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# *Master Design Project guide*

## *2017-2018*

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<b>Format</b>	<b>2</b>
<b>Enrollment</b>	<b>2</b>
<b>Safety</b>	<b>2</b>
<b>Prerequisites</b>	<b>2</b>
<b>Objectives</b>	<b>3</b>
<b>What is a good Design Project</b>	<b>3</b>
<b>Planning of the Design Project</b>	<b>3</b>
<b>Preparation: start of the project search</b>	<b>5</b>
<b>Supervisors</b>	<b>6</b>
<b>Nestor work-flow and deliverables</b>	<b>6</b>
<b>Deliverables of the project</b>	<b>6</b>
<b>Mid term report</b>	<b>6</b>
<b>Final Report</b>	<b>7</b>
<b>Final Presentation and Defense</b>	<b>7</b>
<b>Student-Evaluation Form</b>	<b>8</b>
<b>Finalizing and Grading of the Design Project</b>	<b>8</b>
<b>Coordination and university supervisors</b>	<b>9</b>
<b>Project Management</b>	<b>9</b>
<b>Kick-off of the project</b>	<b>9</b>
<b>Nestor</b>	<b>9</b>
<b>Confidentiality</b>	<b>9</b>
<b>Contracts/work agreements/NDA etc.</b>	<b>9</b>

### Format

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The Master Design Project (MDP) is a project-based design case in the field of Industrial Engineering and Management. The case is organized in an individual project format and executed at a company (project-based-learning).

The project duration is 18 (5 days) working weeks. The study load is 25 EC.

The student is working in the company environment full time.

### Enrollment

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Enrollment via Progress is necessary. The student is expected to plan when he or she will attend the compulsory Research Methodology course (September or January) and wants to start with the Design Project.

Routine starting moments will be in October and in February. Take care to ensure a sufficient grade for the Research Methodology course, which finalizes just before these starting moments.

After enrollment, the student is attached to a nestor organization work-flow time-line in which the subsequent deliverables are indicated. For this the student is, after enrollment into the MDP course, automatically enrolled into the nestor organization. Here all the details of the MDP are resumed, including the work-flow tool.

### Safety

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On nestor a safety protocol is available. To be aware of the specific safety conditions per country or possibly per location, the student is advised to take notice of this document and follow the advices from the website of the Dutch Ministry of Foreign Affairs. In countries with unsafe areas the student is obliged to inform and check with at least two local persons (e.g. the supervisors and/or intermediate officer) his travelling and visit plans. In South-Africa for instance there are known unsafe areas.

### Prerequisites

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The Design Project starts always in year 2 of the Master's degree program.

- The 1 month course Research Methodology is completed.
- All master students who have at least 45 ECTS can participate in the Design Project.

It is expected that the students are proactive in the preparation phase to find a project, are present at the location of the company of selection, send in the deliverables on time, report about the project progress and participate in the presentation sessions.

Taking care of an optimal communication within the company of choice and with the university supervisor and coordinator is an important responsibility of the student.

## Objectives

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The Design Project is intended to improve the student's skills with the following learning objectives:

1. carry out a thorough problem-, system- and stakeholder analysis, in an industrial environment, and formulate a clear research objective in this context;
2. draft a comprehensive research design, based on the analysis mentioned above;
3. explore, read and understand the relevant scientific literature of a specific research topic and internal "company" reports as well as patents;
4. formulate an appropriate design (plan), explicitly focusing on :
  - a. in-depth technical aspects of the design;
  - b. non-technical issues and requirements that are directly and clearly linked to the actual business/industrial context;
  - c. framing of the project in an applied context and the implications for stakeholders and society (also taking ethical and sustainability issues into account) ;
5. communicate, during the project, intermediate results and design steps to his/her supervisors and to propose, if needed, possible adjustment to the design plan;
6. present his/her results clearly in English by means of a written report as well as a presentation and subsequent defense to an academic and professional audience with questioning and answering about all issues related to the project and its results;
7. work effectively in an industrial environment;
8. handle complexity due to a multidisciplinary and socio-technical approach;
9. apply an academic (critical, analytical) engineering approach.

