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|--|---|------------------------------------|
| Course title: Seismic assessment of buildings | | Semester/Year 2/3 |
| Course type: Optional | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 38 Seminars: 6 | | Laboratory: 10 Project: |

Professor: Alberto Balsamo
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Status of the course in the study Programme: Optional course for students in Civil Engineering .

Course description: Analysis of seismic behaviour of buildings: collapse mechanism, local and global ductility. Problems of seismic assessment of RC buildings; strengthening of beams, columns, joints, and use of bracing elements. Assessment and improvement of masonry buildings.

Course aims: Defining the characteristics of materials and elements that govern the seismic behaviour of buildings. Describing interventions of seismic assessment of RC and masonry buildings.

Teaching method: Lectures. Numerical examples.

Prerequisites: Structural Analysis II

Teaching aids: Handing out of problems. Intervention realized examples.

Examination method: Oral examination.

Course registration: Yes.

Examination registration: Yes, no later than three days before the examination.

Bibliography:

Pozzati P., *Teoria e Tecnica delle Strutture*, UTET, 1986.

Walther R., Miehlabrad M., *Progettare in calcestruzzo armato*, Editore Ulrico Hoepli Milano, 1990.

Park R., Pauley G., *Reinforced Concrete Structures*, John Wiley & Sons, New York 1975.

Remarks: None

| | | |
|---|--|------------------------------------|
| Course title: Technical Architecture | | Semester/Year 2/1 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/15 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 46 Seminars: | Laboratory: 8 Project: | |

Professor: Fabrizio Leccisi
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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: The building process. Patterns of development. Operative patterns. The building system: environmental and technological system. The building body: phases of planning. Execution and work management. Foundation, raising and holding structures. Vertical closing; upper and outside horizontal closing; upper closing. Insulating materials. Outlines on the planning of thermal insulation according to law. Inside vertical partition; horizontal and inclined partition. Utility services: electric and water systems, sinks and water elimination, gas feeding plants, trash elimination systems, telecommunication system. Safety system: fire fighting, atmospheric discharges. Architectural barriers. Cement mixes: kinds of cement. Additives. Composition. Degradation of concrete. Outlines of mix-design. Criteria of acceptance. Building typologies and traditional building techniques in the region of Alto Sannio.

Course aims: Providing the student with both theoretical and applicative knowledge and instruments for the development of the building plan, including the executive and yard details and the contract specification.

Prerequisites: Basic knowledge of CAD.

Teaching aids: Scripts referring to the actual topics are distributed during lectures.

Examination method: Oral examination, upon appointment.

Course registration: Yes, at the Students' Office.

Examination registration: With the lecturer, personally or by phone.

Bibliography:

CNR - *Manuale dell'architetto*;
DE SIVO-IOVINO-GIORDANO-IRACE *Appunti di Architettura tecnica* CUEN Napoli 1996;
COLLEPARDI *Scienze e tecnologie del calcestruzzo* HOEPLI Milano;
LECCISI *Tipologie e tecniche costruttive delle architetture dell'Alto Sannio* CUES Salerno 2000.

Remarks: This course is addressed to first-year students in Civil Engineering.

| | | |
|---|--|------------------------------------|
| Course title: Heat Transfer in Buildings | | Semester/Year 2/1 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 4 |
| Total number of hours: 54 Lectures: 38 Seminars: | Laboratory: 16 Project: | |

Professor: Giuseppe Peter Vanoli

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: Basic heat transfer phenomena, conduction: slabe and cilindric wall; thermal resistance. Conductive transient heat transfer ($Biot < 0,1$). Convection: relationship for calculating convective conductances (forced and natural convection). Radiative heat transfer; black body and its radiative characteristics. Heat balances on opaque surfaces. Moist air: thermodynamical properties, psycometrich charts; most common thermodynamical processes; moisture in walls (Fick law), case studies.

Course aims: Making the students able to accomplish heat transfer analysis relating to buildings and their environment.

Prerequisites: Engineering Thermodynamics

Teaching aids: Teachers note, software

Examination method: Oral examination and discussion of numerical examples.

Course registration: No

Examination registration: Yes

Bibliography:

Teacher's notes

R. Mastrullo, P.Mazzei, R. Vanoli, *Termodinamica per Ingegneri*, Liguori Editore, Napoli
ENEA, *Guida alla progettazione del sistema edificio - Impianto di riscaldamento*.

Remarks:

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|--|---|------------------------------------|
| Course title: Economics and Management | | Semester/Year 1/1 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 2 /14 | Number of ECTS credits 3 |
| Number of hours (classroom): 28 | Number of hours (laboratory): | |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering .

Course description: Management Accounting: functions, instruments and aim; Introduction to the Business Management, calculation, evaluation and interpretation of “ratios”.

Basic knowledge of Strategic Management: fit firm-environment, Strategy and strategic School; possible classification of strategic Schools. Innovation Strategies: analysis instruments.

Course aims: Making the student understand the theoretical fundamentals and the practical methods for accounting. S/he should know the accounting principles and should be able to read and interpretate the budget. The student should also be able to calculate the most important “ratios ” and to design the global panorama of a firm by using them and by analysing its budget.

The student should know the most important models of strategical analysis of Innovation.

Teaching method: Lectures, supported by transparencies and slides.

Prerequisites: none.

Teaching aids: Scripts referring to the actual topics are distributed during lectures.

Examination method: Written and oral examination.

Course registration: Yes.

Examination registration: The student has to register his/her name at the Students’ Secretarial Office.

Bibliography:

Guido Capaldo e Domenico Lesina, *Bilancio Aziendale*, Autori, Casa Editrice ESI;

Emilio Bellini, *Le Strategie di Innovazione nelle Piccole Imprese: tra Competenze e Relazioni*, Casa Editrice SIPI.

Remarks: This lecture is addressed to students in Civil Engineering.

| | | |
|---|--|------------------------------------|
| Course title: Precasted structural R.C. and prestressed R.C. elements | | Semester/Year 2/3 |
| Course type: Optional | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 40 Seminars: | Laboratory: hours 14 Project: 1 | |

Professor: Francesca Ceroni
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Status of the course in the study Programme: Optional course for students in Civil Engineering.

Course description: Precast systems for slabs in RC. Prestressed concrete beams. Precast columns and panels in RC. Connections between precast elements. Problems of lifting and assemblage of precast elements. Structural patterns of industrial shed. Organization and costs of production of precast elements.

Course aims: Studying various types of precast elements available on the market. Defining design and assemblage problems of structures realized with precast elements.

Teaching method: Lectures. Numerical examples. Design of precast structures.

Prerequisites: Structural Analysis II

Teaching aids: Technical information about precast systems available on the market. Examples of constructions realized with precast systems.

Examination method: Oral examination.

Course registration: Yes.

Examination registration: Yes, no later than three days before the examination.

