



ATTACHMENT – DESCRIPTION OF CURRICULUM

INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION

Family name(s): FANG

Given name(s): XIAOQING

Date of birth (day/month/year): 07/12/1999

Student identification number or code (if available): 2113232

1 FORMATIVE ACTIVITY (code): Water and solid waste treatment plants (10595646)

FORMATIVE AIMS: The objectives of the course are to provide the student knowledge to plan and manage skills in the context of treatment plants for both municipal solid waste and waste water from both civil and industrial origin. The notions necessary for the design and management of technologies are therefore provided to the student through concepts relating to biological, chemical and physical processes that form the basis of the treatment of both municipal solid waste and waste water. The course provides the student with the basic processes and technologies to deal with problems related to the treatment of waste water and solid urban waste. The student will have at the end of the course a solid background to manage both the design phase and the management of liquid and solid waste treatment and disposal (knowledge and understanding). During the course a design will be developed either of a purification plant or of a waste collection system in an urban environment (applying knowledge) in which the design choices will be faced by the student (making judgments).

COURSE CONTENTS: Description of the main pollutants in waste water Review of biology applied to functionalities in a purification plant Activated sludge, design and individual operating units Adhesive biomass reactors, operating principles, design The resulting sludge treatment line The final disposal of water and sewage sludge Definition of Urban Solid Waste Methodologies for collecting MSW The selection and recovery plants Energy recovery plants Final disposal plants: incineration, composting, landfill, co-digestion

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

2 FORMATIVE ACTIVITY (code): Urban health and Sustainable transport (10595658)

FORMATIVE AIMS: The link between the morphological characteristics of urban contexts and Public Health is a highly topical aspect, given the phenomenon of urbanization that characterizes contemporary society. Health is not only a specifically health problem, but a priority strongly influenced by the environmental and urban context and by strategies implemented by local government. Urban transportation is one example of how local policies can influence health and environmental sustainability. Educational objectives of the course

- To know the environmental factors that influence human health, with particular reference to the built environment.
- To know how epidemiologic studies can help to quantify health risks related to environmental factors.
- To understand how performing a health impact assessment through the analysis of case studies
- To evaluate the health benefits of the application of healthy building and urban design good practices
- To know strategic urban planning actions on large and small scale able to improve population health and wellness, with particular reference to transport policies.
- To understand the potential in terms of health risk reduction and environmental benefits that could derive adopting of sustainable choices. At the end of the course, the students should be able:
- To identify health risks that could arise from incorrect planning /designing/ management of built environments.
- To know good technical practices and the main indications on mitigation interventions to prevent disease and environmental risks
- To be able to perform an integrated analysis about health and environmental benefits of sustainable choices at neighborhood scale

SUSTAINABLE TRANSPORT The link between the morphological characteristics of urban contexts and Public Health is a highly topical aspect, given the phenomenon of urbanization that characterizes contemporary society. Health is not only a specifically health problem, but a priority strongly influenced by the environmental and urban context and by strategies implemented by local government. Urban transportation is one example of how local policies can influence health and environmental sustainability. Educational objectives of the course

- To know the environmental factors that influence human health, with particular reference to the built environment.
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- To know strategic urban planning actions on large and small scale able to improve population health and wellness, with particular reference to transport policies.
- To understand the potential in terms of health risk reduction and environmental benefits that could derive adopting of sustainable choices. At the end of the course, the students should be able:
- To identify health risks that could arise from incorrect

planning /designing/ management of built environments. • To know good technical practices and the main indications on mitigation interventions to prevent disease and environmental risks • To be able to perform an integrated analysis about health and environmental benefits of sustainable choices at neighborhood scale

URBAN HEALTH The link between the morphological characteristics of urban contexts and Public Health is a highly topical aspect, given the phenomenon of urbanization that characterizes contemporary society. Health is not only a specifically health problem, but a priority strongly influenced by the environmental and urban context and by strategies implemented by local government. Urban transportation is one example of how local policies can influence health and environmental sustainability. Educational objectives of the course • To know the environmental factors that influence human health, with particular reference to the built environment. • To know how epidemiologic studies can help to quantify health risks related to environmental factors. • To understand how performing a health impact assessment through the analysis of case studies • To evaluate the health benefits of the application of healthy building and urban design good practices • To know strategic urban planning actions on large and small scale able to improve population health and wellness, with particular reference to transport policies. • To understand the potential in terms of health risk reduction and environmental benefits that could derive adopting of sustainable choices. At the end of the course, the students should be able: • To identify health risks that could arise from incorrect planning /designing/ management of built environments. • To know good technical practices and the main indications on mitigation interventions to prevent disease and environmental risks • To be able to perform an integrated analysis about health and environmental benefits of sustainable choices at neighborhood scale

