



Joint Master

Applied Geophysics

Study Guide

A Joint Degree Programme of three IDEA League Universities:
Delft University of Technology,
ETH Zurich and RWTH Aachen University

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The Joint Master's in Applied Geophysics is a two-year joint degree programme offered by three of Europe's leading science and technology institutions: Delft University of Technology, ETH Zurich and RWTH Aachen University. The programme builds on the strengths and the complementary expertise in Earth Science at the three universities. It offers a combination of study and research, leading to an outstanding qualification in Applied Geophysics.

1 Master's programme



The Joint Master's in Applied Geophysics comprises a significant number of core courses, a selection of specialised courses and a final research-oriented thesis project. The core courses provide the students with fundamental information essential for practice in applied geophysics. Basic processes and important state-of-the-art technologies are taught. Independent thinking and integration of concepts and information are required from the students. A key element of the curriculum is a period of field work during which the students design and execute a programme of geophysical investigation aimed at resolving actual engineering, environmental or archaeological problems. A broad spectrum of geophysical techniques are available for the investigations. After the field campaign, the students are responsible for the processing and interpretation of the acquired data and

for reporting the results of their studies. The specialised courses reflect the research interests of the participating applied geophysics groups. They prepare the students for choosing a thesis research area that best suits their interests, knowledge, skills and experience.

The final theses are the result of approximately six months of research, report writing, presentation and examination. Typically theses involve the integration of theory with data derived from field observations, field tests or laboratory work. The academic quality is guaranteed by integrating the theses into the research activities of (a) one of the partner universities or (b) a suitable industrial, governmental or other university laboratory.

2 Application, admission and regulations

In order to be sufficiently qualified for the programme, applicants must have a solid background in the fundamentals of mathematics and physics as well as basic knowledge of geology and geophysics.

How to Apply

- Step 1: complete the online TU Delft online application form
- Step 2: send copies of all required documents by mail to the TU Delft international office

Detailed instructions

- The closing date for applications for the next term, starting September 1, is April 1, of the actual year. Non-EU/EFTA applicants, who wish to apply for a scholarship, need to do so by November 1 of the previous year.
- Create a profile in the TU Delft online application system. Follow the online instructions, complete all required pages and submit your application electronically.
- Send the paper copies of the documents required according to the table (see page 6) to:

TU Delft / International Office
MSc Admission/Geophysics
Attn. Ms L. Goedvolk
Jaffalaan 9a
2628 BX Delft
The Netherlands

- The applications must contain the required signatures and certified copies of documents. Students who expect to complete their Bachelor's degrees in the period immediately prior to the commencement of the Joint Master's programme may submit their applications anytime during their final year; acceptance in the programme will then be conditional on the students obtaining the necessary degrees.

Applicants from EU/EFTA universities

Applicants who have received high-quality Bachelor's degrees in appropriate subject areas (e.g. earth sciences, environmental sciences, physics, engineering) from European universities are eligible to enter the Joint Master's programme.

Applicants from universities in other countries

Admission to the programme may be granted to a) applicants with a Bachelor degree in appropriate subject areas (e.g. earth sciences, environmental sciences, physics, engineering) issued by one of the partner universities; b) applicants with a Bachelor degree of at least 180 ECTS CPs or an equivalent university qualification in appropriate subject areas (e.g. earth sciences, environmental sciences, physics, engineering), which gives evidence of the required qualification for the programme from other top universities worldwide.

Language requirements

The language of tuition is English. All teaching, exercise and practical material will be provided in English. All students are required to provide a proof of English language proficiency. The detailed requirements are published by TUD at the beginning of each admission period. Only students with a Bachelor from either TUD, ETH or RWTH, nationals from the U.S., U.K., Ireland, Australia, New Zealand and Canada as well as students with a Bachelor degree from one of these countries are exempt from the proof of English language proficiency requirement. TUD specifies the requirements in consultation with the Executive and the Administrative Committees.

