



BASIN ANALYSIS	
Enrollment year	2021/2022
Academic year	2021/2022
Regulations	DM270
Academic discipline	GEO/02 (STRATIGRAPHIC AND SEDIMENTOLOGICAL GEOLOGY)
Department	DEPARTMENT OF EARTH AND ENVIRONMENTAL SCIENCES
Course	GEOSCIENCES FOR SUSTAINABLE DEVELOPMENT
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	Annual (04/10/2021 - 10/06/2022)
ECTS	6
Lesson hours	60 lesson hours
Language	English
Activity type	WRITTEN AND ORAL TEST
Teacher	AMADORI CHIARA - 4 ECTS DI GIULIO ANDREA STEFANO - 2 ECTS
Prerequisites	<p>The course does not have propaedeutic relationships with other courses in the degree program.</p> <p>However, basic knowledge is required such as the principles of stratigraphy (original horizontality, stratigraphic superposition, original lateral continuity, inclusion, intersection and chronological equivalence) and sedimentology (Walther's law). Concepts of structural geology (definition and recognition of folds and faults) and geodynamics (Wilson's cycle) are also required.</p>
Learning outcomes	<p>The module aims to provide fundamental knowledge on modern analytical and stratigraphic approaches used in the study of factors controlling the origin of sedimentary basins, the most populated areas in the world and where strategic resources (water and hydrocarbons) are accumulated.</p> <p>Special emphasis is given on the study of basin syn- and</p>

post-depositional evolution, thus defining the geometries, lithostratigraphic and thermal variations of sedimentary systems that actually reflect the interaction of tectonic and geodynamic processes involving the lithosphere. The course aims to integrate multidisciplinary knowledge such as stratigraphy, sedimentology, seismic, structural geology, numerical modeling, thermochronology, to the analysis of the major sedimentary systems existing on Earth, and project these concepts towards future useful applications both in the profession of Geologist, and industry oriented to the energy transition towards a sustainable model in accordance with goal #7 of the UN Agenda 2030: "Ensure access to affordable, reliable, sustainable and modern energy for all".

Course contents

The module is structured in two main blocks:

Part 1: Origin and classification of sedimentary basins. The effect of subsidence and the main characteristics of sedimentary basins associated to (1) divergent, (2) convergent and (3) transcurrent contexts will be investigated. Examples of current and geologic basins in each particular context will be provided.

Part 2: How to reconstruct the thermal history of a sedimentary basin. We will go through the most important analytical methods used to reconstruct the burial history, diagenetic and thermal evolution of sedimentary basins, such as: thermal indicators, vitrinite reflectance analysis, geohistory analysis, apatite fission-track analysis and fluid inclusion microthermometry.

The module is completed by an excursion of a few days in an Italian sedimentary basin.

Teaching methods

The module consists of 32 hours of face-to-face lectures, including presentations and analysis with discussion of geologic and thematic maps. The module also includes an additional 2 CFU of field excursions with exercises, scheduled for the second semester.

Reccomended or required readings

Allen, and Allen. Basin analysis (third edition): principles and application to petroleum play assessment. ISBN 978-0-470-67376-8 (pbk.) – ISBN 978-0-470-67377-5 (hardback) – ISBN 978-1-118-45030-7 (epub). Scientific articles and materials provided by the teacher.

Assessment methods

The final exam is an individual interview on the topics approached during the course. This could also include a geologic map analysis and/or seismic section in order to reconstruct geologic history. Students will be expected to demonstrate the ability to reason about causes and effects of geological processes. Also, students will be asked to recognize sedimentary systems related to current geodynamic environments through large-scale topographic analysis (e.g., Google Earth). Communication skills and use of appropriate scientific language will also be considered in the overall evaluation.

Further information

Students who do not attend the classes are invited to contact the teacher in order to integrate their preparation with additional didactic material that will be provided to them on the basis of their needs, which will be examined by the teacher with a special preliminary interview.

**Sustainable development
goals - Agenda 2030**

This module, and in general the entire course of Basin Analysis and Tectonic Processes, aims to lay the notional and practical foundations for the informed growth of the geoscientists of the future who will lead the energy transition, according to the goal #7 of UN Agenda 2030: “Ensure access to affordable, reliable, sustainable and modern energy for all”.

[\\$ibl legenda sviluppo sostenibile](#)