COURSE CONTENTS: SUSTAINABLE TRANSPORT APPOLLONI LETIZIA URBAN HEALTH APPOLLONI LETIZIA

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

3 FORMATIVE ACTIVITY (code): Environmental and urban planning in inner areas (10611766)

FORMATIVE AIMS: The course aims to provide the fundamental knowledge relating to territorial, urban and environmental planning and management in consideration of the more general sustainability objectives, as well as to develop (in addition to the technical specifications of analysis, design and management in the environmental, urban and territorial fields) a mastery of urban and environmental planning approaches and methodologies, with particular reference to the perspectives of participatory planning, local development and sustainable development, but above all with particular regard to the specific situation of internal areas, i.e. those territories characterized by high degrees of naturalness, low anthropic density (and depopulation trends), dispersed settlements and lower availability of services, but which in any case are characterized by important potential to be exploited.

COURSE CONTENTS:

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

4 FORMATIVE ACTIVITY (code): Digital modelling for architecture (10595643)

FORMATIVE AIMS: The course in Digital Modeling for Architecture reflects the issues already discussed during the first year of Descriptive Geometry and Architecture Drawing of the Degree in Sustainable Building Engineering on the geometric shape of space and built on the fundamentals of solid geometry as a basis for defining the abstract geometric model. The different ways of the geometric model representation define the basic tools available to engineer who works in the field of sustainable buildings. The representation is understood here in both the canonical form of two-dimensional graphical model in more modern form of 3D computer model and BIM. The course has the goal to revisit in an organic way the concepts of solid geometry that have direct application in the architectural design and in the existing buildings knowledge (architectural survey) providing the tools and knowledge base to operate through the digital model.

COURSE CONTENTS: The Digital Modeling for Architecture course focuses on the definition of the abstract model, rooted in solid geometry and developed from the configuration of built space. Digital models represent a fundamental tool through which engineers working in the field of building construction and environmental systems can understand, analyze, and design architecture. The course provides a theoretical framework for understanding the differences among a wide range of heterogeneous digital models, as well as the tools and application strategies required to create and manage them within a three-dimensional digital environment. The course aims to equip students with advanced skills in architectural surveying and 2D/3D digital modeling. The use of survey data acquired through terrestrial laser scanners (TLS), integrated within a continuous parametric modeling environment, offers an effective method for the documentation, analysis, and communication of architectural heritage. More generally, the course provides the fundamental tools and knowledge necessary to understand existing architecture and to operate coherently within virtual space. The course is structured into three main parts. The first part focuses on architectural surveying, introducing the concept of metric accuracy and providing an overview of the main survey methods and techniques. Students will work with 3D point clouds derived from different sources to extract two- and three-dimensional models. The second part is dedicated to the principles of Building Information Modeling (BIM) as a mathematical-parametric approach that enables control over shapes and geometries in the construction of architectural 3D digital models. The third part presents BIM as a complex information system, rather than merely a 3D model,

emphasizing its role as a queryable database from which various types of information can be extracted (e.g., material take-offs, quantity take-offs, room data). The course awards 9 CFU (90 hours of instruction in total) and belongs to the scientific disciplinary sector ICAR/17. The CFU (University Formative Credit) is the unit used by Italian universities to measure student workload for individual courses and for the entire master's degree program (120 CFU). Each CFU corresponds to 25 hours of student work, including 10 hours of in-class instruction and 15 hours of individual study. Each lesson combines theoretical instruction with practical applications. Applications and exercises are carried out partly in the classroom and partly at home, and include analog drawings, digital drawings, and, above all, the construction of 3D digital models. Course prerequisites include basic knowledge of two-dimensional CAD, principles of design and architectural composition, and familiarity with the graphic language of architectural representation (plans, elevations, and sections at various scales). 4 CFU – Survey Theoretical foundations and methodologies of architectural surveying; integrated digital survey; principles of 3D shape acquisition. 5 CFU – BIM Introduction to BIM processes, digital environments, and main modeling tools.

