GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2019-2020

Geochronology (C003336)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size *(nominal values; actual values may depend on programme)*

Credits 6.0 **Study time 150 h** **Contact hrs** 65.0 h

Course offerings and teaching methods in academic year 2022-2023

A (semester 1)	English	Gent	excursion	5.0 h
			lecture	30.0 h
			seminar: coached exercises	10.0 h
			practicum	20.0 h

Lecturers in academic year 2022-2023

De Grave, Johan	WE13	lecturer-in-charge
Vandenberghe, Dimitri	WE13	co-lecturer

Offered in the following programmes in 2022-2023	**crdts**	**offering**
Master of Science in Teaching in Science and Technology (main subject Geology)	6	A
Master of Science in Geology	6	A
Master of Science in Geology	6	A
Exchange programme in Geology (master's level)	6	A

Teaching languages

English

Keywords

Geochronology, thermochronology, tectonics, Quaternary, deep time, geological time scale, geomorphology, stratigraphy, sediments, magmatism, metamorphism.

Position of the course

This course is a compulsory course in the Masters program of Geology. The aim of this course is to familiarize the student with well-established dating techniques (e.g. U/Pb, Ar/Ar, Lu/Hf, OSL, ^{14}C, FT, U-Th/He, etc ...). An important focus will be directed towards the specific applications of these methods in a broad spectrum of geological time, ranging from the Quaternary, over the Phanerozoic to the Precambrian. This is further iluustrated by using several case studies.

Contents

Methodological aspects of dating techniques (e.g. U/Pb, Ar/Ar, Lu/Hf, OSL, ^{14}C, FT, U-Th/He, etc ...); their applications and applicability to specific time frames; geological time scale. Interpretation and implications of age determinations, radiometric techniques, isotopic systems, isotope geochemistry and their fundamentals. Absolute versus relative age determination. Materials and case studies in geology, geomorphology, tectonics, (geo)archaeology, paleoclimatology, natural radioactivity, solar system and meteorites. Several methods will be explored via guest lectures and/or excursions.

Initial competences

Knowledge of mineralogy, petrology, geochemistry, stratigraphy, physical geography, physics and chemistry.
The student successfully graduated for the course "Isotope geology" or equivalent.

Final competences

1 Obtaining a thorough knowledge and understanding of the investigated dating methods and the underlying (isotope)(geo)chemical principles.
2 The student develops knowledge in obtaining an understanding the analytical techniques involved.
3 He or she understands the treated methods and develops insights in the materials, time frames and contexts of their applicability; included hereby are the possibilities and limitations for each of the methods used.
4 Also the principles of precision and accuracy will come into play and the knowledge of statistical treatment of the data and the uncertainties on the ages will be a final competence for the student.
5 The student will be able to interpret different ages and place them into context.
6 Understanding of branch-specific literature and evaluating where and how certain methods can be used in the broad framework of earth sciences.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Excursion, lecture, practicum, seminar: coached exercises

Extra information on the teaching methods

Guided lab visits and potential field work, literature study.

Learning materials and price

Course notes, hand-outs, copies, papers, powerpoints, electronic files via Ufora or other platforms (estimated costs: 15-25 euro for copies, hand-outs, excursions and practical materials).

References

- Detrital thermochronology. Matthias Bernet & Cornelia Spiegel (2004). Geological Society of America, special paper 378.
- Low-temperature thermochronology: techniques, interpretation, and applications. Peter W. Reiners & Todd A. Ehlers (2005). Mineralogical Society of America, Reviews in Mineralogy & Geochemistry, volume 58.
- Isotopes: principles and applications (third edition). Gunter Faure & Teresa M. Mensing (2005). John Wiley & Sons.
- Age Determination of Young Rocks and Artefacts. G.A. Wagner (1998). Springer – Verlag.
- Quaternary Dating Methods. M. Walker (2005). Wiley.
- An introduction to optical dating: The Dating of Quaternary Sediments by the use of Photon-stimulated Luminescence. M.J. Aitken (1998). Oxford University Press.
- Radiogenic isotope geology. Alan P. Dickin (1995). Cambridge University Press.

Course content-related study coaching

Tutoring and assistance during the seminars and practical exercises. Communication via the internet (Ufora platform) and E-mail. Personal appointments possible. Guidance during practical work in lab and on the field.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions

Examination methods in case of permanent evaluation

Assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Calculation of the examination mark

- End-of-term examination: 80%.
- Permanent evaluation and assignments: 20 %.