| Course of Study - General Information | |
|---|---|
| **University** | Sapienza University of Rome |
| **Italian name of the Degree Course** | Ingegneria per l'Edilizia Sostenibile (IdSua: 1540590) |
| **English name of the Degree Course** | Sustainable Building Engineering |
| **Course Code** | L-23 - Science and Techniques of Constructions |
| **Language Course** | Italian |
| **Web References** | http://corsidilaurea.uniroma1.it/sustainablebuildingengineering/the-course |
| **Fees** | http://www.uniroma1.it/didattica/tasse |
| **Carrying out form** | Conventional course |

| Structure and Staff | |
|---|---|
| **Dean of the Degree Course** | SAPPA Giuseppe |
| **Council for the Degree Course** | CAD Sustainable Building and Environmental Engineering (RIETI) |
| **Academic Structure Reference** | Civil, Building and Environmental Engineering |
| **Other Structures Reference** | Basic and applied sciences for engineering<br>Chemical engineering, materials, environment<br>Structural and geotechnical engineering |

**University Professorships**

| N. | Surname | Name | Sector | Position | Weight | SSD Type |
|---|---|---|---|---|---|---|
| 1 | CELLAMARE | Carlo | ICAR/20 | Associate Professor | 1 | Characteristic |
| 2 | CHIAVOLA | Agostina | ICAR/03 | Associate Professor | 1 | Characteristic |
| 3 | GRIGNAFFINI | Stefano | ING-IND/11 | Associate Professor | 1 | Characteristic |
| 4 | NAPOLITANO | Francesco | ICAR/02 | Full Professor | 1 | Characteristic |
| 5 | NARDINOCCHI | Carla | ICAR/06 | Researcher | 1 | Characteristic |
| 6 | PETRUCCI | Elisabetta | ING-IND/22 | Associate Professor | 1 | Characteristic |
| 7 | ROTISCIANI | Giada Maria | ICAR/07 | Researcher | 1 | Characteristic |
| 8 | VIVONA | Doretta | MAT/07 | AS | 1 | Basic |
| 9 | ARENA | Andrea | ICAR/08 | Researcher | 1 | Characteristic |

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|---|---|
| **Student Representative** | Ricci Federico federico.ricci@oecis.it |
| **Management Group AQ** | CRISTIANA MELILLI<br>Carla Nardinocchi<br>Federico Ricci<br>Giuseppe Sappa |
| **Tutors** | GIUSEPPE SAPPA<br>STEFANIA ESPA |

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| | AGOSTINA CHIAVOLA<br>CARLA NARDINOCCHI<br>GIADA MARIA ROTISCIANI<br>ANDREA ARENA |

| | **The Course in Brief** |
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The Degree in Sustainable Building Engineering is aimed to make students familiar with the knowledge and the skills which can provide a sustainable future both to existing buildings and to those they will design and build; actually, achieving the goal of sustainable development, continues to be among the major global issues of our era. The main purpose of this degree will be to update the traditional, worldwide appreciated, Italian civil and architectural engineering skill, opening its sensitivity to the environmental protection and to a marked attention to sustainable development. Given the above, this degree is dedicated to students coming from many countries, especially those where Italian building and environmental engineering consultants or companies have designed and built important private and public buildings.

To reach this target, the Degree must ensure the acquisition of high scientific and technological contents, and provide the ability to design, plan and manage solutions for the many and complex situations in terms of sustainable architecture, built environment sustainability of territories, through the application of the following principles:

- Lowering the energy demand and consumption by existing and new buildings
- Taking advantage of climate and natural resources to develop passive design strategies and sustainable architecture
- Reusing or recycling building components and materials
- Extending the lifetime of products and buildings
- Risk-free returning materials to the natural cycle
- Adopting a sustainable use of the territory and a participatory planning and design
- Reducing urban sprawl, promoting urban renewal and protection natural areas

This degree is especially dedicated to form professionals that are ready to take on different projects either locally or at international scale. In the design phase, a sustainable building engineer is ready to develop and control sustainable design strategies in architecture and urban planning; during the construction process, he/she is able to use sustainable and recycled materials, to minimize the waste flows and to avoid damages to the urban surrounding or to the natural environment. As a facility manager, he/she knows how to reduce the energy demand, how to alternatively use other natural resources, and how to settle new activities in a sustainable manner.

This program also provides students with the scientific knowledge needed to obtain an appropriate technical and operational training in the fields of Architectural and Environmental Engineering, whose major target is the organization, protection and modification of built environment and territory, for settlement purposes.

Targets of this course is also the acquisition of analytical skills for recognizing, understanding, planning and designing under complex environmental conditions. By teaching the multiple activities of management, design, development, production at the different operational scales, that are the core of the building industry, this course is intended to provide students with the basic knowledge to approach the activity of transforming a territory in its physical, economic, social and morphological aspects, from a sustainable point of view.

The course starts from the knowledge of basic subjects, such as physics, mathematics, engineering geology, and building representation, and continues with the teaching of application and intervention techniques in multidisciplinary fields of sustainable building engineering, like urban planning, architectural technology, hydraulics, hydrology, environmental engineering, planning, structural mechanics, structural techniques, geotechnics and road constructions, which will be taught stressing the specific aspects of sustainable development; all the previous subjects will be enriched with the teaching of principles of

environmental health and of materials technology for sustainable construction. As a consequence of that all, the Sustainable Building Engineer will be able to deal with the many complex problems of building engineering, starting from the design and going on with works management, with a special sensitivity to environmental protection and environmental risks prevention.
The Degree course has also the main purpose of preparing the Degree holder to the Master of Science in Environment and Sustainable Building Engineering, that provides a more complete and thorough preparation and specific skill in the subject areas responsible for intervention on the built environment and the territory, to recover and to protect it.
The portion of the total time available to the student for personal study or other individual learning activities is at least 60% of this (15 h of self-study for 1 CFU).
The Degree course aims to form a professional able to operate in the current complex built environment and to modify the territory in a sustainable way, providing him with the scientific and technical preparation necessary for appropriate technical and operational training in the fields of Architectural and Environmental Engineering.

| A1.a | Consultations with representative organizations of the production of goods and services, of professions, at national and international level (Institution of the course) |
|---|---|

The Degree in Sustainable Building Engineering is the natural evolution of the educational offer, proposed by Sapienza University in Rieti, since more than twenty years. It has been set up according to specific requests coming from local and national stakes holders. Before setting up the studies program in the English language version, they have been met all the most important institution representatives, like the Rieti Province President and its main technical managers, the Latium Region Council Representative in Rieti, which is, also, the Director of the Sabina University Consortium, with the President of the Sabina University Consortium, the President of Industrial Consortium of Rieti, the Representatives of the Technical Professional Associations and last, but not least the representatives of the Varrone Fundation, which is the most important financial sponsor of University in Rieti. All of them have agreed with the proposal of providing the Degree Course in Sustainable Building Engineering in English language. As well they have been consulted some international stakes holders, by the Sapienza University International Office, which guaranteed their interest in this Degree Course.
Nowadays relationships between the Sapienza University and the Sabina University Consortium are ruled a twenty years agreement, signed in November 2007, which is confirmed and implemented with mutual commitments any three years.
The training structures of higher educational institutions and a representation of users also took part in this agreement which the conventional acts and the related implementation protocols are deposited at the Sapienza University. With regard to the current curricular change, the Board of the Consortium Company, on November 2017, took note of the initiative and assured its effective collaboration. Furthermore, after having assessed in detail the Academic Offer of the faculties, the organizations themselves have expressed a favorable opinion on the establishment of the single courses.

| A1.b | Consultations with representative organizations of the production of goods and services, of professions, at national and international level (Institution of the course) |
|---|---|

In the months of July 2015 and March 2016 the President of the Degree Course participated in FIGI meetings, in particular, in the last meeting, the Academic Manifesto of the Degree Courses were distributed to the companies to get back their feedbacks.
On January 2016 at 12 o'clock at the headquarters of the Rieti Industrial Unit, the Board of Directors of the Consortium Company and a representative of the Board met the President of the Consortium for the

Industrial Group of Rieti, the President of Unindustria for the Area of Rieti, the President of Assoindustria, and the President of the Chamber of Commerce to consult the main representatives of economic operators.
This meeting led to the decision to spread a questionnaire to the trade associations, to be filled in to their members, in order to know the degree of knowledge about the presence of the Degree Course in Rieti and expectations about the University Academic Offer in Rieti, as well as on possible collaboration in the field of specialized training, as well as research. In April 2016, dozens of completed questionnaires were received, which content is going to be processed.
In March 2017, the SUA form was submitted to the major companies in FIGI, which reports are published on the FIGI website.
In June 2017 it has been held a specific meeting between the Dean of Civil and Industrial Engineering Faculty of Sapienza University of Rome, present the Chair of Sustainable Building and Environmental Engineering – Site of Rieti, and all the most important stakes holders, including the Rieti Province President and its main technical managers, the Latium Region Council Representative in Rieti, which is, also, the Director of the Sabina University Consortium, with the President of the Sabina University Consortium, the President of Industrial Consortium of Rieti. In this meeting it has been approved the providing of the degree course in Sustainable Building Engineering, in Rieti, in English language, starting form academic year 2018-2019.Nowadays relationships between the Sapienza University and the Sabina University Consortium are ruled a twenty years agreement, signed in November 2007, which is confirmed and implemented with mutual commitments any three years.
The training structures of higher educational institutions and a representation of users also took part in this agreement which the conventional acts and the related implementation protocols are deposited at the Sapienza University. With regard to the current curricular change, the Board of the Consortium Company, on November 2017, took note of the initiative and assured its effective collaboration. Furthermore, after having assessed in detail the Academic Offer of the faculties, the organizations themselves have expressed a favorable opinion on the establishment of the single courses.

| A2.a | Career Opportunities |
|---|---|

The Degree in Sustainable Building Engineering is aimed to train a technical professional figure, able to carry out activities in different areas of the building sector, starting from the organization, protection and modification of built environment and territory, at different dimension levels in respect of environmental constraints and with the minimum environmental impact. Targets of this course is also the acquisition of analytical skills for recognizing, understanding, planning and designing under complex environmental conditions.