Bibliography:

Giangreco E., *Teoria e Tecnica delle Costruzioni*, 1990.
Pozzati P., *Teoria e Tecnica delle Strutture*, UTET, 1986.
Tullio Antonini, *Cemento armato precompresso*, Masson Italia Editori, 1986.

Remarks: None.

| | | |
|---|--|------------------------------------|
| Course title: Basic electric circuit theory | | Semester/Year 1/2 |
| Course type: Compulsory | Hours per week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Number of hours (classroom): 54 | Number of hours (laboratory): | |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering

Course description: The aim of the Course is to develop all basic elements of electromagnetic theory necessary for a simple but rigorous description of the basic concepts of the linear circuit theory. By starting from the framework of electromagnetics, bipoles (voltage and current sources, resistor, capacitor and inductor) and Kirchhoff laws are introduced. Afterwards, the basic elements for the analysis of resistive networks, the analysis of circuits in AC steady state and a time domain analysis of dynamic circuits is developed. Exercises and problems are ever solved in strict connection to theory.

Course aims: The student should obtain a sufficient knowledge of theoretical fundamentals of basic electric circuit theory and S/He should be able to tackle the analysis of any simple network, either in AC steady state than in dynamic conditions.

Prerequisites: Basic knowledge of Calculus , Algebra and basic mechanics and Electromagnetics are necessary.

Teaching aids see suggested books

Examination method: : Oral examination, after a test.

Course registration: No

Examination registration: Yes, via ERACLE

Bibliography:

I. D. Mayergoyz, *Basic Electric Circuit Theory*, Academic Press;
E.M. Purcell, *Electricity and Magnetism*;
The Feynman lectures on Physics

Remarks: The Course is addressed to second-year students in Civil Engineering.

| | | |
|---|--|-------------------------------------|
| Course title: Physics | | Semester/Year 1/1 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits: 6 |
| Number of hours (classroom): 54 | | Number of hours (laboratory): |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: Measurement and Units. Vectors. Kinematics: velocity and acceleration. Rectilinear, circular and general curvilinear motions. Relative motion: uniform relative translational and rotational motions. Forces: composition and torque. Center of mass. Statics. Gravitational law. Dynamics of a particle: Newton laws, linear momentum and torque, friction, equilibrium and rest. Work and energy: power, kinetic and potential energy. Central forces. Dynamics of a system of particles: motion of the center of mass, reduced mass, collisions. Dynamics of a rigid body: angular momentum, rotational motion. Oscillatory motion: damped and forced oscillations, resonance. Thermodynamics: temperature, thermodynamical systems and their transformations, work and heat. Perfect gas. First and second law of Thermodynamics. Entropy.

Course aims: The course is an introduction to the basic concepts of Mechanics and Thermodynamics. It is a prerequisite for all subsequent courses.

Prerequisites: Math-1 (M1), Math-2 (M2).

Teaching aids: Some lecture materials and exercises are available at the Student's Office.

Examination method: Two class-tests (problem solving) focused on Kinematics, Dynamics and Thermodynamics. Compulsory final written test for students who do not pass the class-tests. Oral discussion Compulsory for all students.

Course registration: Yes (web).

Examination registration: Yes (web).

Bibliography:

M. Alonso, E.J. Finn, *Elementi di Fisica per l'Universita' - Meccanica* (Inter European Editions);
R. Feynman, R. Leighton and M. Sands, *La Fisica di Feynman* (Addison Wesley);
La Fisica di Berkeley- Meccanica (Zanichelli);
U. Amaldi, *Meccanica* (Zanichelli);
C. Mencuccini, V. Silvestrini, *Fisica I* (Liguori);
E. Fermi, *Termodinamica* (Boringhieri).

Remarks: -

| | | |
|---|--|------------------------------------|
| Course title: Engineering Thermodynamics | | Semester/Year 2/1 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 30 Seminars: | | Laboratory: 14 Project: |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering

Course description: Introductory concepts and definition: thermodynamic systems (closed and open), property, state, process. Thermodynamic relation for simple compressible substance: p-v-T relation, thermodynamic property data (tables and charts), equation of state of thermodynamic models (ideal gas and liquid). Conservation of mass for a control volume, First law of thermodynamics, Second law of thermodynamics. Energy and entropy analysis of control volumes at steady state: ducts, pipes, turbines, pump, compressor, heat exchanger, valve. Vapor power system (Rankine cycle, regenerative cycle). Vapor compression refrigeration and heat pump systems, refrigerants

Course aims: Making the student understand the bases and the practical methods of applied thermodynamics. S/he should be able to perform energy and entropy balances for closed and/or open thermodynamic systems used in engineering applications: power, refrigeration and heat pump equipments.

Prerequisites: Mathematics I, Physics I.

Teaching aids: Teachers notes, tables and charts.

Examination method: Oral examination, with discussion about numerical examples.

Course registration: No

Examination registration: Yes

Bibliography:

Teacher's notes

A. Cesarano e P. Mazzei, *Elementi di termodinamica applicata*, Liguori Editore, Napoli

R. Mastrullo, P. Mazzei, R. Vanoli, *Termodinamica per ingegneri*, Liguori Editore, Napoli.

C. Aprea, F. De Rossi, *Esercitazioni di termodinamica applicata*, CUEN, Napoli

Remarks:

| | | |
|---|--|---|
| Course title: Basics of Information Technology | | Semester/Year 1/1 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 42 Seminars: | | Laboratory: 3 sessions of 4 hours Project: 1 |

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Status of the course in the study Program: Compulsory course for students in Energetic and Civil Engineering.

Course description: The topics treated can be grouped in a general part and an applicative one. The general part includes the fundamentals of computer architecture and calculus systems, the fundamentals of the operative systems and databases. The applicative part includes the use of the personal computers; the use of the MS-DOS, Windows, and Linux operative systems; the use of network services such as e-mail, file transfer, remote terminal, World Wide Web, hypertext and HTML and tools for the definition and navigation of hypertext/HTML pages; the use of office automation tools such as word processor, spreadsheet, electronic presentation, relational database management systems; and the implementation of simple programs by using the programming language C++.

Course aims: Giving the student the starting knowledge for using the most diffused computer technologies and introducing him to the study of the calculus system architecture. The course has been designed together with "Programming" and will provide the knowledge necessary in the following courses.

Teaching method: Lessons in the lecture theatre with projector and slides.

Prerequisites: None

Teaching aids: All the slides projected during the lesson are distributed to the students and are accessible on <http://snoopy.labing.unisannio.it>.

Examination method: The examination is based on a discussion about the topics required and on a practical proof based on the use of a personal computer, network services and office automation instruments. During the course, homework is given the students, who have to solve them by using the personal computer and the relative tools. These exercises can be presented during the examination.

