Nexus@TUM research group:

Master-level student project guideline

Updated on: 8th November 2022

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Teaching assistant: -

Welcome to Nexus@TUM research group!

The Nexus@TUM group focuses on interactions between the sectors water, energy and food as well as other relevant sectors, in an urban context. Nexus is a new and complex topic. Conducting a project in this group requires a very high level of autonomy, which may not suit all students. This group aims to facilitate a creative process to develop new knowledge by forging an inclusive dynamic atmosphere of co-creation in which everyone becomes a member of the Nexus community. Having fun is an essential part of this process, so if you are not prepared to have fun, don't join.

The Nexus@TUM group is a master level group offering two types of student projects: master theses or study projects. Bachelor thesis topics are not offered.

Master theses must be a full literature review AND development of individual content
Study projects can be a literature review OR development of individual content

To choose a topic, please consult the list of open topics: https://www.wasser.tum.de/nexus/master-level-projects/. You are also welcome to develop your own topic. All projects in this group are required to **focus on the Nexus topic i.e., to link 2 or more relevant sectors**. If you are interested in a particular topic, please join group meetings, and we will discuss your project to get you started.

1.1. Nexus@TUM group meetings

Nexus@TUM group holds one 1,5-hour meeting per week Wednesdays at 13:30-15:00 online:

https://tum-conf.zoom.us/j/99013138781, Meeting-ID: 990 1313 8781, Password: NEXUS@TUM

There will be max. 2-3 presentations per group meeting to allow time for general discussion. **All questions are handled verbally in these meetings, not by email**, due to lack of capacities and because questions tend to repeat or cover similar topics. Therefore, communication in the group is more efficient overall and leads to a better learning effect. Individual meetings are only possible in case of an urgent personal matter. You can ask all project-related questions during group meetings.

Please be aware that if you decide to conduct a project in this group, **regular participation is mandatory**. **If you miss two consecutive meetings** and we don't hear from you in that space of time, **we will assume you are no longer interested**, remove you from the mailing list and your topic will become available again for other students. All students are expected to participate **actively** by turning on their videos during discussion time, and **contribute feedback** on your peers' projects.

Please also refer to the relevant guidelines of the Chair of Urban Water Systems Engineering.

The individual steps of the process of conducting a project in the Nexus@TUM group are as follows:

1.2. Outline

To join this group, please choose a topic and submit a **2-page outline and your grade sheet**. You are welcome to join the seminar and we can discuss aspects of your outline there. Please send me your outline once it is ready. Once the outline has been approved by us, you are given access to the group **LRZ folder** and can join the **WhatsApp group**. The outline structure is as follows:

- **Tentative title** of max. 12 words
- Name, matric number, email address, current semester, specialization / fields of study
- **Abstract** (max. 200 words)
- **Introduction:** ½ page: background of your topic i.e., specific challenge you want to address
- **Research hypothesis:** formulate the key question you want to analyse in max. 3 sentences
- **Methodology:** which methods do you plan to employ in order to analyse your research hypothesis? Data, surveys, literature review, calculations, modelling, etc.
- **Expected results:** what do you think you are going to find out?
- **Timeline:** when do you expect to start and end your project? Suggest presentation slots.
- **References:** a list of first key relevant references your research is based on.

1.3. Project registration

The prerequisite for project registration is the **successful completion of the first draft of your literature review and formulation of your draft research hypothesis**. We do this to make sure you are committed to your topic before registering it, and ensure your project is on track. Once you have finalised and **uploaded your literature review to your LRZ folder**, **please send me an email. Then, we can register your project and schedule presentations**.

1.4. Project report

The time and page requirements for student projects in the Nexus@TUM group are as follows:

	Chapter title	Questions to be answered	Time and word requirement*	
			Master thesis (6 months) 9000 – 11000 words	**Study project** (2-3 months) 6000 – 7000 words
1	**Introduction**	What is the background to the problem you are analysing?	**500**	**500**
2	**State-of-the-art**	What is the state-of-the-art specific to your topic (not general to the Nexus)? This section is a **literature review**. Derived from this: What is your **research hypothesis**?	**3000**	**1000**
	When this has been completed successfully, we can proceed to register your project			
3	**Methodology**	Which methods are used to address your research hypothesis? Literature review, GIS, experiment, survey etc.	**500-1000**	**500**
4	**Results**	What did you find out? Please structure by each individual result or by sub-topics. If you are doing a literature review as a study project, your extended specific literature review is in this section.	**2000-3000**	**2000-3000**
5	**Discussion**	What are the pros and cons of what you found out? Please discuss each individual result	**2000-3000**	**2000**
6	**Conclusion**	What are the broader implications of what you found out?	**1000**	**500**
	*Word count excludes figures, tables, list of references, annexes. Please use font 12, line spacing 1.15			

Please use the template on LRZ to formulate your project report. **The final draft report needs to be submitted <u>at least 1 week</u> before the final presentation**, after which it should be modified based on comments received at the time of your final presentation. You will not receive comments on the report before this. The final report should be submitted on the date arranged with the supervisor. The report must be **submitted in digital form** and not in printed form, in Word AND in PDF format. Please make sure to put your **digital signature** on the first page of the PDF version.

1.5.   Presentations

Each student is required to update the group on their project progress **every 4-6 weeks in form of a 15-minute PowerPoint presentation with max. 10 slides followed by 15 minutes of Q&A.** Please use the template provided on LRZ. Once the outline has been approved, students will be assigned slots for **three interim and one final presentation** with the following content:

1. **Interim 1:** Outline, draft literature review, draft research hypothesis and methodology
2. **Interim 2:** Refined literature review and hypothesis, methodology, and preliminary results
3. **Interim 3:** Final results, discussion and conclusion
4. **Final Presentation:** Summary compilation of the whole project

If you cannot make it to a slot that you have been assigned, please state it during the meetings. In presentation scheduling, final presentations and master theses have priority. If projects of the same type are presented in the same slot, students will present in alphabetical order of first names.

1.6.   LRZ Sync and Shared files

All documents must be uploaded and shared in the LRZ Sync and Shared folder. You must upload your content to this folder: Nexus@TUM Group/Students Projects/Master thesis or Study Projects/. Please structure your LRZ folder into 5 sub-folders as follows: 1) Outline; 2) Presentations; 3) Reports; 4) Data; 5) References.

1.7.   Evaluation

In the Nexus@TUM group, **evaluation criteria** for student projects include:

- How systematically and thoroughly you research the literature
- Logical structure and how you formulate the research hypothesis
- How scientifically you develop your project
- Technical understanding
- Organizational mode of working and ability to work independently
- Reliability in meeting deadlines in your timeline and group requirements, and time-keeping
- Interaction with your supervisors
- Your active participation / interaction, including giving feedback on others' projects

1.8.   Marking

The marking of your project will be undertaken after you have given your final presentation, max. after 4 weeks, and after you have informed me by email that you have uploaded all of your project files i.e., your draft and final reports in both the Word and PDF versions, all of your presentations, your data, and all of your references to your LRZ folder. **Your mark will be based on: <u>How systematically you develop your topic, and your compliance with these guidelines</u>**

1.9.   *Finally and most importantly:* Have fun ☺ !