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

5 FORMATIVE ACTIVITY (code): Building design and H-BIM for architectural renovation (10595663)

FORMATIVE AIMS: The course aims to introduce students in the context of HBIM, the declination of Building Information Modeling specifically designed to adapt to the activities related to the knowledge, restoration, transformation and management of the built and historical built heritage of which our country is particularly rich. BUILDING DESIGN FOR ARCHITECTURAL RENOVATION The course aims to introduce students in the context of HBIM, the declination of Building Information Modeling specifically designed to adapt to the activities related to the knowledge, restoration, transformation and management of the built and historical built heritage of which our country is particularly rich. H-BIM FOR ARCHITECTURAL RENOVATION The course aims to introduce students in the context of HBIM, the declination of Building Information Modeling specifically designed to adapt to the activities related to the knowledge, restoration, transformation and management of the built and historical built heritage of which our country is particularly rich.

COURSE CONTENTS: BUILDING DESIGN FOR ARCHITECTURAL RENOVATION D'AMICO ALESSANDRO H-BIM FOR ARCHITECTURAL RENOVATION D'AMICO ALESSANDRO Sect.1.[I]HBIM basis Introduction to HBIM Regulatory and procedural aspects BIM and HBIM Level of Development and Level of Accuracy Sect.2.[II]HBIM operations HBIM and the Knowledge Framework The evolution phases of the historical heritage (4D of BIM) Detailed modeling for HBIM Representation techniques for constructive knowledge Sect. 3. [III] HBIM applications Building heritage management (6D of BIM) Seismic risk and construction heritage: HBIM for safety measures and anti-seismic devices HBIM for decay mapping and cracking patterns

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

6 FORMATIVE ACTIVITY (code): GEOTECHNICAL ENGINEERING (10589291)

FORMATIVE AIMS:

COURSE CONTENTS:

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

7 FORMATIVE ACTIVITY (code): Fundamentals of fluid mechanics (10593370)

FORMATIVE AIMS: The main objective of this course is to introduce to fluid properties, fluid flow behavior at rest and in motion. The fundamental equations for one-dimensional steady flows will be derived first, and then they will be applied to the study of simple pipe and open-channel flows systems. Knowledge and understanding: description and characterization of the fluid (water) behavior in static and dynamic conditions; Applying knowledge and understanding: understand and characterize the environment in its hydraulic aspects; learn how describe the hydraulics of an area of interest; Making judgements: carry out exercises and activities in group and/or individually; Communication skills: learn how to frame a specific problem and the possible solutions; Learning skills: we expect the student will be able to manage the fluid flow description both in its theoretical and practical aspects; a basic knowledge in hydraulics is fundamental in several courses of Master degree.

COURSE CONTENTS:

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

8 FORMATIVE ACTIVITY (code): Structural dynamics (10595647)

FORMATIVE AIMS: The objective of the course of Structural Dynamics is to provide the tools for the characterization of the dynamic response, in time-domain and in frequency-domain, of linear structures subjected to harmonic loads and base motions. In particular, single- and multi-degrees of freedom discrete systems, including the classical dissipative effects of viscous type and periodic forcing terms, are analyzed both in the time and the frequency domain. Modal analysis techniques are then adopted to study the

dynamic response of discrete systems subjected to generic loading condition with particular attention to the study of the response to assigned boundary displacement. Response spectrum analysis is then illustrated, and theoretically discussed, to study the structural response to seismic loads. Basics of modal analysis of one-dimensional continuum structural elements are given in the last part of the course. Finally, rudiments for the implementation in "ad hoc" computational software of the analytical methods taught in the course are provided to the students.