Course registration: No

Examination registration: It is possible by accessing to the web site, by using the URL: <http://snoopy.labing.unisannio.it>

Bibliography:

B. Fadini, C. Savy, *Fondamenti di Informatica I*, Ed. Liguori

A. Meo, M. Mezzalama, F. Peiretti, R. Meo, *Fondamenti di Informatica I*, vol. 2, Ed. UTET

S. Ceri, D. Mandrioli, *Istituzioni di Informatica*, Ed. Mc-Graw Hill, Italia

Slides and laboratory manuals.

Remarks:

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|---|--|------------------------------------|
| Course title: Road design | | Semester/Year 1/2 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Number of hours (classroom): 44 | Number of hours (laboratory): 10 | |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: Road, flows and vehicles. Driver-car-road interaction. Road design steps. Plani-altimetric composition of road layout. Cross road sections and roadway elements. Speed and visibility diagrams for road safety. Vehicles flows. Level of service. Choice of running road section. Intersection. Road body and his construction. Preliminary surveys. Bases of road geotechnique: parameters and basics soil tests. Road pavements structure. Road materials for pavements construction (stone-aggregations, binders, mixed stone-aggregations and binders) and tests for their characterize. Flexible and rigid road pavements. Pavements catalogues. Road safety for goal. Pratical numerical exercises and some graphic tables of road project.

Course aims: The student should obtain fundamentals knowledge of theoretical and practical methods for design and construction direct to roads and flows safety, instruments and methodology for a critical reading of graphic tables of road project and CNR rules, some methodologies for accidents analysis and road safety test.

Prerequisites: Basic knowledge of mathematics, physics and mechanics are necessary.

Teaching aids: Scripts are distributed during lectures, slides copy, additional aids on CD (rules, manuals, papers), didactic software.

Examination method: Oral examination with discussion of road project tables.

Course registration: No.

Examination registration: At University (Engineering Faculty Library, Convitto Giannone) or with the lecturer, personally or by phone.

Bibliography:

CNR rules (BU n. 77 del 5 maggio 1980, "*Istruzioni per la redazione dei progetti di strade*").

CNR rules (BU n. 78 del 28 luglio 1980, "*Norme sulle caratteristiche geometriche e di traffico delle strade extraurbane*").

UNI-CNR rules n. 10006 del maggio 1963, "*Tecnica di impiego delle terre nelle costruzioni stradali*".

Scripts from lectures.

Scripts from numerical applications.

Remarks:

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|---|--|------------------------------------|
| Course title: Foundations and Retaining Works | | Semester/Year 1/3 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 48 Seminars: | Laboratory: 6 Project: | |

Professor: Armando Lucio Simonelli

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: Design and execution requirements of foundations and retaining works. Regulations and Codes. Foundation typologies. Shallow foundations. Bearing capacity. Absolute and differential settlements. Reduction of differential settlements. Deep foundations: typologies and execution technologies. Bearing capacity of single piles and pile groups. Pile settlements. Design criteria of deep foundations. In situ pile bearing tests. Earth pressure theories. Typologies and design criteria of retaining walls. Drainage systems. Typologies and design of sheet-pile walls. Anchors.

Course aims: Comprehending the mechanisms of behaviour of foundations and retaining works. Acquiring the theories and calculation procedures for the design and verification of common foundations and retaining works. Supplying the reference Codes and Regulations.

Prerequisites: Basic knowledge of "Principles of Soil Mechanics" and "Hydraulics" courses.

Teaching aids: Copies of transparencies and some scripts referring to particular topics are distributed before the lectures.

Examination method: Oral examination, consisting in the discussion about theoretical topics, numerical exercises and laboratory testing activities.

Course registration: Yes.

Examination registration: Filling a form, two days before the examination day. The students propose the examination dates to the lecturer.

Bibliography:

List of suggested books:

C. Viggiani, *Fondazioni*, Hevelius, Benevento

A. Evangelista, *Appunti di Opere di sostegno*, Eliografia Ilardo, Napoli

Remarks: Attending the lectures and laboratory experimental activities is strongly recommended.

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|---|--|------------------------------------|
| Course title: Applied Geology | | Semester/Year 2/3 |
| Course type: Optional | Hours per Week/ Number of Weeks 2/14 | Number of ECTS credits 3 |
| Total number of hours: 28 Lectures: 22 Seminars: | | Laboratory: 6 Project: |

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Status of the course in the study Programme: Optional course for students in Civil Engineering.

Course description: Main topics are: geology and geomorphology elements and relative applications. Geological risks (landslides, floods, earthquakes, volcanic eruptions and subsidence). Building materials. Hydro-geological structures and their interactions with underground structures. Geo-thematic cartography for the design of civil engineering works.

Course aims: Acquiring the basic knowledge of structural geology, geomorphology and hydro-geology elements relevant to the design of civil engineering works.

Prerequisites: Basic knowledge of “Principles of Soil Mechanics ” course.

Teaching aids: Copies of transparencies, and some scripts referring to particular topics, are distributed before lectures.

Examination method: Oral examination, consisting in the discussion about both theoretical topics and laboratory testing activities.

Course registration: Yes.

Examination registration: Filling a form, two days before the examination day. The students propose the examination dates to the lecturer.

Bibliography: list of suggested books:
F. Bell, *Geologia ambientale*, Zanichelli editore.
Vallario, *Frane e territorio*, Liguori editore.

Remarks: Attending the lectures and laboratory experimental activities is strongly recommended.

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|---|--|------------------------------------|
| Course title: Geometry and linear algebra | | Semester/Year 2/1 |
| Course type: Compulsory | Hours per Week/ Number of weeks 4/14 | Number of ECTS credits 6 |
| Number of hours (classroom): 54 | Number of hours (laboratory): | |

Professor: Pasquale Avella

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering and Energetic Engineering

Course description: abstract vectorial spaces; the vectorial space \mathbb{R}^n , matrices, determinants, analytical geometry in the plane and in the space, linear transformations, quadratic forms.

Course aims: Making the student reach the basic knowledge and the instruments of geometry and linear algebra necessary in the applications in the following courses.

Prerequisites: Scolastic knowledge of basic Mathematic (algebra, geometry and trigonometry).

Teaching aids: Scripts referring to the actual topics are distributed during lectures.

Examination method: Scripts examinations during the course; script and oral examination at the end of the course.

Course registration: No.

Examination registration: Personally.

Bibliography:

Marcellini, Sbordone, *Calcolo*, Liguori;

Alvino, Carbone, Trombetti, *Esercitazioni di Matematica*, Vol. 1, parte prima, Liguori;

Bramanti, Pagani, Salsa, *Matematica. Calcolo infinitesimale e Algebra lineare*, Zanichelli..