Documents to be submitted by mail to Delft international office

		EU/EFTA students	other students
1	Photocopy of your passport stating your name, date of birth, place of birth and the passport expiration date	yes	yes
2	English language test (see exemptions above)	yes	yes
3	Resumé/curriculum vitae in english	yes	yes
4	Certified copy of your academic degree(s)	yes	yes
5	If applicable, certified translations of your degree(s) in English, French, Dutch or German	yes	yes
6	Certified Copy of your academic transcript(s)	yes	yes
7	If applicable, certified translations of your academic transcript(s) in English, French, Dutch or German	yes	yes
8	Two letters of reference	no	yes
9	An extended essay *	no	yes

The scanned documents can be either submitted in JPEG or PDF format.

Certified copies of documents should bear original logos and original stamps of the offices that issued the original documents. Alternatively, certified translations should bear original logos and stamps of the sworn translators who did the translations. Forms and letters of reference should also bear original signatures.

* The extended essay should be a text of 2000-3000 words in English that covers the following points:

- a concise summary of courses taken during your Bachelor's studies, together with the grades obtained

- a short description of your Bachelor's thesis or final Bachelor's assignment(s)
- a review of your most favoured subjects, explaining why they are favoured
- a review of your least favoured subjects, explaining why they are not favoured
- your motivation to complete a Master's programme in Applied Geophysics
- your interest in the Joint Master's programme
- examples of three research themes in Applied Geophysics that appeal to you, together with the reasons why they are interesting.

Fees and financial support

Tuition and service fees

Current fees are available on:
www.tudelft.nl/studeren/masteropl/masteropleidingen/design-for-interaction/financien/.

Financial support

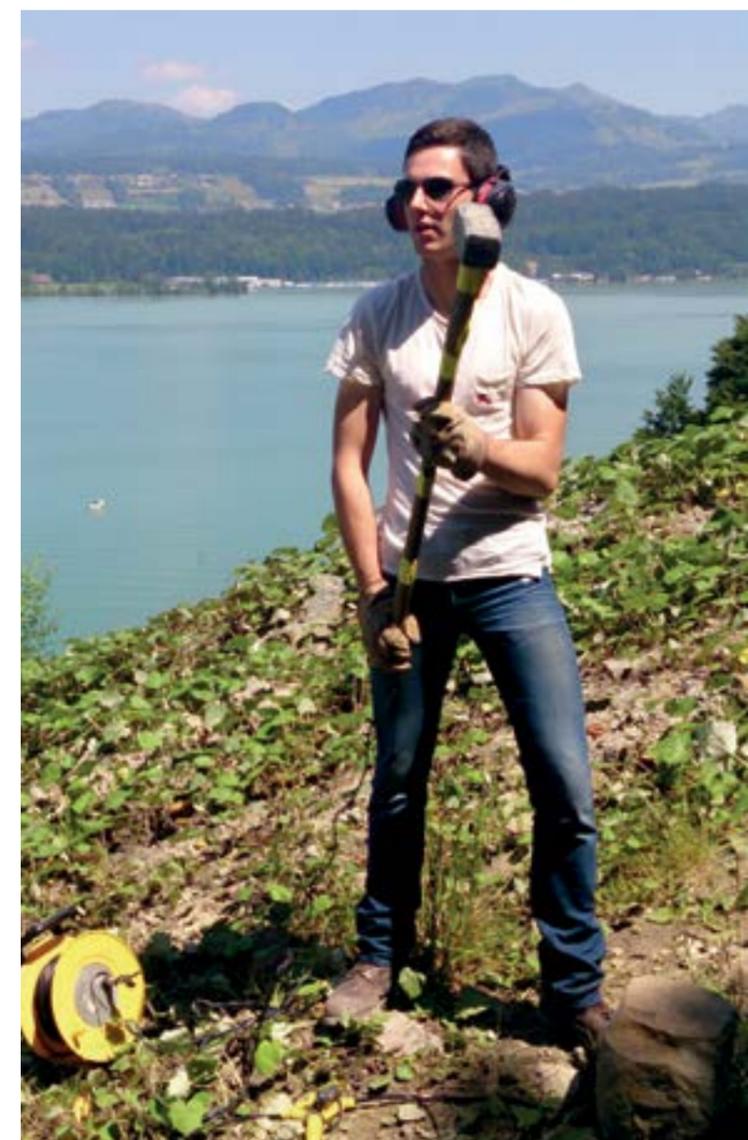
A variety of scholarships are currently available for outstanding students that cover tuition fees and partially living/accommodation costs. Please visit the scholarships page for further details:

www.idealeague.org/geophysics/admission/scholarships

Applicants who apply for an industry-sponsored scholarship,

- complete the scholarship application-form and include it to the documents that you submit to the TU Delft international office.