## What is a good Design Project

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On basis of the objectives given above, the project will have the following important characteristics:

- strong business case (preferably the project is situated within a company and strongly related to some of the company goals)
- the project aims the (re-)design of a 'technical system' for or in an organization
- enough complexity to make the project non-trivial
- sociotechnical context can be taken into account

Other aspects are:

- project is in the field of the students specialization (PTL, PPT)
- the project content is R&D oriented
- the project content is about application of IEM theories (see Hevner cycles)
- the project is planned and managed by the student
- the student is in the company

Projects that were not accepted were about: only implementation, change management, business modelling, marketing, etc.

## Planning of the Design Project

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The overall list of activities during the preparation and execution of the project is shown below in the table.

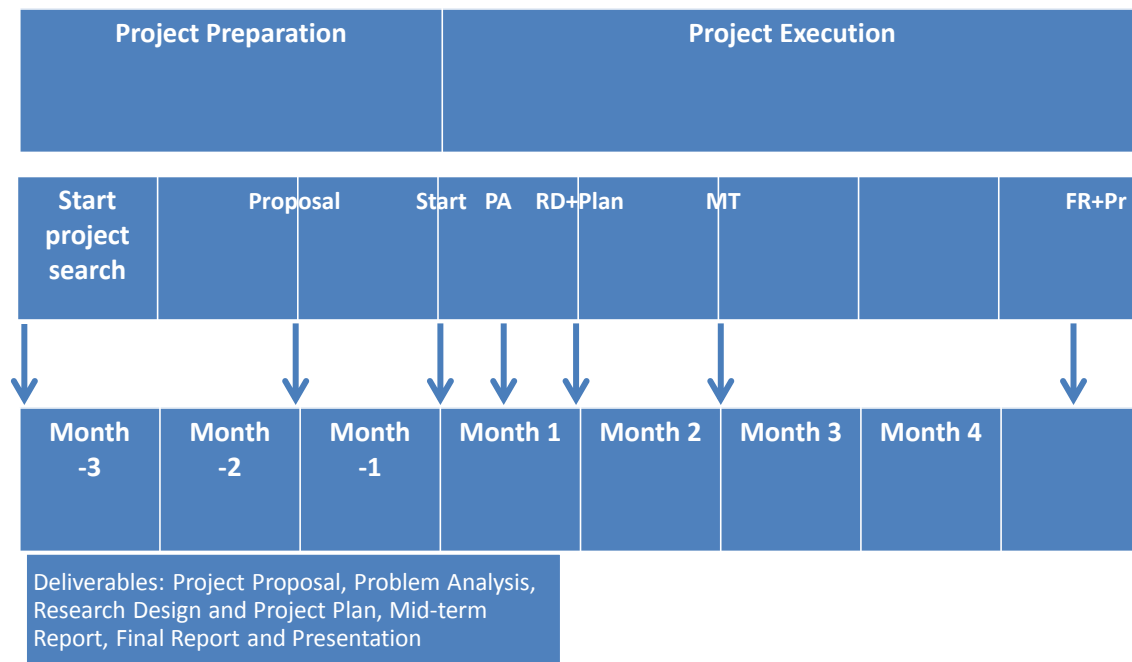
Activity	Date	
Enroll for the MDP in Progress	>3 months before project start	
Enroll for RM in Progress		
Start project/company search in a learning community setting	>3 months before project start	Attend MDP meeting
Upload project proposal with work-flow tool on nestor. Receive feedback and improve.	1-3 months before start	
<u>Project proposal approved</u>	>1 month before project start	Upload in nestor. Approval by the coordinator. Linked to the 1 <sup>st</sup> supervisor.
Course RM	September or February	<i>After this course and proposal approval, the project is started</i>
<u>Draft of Problem Analysis.</u> <u>Literature scan</u> <u>Receive feedback and improve.</u>	2 weeks after project start	Upload nestor, feed-back supervisor
<u>Research Design and Project planning</u> <u>Receive feedback and improve.</u>	4 weeks after project start	Upload nestor, feed-back and approval by the supervisor
Appointment of second supervisor	4 – 6 weeks after project start	
Contact supervisor	Every 2 weeks	Prepare a short ppt for the (telephone/skype) discussion with the supervisor
<u>Mid-term Report</u>	2 months after project start	Upload nestor
<u>Final report</u>	Before final presentation, report must be approved	Upload into nestor and into repository
<u>Final presentation and defense</u>	Plan date via secretary Betsy van Rooij-Oldenboom	Upload nestor
Grading	Within 10 days after the presentation	

The full project time schedule is split into 2 periods: a period of 3 months for the selection of the project and preparation of the project proposal and a period of 4,5 months to execute the actual project at the company.