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|------------------------------------|---|------------------------------------|
| Course title: Hydraulics | Codice del corso: 19814 | Semester/Year: 2/2 |
| Course type: Compulsory | Hours per Week/ Number of Week 4/14 | Number of ECTS credits 6 |
| Number of hours (classroom): | | Number of hours (laboratory): |

Professor: Cristiana Di Cristo

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: *1. Introduction.* The nature of Fluids. The Fluids and their Properties. S.I. units. Internal stresses. Indefinite equation of dynamics. Types of flow. *2. Fluid Statics.* Pressure at a point. Hydrostatic forces. Stevin law. Global Equation of Static Equilibrium. Static forces on surfaces. *3. Fluid Dynamics.* Continuity and Conservation of Mass. The Momentum Equation. The Bernoulli Equation. Applications of Continuity and Bernoulli. Applications of the Momentum Equation. *4. Hydrometry.* Pressure measurement by manometers. Velocity and flowrate measurements. *5. Uniform Flow in closed-conduit.* Resistance to flow equations. Friction coefficient. Applications. Problems in networks of pipes. *6. Uniform flow in open channel.* Resistance to flow equations. Friction coefficient. *7. Steady flow in closed-conduit.* Local energy loss. Applications. *8. Steady flow in open channel.* Steady flow in open channel equation. Gradually varied flow. Specific energy. Critical Depth. Classification of surface profiles. Hydraulic jump. Applications to channels. *9. Porous media flow.* Darcy law. Applications.

Course aims: Providing the bases of Hydraulics in order to solve applicative problems of Civil Engineering.

Teaching method: Lectures in classroom. Numerical applications

Prerequisites: Mathematics. Physics

Teaching aids: Scripts referring to actual topics are distributed during lectures.

Examination method: Oral examination with discussion about the numerical applications developed during the course.

Course registration: No.

Examination registration: Yes personally.

Bibliography:

D. Citrini, G. Nosedà: *Idraulica*. Ed. Ambrosiana, Milano

M. Viparelli: *Lezioni di idraulica*. Ed. Liguori, Napoli

Remarks:

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|---|---|------------------------------------|
| Course title: Air Conditioning and Electrical Plants | | Semester/Year 2/3 |
| Course type: Optional | Hours per Week/ Number of Weeks 6/9 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 36 Seminars: | Laboratory: 18 Project: | |

Professor: Filippo de Rossi, Domenico Villacci
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Status of the course in the study Programme: Optional course for students in Civil Engineering.

Course description: The course contents concern with conditioning and electrical plants. The contents are perfectly integrated in order to facilitate the student's knowledge of actual integrated project competences.

Conditioning plants

Main air conditioning plant typologies classified according to the standards to be warranted, the building to be served and the thermovector fluid. Devices for domestic air conditioning. Thermal plant, refrigerating plant, piping, remote terminals. Plants performances, savings achievable in both plant design and conduction.

Electrical plants

Main electrical plants components and devices. Main electrical plants topologies. Electrical line projecting and control criteria. Protection system choice. Ground plants. Electrical safety elements and principles of electric risk-analysis. Plants performances, savings achievable in both plant design, conduction (integrated plants control).

Course aims: Preparing professional men able to play an active role in projecting groups of medium/large integrated "Systems Building-Plants" (refrigerating and electrical plants) and autonomously project small and simple installations.

Prerequisites: Engineering thermodynamics, Indoor living conditions control, Electrotechnical.

Teaching aids: Teachers notes, tables and charts

Examination method: Oral examination, with discussion about numerical examples.

Course registration: No

Examination registration: Yes

Bibliography:

Teacher's notes.

ENEA, *Guida alla progettazione del sistema edificio-impianto di riscaldamento*, 2000.

De Santoli, Moncada Lo Giudice, *Progettazione di impianti tecnici*, Masson, 1995.

Impianti Elettrici Vol.II, V. Cataliotti, Flaccovio Editore.

Remarks: Visits of domestic commercial and industrial plants.

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|--|--|------------------------------------|
| Course title: In situ investigations and control of geotechnical works | | Semester/Year 2/3 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 2/14 | Number of ECTS credits 3 |
| Total number of hours: 28 Lectures: 20 Seminars: | | Laboratory: 8 Project: |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering (included in the *Curriculum 1* course group).

Course description: Subsoil volume interacting with foundations and earthworks. Investigation planning. Static penetrometer, piezocone. Dynamic penetrometers. Interpretation of penetrometer test results for layering and mechanical characterization of subsoil materials. Vane test. Pressuremeter. Piezometers, In-situ permeability tests. Inclinometers. Pile load testing, anchor load testing, monitoring of unstable slopes.

Course aims: Making the students understanding the testing technologies and relative equipment for monitoring the behaviour of subsoil and geotechnical works. Interpreting criteria and analyses procedures of experimental results for relevant main applications.

Prerequisites: Basic knowledge of "Foundations and Retaining Works" course.

Teaching aids: Copies of transparencies, and some scripts referring to particular topics, are distributed before lectures.

Examination method: Oral examination, consisting in the discussion about both theoretical topics and experimental testing activities.

Course registration: Yes.

Examination registration: Filling a form, two days before the examination day. The students propose the examination dates to the lecturer.

Bibliography:

List of suggested books:

C. Viggiani, *Fondazioni*, Hevelius, Benevento

Associazione Geotecnica Italiana, *Raccomandazioni sulla programmazione ed esecuzione delle indagini geotecniche*, AGI, Roma.

Remarks: Attending the lectures and laboratory experimental activities is strongly recommended.

| | | |
|---|--|------------------------------------|
| Course title: Hydraulic Infrastructures | | Semester/Year 1/3 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 52 Lectures: 46 Seminars: | Laboratory: 8 Project: | |

Professor: Nicola Fontana

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: Water cycle. Demand of water consumption. Drinking water supply: hydraulic schemes; water extraction; water storage; pumping systems; waterworks; drinking water quality and treatment criteria; hydraulic design of distribution network. Elements of hydrology: rainfall measurements and data analysis; hydraulic risk and return period. Urban drainage systems: storm sewers, foul sewers and combined sewers; hydraulic design; system components and layout; wastewater treatment criteria.

Course aims: Giving the students in Civil Engineering a basic understanding of the principles of water resources engineering. As a result students should be able to analyse the role of hydraulic infrastructures and be familiar with the concepts of water distribution and storm sewerage systems; furthermore they should be able to carry out hand calculations to analyze and to design small catchments waterworks.

Prerequisites: Knowledge of hydraulics is necessary.

Teaching aids: Scripts and papers referring to many topics of the course are distributed during lectures.

Examination method: Oral examination and coursework project discussion.

Course registration: Yes.

Examination registration: Personally.