COURSE CONTENTS: Review of linear algebra basics: matrix and algebraic vectors operations, matrix diagonalization and eigenvalue problem, eigenvectors and their normalization, complex numbers and Euler formula, complex eigenvalue problem. Review of statics: kinematics of rigid bodies, Euler axioms to study the equilibrium of rigid bodies. Force-displacement and moment-rotation relationships and equilibrium equations in terms of kinematic parameters. Dynamic problem: geometrical and mechanical aspects of the analytical modelling, time-depending parameters, and motion of a structure, linear constitutive behaviors and rheological models. Forces, moments, and energies of a dynamical system. Formulation of the equations of motion: direct formulation via the balance of forces and moments and the variational approach. Conservative and nonconservative forces. Single-degree-of-freedom systems (SDoFS): Equation of motion via direct and variational formulation, free undamped oscillations, the effect of initial conditions. The space-state variables and the formulation, and the solution, of the equation of motion of SDoFS in the space state. Complex and real forms of the solution. Free damped oscillations: direct and variational formulations of the equation of motion (second-order, and first-order in time equation of motion) and its solution. Complex and real forms of the solution. Definition of damped frequency and damped period of oscillation. Critically damped systems, overdamped systems, and underdamped systems. Forced oscillations of undamped and damped SDoFS: Harmonic excitation, frequency-response curve for undamped and damped harmonically excited SDoFS, the dynamic amplification factor and the resonance phenomenon. The Fourier series and the periodic excitation. The Fourier transform and the logarithmic decrement method. Arbitrary excitations in SDoFS, some case study and analytical solution. Methods for the numerical solution of the equation of motion of SDoFS (pills) Displacement-induced excitations: the case of the ground motion or earthquake excitation. Equation of motion and its solution. Response spectrum: deformation, pseudo-velocity, and pseudo-acceleration response spectra. Difference between design and response spectra. The effect of the dissipation in response spectra. The geometric stiffness and the example of system not possessing elastic stiffness: the rigid pendulum. Nonlinear form of the equation of motion of the pendulum (direct and variational approach), solution of the linearized equation of motion and its limitations. Direct and parametric excitations. Multi-degree-of-freedom systems (MDoFS): direct and variational formulations of the equations of motion. Free undamped oscillations and the modal analysis. Solution in the state-space. Complex and real forms of the solution. Natural frequencies and linear normal modes. Orthogonality of the modes and their normalization. The modal space and the modal coordinates, solution of the free undamped oscillations in the modal space. Solution of the free damped oscillations in the modal space the case of classically damped systems and discussions on non-classically damped systems. Solution of the forced oscillations in undamped and damped MDoFS by means of the modal analysis. The case of earthquake excitation in MDoFS: excited mass and response spectrum method. Analysis of a two-degree-of-freedom (TDoFS) system and example of vibration absorbers (Tuned Mass Dampers) Systems with distributed mass and elasticity: short recap on the kinematics and the equilibrium of the Euler-Bernoulli beam, linear elastic force-strain relationships, and equilibrium in terms of axial and transversal displacement. Equations of motion of the free undamped axial and bending oscillations of the Euler-Bernoulli beam subjected to different boundary conditions. Mode shapes, wave lengths and frequencies. Through all the course are planned applications on all the topics investigated in the lectures. To this end, the teacher will use a dedicated software, i.e., Mathematica, licensed by Sapienza. Homeworks assignments will be given during the course.

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

9 FORMATIVE ACTIVITY (code): Other educational activities to facilitate entry to the labour market (AAF2020)

FORMATIVE AIMS: Provide the students with methods and tools to facilitate integration into the world of work.

COURSE CONTENTS:

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10 FORMATIVE ACTIVITY (code): Foundation and earth retaining structures (10595645)

FORMATIVE AIMS: The course is aimed to provide the elemental tools to design earth retaining structures as well as shallow and deep foundations. Both the theoretical and the technological aspects are treated. Different stages of designing are discussed starting from in situ investigation, soil characterisation and soil profile definition, to end up with the choice of the most convenient solution considering both serviceability and ultimate limit states. Students will be able: to design earth retaining structures; to evaluate the bearing capacity of shallow foundations, the settlements induced by structure self-weight; and to calculate the bearing capacity of a single pile or a pile group, under both axial and lateral loads.

