawbacks in this system. Therefore, further research must be done in order to improve LWS and take full advantages of it. So, that it can be implemented in a large scale as the effect of one LWS does not contribute to a major reduction of the urban heat island effect.

Time planning

WEEL NR. GRADUATION	WEEK NR, YEAR	DATE	Setting graduation plan	Setting up thesis	Research road map	formulate research question and ob	literature research on UHI in gener	Literature research on UHI in Dama	Literature research on LWS	Preparation of P2 report & presenta	P2	P2 presenations
1	46	09-Nov										
2	47	16-Nov										
3	48	23-Nov										
4	49	30-Nov										
5	50	07-Dec										
6	51	14-Dec										
7	52	21-Dec										
8	53	28-Dec										
9	1	04-Jan										
10	2	11-Jan										
11	3	18-Jan										

WEEL NR. GRADUATION	WEEK NR, YEAR	DATE	optimise the research based on the	set design parameters -Conceptual	Holiday	More advanced Design	P3 -Progress Review	exploring simulation orgrammes	simulation	analyse of the simulation result	optimise the desing if needed
1	46	09-Nov									
2	47	16-Nov									
3	48	23-Nov									
4	49	30-Nov									
5	50	07-Dec									
6	51	14-Dec									
7	52	21-Dec									
8	53	28-Dec									
9	1	04-Jan									
10	2	11-Jan									
11	3	18-Jan									
12	4	25-Jan									
13	5	01-Feb									
14	6	08-Feb									
15	7	15-Feb									
16	8	22-Feb									
17	9	01-Mar									
18	10	08-Mar									
19	11	15-Mar									
20	12	22-Mar									
21	13	29-Mar									
22	14	05-Apr									
23	15	12-Apr									
24	16	19-Apr									
25	17	26-Apr									

WEEL NR. GRADUATION	WEEK NR, YEAR	DATE	Preparing P4	P4 -go /no go	Optimise based on the feedback	finalise the deisgn	Reparation of the report	Reparation of the presentation	P5
1	46	09-Nov							
2	47	16-Nov							
3	48	23-Nov							
4	49	30-Nov							
5	50	07-Dec							
6	51	14-Dec							
7	52	21-Dec							
8	53	28-Dec							
9	1	04-Jan							
10	2	11-Jan							
11	3	18-Jan							
12	4	25-Jan							
13	5	01-Feb							
14	6	08-Feb							
15	7	15-Feb							
16	8	22-Feb							
17	9	01-Mar							
18	10	08-Mar							
19	11	15-Mar							
20	12	22-Mar							
21	13	29-Mar							
22	14	05-Apr							
23	15	12-Apr							
24	16	19-Apr							
25	17	26-Apr							
26	18	03-May							
27	19	10-May							
28	20	17-May							
29	21	24-May							
30	22	31-May							
31	23	07-Jun							
32	24	14-Jun							
33	25	21-Jun							
34	26	28-Jun							
35	27	05-Jul							
36	28	12-Jul							
37	29	19-Jul							
38	30	26-Jul							