**Function in a work context:**
The graduate in the Degree in Sustainable Building Engineering will be able to understand the morphological, typological, structural and technological features of the organization, protection and modification of urbanized environment and territory, in relation to the environmental, social, economic, regulatory and productive context.

**Skills associated with the function:**
The specific skills of the graduate in the Degree in Sustainable Building Engineering concern all the operations connected with: the survey of the morphological and physical characteristics of the environment, of the urbanized areas and of the buildings; the identification and the evaluation of activities on the territory, produced by modifications for settlement purposes; planning and construction processes, in the different components; management, economic assessment, technical-administrative management of the processes for carrying out the interventions, including the processes of safety; management of industrial production processes for building components and systems, as well as for the maintenance of building structures, their integration and provision of services, and related safety.

**Employment opportunities:**

The graduate will then be able to apply the skills learnt at public and private institutions and companies, engineering companies, building and environmental industries, construction companies, as well as in the freelance profession and in consulting activities. The Degree Course also prepares for access to different master's degrees and, in particular, to the Master's Degree in Environmental and Sustainable Building Engineering, which provides more specific and in-depth knowledge in subjects, involvedin intervention on the territory, both to modify it to safeguard it.

| A2.b | Preparing for the Profession of (ISTAT code) |
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1. Civil construction technicians and similar professions - (3.1.3.5.0)
2. Energy saving and renewable energy technicians - (3.1.3.6.0)
3. Technicians of collection and treatment of waste and environmental remediation - (3.1.8.3.2)

| A3.a | Entry requirements |
|---|---|

The admission to the Degree Course requires the high school diploma or other qualification obtained abroad, recognized as suitable by Italian Laws. For a productive participation in the training process, the student must possess first of all an adequate ability to understand the text and the basic logical skills that will allow him to deal with the study and analysis of problems. Furthermore, in order to tackle a scientific-technological training path, the student must know the founding elements of the language of mathematics and physics. The verification of the knowledge necessary for admission to the Degree Course is obtained through evaluation tests. In case of non-positive evaluation it is necessary to fulfil on additional training obligations within the first year of studies (OFA). For detailed indications on the methods of verification, please refer to the Degree Course regulations, which also specify the additional training obligations and the procedures for their performance within the first year.

| A3.b | Admission procedure |
|---|---|

For admission to the Degree Course, it is required the TOLC-I online test. The CISIA Online Test (TOLC) is an orientation tool for the assessment of initial abilities, available on a computerised platform and managed by the Consortium of Inter-University Integrated Access Systems (CISIA). It is an individual test, different for each student and consists of questions that are automatically and randomly selected from the CISIA TOLC database by a software developed and managed by CISIA. All generated TOLCs of the same type are of the same level of difficulty. The test aims to verify if the aptitude and basic skills of the candidates are adequate to successfully begin a course of study in Engineering. TOLC-I consists of 40 questions (20 maths questions, 5 reasoning questions, 10 science questions, 5 verbal comprehension questions), and total duration is 1 hour 45 minutes. Tests also include an English section consisting of 30 questions (15 minutes of additional test time). The result of each TOLC-I test, excluding the English Language test, depends on the number of correct, wrong and not given answers that determine an absolute score, deriving from: 1 point for each correct answer; 0 points for each answer not given; -0.25 points for each wrong answer. For the English Language test there is no penalty for the wrong answers and the score is determined by the assignment of 1 point for the correct answers and by 0 points for the wrong answers or not given. The TOLC-I test can be performed at any University which is part of CISIA The calendar of TOLC-I session schedule at the Faculty of Civil and Industrial Engineering is published in the call for applications for 2016-17 enrolment, while for the tests are available on the relative pages on the website www.cisiaonline.it. TOLC tests can be repeated in the aim of obtaining a result equal to or higher than the minimum threshold provided in the academic manifesto and avoid the assignment of additional

educational obligations (OFA), however candidates may not retake the exam more than once per month (calendar month). More detailed information on how to conduct the test can be found on the CISIA website: http://www.cisiaonline.it/area-tematica-tolc-ingegneria/la-prova-line/ through which you can also access guides and training tests. There are some exemptions from the TOLC-I test for students already enrolled in some degree courses at the Sapienza University of Rome or from other Universities, as specified in the notice. Students who have not completed the TOLC-I test the minimum score required by the call must complete the additional educational obligations (OFA). The results of the English section does not affect the assessment thresholds set for exceeding the TOLC-I. The additional educational obligations are performed by passing the appropriate test for the recovery of the OFA that Sapienza will organize at its headquarters, several times, starting from November 2016. The student will not be allowed to take any profit examination if he does not have before complete the additional educational obligations.

| A4.a | Description and Teaching Targets |
|---|---|

The Degree Course aims to train a construction technician aware of the economic, social and environmental implications of the changes made in the territory that together define the basis of a sustainable construction concept. A technician aware of the role played by building activities, in the whole, in the context of an effective protection and enhancement of the environmental properties of the territory, sensitive to the need for a sustainable vision of its modification, starting from the knowledge of its qualities and its social, economic structure and environmental, based primarily on the relief of the existing buildings, and applying in the processes of modification techniques and materials with reduced environmental impact.

In the specific academic path, therefore, while they have an appropriate placement, in addition to the basic training courses, the subjects distinguishing the building engineering, integrated with the traditional ones of civil engineering, environmental sustainability finds particular attention in the placement of characterizing disciplines and related to environmental engineering, helping to train a building technician, aware of the sustainable dimension of environmental changes that it operates on the territory.

In this context, the specific academic targets of the degree program give the student a set of skills for analysis, recognition, understanding and intervention in the awareness of the complex interrelations existing between the multiple management activities, design, realization, production and differences operating scales that make up the field of the construction industry, intended as an activity of transformation of a territory in physical, morphological economic and social aspects, with particular attention to the impact and sustainability of project interventions.

In order to train a professional figure able to play consciously and adequately in the current complex structuring of building and territory modification with a view to sustainability, the degree program provides students with the scientific knowledge necessary for appropriate technical training. operating in the fields of Building and Environmental Engineering, which have as their purpose the organization, protection and modification for settlement purposes, the environment and the territory in which man lives. For this reason, the Degree in Sustainable Building Engineering match precise and widespread cultural, social and economic needs of an important operating sector, representing the response to the demands of an operating sector that needs knowledge of high scientific content and technological, able to give design and management solutions to the many interventions on the territory and on the environment. The Degree Course, divided into semesters, develops so that the acquisition of the different skills and abilities are achieved according to a progression of increasing complexity. The first year will be aimed at the acquisition of basic knowledge and application techniques for scientific-technological training aimed at understanding the built environment and the intervention practices on it. The second year will be finalized, on one hand, to the implementation of basic disciplines as well as of operating technologies in the field of building and, on the other hand, to basic training in engineering subjects. The last year of the study course will be aimed at training in the sectors that characterize the Engineering for Sustainable Building, with particular regard to the training fields applied to the intervention both in the anthropic and natural environment. In order to provide the engineer for Sustainable Building an operational experience

of the integration between the multiple applications in which its skills can operate, the path also includes laboratory activities, both disciplinary and interdisciplinary, and the possibility of training stages.

| A4.b.1 | Knowledge and understanding, and Capability to apply knowledge and understanding: Summary |
|---|---|
| **Knowledge and ability to understand** | The Degree Course aims to train a construction technician aware of the economic, social and environmental implications of the changes made in the territory that together define the basis of a sustainable construction concept. A technician aware of the role played by the complex of building activities in the context of an effective protection and enhancement of the environmental characteristics of the territory, sensitive to the demand of a sustainable vision of its modification, starting from the knowledge of its properties and its social, economic and environmental structure, based primarily on the relief of the existing, and applying in the processes of modification techniques and materials with reduced environmental impact.<br>In this specific academic path, therefore, in addition to the basic training courses, they are taught subjects characteristics for the building engineering, integrated with the traditional ones of civil engineering, and environmental sustainability matters are dealt in some environmental engineering characteristic subjects, and in other related to them. By this path it can be trained a building technician, aware of the sustainable dimension of environmental changes, which can be carried on the territory.<br>In this context, the specific academic targets of the degree program give the student a set of skills for analysis, recognition, understanding and intervention in the awareness of the complex interrelations existing between the different management, design, realization, production technical activities at different operating scales. In this way the student can learn how complex the field of the construction industry is: as it is an activity of transformation of a territory in physical, morphological economic and social aspects, with particular attention to the environmental impact and sustainability of project interventions.<br>In order to train a professional technical figure able to work, with awareness, and adequately, in the nowadays complex building structuring of territory modification with a view to sustainability, the degree program provides students with the scientific knowledge, necessary for appropriate technical training. operating in the field of Building and Environmental Engineering. It has as its main target the organization, protection and modification for building purposes, of the environment and the territory in which man lives. For this reason, the Degree in Sustainable Building Engineering matches to specific and widespread, cultural, social and economic demands of an important operational sector, representing the answer to demands of an operational sectors that require knowledge of high scientific content and technological, able to give design and management solutions to the many interventions on the territory and on the environment. The Degree Course, divided into semesters, develops so that the acquisition of the different skills and abilities are achieved according to a progression of increasing complexity. The first year it is aimed at the acquisition of basic knowledge and application techniques for scientific-technological training aimed at understanding the built environment and the intervention practices on it. The second year is finalized, on one hand, to the implementation of basic disciplines as well as of operational technologies in the field of building and, on the other hand, to basic training in |

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| | engineering subjects. The last year of the study course will be aimed at training in the sectors that characterize the Sustainable Building Engineering, with particular regard to the training fields applied to the intervention both in the anthropic and natural environment. In order to provide the engineer for Sustainable Building an operational experience of the integration between the multiple applications in which its skills can operate, the path also includes laboratory activities, both disciplinary and interdisciplinary, and the possibility of training stages. |
| | |
| **Ability to apply knowledge and understanding** | The graduate in Sustainable Building Engineering is able to work with renewed operational awareness on the natural and man-made territory, taking action appropriately in the building activity at the different operational scales in the areas of management, design, construction and production of new construction organizations and/or existing, applying scientific knowledge and methods of analysis and data acquisition, specific to the training path followed. Among the applicative skills acquired by the graduate in Sustainable Building Engineering it will find adequate space the updated scientific and technical knowledge learnt on the static and dynamic behavior of natural and artificial physical structures, built by traditional and innovative materials, beyond an in-depth knowledge of design and intervention building techniques capable of reducing the environmental impact of the building process, also using executive technologies, that allow effective energy savings. In particular, he is able to understand the reference environment, in its settlement, landscape, geomorphological, hydraulic and land use aspects, using territorial information systems (GIS), in order to set up a framework for sustainable land modification, using consciously modeling and graphic, manual and digital representation of the man-made environment and the territory both in terms of its specific geological, hydrological and hydraulic structures. The achievement of these skills by the student will be guaranteed by the provision of a qualified frontal teaching, structured in lectures and exercises in classroom, but above all by a specific practical activity carried on as in laboratories as in field, with the support of technical and scientific equipment, available at the Sapienza University in Rieti, and with the application of specific software, used within the individual disciplines and specifically during the individual work carried on to the final exam. |

| **A4.b.2** | **Knowledge and understanding, and Capability to apply knowledge and understanding: Description** |
|---|---|
| **Sustainable Building Area** | |
| Knowledge and understanding<br>By the experiences carried out and the works developed in his personal curriculum, the student knows and is able to understand:<br>– the theoretical-scientific value of the disciplines of mathematics, geometry, physics, history, relief and representation, applied geology, and other basic disciplines;<br>– the theoretical and scientific aspects of civil, construction and environmental engineering, in order to be able to formulate, analyse and interpret concrete problems related to the construction and environment sectors.<br>The student will also be able to further pursue the updating of his knowledge, having acquired the ability to use advanced scientific texts. | |

The subject information and the methodological learning processes, necessary for the student to learn all the knowledge and skills above mentioned, are spread and developed within the ex cathedra lessons of all courses, and in the context of the application laboratory activities carried on in relationship and coordination with all the teaching activities, that are part of the degree course.

**Ability to apply knowledge and understanding**

Expected learning outcomes for each area. Information, subdivisions and references to specific courses can be inserted.

Graduates in Sustainable Building Engineering are able to take action on the natural environment, built and/or to be built, applying scientific knowledge and methods of analysis and data acquisition, specific to the training path followed.

In particular, it is able to understand the reference environment, in its landscape, geomorphology, hydraulics and land use, using geographical information systems (GIS), in order to set up a framework for sustainable development of the territory, and also tools of graphic, manual and digital representation of the built environment.

Moreover, it is able to set up, also graphically, a basic geological model of the project site, through the drafting of geological sections, and to characterize, from the hydrological and hydraulic point of view, the area interested by a recovery project or a new building intervention.

Among the operative skills acquired by the graduate in Sustainable Building Engineering are included:

- basic structures design with innovative materials and their foundations,
- the choice of building techniques that reduce the environmental impact of the building process, also using executive technologies that allow significant energy savings.

The achievement of these skills is expected to occur through the provision of frontal teaching, classroom exercises, in the laboratory and in the field, with the support of technical and scientific equipment, available at the Sapienza University in Rieti.

It is also expected the use of specific software, applied both within the individual disciplines and during the thesis work carrying on.

**The knowledge and skills are achieved and verified in the following training activities:**

Physics
Analysis 1 and 2
Descriptive geometry and architecture design
Materials technology for sustainable construction with Applied Chemistry elements
Environmental health
Geometry
Geomatics
Engineering Geology for Sustainable Building
Hydraulics
Architectural Technology and Sustainable Building
Environmental Engineering Physics
Structural Mechanics
Bioclimatic Building Design
Construction site Organization
Sustainable techniques for Road Construction
Project Evaluation
Hydraulic Constructions
Architectural design for Sustainable Building
Comparative International Legislation for public works
Engineering Geophysics
Building components design
Structural Design
Geotechnical engineering
Sustainable Community Planning
Hydrology

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| Environmental Engineering<br>Chosen by the student<br>Foreign Language<br>Stage<br>Final test |

| A4.c | Autonomy of judgment<br>Communication skills<br>Learning skills |
|---|---|
| **Autonomy of judgment** | Characterizing and professionalizing courses included in the study plan are mainly aimed to give students applicative and operational skills through training courses, and they involve mostly individual and group exercises and activities. The academic paths allow students, through discussions and problem-solving approach, to learn self-judgment skills selection, processing and interpretation of a problem, identification and development of technical solutions and operational tools, that match the environmental compatibility of the work.<br>The verification of the achievement of the pursued training goals is carried out in an organic manner in the framework of all the tests included in the study path. |
| | |
| **Communication skills** | The graduate in Sustainable Building Engineering must be able to set up, in the fields disciplinary relevance and at different scales of application, the study of the given problem and to describe clearly the carried out analysis, the acquired information, the carried on elaborations, the achieved synthesis and the proposed solutions, both in terms of methodologies and operational parameters used, both in related technical aspects; this also in the setting up of possible solutions, identified on the basis of their skills.<br>In carrying out his work he must know how to interact effectively with the many operators, both specialists in the sector, both external and connected, that play in the territory.<br>For this reason, the training course offers different opportunities, both during normal included educational activities, and inside other activities in which to enhance communication skills, discussions, exhibitions, workshops, etc. both individually and in group elaborations, also with meeting opportunities with external representatives of the world of work, of territorial institutions, and by taking part in conferences, lectures, guided tours, etc. Final verification moment, in addition to those coordinated with all the activities carried out during the entire course of study, is the dissertation examination, fundamental opportunity to show the communication skills in relation to the disciplinary subjects addressed.<br>The training course also enhance knowledge that allows basic communication skills through the English language. |
| | |
| **Learning skills** | Thanks to the training course that provides large basic knowledge in many scientific subjects, and a methodological approach in improving interdisciplinary application skills, the student should have appropriate tools to learn further technical knowledge by himself, related to the topics of his own competence, therefore being able to continue in the next |

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| | educational level of the master's degree. The learning abilities, guaranteed by the knowledge acquired in basic subjects, in the operational methodologies and in critical analysis, ensure the graduate to continue to learn systematically throughout his professional experience. |

| A5.a | Final Exam: Characteristics |
|---|---|
| The student, after having obligatorily attended training and orientation internships within the chosen address, will have to complete the academic course under the guidance of a reference teacher, completing a synthesis to be discussed in the final exam. The latter, to be carried out in the presence of the Graduation Commission, which also verifies the possession of suitable and relevant levels of communication, has the purpose of evaluating the achievement of the training objectives, referred to knowledge data, analytical skills, synthesis processing in relation to the problem of the thesis under discussion. | |

| A5.b | Final Exam: Procedure |
|---|---|
| The final test consists usually in the presentation of a preliminary project or a personalized study or exercise.<br>The preparation of the final exam must be contained in a maximum of 3 months. | |

| B1 | Didactic Rules and Programme Training Activities |
|---|---|
| | |

| B2.a | Academic Calendar and Lesson Timetable |
|---|---|
| https://corsidilaurea.uniroma1.it/it/corso/2017/ingegneria-ledilizia-sostenibile | |

| B2.b | Exam calendar for the academic year |
|---|---|
| https://corsidilaurea.uniroma1.it/it/corso/2017/ingegneria-ledilizia-sostenibile | |

| B2.c | Final Exam calendar for the academic year |
|---|---|
| https://corsidilaurea.uniroma1.it/it/corso/2017/ingegneria-ledilizia-sostenibile | |

| B3 | Lists od Professors |
|---|---|

| N. | Sector | Year | Course Title | Surname Name | Position | Credits | Hours | Reference Professor |
|---|---|---|---|---|---|---|---|---|
| 1 | MAT/05 | 1 | Analysis 1 | | | 6 | 60 | |
| 2 | MAT/05 | 1 | Analysis 2 | | | 6 | 60 | |
| 3 | FIS/01 | 1 | General physics | | | 9 | 90 | |
| 4 | ICAR/18 | 1 | Fundamentals of architecture history (Descriptive geometry and architecture design and fundamentals of history of architecture) | | | 6 | 60 | |
| 5 | ICAR/17 | 1 | Descriptive geometry and architecture design (Descriptive geometry and architecture design and fundamentals of history of architecture) | | | 9 | 90 | |
| 6 | 0 | 1 | English language | | | 3 | 30 | |
| 7 | MAT/07 | 1 | Mathematical Methods For The Mechanics | VIVONA DORETTA | AS | 6 | 90 | |
| 8 | ING-IND/22 | 1 | Materials Technology For Sustainable Building With Elements Of Applied Chemistry | PETRUCCI ELISABETTA | Associate Professor | 9 | 90 | |

| B4 | University Classrooms |
|---|---|
| http://www.uniroma1.it/node/20266 | |

| B4 | Computer Labs & Classrooms |
|---|---|
| http://www.uniroma1.it/node/20266 | |

| B4 | Study Rooms |
|---|---|
| http://www.uniroma1.it/node/20266 | |

| B4 | Libraries |
|---|---|
| http://opac.uniroma1.it/SebinaOpacRMS/.do | |

| B5 | Orientation & Matriculation |
|---|---|

The SOrT is the integrated orientation service of Sapienza. SOrT branches are present in all the Faculties and in the Palazzo delle Segreterie (University Campus). At SOrT students can find more specific information regarding faculties and degree courses and a support to orient themselves in choices.
The SOrT manages the organization and coordination of the Porte Aperte event at Sapienza University, the usual summer appointment dedicated to matriculation. It is an opportunity to meet the Faculty, which help students to consciously choose their training path, in line with their attitudes and aspirations and provide information on study courses and teaching subjects.
The event, which is held every year in the third week of July, at the University City, is open mainly to students who ended the last classes of high secondary schools, teachers, parents and operators of the sector and constitutes the opportunity to know the Sapienza University, its educational offer, the places of study, culture and meeting place and the many services available to students (libraries, museums, concerts, conferences, etc.).
In addition to information on teaching, during the meetings, it is possible to obtain information on administrative procedures both in general and, more specifically, on the procedures for registration in the various courses and acquire copies of the calls for participation in the tests for access to courses.
At the same time, conferences are held at the Aula Magna to present all the Faculties of the University.
The Sector also coordinates the guidance projects specified below and proposes support actions in the approach to the university and in the training path: Project a bridge between school and university.
The Bridge Project between school and University (for the sake of brevity called Bridge Project) was created with the aim of presenting the services offered by Sapienza and the students' university experience.
The project is divided into three initiatives:
Profession Orientation.
Meeting with teachers of high secondary schools for orientation counselling, to facilitate the exchange of information between the realities of the high secondary school and the services and projects offered by Sapienza;
Sapienza presents itself.
Meetings for the presentation of the Faculties and typical lessons realized by the teachers of Sapienza to the students of the high secondary schools on topical subjects;
Sapienza of the students
Presentation to schools of services offered by Sapienza and university experience by mentor students.
Know yourself
Self-assessment questionnaire to effectively accompany the decision-making process of the student in the choice of the training.
Network Orientation Project
Orientation and re-alignment project on minimum knowledge. The initiative foresees the development of an orientation course for access to the Faculties with a programmed number of the medical-health area, for students in the last year of high secondary school.
Scientific English exam
The project provides for the possibility to support at the Sapienza, by the students of the last year of the high schools of Lazio, the exam of scientific English for the achievement of credits in case of subsequent registration in this University.
Gong - Nutritional and gastronomic education Gong (Youth Nutrition Guidance Group) is the acronym chosen to indicate the Nutritional and Gastronomy Education Unit, a service that the Sapienza University

offers, free of charge, to all students to teach them to nourish themselves with wisdom and, at the same time, in a tasty way.
As the course will be provided in English Language starting from the beginning of 2018, with the support of International Offices of Sapienza University, it will be presented in any event, held abroad, where Sapienza University will give information about its educational offer in English Language. Moreover the Degree Course in Sustainable Building Engineering will be described in any Sapienza University on line platform, addressed to foreigners students.

| B5 | Tutoring & Academic Support Services |
|---|---|

The ongoing tutoring is ensured by the guidance service of the faculties (Sort), which provide for one or more teachers of reference.
For general information on administrative procedures, support for IT services (reservation at the exams, etc.) Italian students can apply to the CIAO service (Information and counselling center) for the foreigners the HELLO service is active.

| B5 | Internships Or Training Opportunities Abroad |
|---|---|

Sapienza University promotes and supports training and professional training activities in Italy and abroad in favour of students enrolled in own degree courses, specialization, masters and doctorates, as well as graduates within 18 months from graduation. The target is to offer young people real opportunities of meeting with the world of work and thus favour their choices professional future.
The purpose of the service is to support young people in the world of work and to provide companies and institutions accredited to the system www.jobsoul.it, useful tools for finding qualified personnel.
SOUL (University Job Orientation System) was born from the agreement between Sapienza University of Rome, University of Roma Tre, Tor Vergata University of Rome, Foro Italico University of Rome, Academy of Fine Arts, University of Cassino, University of Tuscia Viterbo and LUMSA Free University of Maria SS. Assumption of Rome.
The service, guaranteed by the JobSOUL portal, operates as a node in the public services network for use in collaboration with other institutions (Ministry of Labor, Health and Social Policies, Lazio Region, Province of Rome and Municipality of Rome), and with the main agencies involved in carrying out interventions for young university students (Laziodisu, Caspur, Irfi, Bic Lazio, Italy Lavoro and Isfol).
Especially for students and graduates of Sustainable Building Engineering in Rieti, by Sabina Universtas Consortium, on JobSoul, it has been set up a specific conventional act with the Latium Regional Office, sited in Rieti for reconstruction activities after 2016 earthquake, which will involve our students and our graduates in these activities.
As a matter of fact, SOUL operates by means of an evolved IT platform and a series of presence guidance services.
Through the portal www.jobsoul.it students can:

- register by entering your personal data and compiling, publishing and personally managing your curriculum vitae;
- search through the portal's ads for job/internship offers in line with your curriculum profile and apply for ads directly online;
- activate the procedures for internships in agreement with the University via the web;
- contact the companies directly and propose their own candidature;
- choose whether to express their consent to the companies or otherwise not make their personal data accessible.

Services in the presence of SOUL

Information desks in the Faculties offer services of:

- reception and information
- job orientation interviews
- technical assistance for using the portal

| B5 | Assistance and agreements for international student mobility |
|---|---|

This field must include all the international mobility agreements for students activated with universities foreigners, with the exception of the conventions regulating the structure of inter-university courses; the latter must instead be entered in the appropriate field "Inter-university courses".
For each affiliated foreign university, it is necessary to insert the convention that regulates, among other things, the mobility of students, and indicate whether or not for the students who are following the related mobility path, the issue of a double degree is required multiple. In case the release of a double or multiple degree with the foreign University is not foreseen (for example, in the case of conventions for Erasmus mobility) as a title it is necessary to indicate "Only Italian" to indicate that the students who follow the mobility path will only achieve the normal title issued by the university of origin.
The courses of study that issue a double or multiple degree with a foreign university are international according to the DM 1059/13. Erasmus + Mobility for study and internship
http://www.uniroma1.it/internazionale/erasmus/studenti-students Erasmus promotes the activity of transnational cooperation between institutions of higher education; finances mobility for the purpose of study (SMS) and internship (SMP) of students between European universities in all disciplines and levels of study (doctorate including) and fosters the academic recognition of studies within the European Community.
Student mobility for Erasmus study stays allows the attendance of a European university, among those participating to the program, where you can take courses and take exams related to your academic curriculum or to carry out studies for his degree thesis or to carry out training activities in the framework of a doctorate course. The study stay can have a minimum duration of three and maximum of twelve months, for each cycle of studies (24 months for single-cycle courses) from take place between 1 June and 30 September of the following year.
Student mobility for Erasmus internships allows for traineeships in companies, training and research centers based in one of the countries participating in the program. The duration of the traineeship activity is between two and twelve months from to be carried out in the period from 1 June to 30 September of the following year, to carry out exclusively internship activities a full-time recognized as an integral part of the student's/graduate student's curriculum from its Institute of membership. The internship can be done even after graduation as long as the selection takes place before the achievement of the title. The number of months of mobility is added to those of the Erasmus periods for study, up to the maximum expected from the program (12 months per cycle or 24 for single-cycle courses).
General conditions for participation.
Participation in the Erasmus program of Sapienza University of Rome takes place by participating in annual calls. Furthermore, they are specific calls for proposals to take part in the SMP activity (Erasmus internship) that are advertised on the dedicated web page Erasmus.
Mobility grants for non-European universities
http://www.uniroma1.it/internazionale/studiare-allestero/borse-di-mobilit%C3%A0-extra-ue
Thanks to funds provided by the Ministry of Education, University and Research (MIUR) and its own contributions, Sapienza offers every year students with a Bachelor's degree, master's degree and doctorate (provided they do not have a scholarship), the opportunity to spend a period of study, to take exams or do thesis research in one of over 125 non-EU institutions with which it has bilateral agreements in force. There a salient feature of mobility based on an agreement between our and the foreign institution is mutual benefit (for those who leave, as to arrive at Sapienza) of the TOTAL EXEMPTION from the payment of registration fees at the host university. The selected Sapienza student (outgoing) will continue

to pay taxes normally at Sapienza e NOT at the foreign University. To this advantage is added, the university contribution of 2,100 euros paid by the Area for Internationalization (ARI) and overall for the entire period spent abroad, which can not be less than 90 days and up to a maximum of 2 consecutive semesters. Remember that it is only allowed to use the contribution once for each cycle of study and that the scholarship can not be combined with other contributions.
The new Erasmus + program funds study periods abroad also for non-European universities with which Sapienza has entered into an inter-university agreement. The rules for participation are the same as those of the Erasmus program with universities European. Information is available on the web page:
http://www.uniroma1.it/internazionale/erasmus/mobilita-extra-ue
Students free movers
http://www.uniroma1.it/internazionale/studiare-allestero/studenti-free-movers
Students who do not take part in an exchange program organized by the university, such as ad, are called "free mover" Erasmus example, but instead choose the host university on their own initiative, organizing the period of study independently abroad.
To have the opportunity to attend courses at another university and then to have them recognized within their own plan study must be approved by the faculty of origin and admission by the host university.

| N. | University | Date | Duration of the contract | Title |
|---|---|---|---|---|
| 1 | Universidad Central de Venezuela (Caracas VENEZUELA) | 21/01/2015 | 3 | Double |

| B5 | Career Support & Employment |
|---|---|

Since February 2010 at the SOUL office, the Sapienza Employment Center is active, dedicated to students and graduates with services of:

- Reception and information
- Advice and professional and training orientation
- Job offers on the whole provincial territory
- Offers of internships in the company and training internships
- Advice on European mobility through the Eures portal
- Information on labor contracts and the local labor market

Employment Center - SAPIENZA
Via Cesare de Lollis 22 - 00185 Rome
Tuesday - Thursday from 9:30 to 13:00
Wednesday - by appointment only to request by e-mail to cpi.sapienza@cittametropolitanaroma.gov.it
Tel / Fax +39 0645606976
Link inserted: http://uniroma1.jobsoul.it/studenti-e-laureati/cpi-centri-limpiego

| B5 | Other Initiatives |
|---|---|

The Welcome and Orientation Information Center is a service managed by the Offer Area Training and right to study and about 150 students who have won a collaboration grant and have enrolled in the last years of all faculties of Sapienza University.
Ciao carries out information and counselling activities for students on:

- modality of enrolment and registration;
- times and offices of the secretariats, offices and service and utility facilities;
- use of the university information system (Infostud);
- procedures foreseen in the regulations for students (passages, transfers, etc.);
- promotion of University services, activities and cultural initiatives.

The activities and initiatives of Ciao, established in the academic year 1998-1999, are aimed at making positive and welcoming the moments of first impact and subsequent interactions of students with institutions, structures and university procedures.
The main tasks of Hello are:

- provide complete, clear and accessible information;
- diversify channels and communication tools;
- adopt languages, texts and styles of interaction close to the needs of the students;
- have attitudes of readiness to listen;
- carry out assistance and consultancy activities.

The CIAO has over 90,000 contacts a year, including front-office, email, and responses through facebook; in periods of greatest inflow yes they count peaks of over 700 contacts a day. Beyond the numbers, the Ciao has become in recent years a point of reference for the students of Sapienza, who on many occasions continue to show their appreciation thanks to their work and professionalism and the willingness of their colleagues to take turns in service.
HELLO welcome service
www.uniroma1.it/hello
"Hello" is the reception and information desk for foreign students interested in studying at our university. More generally, Hello carries out a first contact service with the international public, also with the aim of directing them requests from users to specific offices.
The service is managed by units of staff belonging to the Area Educational Offer and Right to Education and scholarships selected among the our non-EU and Italian students with excellent knowledge of English and at least a second foreign language.

| B6 | Student Opinions |
|---|---|
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| B7 | Graduate Opinions |
|---|---|
| | |

| C1 | Student data |
|---|---|
| | |

| C2 | Placement |
|---|---|
| http://www2.almalaurea.it/cgi-php/universita/statistiche/framescheda.php?anno=2016&corstipo=TUTTI&ateneo=70026&facolta=tutti&gruppo=tutti&L | |

| C3 | Opinions of job companies with internship / curricular or extra-curricular internship agreements |
|---|---|
| The IV Survey Opinions and satisfaction on the service (2017) involved about 13,300 companies registered on the platform jobsoul.it. 1,210 companies responded to the questionnaire. The form sent intended to investigate the following topics:<br>1) utility for the company of training activities;<br>2) level of satisfaction of the company for the preparation of the trainee;<br>3) level of satisfaction of the company for placement services and internships offered by Sapienza;<br>4) in-depth analysis of the compliance of available services with respect to company expectations;<br>5) level of satisfaction of the company with respect to students and graduates with whom they have come into contact (both through internships and through work collaborations);<br>6) priorities on which to intervene to favour the relationship between the training phase and that of work placement.<br>Using a structured questionnaire the results reported in the attached file were recorded<br>Furthermore, the internships (curricular and extra-curricular) activated by the Faculty between 1 July 2016 and 30/06/2017 were analysed.<br>Overall, the internships activated by Sapienza were 2624 and the agencies and companies involved 1069. | |

| D1 | University Structure and Duties |
|---|---|
| Sapienza's Quality Assurance System (AQ) is widely described in the Quality Web Pages that can be consulted at the address http://www.uniroma1.it/ateneo/governo/team-qualit%C3%A0.<br>The Web pages describe the ten-year path developed by the University for the construction of Quality Assurance<br>Sapienza, the organizational model adopted, the AQ actors (Quality Team, Monitoring Committees, Joint Commissions) Lecturers-Students, Commissions Quality of the Courses of Study), the active Working Groups, the main activities developed, the documentation prepared for the management of Quality Assurance processes and activities in Didactics, in the Research and in the Third Mission.<br>The web pages also represent the communication platform and the provision of reference data for re-examination activities, drafting of the reports of the Joint Teaching-Student Committees and Monitoring Committees and for the compilation of the SUA-Didactics and USA-Research Cards.<br>Each study course and each department has the right to decline the defined Sapienza Quality Assurance Model in the Web pages of the Quality Team in the Quality Assurance of the Council/Department, borrowing and adapting it to their own organizational specificity while respecting the models and procedures defined by the Anvur and the Quality Team.<br>The Web pages of the Council/Department represent, together with the SUA- Didactics and the USA-Research communication of the implementation methods of the Quality Assurance System at the Council/Department level.<br>http://www.uniroma1.it/ateneo/governo/team-qualit%C3%A0. | |

| D2 | AQ Structure and Duties |
|---|---|
| Giuseppe Sappa Dean of Sustainable Building and Environmental Engineering Course and Responsible for the Review<br>Carla Nardinocchi professor Sustainable Building Engineering Course, Head of the AQ of the Environmental Engineering Course, of the quality commission<br>Daniela D'Alessandro Professor of the Sustainable Building and Environmental Engineering Course<br>Cristiana Melilli, administrative technician that carries out activities of educational management<br>Ricci Federico, Student, representative of the group students of Management of AQ, that carries out its work of organization and responsibility, of verification, acquisition and processing of data, upstream in relation to the management of the Environmental Engineering Course, and downstream in the review activity<br>It meets collegially and schedule their meetings on a regular basis, and anyway whenever they are called to perform acts,<br>responses, documents and official tasks in respect of the Council of Environmental Engineering Course, the Security Council, of the Joint Commission, of the University, according to the procedures established from time to time by the Anvur. | |

| D3 | Scheduling of works and deadlines |
|---|---|
| The course of study, through the AQ management group, will proceed, with regular meetings, to monitoring corrective actions indicated in the previous Review Report; will evaluate the results of the adoption of the same, highlighting the strengths that have emerged, any critical issues and changes deemed necessary; verify the adequacy and effectiveness of the management of the course of study; will propose, where necessary, the corrective actions to be introduced in the subsequent Review Report. The calendar of meetings will be fixed downstream of the completion of the University's obligations. | |

| | Course of Study - General Information |
|---|---|
| **University** | Sapienza University of Rome |

| | |
|---|---|
| **Italian name of the Degree Course** | Ingegneria per l'Edilizia Sostenibile |
| **English name of the Degree Course** | Sustainable Building Engineering |
| **Course Code** | L-23 - Science and Techniques of Constructions |
| **Language Course** | Italian |
| **Web References** | http://corsidilaurea.uniroma1.it/sustainablebuildingengineering/the-course |
| **Fees** | http://www.uniroma1.it/didattica/tasse |
| **Carrying on form** | Conventional course |

| | **Inter-university courses** |
|---|---|
| This field must be completed only for inter-university courses.<br>A course is called "inter-university" when the participating Universities stipulate a convention aimed at directly regulating the objectives and training activities of a single course of study, which is activated jointly by the universities involved, with one of the universities that (also in turn) follows the administrative management of the course. The universities involved also agree on the part of the teachings that is activated by each one; and the release to all registered students of a joint degree must be provided (also through the provision of a double parchment - double degree).<br>An inter-university course may involve only Italian universities, or Italian universities and foreign universities. In this last case the course of studies is international according to the DM 1059/13.<br>Study courses provided in full by an Italian University, also in the presence of agreements with one or more foreign universities which, essentially regulating international student mobility programs (usually under the exchange regime), provide for the granting to interested students of a qualification study issued by foreign universities, are not inter-university courses. In this case the relative conventions should not be inserted here but in the field "Assistance and agreements for international student mobility" of the B5 framework of the SUA-CdS.<br>For inter-university courses, in this field must be indicated which are the universities involved, and be inserted the convention that regulates, among other things, the subdivision of the training activities of the course between them.<br>Any action on this field is configured as a sort change. In the case on the SUA-CdS board of the A.A. 14 to 15 have been included in this field of agreements not related to inter-university courses, these conventions must be moved to the field "Assistance and agreements for international student mobility" in the B5 framework. In case no one is carried out another change to the legal system, it is sufficient to indicate in the field "Communications of the University to CUN" the information that this shift is the only order modification carried out this year to ensure the automatic approval of the order by the CUN.<br>There are no universities in convention. | |

| | **Structure and Staff** | |
|---|---|---|
| **Dean of the Degree Course** | SAPPA Giuseppe | |
| **Council for the Degree Course** | CAD SUSTAINABLE BUILDING AND ENVIRONMENTAL ENGINEERING (RIETI) | |
| **Academic Structure Reference** | | Civil, Building and Environmental Engineering |

| | |
|---|---|
| **Other Structures Reference** | Basic and applied sciences for engineering<br>Chemical engineering, materials, environment<br>Structural and geotechnical engineering |

**University Professorships**

| N. | Surname | Name | Sector | Position | Weight | SSD Type | Title Course |
|---|---|---|---|---|---|---|---|
| 1 | CELLAMARE | Carlo | ICAR/20 | Associate Professor | 1 | Characteristic | Sustainable Community Planning |
| 2 | CHIAVOLA | Agostina | ICAR/03 | Associate Professor | 1 | Characteristic | Environmental Engineering |
| 3 | GRIGNAFFINI | Stefano | ING-IND/11 | Associate Professor | 1 | Characteristic | Bioclimatic Building Design |
| 4 | NAPOLITANO | Francesco | ICAR/02 | Full Professor | 1 | Characteristic | Hydrology |
| 5 | NARDINOCCHI | Carla | ICAR/06 | Researcher | 1 | Characteristic | Topography |
| 6 | PETRUCCI | Elisabetta | ING-IND/22 | Associate Professor | 1 | Characteristic | Materials Technology For Sustainable Construction With Applied Chemistry Elements |
| 7 | ROTISCIANI | Giada Maria | ICAR/07 | Researcher | 1 | Characteristic | Geotechnical Engineering |
| 8 | VIVONA | Doretta | MAT/07 | AS | 1 | Basic | Mathematical Methods For The Mechanics |
| 9 | ARENA | Andrea | ICAR/08 | Researcher | 1 | Characteristic | Structural Mechanics |

| | | |
|---|---|---|
| **Student Representative** | | Ricci Federico federico.ricci@oecis.it |
| **Management Group AQ** | | CRISTIANA MELILLI<br>Carla Nardinocchi<br>Federico Ricci<br>Giuseppe Sappa |
| **Tutors** | | GIUSEPPE SAPPA<br>STEFANIA ESPA<br>AGOSTINA CHIAVOLA<br>CARLA NARDINOCCHI<br>GIADA MARIA ROTISCIANI<br>ANDREA ARENA |

| Access programming |
|---|
| National programming (art.1 Law 264/1999) No |

| |
|---|
| Local programming (art.2 Law 264/1999) No |

| | Course locations |
|---|---|
| DM 987 12/12/2016 Annex A - teaching requirements | |
| Course location: - RIETI | |
| Start date of the teaching activity 25/09/2017 | |
| Expected students 180 | |

| | Possible curriculum |
|---|---|
| Sustainable Building Engineering (training course also valid for the achievement of the double Italo-Venezuelan title)<br><br>28682-01 | |

| | Other Information |
|---|---|
| **University internal code of the of the course** | 28682 |
| **Maximum number of recognizable credits** | 12 DM 16/3/2007 Art 4 Note 1063 of 29/04/2011 |
| **Courses of the same class** | Building Process Management - Project Management |
| **Affinity group number** | 1 |

| | Reference resolutions dates |
|---|---|
| **Date of approval of the educational structure** | 12/16/2015 |
| **Date of approval of the academic senate / board of directors** | 07/04/2016 |
| **Date of the evaluation team technical report** | 07/01/2009 |
| **Date of consultation with representative organizations at the local level of production, services, professions** | 06/11/2008 -19/01/2009 |
| **Date of the favorable opinion of the Regional Coordination Committee** | |

| | Summary of the technical report of the evaluation team |
|---|---|

Having recalled the criteria and procedures set out in the summary of the general report of the NVA and the notes relating to the individual faculties, having obtained the opinions of the Commission for didactic innovation, considering the forms and documentation sent by the faculty and the NVF, the Unit certifies that This course meets the criteria for the correct design of the proposal, the definition of access policies, transparency requirements and minimum student size requirements. The NVA also believes that the course is fully sustainable compared to the role and non-role teaching and considers the number and capacity of the classrooms, the other facilities and the existing support services that the faculty can make available fully adequate.
The NVA certifies that the proposal meets all the criteria that can now be evaluated as foreseen by the legislation and by the Academic Senate and expresses a favorable opinion to the institution of the course.

| | Evaluation Unit Report by Accreditation |
|---|---|

The complete NdV report necessary for the accreditation procedure of the study courses must be inserted in the appropriate space within the SUA-CdS card called "Evaluation Unit Report by Accreditation" by March 31st 2017 for the courses new institution and within the expiry of the USA survey for all other courses. The report of the Unit can be drawn up following the evaluation criteria, summarized below, detailed in the ANVUR guidelines for the initial accreditation of the newly activated Degree Programs, which can be consulted on the ANVUR website.

Guidelines for non-telematic study courses

Guidelines for telematic courses

1. Motivations for the planning / activation of the CdS

2. Analysis of the training application

3. Analysis of the profiles of competence and expected learning outcomes

4. The student's experience (Analysis of the modalities that will be adopted to ensure that the performance of the training activities and the results of the CdS is consistent with the objectives and is correctly managed with respect to quality criteria with a strong commitment to collegiality on the part of the teaching body)

5. Expected resources

6. Quality assurance

Having recalled the criteria and the procedures set out in the summary of the general report of the NVA and the notes on the individual faculties, having obtained the opinions of the Commission for didactic innovation, considering the forms and documentation sent by the faculty and the NVF, the Unit certifies that this course meets the criteria for the correct design of the proposal, the definition of access policies, transparency requirements and minimum student size requirements. The NVA also believes that the course is fully sustainable compared to the role and non-role teaching and considers the number and capacity of the classrooms, the other facilities and the existing support services that the faculty can make available fully adequate.

The NVA certifies that the proposal meets all the criteria that can now be evaluated as foreseen by the

legislation and by the Academic Senate and expresses a favorable opinion to the institution of the course.

| | Summary of the motivations for the establishment of affinity groups |
|---|---|
| | The educational objectives of the Degree Course cover a segment of technical skills and specific knowledge in the construction, land and environment sectors. These skills, even if very important and particularly requested in the training of an engineer, are not found in the other courses activated by the Faculty of Engineering and being activated in the University. The present Degree course which represents a modification of a course already activated in the Class L-23, and which has recorded significant feedback from the students, now requires a recalibration to better respond to the objectives set out above. The need, therefore, is to further characterize the training path in order to combine it closely with the specificities related to the specific engineering sectors, both to guarantee better employment opportunities and to better respond to a demand emerging from the world of construction entrepreneurship and territorial institutions and, in this regard, it is essential to define an autonomous affinity group with respect to the Course in the same class being activated at the Faculty of Architecture. |

| | Reasons for establishing multiple courses in the class |
|---|---|
| | The Degree Course in Engineering for Sustainable Building is a more recent review of the course of study in the L23 Class, already active for years at the headquarters of Rieti della Sapienza University of Rome. The review of the proposed course, with a new and consistent designation (ie Engineering for Sustainable Building already Engineering for Construction and the Territory) originates from an in-depth reflection, carried out within the Area Council, on the contents and on the outcomes achieved by the disciplines given in the course of study, reaffirming the centrality of the multi-year experience, has noted the need for a more careful awareness of the relationships between the building and the environment as a complex process of land modification, synthesis of economic, social and environmental implications, in a key of complex sustainability. This reflection led to a partial re-orientation of the training objectives and the graduation of the study course, mainly directed towards the training of a construction technician aware of the economic, social and environmental implications of the changes made by the building in the territory and which together define the basis of a sustainable construction concept. The Degree Course in Management of Building Process starts from the need to offer a highly professional degree course, which covers a segment of specific skills in the field of construction of an architectural body and the management of construction sites and which maintains, at the same time, the peculiarities of the disciplinary sectors of architecture providing all the necessary certifications and qualifications. In addition, the entire course is set up according to the latest European regulations in BIM (Building Integrated Modeling) logic and therefore provides the student with the knowledge of an integrated computer logic of the entire building process essential for its location in the European construction sector. The two courses of study, therefore, stand out clearly, as the degree course in Engineering for sustainable construction, given at the headquarters of Rieti, is aimed at the training of a construction technician aware of the economic, social and environmental changes due to construction in the territory; otherwise the Degree Course in Building Construction Management, given at the Rome office, is focused on a specific sector of skills in the field of construction of an architectural body and the management of construction sites. The differences between the two courses, as well as the purposes, are found in the type of SSD involved in the organization, which leads to a differentiation of well over 60 CFU. |

| | Summary of the opinion of the regional coordination committee |
|---|---|

Educational offer provided

| Coorte CUIN | Title Course | Sector | Professor | SDD | Hours |
|---|---|---|---|---|---|
| 1 2017 261729470 | **ANALYSIS 1** (half yearly) | MAT/05 | not specified | | 60 |
| 2 2017 261719474 | **ANALYSIS 2** (half yearly) | MAT/05 | not specified | | 60 |
| 3 2016 261759421 | **ARCHITECTURAL TECHNOLOGY AND SUSTAINABLE BUILDING 1** (half yearly) | ICAR/10 | Carlo CECERE Full Professor | ICAR/10 | 90 |
| 4 2016 261736482 | **BIOCLIMATIC BUILDING DESIGN** (half yearly) | ING-IND/11 | Stefano GRIGNAFFINI Associate Professor | ING-IND/11 | 60 |
| 5 2016 261759422 | **ARCHITECTURAL DESIGN ELEMENTS** (half yearly) | ICAR/14 | not specified | | 60 |
| 6 2016 261759438 | **PROJECT EVALUATION** *(half yearly)* | ICAR/22 | not specified | | 60 |
| 7 2017 261719473 | **PHYSICS** (half yearly) | FIS/01 | not specified | | 60 |
| 8 2016 261759425 | **ENVIRONMENTAL ENGINEERING PHYSICS** (half yearly) | ING-IND/11 | not specified | | 90 |
| 9 2016 261759439 | **ENGINEERING GEOPHYSICS** (half yearly) | GEO/11 | Ettore CARDARELLI Full Professor | GEO/11 | 60 |
| 10 2016 261759426 | **ENGINEERING GEOLOGY FOR SUSTAINABLE BUILDING** (half yearly) | GEO/05 | Giuseppe SAPPA Associate Professor | GEO/05 | 90 |
| 11 2017 261719466 | **DESCRIPTIVE GEOMETRY AND ARCHITECTURE DESIGN**) (half yearly) | ICAR/17 | not specified | | 60 |
| 12 2015 261738486 | **GEOTECHNICAL ENGINEERING** (half yearly) | ICAR/07 | Giada Maria ROTISCIANI *Researcher (art.24 c.3-a L. 240/10)* | ICAR/07 | 60 |
| 13 2016 261759423 | **HYDRAULICS** (half yearly) | ICAR/01 | Stefania ESPA Associate Professor *(L. 240/10)* | ICAR/01 | 60 |
| 14 2015 261736477 | **HYDROLOGY** (half yearly) | ICAR/02 | Francesco NAPOLITANO Full Professor (L. 240/10) | ICAR/02 | 60 |
| 15 2016 261759437 | **ENVIRONMENTAL HEALTH** (half yearly) | MED/42 | Daniela D'ALESSANDRO Full Professor | MED/42 | 60 |

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|---|---|---|---|---|---|
| 16 2107 | **SUSTAINABLE TECHNIQUES FOR ROAD CONSTRUCTION** | ICAR/04 | not specified | ICAR/04 | 60 |
| 17 2015 261736474 | **SUSTAINABLE COMMUNITY PLANNING** (half yearly) | ICAR/20 | Carlo CELLAMARE Associate Professor | ICAR/20 | 60 |
| 18 2015 261738485 | **ENVIRONMENTAL ENGINEERING** (half yearly) | ICAR/03 | Agostina CHIAVOLA Associate Professor *(L. 240/10)* | ICAR/03 | 90 |
| 19 2017 261719471 | **ENGLISH LANGAUAGE** (half yearly) | 0 | not specified | MAT/07 | 30 |
| 20 2017 261719472 | **MATHEMATICAL METHODS FOR MECHANICS** (half yearly) | MAT/07 | **Docente di riferimento** Doretta VIVONA *Assistant* | MAT/07 | 60 |
| 21 2016 261759440 | **CONSTRUCTION SITE ORGANIZATION** (half yearly) | ICAR/11 | not specified | | 60 |
| 22 2016 261759424 | **STRUCTURAL MECHANICS** (half yearly) | ICAR/08 | Andrea ARENA *Researcher (art.24 c.3-a L. 240/10)* | ICAR/08 | 60 |
| 23 2015 261736479 | **STRUCTURAL DESIGN** (half yearly) | ICAR/09 | Nicola NISTICO' Associate Professor | ICAR/09 | 60 |
| 24 2017 261719468 | **MATERIALS TECHNOLOGY FOR SUSTAINABLE CONSTRUCTION WITH APPLIED CHEMISTRY ELEMENTS** (half yearly) | ING-IND/22 | Elisabetta PETRUCCI Associate Professor (L. 240/10) | ING-IND/22 | 90 |
| 25 2016 261759427 | **GEOMATICS** (half yearly) | ICAR/06 | Carla NARDINOCCHI *Researcher* | ICAR/06 | 48 |

**Curriculum: Engineering for Sustainable Construction (training course also valid for the achievement of the double Italo-Venezuelan title)**

| **Activity** | **Sector** | **CFU Ins** | **CFU Off** | **CFU Rad** |
|---|---|---|---|---|
| **Basic scientific training** | MAT/07 Mathematical Physics<br>MATHEMATICAL METHODS FOR MECHANICS (First Year) – 9 CFU – half yearly – obligatory | 51 | 39 | 36-45 |
| | MAT/05 Mathematical Analysis<br>ANALYSIS 1 and 2 (First Year) – 12 CFU – half yearly – obligatory<br>ANALYSIS 1 (First Year) – 6 CFU – half yearly – obligatory ANALYSIS 2 (First Year) – 6 CFU – half yearly – obligatory | | | |
| | GEO/05 ENGINEERING GEOLOGY FOR SUSTAINABLE BUILDING | | | |

| | | | | |
|---|---|---|---|---|
| | (2 Year) – 9 CFU – half yearly – obligatory | | | |
| | FIS/01 Physics<br>PHYSICS (1 Year) – 9 CFU – half yearly – obligatory | | | |
| **Basic training in history and representation** | ICAR/18 Architecture History<br>DESCRIPTIVE GEOMETRY AND ARCHITECTURE DESIGN AND FOUNDATIONS OF ARCHITECTURE HISTORY (First Year) – 15 CFU – half yearly – obligatory<br>FOUNDATIONS OF ARCHITECTURE HISTORY (First Year) – 6 CFU – half yearly – obligatory. | 45 | 15 | 12-18 |
| | ICAR/17 Design<br>DESCRIPTIVE GEOMETRY AND ARCHITECTURE DESIGN AND FOUNDATIONS OF ARCHITECTURE HISTORY (First Year) – 15 CFU – half yearly – obligatory.<br>DESCRIPTIVE GEOMETRY AND ARCHITECTURE DESIGN (First Year) – 9 CFU – half yearly – obligatory | | | |
| **University minimum of credits reserved: - (min from D.M. 36)** | | | | - |
| Total | | | 54 | 48-63 |

| **Specific scientific training** | **Sector** | **CFU Ins** | **CFU Off** | **CFU Rad** |
|---|---|---|---|---|
| Architecture and urban planning | ICAR/20 Technique and urban planning<br>SUSTAINABLE COMMUNITY PLANNING (3 year) – 6 CFU – half yearly – obligatory | 51 | 21 | 21-27 |
| | ICAR/14 Architectural and urban composition<br>ARCHITECTURAL TECHNOLOGY 1 ARCHITECTURAL DESIGN FOR SUSTAINABLE BUILDING 2 (2 year) – 15 CFU – half yearly – obligatory<br>ARCHITECTURAL DESIGN ELEMENTS (2 year) – 3 CFU – half yearly – obligatory | | | |
| | ICAR/10 Architectural Technology<br>ARCHITECTURAL TECHNOLOGY 1 ARCHITECTURAL DESIGN FOR SUSTAINABLE BUILDING 2 (2 year) – 15 CFU – half yearly – obligatory<br>ARCHITECTURAL TECHNOLOGY 1 (2 year) – 6 CFU – half yearly – obligatory<br>ARCHITECTURAL TECHNOLOGY 2 (2 year) – 6 CFU – half yearly – obligatory | | | |
| Environmental and Building | ING- IND/22 Science and technology of materials<br>MATERIALS TECHNOLOGY FOR SUSTAINABLE CONSTRUCTION WITH APPLIED CHEMISTRY ELEMENTS (1 year) – 9 CFU – half yearly – obligatory | 42 | 42 | 27-42 |
| | ING-IND/11 Environmental Engineering Physics | | | |

| | | | | |
|---|---|---|---|---|
| | ENVIRONMENTAL ENGINEERING PHYSICS (2 year) – 6 CFU – half yearly – obligatory | | | |
| | ICAR/08 Structural Mechanics<br>STRUCTURAL MECHANICS (2 year) – 9 CFU – half yearly – obligatory | | | |
| | ICAR/03 Environmental Engineering<br>ENVIRONMENTAL ENGINEERING (3 year) – 9 CFU – half yearly – obligatory | | | |
| | ICAR/01 Hydraulics<br>HYDRAULICS (2 year) – 9 CFU – half yearly – obligatory | | | |
| Safety and protection engineering | ICAR/09 Structural Design<br>STRUCTURAL DESIGN (3 year) – 6 CFU – half yearly – obligatory | 21 | 21 | 21-24 |
| | ICAR/07 Geotechnical engineering<br>GEOTECHNICAL ENGINEERING (3 year) – 9 CFU – half yearly – obligatory | | | |
| | ICAR/06 Topography and cartography<br>TOPOGRAPHY (2 year) – 6 CFU – half yearly – obligatory | | | |
| **University minimum of credits reserved(min from D.M. 45)** | | | | **69** |
| Total | | | 84 | 69-93 |

| **Activity** | **Sector** | **CFU Ins** | **CFU Off** | **CFU Rad** |
|---|---|---|---|---|
| Supplementary training activities | GEO/11 Engineering Geophysics<br>ENGINEERING GEOPHYSICS (2 year) – 6 CFU – half yearly – obligatory | 48 | 18 | 18-30 min 18 |
| | ICAR/02 Hydraulic and Maritime Constructions and Hydrology<br>THECNICAL HYDROLOGY (3 year) – 6 CFU – half yearly – obligatory<br>HYDRAULIC CONSTRUCTIONS (3 year) – 6 CFU – half yearly – obligatory | | | |
| | ICAR/11 Construction production<br>CONSTRUCTION SITE ORGANIZATION (2 year) – 6 CFU – half yearly – obligatory | | | |
| | ING-IND/11 Environmental Engineering Physics<br>BIOCLIMATIC BUILDING DESIGN (3 year) – 6 CFU – half yearly – obligatory | | | |
| | IUS/10 Comparative International Legislation for public works<br>COMPARATIVE INTERNATIONAL LEGISLATION FOR PUBLIC WORKS (3 year) – 6 CFU – half yearly – obligatory | | | |

| | | | | |
|---|---|---|---|---|
| | MED/42 Environmental health<br>ENVIRONMENTAL HEALTH (2 year) – 6 CFU – half yearly – obligatory | | | |
| **Total** | | | 18 | 18-30 |
| **Other training activities** | **Sector** | **CFU** | | **CFU Rad** |
| Chosen by the student | | 12 | | 12-18 |
| Final test and Foreign language (art. 10, co. 5, l. c) | Final test | 6 | | 6 - 6 |
| | Foreign language | 3 | | 3 – 3 |
| University minimum of credits reserved art. 10, co. 5 l. c | | | | - |
| Other training activities | Another languages | - | | - |
| | IT and telematic skills | - | | - |
| | Stage | 3 | | 3 -3 |
| | Other skills | - | | - |
| University minimum of credits reserved art. 10, co. 5, l. d | | | | |
| For internships and placements in companies, public or private bodies, professional orders | | - | | - |
| Total | | 24 | | 24-30 |
| Total CFU for the achievement of Degree title | | 180 | | |
| Total CFU for the achievement of Degree in Sustainable Building Engineering (training course also valid for the achievement of the double Italo-Venezuelan title) | | 180 | | 159-216 |

| | Basic scientific training | | | |
|---|---|---|---|---|
| **Disciplinary area** | **Sector** | **CFU** | | **MIN from Law** |
| | | **min** | **max** | |
| Basic scientific training | FIS/01 Physics<br>GEO/05 Engineering Geology<br>MAT/03 Geometry<br>MAT/05Mathematical Analysis<br>MAT/07 Mathematical Physics | 36 | 45 | - |
| Basic training in history and representation | ICAR/17 Design<br>ICAR/18 Architecture History | 12 | 18 | - |

| | |
|---|---|
| University minimum of credits reserved from DM 36 | - |
| Total | 48-36 |

| | Specific scientific training | | | |
|---|---|---|---|---|
| **Disciplinary area** | **Sector** | **CFU** | | **MIN from Law** |
| | | **min** | **max** | |
| Architecture and urban planning | ICAR/10 Architectural Technology<br>ICAR/14 Architectural and urban composition<br>ICAR/20 Technique and urban planning | 21 | 27 | - |
| Environmental and Building | ICAR/01 Hydraulics<br>ICAR/03 Environmental Engineering<br>ICAR/08 Structural Mechanics<br>ING-IND/11 Environmental Engineering Physics<br>ING- IND/22 Science and technology of materials<br>ICAR/04 – Road Construction | 27 | 42 | - |
| Safety and protection engineering | ICAR/06 Topography and cartography<br>ICAR/07 Geotechnical engineering<br>ICAR/09 Structural Design | 21 | 24 | - |
| University minimum of credits reserved from DM 45 | | | | 69 |
| Total | | | | 69-93 |

| | Supplementary training activities | | | |
|---|---|---|---|---|
| **Disciplinary area** | **Sector** | **CFU** | | **MIN from Law** |
| | | **min** | **max** | |
| Supplementary training activities | GEO/11 Engineering Geophysics<br>ICAR/02 Hydraulic and Maritime Constructions and Hydrology<br>ICAR/03 Environmental Engineering<br>ICAR/11 Construction production<br>ICAR/22 - Project Evaluation<br>ING-IND/11 Environmental Engineering Physics<br>ING- IND/22 Science and technology of materials<br>IUS/10 Comparative International Legislation for public works<br>MED/42 Environmental health | 18 | 30 | 18 |

| | |
|---|---|
| Total | 18-30 |

| | Other training activities | | |
|---|---|---|---|
| **Disciplinary area** | | **CFU** | |
| | | **min** | **max** |
| Chosen by the student | | 12 | 18 |
| Final test and Foreign language | Final test | 6 | 6 |
| | Foreign language | 3 | 3 |
| University minimum of credits reserved from art 10 co. 5 l. c | | | |
| Other training activities | Another languages | - | - |
| | IT and telematic skills | - | - |
| | Stage | 3 | 3 |
| | Other skills | | |
| University minimum of credits reserved from art 10 co.5 l. d | | | |
| For internships and placements in companies, public or private bodies, professional orders | | | |
| Total | | | 24-30 |

| | CFU Summary |
|---|---|
| Total CFU for the achievement of Degree title | 180 |
| Range CFU | 158-216 |

| Considerations |
|---|
| (ING-IND / 11, ING-IND / 22) The specific disciplines of Engineering for Sustainable Building are those typically referred to the competences concerning the design and construction of construction works and infrastructural products for the territory. The ICAR / 02 sector is proposed in the group of related subjects and not in the characteristics, as it is aimed at completing the student's preparation in issues related to the cultural path defined by the characteristics, such as hydraulic systems serving buildings.<br><br>The SSD ICAR / 03 already present among the characterizing disciplines has been included among the similar / integrative as it allows educational insights necessary to train professional and technical skills that respond to the problems required by the territory. The inclusion of GEO / 11 is also motivated by the need to provide professional skills in the field of geophysics already at the level of the basic degree, to meet local needs. The teaching regulations of the course of study and the training offer will be such as to allow students who want to follow training courses in which there is an adequate amount of credits in related and supplementary sectors that are not already characterizing. |