COURSE CONTENTS: The course will cover the following topics: 1. Fundamentals of Soil Mechanics (Short Review) 1.1. Soil Classification 1.2. Continuum Mechanics 1.3. Basic Constitutive Models 1.4. Principle of Effective Stress 1.5. Geostatic Stress 1.6. Soil Compressibility 1.7. Shear Strength of Soil 2. Shallow Foundations 2.1. Bearing Capacity 2.1.1. Bearing Capacity Equations 2.1.2. Bearing Capacity Factors 2.1.2.1. Shape, Depth, Ground and Base Coefficients 2.1.2.2. Footing with Eccentric or Inclined Loadings 2.1.2.3. Effect of Water Table on Bearing Capacity 2.1.3. Technical Code: Ntc-18 and Eurocode 7 2.1.4. Exercise: #1 ULS Safety Check of Spread Footing 2.2. Settlements 2.2.1. The Boussinesq Method for Pressure Increase due to Footing Pressure 2.2.2. Immediate Settlement 2.2.3. Consolidation Settlements 2.2.4. Exercises: #2 Stress induced by external loading; #3 Settlements 2.3. Structural Tolerance to Settlements and Differential Settlements 3. Pile Foundations 3.1. Type of pile foundations and method of construction 3.2. Bearing capacity under vertical load: single pile, pile groups 3.3. Bearing capacity under horizontal load: single pile, pile groups 3.4. Exercises #4, 5, and 6: 3.4.1.1. Bearing Capacity of a Single Pile 3.4.1.2. Bearing Capacity of a Pile group 3.4.1.3. Design the foundations of a high-voltage pylon 4. Earth-Retaining Walls 4.1. Types of retaining wall 4.2. Available solutions to evaluate the earth pressure acting on retaining walls 4.2.1. Rankine's Theory 4.2.2. Coulomb's Method 4.3. Design of Retaining Walls: Translation, Rotation, Bearing Capacity 4.4. Exercise #7 4.4.1. Design of a Retaining Wall
ASSESSMENT METHODS: Attestato di profitto
TEACHING METHODS: 30

11 FORMATIVE ACTIVITY (code): Remote sensing and GIS (10595644)

FORMATIVE AIMS: The course provide basic knowledge about Remote Sensing and how it is applied to the study and monitoring of Earth's surface and its environment. At the end of the course the student is able through GIS software and Remote Sensing Imagery to acquire qualitative and quantitative information about the territory at different scale and its change during the time. Course Goals Upon completion of the course, students will be able to.... 1. Define and describe basic remote sensing application 2. Analyse and explain remote sensing purposes, advantages, and limitations. 3. Describe basic characteristics of remote sensing imagery. 4. Use the most appropriate satellite imagery to acquire qualitative and quantitative information for a specific application 5. Use GIS software to data processing and analysis 6. Use LiDAR data for the production of Digital Terrain Models GIS The course provide basic knowledge about Remote Sensing and how it is applied to the study and monitoring of Earth's surface and its environment. At the end of the course the student is able through GIS software and Remote Sensing Imagery to acquire qualitative and quantitative information about the territory at different scale and its change during the time. Course Goals Upon completion of the course, students will be able to.... 1. Define and describe basic remote sensing application 2. Analyse and explain remote sensing purposes, advantages, and limitations. 3. Describe basic characteristics of remote sensing imagery. 4. Use the most appropriate satellite imagery to acquire qualitative and quantitative information for a specific application 5. Use GIS software to data processing and analysis 6. Use LiDAR data for the production of Digital Terrain Models REMOTE SENSING The course provide basic knowledge about Remote Sensing and how it is applied to the study and monitoring of Earth's surface and its environment. At the end of the course the student is able through GIS software and Remote Sensing Imagery to acquire qualitative and quantitative information about the territory at different scale and its change during the time. Course Goals Upon completion of the course, students will be able to.... 1. Define and describe basic remote sensing application 2. Analyse and explain remote sensing purposes, advantages, and limitations. 3. Describe basic characteristics of remote sensing imagery. 4. Use the most appropriate satellite imagery to acquire qualitative and quantitative information for a specific application 5. Use GIS software to data processing and analysis 6. Use LiDAR data for the production of Digital Terrain Models

COURSE CONTENTS: GIS The electromagnetic energy, the electromagnetic spectrum, atmospheric window, active and passive sensors, remote sensing platform. Source and characteristic of remote sensing data: RGB images, multispectral images, hyper spectral images, laser data. From RGB images to orthophoto: taking, orientation and plotting step. Ground control point and tie point. Check point. Product of photogrammetry: Vector map and wireframe model. Point cloud and orthophoto. From point cloud to DEM: DTM and DSM. Airborne laser scanner: point cloud. Satellite images: Landsat and Sentinel. Atmospheric correction. Image interpretation. Radiometric enhancement of images. Supervised classification techniques. Clustering and unsupervised classification techniques. Remote Sensing application. Elements of SAR REMOTE SENSING The electromagnetic energy, the electromagnetic spectrum, atmospheric window, active and passive sensors, remote sensing platform. Source and characteristic of remote sensing data: RGB images, multispectral images, hyper spectral images, laser data. From RGB images to orthophoto: taking, orientation and plotting step. Ground control point and tie point. Check point. Product of photogrammetry: Vector map and wireframe model. Point cloud and orthophoto. From point cloud to DEM: DTM and DSM. Airborne laser scanner: point cloud. Satellite images: Landsat and Sentinel. Atmospheric correction. Image interpretation. Radiometric enhancement of images. Supervised classification techniques. Clustering and unsupervised classification techniques. Remote Sensing application. Elements of SAR
ASSESSMENT METHODS: Attestato di profitto
TEACHING METHODS: 30

