Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (<u>Examencommissie-BK@tudelft.nl</u>), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

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

Personal information		
Name	Nihat Mert Ogut	
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Studio		
Name / Theme	Building Technology	
Teachers / tutors	Ulrich Knaack and Michela Turrin	
Argumentation of choice	Relevance to the MSc. Building Technology due to designing for an	
of the studio	extreme environment	

Graduation project				
Title of the graduation project	Building on Mars			
Goal				
Location:		Mars (Exact location to be determined)		
The posed problem,		Many space agencies are designing mission architecture for Mars and collaborating with firms in order to design a habitat. The mission has no tolerance to mistakes. Nevertheless, technical elaboration of these habitats are yet missing and needs further development.		
research questions and		How to autonomously construct a radiation shielding habitat for a crew of 4/6 on Mars?		
design assignment in which these result.		Designing and constructing of a segment of a Martian facade though deep analysis of technical requirements		

Sub-research questions

What are the most suitable digital manufacturing techniques for the Martian habitat?

What are the construction tools that can utilize in-situ resources in order to build the Martian habitat?

What are the effects of the space radiation, GRE and SEPs, on human anatomy?

What are materials that can mitigate the exposure to space radiation whilst the crew is in the Martian Habitat?

What is the optimal architectural lay out to mitigate the psychological issues on an isolation mission of approximately 500 days?

Process

Method description

Phase I - Qualitative research methods: Literature study, data collection, case studies, interviews with experts.

Phase II - Quantitative research methods: Data collection, design simulation for parametric design, simulation for radiation shielding assessment.

Phase II - Correlation research methods: correlation between different compositions of composite material, their mechanical

Literature and general practical preference

Design manuals published by NASA. Books published by Erik Seedhouse pointing out the challenges of establishing a human settlement on Mars. Papers published for 3D printing habitats on Mars. Papers on construction materials in cold environments.

Physical tests in order to assess the mechanical strength of the composite material made out of regolith analogues and water. Geant 4 and Trisco simulation assessments for minimizing the radiation pass through the facade.

Reflection

Relevance

Building and setting performance requirements for extreme conditions.

Time planning