The student is fully responsible for the project from the very beginning where the search for a project subject is started. The project is within a company.

Below the time schedule is shown:

## Plan



During the year 2 start moments are scheduled, in October and in February and in addition 2 presentation sessions will follow.

### Preparation: start of the project search

- Subscribe to the Design Project in Progress in time (> 3 months before start).
- Contact the MDP coordinator about possible projects
- Define the companies to be contacted. Use all options and a wide window of subjects to find a project. Use your particular motivations.
- Make a rough sketch of the project in coordination with the contact person at the company of choice and ask for feedback from the coordinator.
- Define the project and finalize the Design Project Proposal and Registration Form (see nestor) and upload into the work-flow tool. The proposal will now be screened within one week.
- Get an approval from the coordinator.

Criteria for approval are: see paragraph 'What is a good Design Project' After approval of the project proposal the student is ready to start the project, in October or in February preferably. If the proposal is insufficient, an improved proposal has to be uploaded for a second screening etc.

## **Supervisors**

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The student is supervised by a staff member from the Design Group. For specific expertise a second supervisor is allocated in time from the ENTEG research groups. Both supervisors are responsible for the final grading.

A student shall have an additional supervisor from the company.

## **Nestor work-flow and deliverables**

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To monitor and manage the progress of the project and in order to receive the deliverables, a nestor work-flow tool is created, aimed to streamline the process of the MDP.

The tool is started with the button 'Start Design Project' in the nestor menu of the organization Master Design Project.

## **Deliverables of the project**

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After finalization of the project the following deliverables are available:

- Proposal: Design Project Proposal and Registration Form (-1 month), needs an approval by the coordinator
- PAL: Draft Problem Analysis & Literature scan, version 1 (week 2)
- RDP: Research Design and Project Plan (final version week 4), needs an approval by the supervisor
- MT: Mid term report(s) (week 8)
- Final Report (2 weeks before the presentation), needs approval
- Final Presentation and Defense
- Student-Evaluation Form completed by the company(1 week before the presentation)

## **Mid term report**

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The Mid-term report informs the supervisors about the status of the project, with respect to the plan. It is to be uploaded on nestor, see work-flow.

## Final Report

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The final report resumes all the deliverables and the project progress reports, the results and the added value to the company. It will contain at least the following parts:

- Summary of the project on 1 page
- The full Problem Analysis with System description, Stakeholder analysis, Research Objective, Research Question(s), Design Objectives
- Research Design with use and choice of methods for the project
- Relevant scientific context (short description, literature study), use of academic knowledge, methods, tools and technology
- Description of the design and/or the solution, the implementation route and full result(s). What is added to the company?
- Evaluation of working within the company environment
- Short analysis of this Design Project: 3 pros and 3 cons. What must be improved?

Sometimes companies ask for a report, sometimes they don't. For the first case the last two items can be included in an addendum, other items can be added to the report if required.

The final report must be uploaded at two locations:

- a) The final and approved report must be uploaded into the nestor workflow.
- b) Repository: the final and approved report must be uploaded in to the repository before the mark is in Progress. The manual for this is on nestor.

## Final Presentation and Defense

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Presentation sessions are scheduled by Betsy van Rooij-Oldenboom, secretary of the Design Group. The students who give presentations on a specific day are expected to be present at the other presentations on that day and attend the evaluation as well.

For students starting the before September 2017, The presentation of 40 minutes including discussion is meant to resume all the aspects of the Design Project. The presentation is not meant to only introduce the company of choice. The presentation will be organized after the report is finished.