12 FORMATIVE ACTIVITY (code): Advanced processes and technologies for water sustainability (10595654)

FORMATIVE AIMS: ADVANCED PROCESSES AND TECHNOLOGIES FOR SUSTAINABILITY IN WATER MANAGEMENT The course aims to provide the student with knowledge on the processes, technologies and management strategies that must satisfy the principle of environmental sustainability in the water treatment sector. The solutions aimed at recovering the resource contained in the water, in terms of matter and energy, will be presented in the most modern vision of purification plants as a biorefinery. Along with the most widespread advanced treatment processes, of which the principles and operating characteristics and sizing parameters will be presented, some innovative treatment technologies and systems will also be illustrated with reference to energy and environmental impact. The emerging problems in the water treatment sector will also be discussed, as well as the possible solutions proposed so far.

COURSE CONTENTS: Introduction to the course. Sustainability in the water cycle. (3h) Energy issues in the water cycle. (2h) Advanced water characterization. Contaminants of emerging concern. (3h) Advanced treatment technologies. Ion exchange. Adsorption. Coagulation-flocculation. (12h) Sequencing Batch Reactor. (5h) Drinking water treatment plants. (3h) Advanced treatment technologies for the removal of CECs. (2h) Sludge production, treatment and minimization. (5h) Environmental Risk Assessment. Prioritization. (5h) SWOT Analysis. (3h) Life Cycle Costing Analysis. (2h) Water Safety Plans. (3h) Water Reuse. (2h) Matter and energy recovery from wastewater. (3h) Nature-based solutions. (2h) Carbon-footprint of water cycle. Definition, calculation and applications. (5h)

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

13 FORMATIVE ACTIVITY (code): Innovation materials for structural design (10600183)

FORMATIVE AIMS: The Course concerns Fiber Reinforced Polymer (FRP) composites for retrofitting of existing civil constructions and realizations of new ones. The required knowledge on Mechanical Properties of FRP materials will be introduced, together with the main industrial process adopted for the productions of FRP elements. Applications will be discussed and developed.

COURSE CONTENTS: The Course concerns Fiber Reinforced Polymer (FRP) composites for retrofitting of existing constructions and new realizations. Basic knowledge on mechanical properties and industrial processes will be introduced to develop specific design applications. The course covers: 1. Review of statics and structural mechanics; 2) Actions on structures: principles and codes; 3) Characterization of isotropic and orthotropic materials; 4) Composite materials for structural elements; 5) Structural verification (methodology, simplified evaluations, and FEM applications via SAP 2000); 6) Principles of sustainable structures (CO2 emissions) and structural safety; 7) Regulatory framework: characteristics of pultruded FRP; 8) ULS verification of profiles and joints; 9) SLS verification.

ASSESSMENT METHODS: Attestato di profitto

TEACHING METHODS: 30

14 FORMATIVE ACTIVITY (code): Final test (AAF2021)

FORMATIVE AIMS: The final exam consists of the discussion of the thesis of Degree and involves the acquisition of 17 credits. The thesis, with interdisciplinary and original content, is a pivotal moment for the verification of the knowledge acquired by the student and his ability to deepen and apply independently and original way the specific aspects of the modification of the territory for the purpose of settlement , the protection and enhancement of its environmental features. It will be carried out under the supervision of a teacher among those of the Degree (Rapporteur) and with the concurrence of at least a second teacher, expert in a discipline different from that of the rapporteur. The final test is intended to evaluate the thesis developed by the candidate and the possession of appropriate communication skills, in reference to the specific learning outcomes.

COURSE CONTENTS:

ASSESSMENT METHODS:

TEACHING METHODS: