



TRAIL Training & Education: PhD course program and rules

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1 Introduction

A redesign of the current TRAIL Training and Education (T&E) program, in terms of both the content and rules, is required in response to the recommendations of the international peer review committee of TRAIL (2012), the ongoing development of local graduate school programs and research masters, and, last but not least, the changing needs and desires of PhD students. More specifically, the following reasons fuel the need for a revised program:

- The increasing need for a 'core curriculum', creating a body of common knowledge among TRAIL PhD students (TRAIL-IPRC, September 2012);
- The increasing divergence of the educational needs of PhD students with increasingly different backgrounds;
- The recognition of heterogeneity of categories of PhDs according to their formal position: internal, part-time, external;
- The need to improve the link with TRAIL Research Program (Themes: TRAnsport, Infrastructure, Logistics);
- The development of local Graduate Schools with their own rules and courses;
- The development of local Research Masters at universities, in which part of the PhD education is likely transferred to the Masters phase;
- The educational needs of potential new TRAIL partners (VU, UvA, RUG, UU, LU), amongst others in the area of OML (Operations Management & Logistics).

2 The role of TRAIL in Training and Educating PhD students

Before explaining the program objectives, we discuss the role of TRAIL Research School in contributing to the qualifications that apply to a PhD student.

The members of European Higher Education Area (EHEA) prescribe the qualifications a PhD student should have when completed a PhD study.¹ The Dutch Ministry of Education, Culture, and Science/The Accreditation Organisation of the Netherlands and Flanders (NVAO) has adopted them. Table 2-1 gives these qualifications.

Within the Dutch context, multiple organisations support the PhD student in achieving these qualifications, the most important being: the Promoter/Supervisor, the local Graduate School (GS), and the Research School (RS). Table 2-1 presents the level of support within the context of the TRAIL research school. The type of support varies from individual meetings and traditional courses to learning by doing (e.g. presenting a paper, giving a lecture, visiting a masterclass/conference, etc.) and day-to-day supervision.

¹ http://www.ehea.info/Uploads/QF/050520_Framework_qualifications.pdf

Table 2-1: Qualifications of PhD student and (indicative) contributing bodies

Qualifications	Bodies	TRAIL Promotor/ Supervisor	Local Graduate Schools at TRAIL-universities	TRAIL Research School
1. A demonstration of a systematic understanding of a field of study and a mastery of the skills and methods of research associated with that field		XXX		XXX
2. A demonstration of the ability to conceive, design, implement and adapt a substantial process of research with scholarly integrity		XX	XXX	X
3. The capability of critical analysis, evaluation and synthesis of new and complex ideas		XX	XX	XX
4. A contribution through original research that extends the frontier of knowledge by developing a substantial body of work, some of which merits national or international refereed publication (including PhD thesis)		XXX	X	XX
5. The ability to communicate with their peers, the larger scholarly community and with society in general about their areas of expertise		XX	XX	XX
6. To be able to promote, within academic and professional contexts, technological, social or cultural advancement in a knowledge based society		XX	XX	XX

Number of 'X's represents the level of contribution (indicative) of a body to achieving a qualification

From here we limit ourselves to education related needs only (GS and RS). In general, the Graduate School supports the PhD student in acquiring general PhD research knowledge and skills, while the Research School focuses on domain-specific/applied PhD research knowledge and skills. As such, the local Graduate Schools and TRAIL Research School are complementary, in line with the recommendations of the KNAW, VSNU and NWO.²

Now that we have made explicit that the main contribution of the role of TRAIL research school to meeting PhD qualifications is related to the first qualification we can make explicit the main objective of the education program: To educate PhD students in TRAIL domain knowledge (empirical and theoretical), methods, and skills. Because our program includes not only knowledge but also skills we use the term Training and Education (T&E).

TRAIL also supports PhD students to acquire other qualifications as presented in Table 2, not only via education, but also in other ways. For example TRAIL provides a course training people to do a literature review (relevant for qualification 3), organizes conferences, master classes and symposia (relevant for qualifications 5 and 6).

² http://www.know.nl/content/Internet_KNAW/publicaties/pdf/20101032.pdf

3 The new TRAIL Training and Education Program

3.1 T&E Rules

TRAIL is not a PhD-granting institute and has as such no formal incentives for PhD students (and supervisors) for a mandatory course program. However, most TRAIL-universities, that are responsible for granting PhD degrees, have strict education rules for PhD students within the so called Graduate Schools. As described in section 2, these requirements include that part of the PhD student education should be on the domain of the PhD student, in our case the domain of Transport, Infrastructure and Logistics (TIL³).

TRAIL welcomes all PhD students for following courses. At a minimum, TRAIL PhD students who follow only one or more TIL-courses receive a certificate per course. If they successfully do an exam (often: an assignment), this will be made explicit on the certificate. PhD students who follow and pass (successful exam) a full education program of at least 15 ECTS (of 28 hours each) of TIL-courses receive a TRAIL diploma listing the courses. TRAIL is pleased if PhD students (and supervisors) decide to go for the TRAIL diploma. As far as TRAIL is concerned, PhD students can decide upon the choice for the diploma- option before starting to do research, but also in a later stage. Note that supervisors and faculty Graduate Schools can have related requirements.

Main Rule: TRAIL PhD students who pass at least 15 ECTS of courses in the domain of Transport, Infrastructure and Logistics (i.e. TIL-courses) receive a TRAIL diploma.

Hence, TRAIL makes a distinction between TIL-courses (TIL: Transport, Infrastructure and Logistics) and non-TIL-courses. TIL-courses provide knowledge about (theories, methods, empirics) and skills for the TIL domain. Non-TIL-courses focus on general PhD research knowledge and skills like 'writing in English', presenting a scientific paper, etc. TIL-courses are provided by TRAIL or similar institutes.

TRAIL believes that good education includes providing a solid basis, enabling in-depth specialization, and broadening the horizon of the PhD Student. Consequently, TRAIL encourages its PhD students to follow courses at other Research Schools and elsewhere. Our experience is that Research Schools such as Beta, Disc, LNMB, Nethur, ERIM, and Tinbergen Institute provide valuable courses of high quality that can be relevant to individual TRAIL PhD students. And some well-respected universities worldwide also provide excellent course. Currently, TRAIL PhD students can follow courses for free at Beta, Disc and Stream, and soon also at GP-OML (Graduate Program Operations Management and Logistics, in which TRAIL participates). Courses at other institutes often require a registration fee.

3.2 T&E Program and courses

The TRAIL T&E program consists of three parts (see Table 3-1): Basic TRAIL-courses (TRAIL PhD students opting for a TRAIL diploma should pass at least 7 ECTS: the TRAIL Fundamental Domain Knowledge Course, and the TRAIL Theories and Methods course - these are the two first courses in Table 4.2 below), General TRAIL courses, and TRAIL Specialization courses (all TRAIL courses together at least 15 ECTS). Although TRAIL does not apply additional rules with respect to the distribution of courses over categories, supervisors (and maybe also the Graduate School) may apply rules.

Basic courses support PhD students to become TRAIL scholars: scholars with a basis of knowledge and skills about all TRAIL-related areas, the domains of transport, infrastructure, and logistics. These fundamental courses are considered highly important, as these give the PhD student a solid framework, based upon which he/she can choose future research directions, better explain his/her research to TRAIL colleagues (and non-TRAIL-ers), as well as understand the research approaches and outcomes of TRAIL colleagues. If PhD students already successfully participated in courses in the past (Masters, Bachelors) that are the equivalent of TRAIL basis courses, they do not have to follow those courses at TRAIL: in that case the minimum of 15 ECTS still applies.

General courses are follow-up courses on some basic courses and/or independent of the specialization (T, I, or L) of the student.

³ The TIL-domain focuses on Transport, Infrastructure and Logistics, combining disciplines such as economics, engineering, operations research, managerial sciences, psychology, planning and their various theories and research methods.

Specialization courses are advanced courses that can be chosen according to the individual needs and preferences of the student. TRAIL offers three specializations (in line with the TRAIL research themes): Transport, Infrastructure, and Logistics (T, I, and L).

Table 3-1: TRAIL courses

Basic TRAIL Courses	<ul style="list-style-type: none"> • TRAIL fundamental ‘domain’ knowledge of TIL systems [1-4 ECTS]¹ [D]^{2, 5} • TRAIL theories and methods [1-3 ECTS] [T,M] • TRAIL skills I - introduction to TRAIL & organizing your own PhD research [0.25 ECTS] [S] • TRAIL skills II – the societal relevance of your PhD research [0.5-2 ECTS] [S] 		
General TRAIL Courses	<ul style="list-style-type: none"> • Discrete choice modeling [1-3 ECTS][M] • TRAIL data analysis and statistics⁵ [1-4 ECTS] • Transport innovations [1-3 ECTS] [D] • TIL Capita Selecta [1-3 ECTS][D] • TRAIL literature review [1-3 ECTS] [S] • Writing and publishing a TRAIL article [1-3 ECTS] [S] • TRAIL skills III – Profile of future employers of PhD students [0.25 ECTS] [S] • T, I, or L basic disciplinary course³ [1-3 ECTS] [D] • (Writing a TRAIL research proposal (e.g. NWO) [1-3 ECTS][S])⁴ 		
TRAIL Specialisation Courses	Transport [D]	Infrastructure [D]	Logistics [D]
	<ul style="list-style-type: none"> • Policy analysis for TIL-systems • Transport governance • Transport - Capita Selecta 	<ul style="list-style-type: none"> • Traffic flow phenomena • Behavioural aspects in transport • Traffic safety • Infra - Capita Selecta 	<ul style="list-style-type: none"> • Logistics and freight transport systems analysis⁵ • Facility logistics management⁵ • Operations Research and health care⁵ • Quantitative modelling and analysis of supply chains⁵ • Advanced inventory theory⁵ • Freight transport management⁵ • Public transport⁵

¹ Exact number of ECTS will be determined with course leaders. The first number of ECTS refers to participation only (no exam/assignment), the second to participation plus a successful exam/assignment.

² D: domain knowledge, T: theory, M: methodology, S: skills.

³ The number of ECTS of PhD or Research Master courses count fully for the TRAIL program if additional to the TRAIL curriculum; for regular Master courses only 70% of the number of ECTS is included.

⁴ Based on demand of TRAIL students/staff members.

⁵ Courses given by TRAIL and Research School Beta within the Graduate Program Operations Management and Logistics (GP-OML). See Appendix I for more information

4 Course application and practicalities

4.1 Application for a course

You can enroll in a course by sending an e-mail request to the TRAIL office (info@rstrail.nl). It is strongly recommended to apply for a course as soon as possible. The TRAIL office will inform the PhD student in time when and where the course will start. Courses can be found on the TRAIL Website (www.rstrail.nl/agenda), and will also be announced by e-mail at regular times. This application procedure also goes for courses provided by Beta, ERIM, Disc, Nethur and VU (STREEM).

4.2 Participating or passing a course (for TRAIL PhD students only)

Everybody who participates in a course receives a certificate indicating the name of the course, the date(s) the course was given, and the amount of ECTS related to participation. In addition, for those who choose to do the assignment (e.g. research master students, TRAIL PhD students opting for a TRAIL diploma) the certificate will be expanded with a grade or pass clarification and an adjusted amount of ECTS.

4.3 Course fees

The fees for following a course at TRAIL (or a TRAIL associated institutes) depend on the type of TRAIL membership one has (i.e. course demander) and the course-supplying institute (see Table 4-1).

The main rules are:

- PhD students from TRAIL-faculties can follow courses for free at TRAIL, GP-OML, TRAIL-associated institutes (Beta, ERIM, Disc, Nethur), and Research Masters STREEM (VU);
- Postdocs, (ass.)fellows, and alumni from TRAIL-faculties can follow courses for free at TRAIL and at GP-OML;
- Research Master students from TRAIL faculties can follow all courses for free at TRAIL and some of the GP-OML courses;
- Professionals from I&M can follow courses for free at TRAIL and some of the GP-OML courses.

Traveling costs, etc. are at the student's own expense.

Table 4-1: Financial rules for attending a course

Supplier	TRAIL	GP-OML	Beta	ERIM, Disc, Nethur	Research Masters TRAIL faculties	Research Masters STREEM (VU)
Demander						
TRAIL PhD student ¹	free	free	free	free	n.o. ²	free
Beta PhD student	free	free	free	n.o.	n.o.	n.o.
PhD student in ERIM/Disc/Nethur	free	partly free ³	n.o.	n.o.	n.o.	n.o.
PhD student in BIVEC	partly free ⁴	partly free ^{3,4}	n.o.	n.o.	n.o.	n.o.
Other PhD students	125 €/day	125 €/day	n.o.	125 €/day	n.o.	n.o.
RM student TRAIL-faculty	free	partly free ²	n.o.	n.o.	n.o.	n.o.
RM Student STREEM(VU)	free	partly free ³	n.o.	n.o.	n.o.	free
TRAIL postdoc, (ass)fellow, alumni	free	free	n.o.	n.o.	n.o.	n.o.
I&M employees	free	partly free ⁵	n.o.	n.o.	n.o.	n.o.
Other Professionals	250 €/day	250 €/day	n.o.	n.o.	n.o.	n.o.

¹ including other Phd students at TRAIL member faculties.

² not offered by TRAIL, see local rules at supplying institute.

³ courses provided by TRAIL within GP-OML are free, else 125 € per course day.

⁴ up to 5 courses in total per year across all BIVEC PhD students, else 125 € per course day.

⁵ courses provided by TRAIL within GP-OML are free, else 250 € per course day.

4.4 Terms of cancellation

TRAIL reserves the right to cancel a course in case the number of participants is too low (e.g. below 10). Such cancellation is mostly based on the fact that this is too much to ask from course manager and/or teachers, and for economic reasons.

Participants can cancel their application up to one week before the start of the course. A cancellation within one week of the start of the course results in losing priority when applying for another course for non-paying participants, and a cancellation charge of 50% of the course fee for paying participants.

4.5 Contact information:

TRAIL Research School
Jaffalaan 5
2628 BX Delft
The Netherlands
phone: +31.15.2786046
e-mail: info@rstrail.nl

Appendix I – Graduate Program Operations Management and Logistics (GP-OML)

Research Schools TRAIL and Beta have developed a joint Graduate Program on Operations Management and Logistics (sponsored by Dinalog). This program has the following characteristics:

- The OML program runs for 1.5 year (spring 2014, fall 2014, spring 2015) and consists of 9 courses (each about 4-ects, including preparation and assignment);
- Spring is from February to May, fall is from September to December;
- Per semester 12 course days are available. Each semester, three 4-day courses are given on a fixed day (Wednesday) every week at a central location (Dinalog-Schiphol);
- A course day starts at 10:00 h. and ends at 16:00 h. Per course, a rotating schedule is followed in order to enable studying between lectures and/or make intermediate assignments (i.e. course A, B, and C are planned over 12 days as follows: A, B, C - A, B, C - A, B, C - A, B, C);
- Each course will be examined by e.g. an assignment.

In the first GP-OML cycle, the following courses will be offered:

- *Fundamental domain knowledge of transport systems* (Spring 2014, Van Wee & Annema);
- *Facility logistics management* (Spring 2014, De Koster);
- *Operations research and health care* (Spring 2014, Hans & Van de Klundert, via LNMB);
- *Quantitative modelling and analysis of supply chains* (Fall 2014; De Kok);
- *Data-analysis and statistics* (Fall 2014; R. Hoogendoorn & Kroesen);
- *Logistics and freight transport systems analysis* (Spring 2015; Zuidwijk; Tavasszy)
- *Advanced inventory theory* (Spring 2015; Van Houtum & Dekker);
- *Freight transport management* (Fall 2014; Vis & Van Woensel);
- *Public transport* (Spring 2015; Kroon).