For students starting from September 2017, the session will be differently organized. The presentation is reduced to 10 minutes and the defense questioning and answering (Q&A) will take 30 minutes. The questions will touch all issues related to the project and its results, e.g.

- Design choices
- Application of technology
  - Extend and apply findings to other applications
  - Professional skills when applying science and technology (managerial/societal/ethical)
- Implementation/evaluation
- Critical, academic attitude
- Learning skills
- Communication to RUG and company management
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The student may use the Q&A to explain his project approach and results to the supervisors and can take the change to improve weak points in the report.

### Student-Evaluation Form

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The evaluation of the student by the company supervisor is important and contributes to the final grading by the university supervisor. It is the student's responsibility to provide the university supervisor with the completed form (the format is on nestor), which is needed for grading.

### Finalizing and Grading of the Design Project

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The grading is after finalization of the project and is based on the different learning objectives:

- A. Design quality (50%)
  - a. Problem description and analysis
  - b. Literature research
  - c. Design methodology
  - d. Tools and techniques
  - e. Quality, validity and limitations of the proposed design
  - f. Reflection
- B. Management of research (25%)
  - a. Independence
  - b. Initiative
  - c. Motivation
  - d. Planning
  - e. Collaboration/Teamwork
- C. Colloquium/final presentation (12,5%)
  - a. Structure
  - b. Clarity
  - c. Presentation skills
  - d. Response to questions
- D. The report (12,5%)
  - a. Structure and layout
  - b. Writing skills
  - c. Linguistic skills

Final grade for the project =  $(4xA + 2xB + C + D)/8$

The student can only pass if all aspects are graded 5.5. or higher.

With respect to this the following deadlines are important.

*Final presentations are arranged in agreement with the supervisor and coordinator and the student has the task to deliver his report 2 weeks before this date to provide the supervisor the possibility to study the report and give feed-back.*



*The supervisor arranges a meeting with the student to discuss the results and the grading, within 10 days after the presentation. The grading sheet must also be send to the Design Project coordinator and ESC.*

The grading format can be found on nestor.

For archiving purposes, the final report must also be uploaded into the repository and into nestor (obligatory).

### **Coordination and university supervisors**

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The Design Project is coordinated by dr. A.J. Bosch. Each Design Project starts with approval of the coordinator.

In cooperation with the coordinator, the university supervisors are to be selected from the Design Group and form the ENTEG staff.

### **Project Management**

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Project management is of course an important skill during the Design Project. The student manages his own project.

### **Kick-off of the project**

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Normally, the project kick-off is in October and in February.

### **Nestor**

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Via Nestor students will be informed. Documents are provided as usual with help of Nestor. See the nestor site of the Master Design Project, available under 'my organizations'.

### **Confidentiality**

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Design Projects can exhibit a confidential character. This is no problem at all. A condition for correct grading is however that a full report is available for the supervisor and for inspection purposes. If necessary, a confidentiality agreement can be signed. The report has to provide enough detail to make grading possible.

### **Contracts/work agreements/NDA etc.**

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Some companies require to agree on a contract or a work placement agreement (other names possible). The precise formulation always asks for the acceptance by the RUG juridical office, this can take 1-6 weeks. To save time the completion of a contract should be started as early as possible. Contact the coordinator.

## Insurances

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During the period of the Design Project, abroad or in the Netherlands, some insurances are provided but some you have to arrange yourself

1) Third party insurance (Wettelijke aansprakelijkheidsverzekering). The RUG has such an insurance with world-wide coverage, also for students. However there is one exception, which is for contract research in the USA and Canada.

2) Travel assurance (reisverzekering). The RUG has such an insurance, also for students. But only for the stay of 1 year abroad. This is a complementary assurance. In case of private travel, connected to the stay, a separate travel assurance has to be arranged by the student for that period.

3) Health insurance (ziekttekostenverzekering). This must be arranged by the student: check the coverage for the stay abroad. Some is arranged in the travel assurance.

Information about the insurances provided by the university can be found with following link of the Office of the University (ABJZ Department):

<http://www.rug.nl/bureau/expertisecentra/abjz/producten/verzekeringenRUG>

(English version is available)

In case of further questions, contact the coordinators of this course.