- submit an additional motivation letter and tabular CV, both signed and scanned in good quality.



Student visas

Each applicant must apply for and receive the necessary visas from their home country before embarking on the journey to the Netherlands. Students need both a European (Schengen) visa for study in the Netherlands and Germany, and a Swiss visa for study in Switzerland.

Services at Delft University of Technology for non-EU/EFTA nationals

Delft University of Technology offers Master's students from non-EU/EFTA countries special services, such as mediation in visa application, health and liability insurance and an introductory summer school.

* EU countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

EFTA countries: Iceland, Liechtenstein, Norway, Switzerland.

The visa acquisition procedure for individual students takes at least three months but can, in some cases, take anything up to six months. If you require a visa to enter the Netherlands, Delft University of Technology will be happy to mediate for you. Your visa will normally be issued within six weeks after we have filed the application with the Dutch immigration authorities. Please note that this service is only available for Master's students, but not for their partners or other relatives.

Before we can apply for your visa, we must have proof that your financial resources meet the criteria laid down by the Dutch authorities. You must be able to finance the first year's tuition fee and cover the first year's living expenses (approximately 6800 euro). We can only apply for your visa once the



first year's tuition fee has been received by Delft University of Technology together with the amount required to cover living expenses. Your letter of admission will specify how much has to be paid before a visa can be applied for.

You will be reimbursed the amount for your living expenses shortly after your arrival in Delft (it will be transferred to your bank account).

Additional visa requirements apply to nationals from the following countries:

- People's Republic of China
- Chinese nationals require a certificate from the Netherlands Education Support Office (NESO) in Beijing before Delft University of Technology can apply for their visa (see also NESO- certificate).
- Ghana, the Dominican Republic, India, Nigeria and Pakistan

The Netherlands Embassy or Consulate General requires a certified birth certificate. This document has to be verified and legalised by the Netherlands Embassy or Consulate General before Delft University of Technology can start the visa application. This procedure may take some months. We advise you to contact the Netherlands Embassy or Consulate General for more details, as soon as you have received the admission letter.

Duration and regulations

Explicit regulations and rules on the periods of practical training and examinations are provided in the „Regulations for the Idea League Joint Master's programme in Applied Geophysics“. For most courses, written examinations will be given at the end of the respective teaching period. Oral examinations, continual assessments or written reports may be the most appropriate forms of evaluation for some courses. Approximately 6 months after the beginning of their studies, students will receive advice as to whether or not they should continue their studies.

If a student fails the maximum number of re-examinations, then he/she will be given the opportunity to move to a regular Dutch programme of Masters studies.

Maximum study duration

The maximum study duration of the Joint Master's programme is 4 years. In the Netherlands and Germany, a maximum study duration is legally not possible for a national Master's programme. If a student from one of these countries requires more than 4 years to complete his/her Master's degree, then he/she will have the opportunity to move to a regular Dutch/German programme of Master's studies.



3 Curriculum

Performance assessment

ECTS grade	Description	TU Delft	RWTH	ETH
A	Excellent	9.5 to 10	1.0 to < 1.5	> 5.5 to 6.0
B	Very good	8.5 to < 9.5	1.5 to < 2.1	> 5.0 to 5.5
C	Good	7.5 to < 8.5	2.1 to < 2.8	> 4.5 to 5.0
D	Satisfactory	6.5 to < 7.5	2.8 to < 3.5	> 4.0 to 4.5
E	Sufficient	6.0 to < 6.5	3.5 to 4.0	4.0
F or FX	Fail	< 6.0	> 4.0	< 4.0
X	Exemption			

> greater than, < less than

Registering for courses

Students register for their modules through the respective system of each partner university.

Credit examinations

Credit examinations are in the responsibility of each partner university and thus handled according to local rules and regulations. The results of the credit examinations are to be declared to the students, the respective administration units and in particular the coordinating office at TUD. The Joint Examination Board may require students who have interrupted or delayed their studies to retake any credit examination they passed during their previous enrolment in the programme if the content of the course in question has considerably changed since then. Such re-entries will be evaluated on a case-by-case basis.

Grading System

Each partner university uses its local grading scale, but for the award of the degree all grades are converted to ECTS grades. These will be listed on the diploma supplement and the table above will be included to allow easy student performance assessment in the participating countries.

Obtaining credit points

A student will receive the allocated number of credit points for each course provided he/she has obtained a minimum grade of E in the respective examination or has been granted an exemption.

Master's degree

Students who have successfully completed the Joint Master's programme will receive three cross-referenced degree certificates, one from each of the participating universities.

- TU Delft awards a degree certificate „Master of Applied Earth Sciences“ with the remark that the student has specialised in Applied Geophysics.
- ETH Zurich gives a degree certificate „Master of Science in Applied Geophysics“.
- RWTH Aachen gives a degree certificate „Master of Science RWTH Aachen University“.

In addition, the three universities issue a single Joint Diploma Supplement in which all courses taken in the programme are listed with the grades obtained and in which it is indicated that these courses together constitute the IDEA League Joint Master's in Applied Geophysics.

In the 120-EC (European Credits) Joint Master's programme the students study together at each university and move between universities as a group.

General rule: Each student must obtain a minimum of 25 EC from each partner universities' regular courses as shown in the Course Calendar.

First term at TU Delft

You start your education on September 1 at TU Delft. To benefit fully from the Joint Master's programme, it may be necessary for you to review some appropriate convergence courses that are available online.

A. Core Modules - at least a minimum of 2 out of the following 3 Modules must be passed:

- Module: Electromagnetic Exploration Methods (6EC)
- Module: Sedimentary Systems and Seismic Interpretation
- Geologic Interpretation of Seismic Data (3 EC)
- Petroleum Geology (3 EC)
- Sedimentary Systems (3 EC)
- Module: Advanced Reflection Seismology and Seismic Imaging (6EC)

B. Elective Modules

- Module: Methods of Exploration Geophysics and Programming
- Introduction to Reflection Seismology (1 EC)
- Matlab/Programming (2 EC)
- Methods of Exploration Geophysics (3 EC)
- Module: Geophysics Special Subjects (6 EC)
- Module: Geodesy and Remote Sensing (5 EC)
- Module: Seismic Resolution and Programming (5 EC)

Second term at ETH Zurich

You have two weeks to move to Zürich where your education continues at ETH Zurich with courses on modelling, processing and inversion of geophysical and hydrological data. It is during this period that you design and execute your geophysical field work. The course work at ETH Zurich ceases at the end of June.

A. Core Modules - at least a minimum of 2 out of the following 3 Modules must be passed:

- Module: Reflection Seismology Processing (practical) (6 EC)
- Module: Inverse Theory and Modelling for Applied Geophysics
- Modelling for Applied Geophysics (3 EC)
- Inverse Theory for Applied Geophysics (3 EC)
- Module: Geophysical Field Work & Processing
- Methods (2 EC)
- Field Work (7 EC)

B. Elective Modules

- Module: Groundwater (6 EC)
- Module: Soil Mechanics for Geophysics (4 EC)
- Module: Engineering and Environmental Geophysics (4 EC)

Third term at RWTH Aachen University

After the summer break, you continue in early October your programme at RWTH Aachen University, where you are educated in petroleum and exploration geology, well-logging, NMR- and IP-methods and geothermics. In November, the Master's Thesis topics will be presented, from which you can choose a project of your liking. Alternatively, you can propose your own project idea (requires approval of the Examination committee). The study period at Aachen ends by the end of February.



A. Core Modules - at least a minimum of 3 out of the following 4 Modules must be passed:

Module: Geophysical Special Methods

- Geophysics Special Methods: NMR (3 EC)
- Geophysics Special Methods: Spectral IP (3 EC)

Module: Geophysical Logging and Log Interpretation (5 EC)

Module: Geothermics (5 EC)

Module: Hydrogeophysics and Data Analysis in Geoscience

- Hydrogeophysics (3 EC)
- Data Analysis in Geoscience (3EC)

B. Elective Modules

Module: Sedimentary Basin Dynamics and Modelling

- Sedimentary Basin Dynamics (3 EC)
- Petroleum System Modelling (3 EC)

Module: Engineering Geophysics and Remote Sensing

- Remote Sensing of Sedimentary Basins (3 EC)
- Engineering Geophysics (3 EC)

Module: Mineral Exploration and Project Management

- Planning-Realization-Optimization in Georesource Management (3 EC)
- One out of two subjects have to be taken to complete the Module: Option 1: Mineral Exploration (3 EC), Option 2: Energy Resources Management (3EC)

Module: Geological Planning and Development

- Portfolio Management (3 EC)
- Prospect Evaluation and Risk Analysis (3 EC)

Fourth term: Master's Thesis

Subject to availability and an equitable distribution of active thesis projects amongst the three partner universities, every effort will be made to provide you with research themes that match your preferences and suit your knowledge, skills and experience. For most students, the 6-month thesis project will be performed at one of the three partner universities. Collaborative thesis projects may involve spending time at two of the partner universities. Some themes may involve extensive periods of closely supervised research in industry, government or other university laboratories.

Module: Master's Thesis

- Master's Thesis with colloquium (30 EC)

4 Useful Information

TU Delft

TU Delft is the largest university of technology in the Netherlands and has a history of over 170 years. Approximately 2500 scientific research and 1850 support staff are responsible for the education and research training of 17,500 bachelor and master students and 2300 PhD students at TU Delft. Consistently rated among the top universities of technology in Europe, TU Delft is a leading participant in the world of research and education in the Netherlands and abroad. Its eight faculties offer 15 Bachelor, 33 Master, and numerous Doctoral programmes organized in graduate schools in engineering sciences. They form an extended and trusted network of alumni contacts. The university is uncompromising in applying the strictest standards to its qualifications. A degree from Delft is an assurance that the person carrying it fully merits the honour. The international environment is represented in both staff and student populations. The excellent teaching and research infrastructure make TU Delft the ideal place for creative individuals who want to excel in engineering sciences. Connections with business and industry are strong and have a long history. At TU Delft, the Department of Geoscience & Engineering runs the Joint Master's programme in Applied Geophysics.

TU Delft campus and the city of Delft

The TU Delft campus is located just outside the city center of Delft. The university is situated close to the old inner city of Delft. The city of Delft is world famous for its historic town hall, impressive churches and narrow canals, charming little shops, galleries, bars and restaurants. In the Golden Age, Delft was a wealthy merchant city, housing VOC (Dutch East India Company) chambers, and home to famous scientists and painters such as Johannes Vermeer. A versatile offering of sports, cultural, and leisure activities provides a welcome complement to the intense and demanding student life.

<http://studenten.tudelft.nl/en/students/student-life/>



With its hundreds of high-tech companies and specialized institutes close by; Delft is at the heart of North West European technological progress. It is strategically well placed; close to the government centre of The Hague and the great port city of Rotterdam; within 30 minutes of the national capital Amsterdam and the sea. The area hosts some of the largest petroleum-geophysics linked interests in the world including Shell, Fugro-Jason, and the Netherlands Institute for Built Environment and Geosciences. The area possesses great intellectual dynamism.

Delft is at the cockpit of Europe; close to London, Paris, Berlin, and other major Euro-cities. By rail, road, air, and water Delft is easy to get to and easy to leave.

Accommodation at Delft

After being admitted you will receive information on how to arrange accommodation through the University. TU Delft arranges accommodation in cooperation with the housing organisation DUWO. Both private and shared student units are available.



ETH Zurich

Approximately 380 professors and 4600 research and support staff are responsible for the education and research training of 13,000 undergraduate and graduate students at ETH Zurich. Consistently rated among the top universities in Europe, ETH Zurich is a leading participant in the world of research and education in Switzerland and abroad. Its 16 departments offer Bachelor, Master and Doctoral programmes in engineering and natural sciences. The most famous graduate of ETH was none other than Albert Einstein, one of twenty-one Nobel laureates to have been associated with ETH as a student or during their professional careers. The international environment – ca. 60% of the professors come from outside of Switzerland – and the excellent teaching and research infrastructure make ETH Zurich the ideal place for creative individuals. Connections with business and industry are strong, as the greater Zurich area is the economic centre of Switzerland and home to numerous international companies. At ETH Zurich, the Joint Master's programme in Applied Geophysics is run by the Department of Earth Sciences.

Campus and City

ETH has two principal locations: one in the centre of Zurich and the Science City campus at Hönggerberg, just outside the city.

A versatile offering of sports, cultural, and leisure activities provides a welcome complement to the intense and demanding student life. Zurich is an attractive city with an extremely high standard of living. Although relatively small, with 360,000 inhabitants, Zurich has a metropolitan flair, excellent sports facilities, an extensive range of cultural and recreational offerings – and a very vibrant nightlife. The beautiful location at the end of Lake Zurich makes the city very pleasant in the summer and winter. The nearest ski slopes are less than an hour away.

Accommodation at Zurich

ETH provides student dorms. «International Student support» will send you the procedures of how to apply.



RWTH Aachen

RWTH Aachen University is one of the most renowned Technical Universities in Europe. It has approximately 35,000 students and an academic staff of 2,420 – 460 of whom are full professors. RWTH Aachen University's long-standing reputation for research and educational distinction attracts students from all over the world: Currently over 5,000 international students from more than 130 different countries are part of our academic community.

RWTH Aachen University's reputation for excellence in teaching, learning and research started in 1870, when the university was founded with considerable support from local companies. Originally a polytechnic institute, it became the Rheinisch-Westfälische Technische Hochschule Aachen (RWTH Aachen University) in 1948.

Nowadays, close cooperations in research and development between the Departments of Engineering and Natural Sciences and numerous important companies contribute decisively to RWTH Aachen University's competitiveness at the national and international level. The establishment of international research centers by major companies such as Microsoft, Ford and United Technologies as well as a large number of start-up companies in the Aachen region, proves the university's strength in innovation.

At RWTH Aachen University, the Joint Master's programme in Applied Geophysics is run by the Division of Earth Sciences and Geography of the Faculty of Georesources and Materials Engineering (<http://www.fb5.rwth-aachen.de/cms/Fakultaeten/~hgv/Georessourcen/?lid=1>).

Campus and City

RWTH Aachen university is distributed over the City of Aachen to five campuses: Campus Mitte, Campus West, Campus Sued, Campus Hörn and Campus Melaten (http://www.rwth-aachen.de/cms/main/root/Die_RWTH/~emu/Kontakt_Lageplaene/?lid=1). Students participating in the Applied Geophysics Master's programme spend most of their time at Campus Mitte and Campus Melaten.

Your life in Aachen – Enjoy the European flair: Aachen is an ancient city, which was already greatly appreciated by

the Romans for its thermal springs. To this day Aachen is famous for the curative effects of its thermal waters. Its historical importance dates back to the days of emperor Charlemagne, the "father of Europe".

Aachen cathedral, which became the first German building to be listed as a UNESCO world heritage site, the gothic city hall and the cathedral treasury give testimony to the city's rich cultural heritage and beauty.

Aachen is a medium-sized, international city of 250,000 residents, whose lives are perceptibly influenced by its geographical location: Being Germany's westernmost city, Belgium and the Netherlands can be reached easily within just a few minutes. Other major cities such as Brussels, Cologne and Düsseldorf are just a short trip away.

The narrow winding streets in the city center and its numerous fountains render Aachen a very romantic and idyllic place. Aachen is also famous for its annual events such as the CHIO, the World Equestrian Festival, and the awarding ceremony of the International Charlemagne Prize, which is awarded in recognition of services promoting European peace and unity. For detailed information please visit: <http://www.aachen-emotion.com/en-students/content/welcome-to-aachen-students>.

Accommodation at Aachen

Student dorms (furnished rooms at a reasonable price) are available via application at Studentenwerk Aachen (<http://www.studentenwerk-aachen.de/en/willkommen.asp>). Studentenwerk Aachen is informed about the expected students for the Aachen term briefly after your study start at TU Delft in order to provide an appropriate contingent of student dorms. However, it is your responsibility to book a room at Studentenwerk Aachen. Further information, including the private accommodation market, can be found under http://www.rwth-aachen.de/cms/main/root/Studium/Vor_dem_Studium/~egp/Wohnen_in_Aachen/?lid=1.

