Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	**District Heating Systems Design**
Course code	45515
Scientific sector	ING-IND/10
Degree	Master Energy Engineering
Semester	II
Year	2°
Academic year	2020/2021
Credits	6
Modular	1

Total lecturing hours	50
Total lab hours	-
Total exercise hours	10
Attendance	Free
Prerequisites	-
Course page	To be indicated

Specific educational objectives	The main educational objectives are: - the presentation of the methodology to calculate the main technical indexes to evaluate the benefits of the District Heating (DH) implementation on Energy scenarious; - to train the student on the use of the most appropriate methodology and engineering tools for the design of a district heating network; - to propose an integrate approach based on both technical and economical analysis of DH proposals.

Lecturer	Maurizio Grigiante
Scientific sector of the lecturer	ING-IND/10
Teaching language	English
Office hours	10
Teaching assistant *(if any)*	-
Office hours	-
List of topics covered	Energy analysis; District Heating Design Procedures and Methodologies; Economical Analysis; District Heating Index Evaluations
Teaching format	Classroom-taught lessons

Learning outcomes	**Knowledge and understanding:** - fundamental knowledge regarding the specific energy balance approach involved on District Heating technology and devices; - knowledge of the procedures conventionally adopted on the design of district heating pipe lines involving: central energy power calculation and definition, heating and cooling parameters definition and calculations, main users facilities calculation procedures. **Applying Knowledge and understanding:** **-** knowledge pertaining the operative tool for DH design: central plant potentiality estimation; pipe lines design of the DH network involving geometrical definitions and fluid flow parameters (diameters, mass flow rate, pressure drop...) - understanding the technical meaning of the main parameters and indexes pertaining the performances of the designed DH including the economical evaluation. **Communication skills:** - to learn the capability and the ability of proposing and discussing the complex problems pertaining the decisions involved on the realization of a DH including also the competences pertaining the technical details, - to acquire the ability in communicating the proposed design solutions based on the local conditions on which the DH proposal has to be addressed. **Learning skills:** **-** knowledge regarding the evaluation of the technical feasibility of a DH; - the capability of understanding schemes, technical parameters and the indexes regarding the performances of a DH and of the components devices; - the capability of evaluating the solutions involving innovative solutions including active DH grids (smart DH).
Assessment	The assessment is based on the presentation of a DH project selected on the bases of the student proposals according to the constrains indicated by the teacher. This approach will be mainly oriented to consider the evaluation of the applied knowledge acquired during the course and the attention the student pays on the different aspects of this technology including its integration among the involved technical and economical issues.
Assessment language	English
Evaluation criteria and criteria for awarding marks	The evaluation criteria are: - check of the fundamental and applied knowledge

	involved on DH design procedures; - evaluation of the consistency between the proposals of the project and the obtained results for the selected project; - the completeness of the design project including the accuracy of technical details of both the design and the corresponding evaluation of the economical analysis; The awarding marks are equally subdivided among the three indicated points of the indicated evaluation.

Required readings	Actually the structure of the course does not requires readings. These will be indicated and provided by the teacher during the course.