Bibliography:

G. Ippolito: *Appunti di Costruzioni Idrauliche*. Liguori editore

V. Milano: *Acquedotti: guida alla progettazione*. Hoepli editore

AA.VV.: *Sistemi di fognatura. Manuale di progettazione*. Hoepli editore

Remarks:

| | | |
|---|---|---|
| Course title: English | Course code: 19503 | Semester/Year: 1/1 |
| Course type: Compulsory | Hours per week /Number of weeks: 4/10 | Number of ECTS credits: 4 |
| Total number of hours: 40 Lectures: n. 20 - n. of hours: 40 | | Language Laboratory - n. of hours : 10 Tutorials - n. of hours: 25 Mock exams: 1 - n. of hours: 2 |

Professor: Erricoberto Pepicelli

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: Language functions and morpho-syntactic structures, specific of both the informal and formal registers of the language, at elementary/intermediate levels. The Phonetic transcription. Educational Systems in Italy, U.K. USA. The contents of the video: *Happy Days in England*. The Internet, Housing, Plans and Designs, Design Types. Mathematical Expressions, Essential Glossary.

Course aims: The primary aim is the acquisition of communicative competence, with emphasis on listening and speaking. Acquisition of techniques and strategies appropriate for the development of the four language skills also in the field of the micro-language of Civil Engineering and in the other content subjects.

Teaching method: The approach to the teaching-learning process is the humanistic-cooperative one, even if the large number of students attending the course makes it difficult to implement, at times. The focus is on the learner who is the main actor of his/her learning process. S/he is involved also in pair and group-work activities in interactive situations. The inductive method is the privileged one. Audio-tele-visuals are exploited such as audio-video-recorders, OHP, as a support to lectures; a language laboratory, and language multimedial programs are available for reinforcement and self-access.

Prerequisites: None.

Teaching aids: Audio and video cassettes and cd.roms are used by students also for self-access both during the lectures and in the laboratories. Notes related to the programme, together with authentic materials (paper clippings, tables...)

Examination method: both written and oral with discussion of the written paper. Checking of the competencies in the four language skills with emphasis on oral communication.

Course registration: No.

Examination registration: Yes, personally or by phone at the appropriate office.

Suggested books:

-John and Liz Soars – *New Headway Elementary* – O.U.P.

- Branca, Torretta, *Using English in the Building Workshop*, Zanichelli.

Additional Materials

- *Interactive English* (Cd-rom) De Agostini

- *Northampton University College* (Video)

-*Happy Days in England* (Video)- Zanichelli.

Remarks: This course is addressed to all first year students in Civil Engineering.

| | | |
|---|--|------------------------------------|
| Course title: Mathematics I | | Semester/Year 1/1 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Number of hours (classroom): 54 | Number of hours (laboratory): | |

Professor: Enrico Meccariello

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: 0. Basic Arithmetics, elementary logic and set theory; analytic geometry and trigonometry. 1. Functions and their graphs. 2. Derivatives and applications. 3. Series and power series.

Course aims: Providing the students with the basic notions of Mathematical Analysis and Calculus.

Prerequisites: No other examinations are required.

Teaching aids

Examination method: Written examination. In exceptional cases only, an oral evaluation can be required.

Course registration: No

Examination registration: Yes.

Bibliography:

George B. Thomas Jr and Ross L. Finney: *Elementi di Analisi Matematica e Geometria Analitica*, Zanichelli.

Remarks: This course is addressed to first-year students in Engineering.

| | | |
|---|--|------------------------------------|
| Course title: Mathematics II | | Semester/Year 2/1 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Number of hours (classroom): 54 | | Number of hours (laboratory): |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: 1. Complex Numbers. 2. Integration. Application of definite integration. Methods of Integration. 3. Differential Equations.

Course aims: Providing the students with a further understanding of the basic notions of Mathematical Analysis and Calculus.

Prerequisites: No other examinations are required. It is conceivable that the student has already taken MATEMATICA I.

Teaching aids

Examination method: Written examination. In exceptional cases only an oral evaluation can be required.

Course registration: No

Examination registration: Yes.

Bibliography:

George B. Thomas Jr and Ross L. Finney: *Elementi di Analisi Matematica e Geometria Analitica*, Zanichelli.

Remarks: This course is addressed to all first-year students in Engineering.

| | | |
|---|---|------------------------------------|
| Course title: Innovative materials and techniques for civil engineering | | Semester/Year 2/3 |
| Course type: Optional | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 34 Seminars: 10 | | Laboratory: 10 Project: |

Professor: Maria Rosaria Pecce

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Status of the course in the study Programme: Optional course for students in Civil Engineering.

Course description: Physical, chemical and mechanical properties of composite materials for civil engineering. Fiber reinforced polymers materials (FRP): fibers and resins. FRP rebars for RC structures. Calculation procedures and design provisions for strengthening in bending and shear of RC beams with FRP laminates. Bond mechanisms of FRP rebars and laminates. FRP profiles, deformability and buckling.

Course aims: Making the student understand the material characteristics and the application fields of composite materials in civil engineering. Defining code provisions for design using FRP materials.

Teaching method: Lectures. Numerical examples. Explication of real strengthening interventions.

Prerequisites: Structural Analysis II

Teaching aids: Example of applications. Electronics sheets for calculation of RC elements reinforced with FRP rebars or strengthened with FRP laminates.

ACI Committee 440. (2001), "Guide for the Design and Construction of Concrete Reinforced with FRP Bars. 440.1R-01," American Concrete Institute, Farmington Hills, MI, pp. 95.

Examination method: Oral examination.

Course registration: Yes.

Examination registration: Yes, no later than three days before the examination.

Bibliography:

Nanni, A., Editor, *Fiber-Reinforced-Plastic (FRP) Reinforcement for Concrete Structures: Properties and Applications, Developments in Civil Engineering* Volume 42, Elsevier, Amsterdam, 1993, 450 pp.

Jones R.M., *Mechanics of composite materials*, McGraw-Hill Book Company, 1975

Remarks: None.

| | | |
|---|--|------------------------------------|
| Course title: Engineering Mechanics | | Semester/Year 2/1 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Number of hours (classroom): 54 | Number of hours (laboratory): | |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering .

Course description: Vectors, operations with vectors, fields of vectors, moments. Lagrange cinematic of systems, restraints, mathematical model. Freedom degrees. Weak, hyperstatic, isostatic systems. Applications to plane and spatial systems. Definition and models of equilibrium: cardinal equations of static, principle of virtual work. Systems of monodimensional elements. Calculation of restraint reactions. General principles of dynamic.

Course aims: Giving the students theoretical bases to operate with vectors and to analyse the static behaviour of rigid bodies.

Teaching method: Lectures. Numerical examples.

Prerequisites: Mathematics I

Teaching aids: Handing out of problems and examples.

Examination method: Oral and written examination with project discussion.

Course registration: Yes.

Examination registration: Yes, no later than three days before the examination.

Bibliography:

M. Fabrizio, *La Meccanica Razionale ed i suoi Metodi Matematici*, Zanichelli.

F.P. Beer, E.R. Johnston, *Vector Mechanics for Engineers: Statics*, McGraw Hill.

J.M. Prentis, *Engineering Mechanics*, Clarendon Press.

Remarks: None

| | | |
|---|--|------------------------------------|
| Course title: Principles of Soil Mechanics | | Semester/Year 2/2 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 44 Seminars: | | Laboratory: 10 Project: |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: The main topics are: Rocks and soils. Physical characteristics of granular soils. Fine grained soils: interaction between solid and liquid phases. Soil permeability. Total stresses, effective stresses and pore water pressures in granular soils. Pore water pressures induced in undrained conditions. Overconsolidated soils. Soil deformability and relative laboratory testing procedures. Stresses induced by applied loads. Settlements. Elements of consolidation theory. Soil strength and relative laboratory testing procedures. Rankine theory and bearing capacity of foundations. In situ investigations.

Course aims: Making the student understand the theoretical fundamentals of soil mechanics. Moreover he should study the methodologies and the technics for both in situ and laboratory investigations, which allow to determine physical and mechanical soil properties. The final objective is the assessment of the geotechnical characterization of the subsoil which interacts with common civil engineering structures (to solve problems of settlement and bearing capacity of foundations).

Prerequisites: Basic knowledge of Continuum Mechanics course.

Teaching aids: Copies of transparencies, and some scripts referring to particular topics, are distributed before lectures.

Examination method: Oral examination, consisting in the discussion about theoretical topics, numerical exercises and laboratory testing activities.

Course registration: Yes.

Examination registration: Filling a form, two days before the examination day. The students propose the examination dates to the lecturer.

Bibliography:

Istituto di Tecnica delle Fondazioni e Costruzioni in Terra, *Appunti di Principi di Geotecnica*, Eliografia Ilardo, Napoli.

Pellegrino, *Appunti integrativi*, Eliografia Ilardo, Napoli.

Pellegrino, *Esercitazioni del Corso di Principi di Geotecnica*, Eliografia Ilardo, Napoli.

Associazione Geotecnica Italiana, *Raccomandazioni sulla programmazione ed esecuzione delle indagini geotecniche*, AGI, Roma.

Associazione Geotecnica Italiana, *Raccomandazioni sulle prove geotecniche di laboratorio*, AGI, Roma.

Remarks: Attending the lectures and laboratory experimental activities is strongly recommended.

| | | |
|---|--|--|
| Course title: Design elements of RC buildings | | Semester/Year 2/3 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 2/14 | Number of ECTS credits 3 |
| Total number of hours: 28 Lectures: 15 Seminars: | | Laboratory: 14 Project: 1 |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: General principles to design structures in seismic area. Static method to design buildings in seismic area. Design of a simple R.C. building subjected to vertical and horizontal loads. Practical details about holes and overhanging in slab. Stairs: rampant slabs, knee beams, steel stairs.

Course aims: Analysing the main problems about design of a simple R.C structure, also in seismic area. Providing the student with a basic knowledge about calculation and realisation of practical details and stairs. Analysis and application of a software to design R.C framed structures.

Teaching method: Lectures. Numerical examples. Software for design of R.C framed structures.

Prerequisites: Structural Analysis 2

Teaching aids: Software utilisation.

Examination method: Oral examination with project discussion.

Course registration: Yes.

Examination registration: Yes, no later than three days before the examination.

Bibliography:

Giangreco E., *Teoria e Tecnica delle Costruzioni*, 1990.

Park R., Pauley G., *Reinforced Concrete Structures*, John Wiley & Sons, New York 1975.

Pozzati P., *Teoria e Tecnica delle Strutture*, UTET, 1986.

Walther R., Miehbradt M., *Progettare in calcestruzzo armato*, Editore Ulrico Hoepli Milano, 1990.

Remarks: None.

| | | |
|---|--|------------------------------------|
| Course title: Watershed Protection and Flood Prevention | | Semester/Year 2/3 |
| Course type: Optional | Hours per Week/ Number of Weeks 2/14 | Number of ECTS credits 3 |
| Number of hours (classroom): 28 | Number of hours (laboratory): | |

Professor: Nicola Fontana

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Status of the course in the study Programme: Optional course for students in Civil Engineering.

Course description: Elements of hydrology: measurement and processing of hydrological data; hydraulic risk and return period, excess rainfall and direct runoff. Open channels hydraulics: steady flow and water surface profiles; unsteady flow and De Saint Venant equations. Rainfall-runoff processes and routing models. Numerical solutions of De Saint Venant equations: lumped and distributed routing models. Flood control infrastructures in catchments basins: normative statements, structural and non-structural measures.

Course aims: Giving the students in Civil Engineering a basic understanding of the principles of watershed protection and flood prevention measures. Students should be familiar with the basic concepts of hydrology and be able to carry out calculation of the flood hazard in catchment basins and a preliminary design of flood control infrastructures.

Prerequisites: Knowledge of hydraulics and hydraulic infrastructures is necessary.

Teaching aids: Scripts and papers referring to many topics of the course are distributed during lectures.

Examination method: Oral examination and coursework project discussion.

Course registration: Yes.

Examination registration: Personally.

Bibliography:

V. T. Chow, D. R. Maidment, L. W. Mays: *Applied Hydrology*, Mc Graw-Hill Book Company

L. Da Deppo, C. Datei, P. Salandin: *Sistemazione dei corsi d'acqua*, Edizioni Libreria Cortina

U. Maione: *Sistemazione dei corsi d'acqua montani*, BIOS editore

Remarks:

| | | |
|--|--|------------------------------------|
| Course title: Functional and structural rehabilitation of masonry structures | | Semester/Year 2/3 |
| Course type: Optional | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 32 Seminars: 8 | | Laboratory: 14 Project: |

Professor: Maria Rosaria Pecce / Filippo de Rossi
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Status of the course in the study Programme: Optional course for students in Civil Engineering.

Course description: Masonry structures: different structures and damages typology. Strengthening and repairing methods for wooden and steel slabs. Design of masonry structures subjected to seismic actions using POR method. Techniques for strengthening of masonry structures. Functional rehabilitation of masonry buildings: moistness and conditioning problems. Specific comfort standards. Analysis of moisture within the brick wall: causes and remedies. Heat transfer characteristics of brick walls. Analysis of improving technique.

Course aims: Underlining the main structural issues related to the different typology of damages and to the strengthening techniques. Providing the student with a general knowledge about main strengthening techniques and functionality rehabilitation of masonry structures.

Teaching method: Lectures. Numerical examples. Explication about real strengthening interventions.

Prerequisites: Structural Analysis II, Heat Transfer in Buildings

Teaching aids: Technical records about typical reinforcement interventions.

Examination method: Oral examination and discussion of numerical examples.

Course registration: Yes.

Examination registration: Yes, no later than three days before the examination.

Bibliography:

Augenti N., *Il rinforzo sismico di strutture in muratura*, UTET, 2001
Manuale per la riabilitazione e la ricostruzione postsismica degli edifici, regione Umbria, DEI s.r.l. Tipografia del genio Civile 1999.
Del Piero G., *Le costruzioni in muratura*, Lezioni tenute al 2° convegno di studio sul consolidamento delle costruzioni di Udine 1983, Collana di Ingegneria Strutturale 1984.
Mastrodicasa S., *Dissesti statici delle strutture edilizie*, Ulrino Hoepli, Milano, 1980.
Monaco L.M., Santamaria A., *Indagini prove e monitoraggio nel restauro degli edifici storici*, Edizioni Scientifiche Italiane 1998.
C.Aghemo, C.Azzolino, *Il progetto dell'elemento di involucro opaco*, Celid 1996

Remarks:

| | | |
|--|--|--|
| Course title: Continuum mechanics | | Semester/Year 1/2 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 6/14 | Number of ECTS credits 9 |
| Total number of hours: 84 Lectures: 67 Seminars: 2 | | Laboratory: 5 sessions of 3 hours Project: |

Professor: Antonio Gesualdo

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering .

Course description: Theory of deformation in finite and infinitesimal model. Stress in the 3 D Cauchy model. Constitutive elastic law. Hyperelastic material. Outline on non linearity of materials. Stationary of the total potential energy functional. Saint Venant beam. Analytic and graphic static. Hypostatic, isostatic and hyperstatic beams and structures in the hypothesis of elastic material. The Eulero-Bernoulli model of the elastic beam. Outline on the Timoshenko model of the elastic beam. Solution of typical structural systems. Introduction to codes of the structural analysis in the FEM. Design and evaluation of the safety degree. Buckling of the elastic beam in the Euler model.

Course aims: 1) introduction to project and estimates of the structural safety degree of the structures; 2) general theorem and procedur for analysis of complex structures and 3-D and 2-D continuum solids; 3) use of the computer program for the applications.

Teaching method: Lectures, supported by laptop.

Prerequisites: Basic knowledge of Mathematical Analysis (I, II), Geometry, Physics and Solid Mechanics are necessary.

Teaching aids: Exercises elaborated by the professor.

Examination method: Oral examination.

Course registration: No.

Examination registration: With the lecturer, personally or by phone.

Bibliography:

NUNZIANTE L.: *Scienza delle Costruzioni, il continuo*. Jovene, Napoli; 2000. (n° 2 copie).

NUNZIANTE L.: *Scienza delle Costruzioni, La Trave*. Jovene, Napoli; 2000. (n° 2 Copie).

NUNZIANTE L.: *Scienza delle Costruzioni, La Cinematica, La Statica*. Jovene, Napoli; 2000. (n° 2 copie).

VIOLA E.: *Esercitazioni di scienza delle costruzioni. Vol. 1. Strutture isostatiche e geometria delle masse*, Pitagora Editrice, Bologna, 1993.

VIOLA E.: *Esercitazioni di scienza delle costruzioni. Vol. 2. Strutture iperstatiche e verifiche di resistenza*, Pitagora Editrice, Bologna, 1985.

VIOLA E.: *Esercitazioni di scienza delle costruzioni. Vol. 3. Introduzione all'analisi probabilistica delle strutture*, Pitagora Editrice, Bologna, 1986.

VIOLA E.: *Esercitazioni di scienza delle costruzioni. Vol. 4. Temi d'esame*, Pitagora Editrice, Bologna, 1994.

Remarks: This lecture is addressed to all second-year students in Civil Engineering.

| | | |
|---|---|-------------------------------------|
| Course title: Foundation of Materials Science and Engineering | | Semester/Year 2/1 |
| Course type: compulsory | Hours per Week/ Number of Weeks: 2/14 | Number of ECTS credits: 3 |
| Number of hours (classroom): 27 | Number of hours (laboratory): | |

Professor: Domenico Caputo

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Status of the course in the study programme: Compulsory course for students in Civil Engineering.

Course description: The aim of this course is to provide: 1) the basilar knowledge of general chemistry, as necessary introduction to the materials science and engineering; 2) the basic notions on the materials structure and technological properties; 3) the fundamental knowledge on the materials manufacture and employments, and on the chemical principles of the water treatments.

Course aims: Passing the examination of the course in Foundation of Materials Science and Engineering the student should have reached the basical understanding of the inorganic and organic chemistry, of the microstructure and of the thermomechanical properties related to the solid-state materials. Moreover, s/he must know how to choose the materials with respect to peculiar applications, likewise reinforcing her/his choice with considerations on the technological manufacture and on the specific properties of the materials identified.

Teaching method: Frontal lessons in the lecture-room with the aid of blackboard and trasparenes, and of supporting material supplied at the students before the lessons. Interactions with the students on numerical aspects regarding the theoretical subjects treated.

Prerequisites: Formally: no prerequisites are required. However the students should have an acceptable mathematical basic-knowledge.

Teaching aids: Scripts referring to the actual topics are distributed during lectures, in the form of graphics, tables and trasparenes copies.

Examination method: The examination includes an oral discussion suitable to verify the comprehension of the subjects treated during the course.

Course registration: Yes. The registration is directly carried out with the professor at the beginning of the course.

Examination registration: Yes. The students must registrate themselves (up to three days before the examination) and own a valid ID and a university document.

Bibliography:

P. Corradini: *Chimica generale*, Casa Editrice Ambrosiana, Milano.

W. F. Smith: *Scienza e tecnologia dei materiali*, McGraw-Hill Italia.

B. Marchese: *Tecnologia dei materiali e chimica applicata*, Ed. Liguori, Napoli.

C. Brisi: *Chimica applicata*, Ed. Levrotto & Bella, Torino.

Notes on the lectures.

Remarks: The course of Foundation of Materials Science and Engineering is a basic course held during the 1st year; thus, no laboratory and/or seminars are contained in it but all the available ECTS credits are employed in the frontal lessons and in the numerical exercises.

| | | |
|---|--|------------------------------------|
| Course title: Experimental tests on materials and constructions | | Semester/Year 2/3 |
| Course type: Optional | Hours per Week/ Number of Weeks 2/14 | Number of ECTS credits 3 |
| Total number of hours: 28 Lectures: 14 Seminars: | | Laboratory: 14 Project: |

Professor: Maria Rosaria Pecce

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Status of the course in the study Programme: Optional course for students in Civil Engineering.

Course description: Metrology. Characteristics of measure instruments. Force and displacement transducers. Strain gauges. Machines for experimental tests of materials. Constitutive relationships and tests procedures of materials for constructions: concrete, steel, masonry. Non destructive tests. Tests for final inspection.

Course aims: Defining the working principles of measure instruments used for tests on materials and constructions. Explaining test procedures of most common experimental tests on materials and constructions.

Teaching method: Lectures. Numerical examples. Laboratory activities of experimental tests on materials and structural elements.

Prerequisites: Structural Analysis II

Teaching aids: Code provisions for tests on materials. Procedure patterns of tests on constructions.

Examination method: Oral examination.

Course registration: Yes.

Examination registration: Yes, no later than three days before the examination.

Bibliography:

Bray A., Vicentini V., *Meccanica sperimentale*, Editore Levrotto & Bella, 1978.

Barbarito B., *Verifica sperimentale delle strutture*, UTET, 1984.

Monaco L.M., Santamaria A., *Indagini prove e monitoraggio nel restauro degli edifici storici*, Edizioni Scientifiche Italiane 1998.

Remarks: None.

| | | |
|---|--|------------------------------------|
| Course title: Indoor Living Conditions Control | | Semester/Year 1/3 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 3/14 | Number of ECTS credits 4 |
| Total number of hours: 28 Lectures: 20 Seminars: | | Laboratory: 14 Project: |

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: Reference standards for indoor air quality, temperature, humidity, noise and lighting. Controlling active and passive systems. Building refrigerating and thermal duties.

Course aims: Making the students able to work in building design taking in account the indoor reference standards.

Prerequisites: Heat transfer in buildings

Teaching aids: Teachers note, software

Examination method: Oral examination and discussion about numerical examples.

Course registration: No.

Examination registration: Yes

Bibliography:

Teacher's notes

Fondamenti di Benessere Termoisgrometrico – G.Alfano, F.R. Dambrosio, F.De Rossi - CUEN

ENEA, *Guida alla progettazione del sistema edificio - Impianto di riscaldamento.*

Remarks: None

| | | |
|--|--|------------------------------------|
| Course title: Transportation technique and economics | | Semester/Year 2/2 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Number of hours (classroom): 54 | | Number of hours (laboratory): |

Professor: Mariano Gallo

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: Road transportation systems and Rail transit systems: vehicles and infrastructures, adhesion force, tractive effort, resistance to motion, propulsion, regimes of motion, travel time equations and diagrams, equilibrium conditions, capacity, density, speed, fundamental diagram of traffic flows. Urban and suburban transportation systems: vehicles and infrastructures, performance characteristics, operational parameters. Transportation economics: building and maintenance infrastructure costs, operational costs, user costs. Transportation system modeling: travel demand definitions, OD matrices, transportation supply models, travel demand forecasting (surveys and models), assignment models. Transportation system evaluation methods: Cost-Benefits analysis, Multicriteria analysis.

Course aims: Making the student understand the theoretical fundamentals and the practical methods for simulating, operating and evaluating transportation systems. S/he should be able to calculate the performances and operational parameters of transportation systems, to handle a model of a transportation system and to evaluate the benefits and costs of a transportation project.

Prerequisites: Basic knowledge of mathematics, physics and statistics are desirable.

Teaching aids: Scripts distributed during lectures and, on demand, by e-mail.

Examination method: Oral examination.

Course registration: No.

Examination registration: Yes, at University (library of faculty, Convitto Giannone) or with the lecturer, personally or by phone.

Bibliography:

G. E. Cantarella (a cura di) – *Introduzione alla tecnica dei trasporti e del traffico con elementi di economia dei trasporti* – UTET, Torino, 2001.

M. de Luca – *Tecnica ed economia dei trasporti* – CUEN, Napoli, 1989.

E. Cascetta – *Teoria e metodi dell'ingegneria dei sistemi di trasporto* – UTET, 1988.

Scripts distributed during lectures.

Remarks:

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|---|--|------------------------------------|
| Course title: Structural Analysis 1 | | Semester/Year 2/2 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 44 Seminars: | Laboratory: 10 Project: 1 | |

Professor: Maria Rosaria Pecce

Institute/Department: Faculty of Engineering, University of Sannio, Piazza Roma, 82100, Benevento.

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering .

Course description: Continuous beams and no-sway plane frames. Allowable stress and factored loads methods for designing reinforced concrete elements. Design and check of reinforced concrete elements subjected to axial load, bending, bi-directional bending, shear and torsion. Design of reinforced concrete slabs.

Course aims: Making the student able to design reinforced concrete continuous beams and elements. Providing him/her with the basic knowledge for designing slabs.

Teaching method: Lectures. Numerical examples. Software for analysis of beam systems.

Prerequisites: Continuum Mechanics

Teaching aids: Handing out of problems and examples.

Examination method: Oral and written examination with project discussion.

Course registration: Yes.

Examination registration: Yes, no later than three days before the examination.

Bibliography:

Giangreco E., *Teoria e Tecnica delle Costruzioni*, 1990.

Pozzati P., *Teoria e Tecnica delle Strutture*, UTET, 1986. (Volume secondo)

Walther R., Miehlabrad M., *Progettare in calcestruzzo armato*, Editore Ulrico Hoepli Milano, 1990.

Remarks: None

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| Course title: Structural Analysis 2 | | Semester/Year 1/3 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 44 Seminars: | | Laboratory: 10 Project: 1 |

Professor: Maria Rosaria Pecce
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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: Analysis of actions in sway plane frames. Deformation method. Grinter frames. Elastic beams on elastic soil. Foundations: isolated plinths, plinths on piles, foundation beams. Analysis of steel members: welded and bolted connections. Design of a simple steel structures. Elements of prestressed reinforced concrete theory.

Course aims: Providing the student with a basic understanding on frame analysis and enable him/her to design reinforced concrete frames and foundations. Underlining the main issues related to the design of steel elements and connections.

Teaching method: Lectures. Numerical examples. Software for analysis of plane frames. Make up of electronic sheets for calculation of plane frames.

Prerequisites: Structural Analysis I.

Teaching aids: Handing out of problems and examples, software output.

Examination method: Oral and written examination with project discussion.

Course registration: Yes.

Examination registration: Yes, no later than three days before the examination.

Bibliography:

Ballio G., Mazzolani F., *Strutture in acciaio*, Arnoldo Mondadori Editore, 1979.
Giangreco E., *Teoria e Tecnica delle Costruzioni*, 1990.
Pozzati P., *Teoria e Tecnica delle Strutture*, UTET, 1986. (Volume secondo)
Walther R., Miehlabrad M., *Progettare in calcestruzzo armato*, Editore Ulrico Hoepli Milano, 1990.

Remarks: None.

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| Course title: Town and Country Planning | | Semester/Year 2/2 |
| Course type: Compulsory | Hours per Week/ Number of Weeks 4/14 | Number of ECTS credits 6 |
| Total number of hours: 54 Lectures: 42 Seminars: 6 | Laboratory: 6 Project: 1 | |

Professor: Romano Fistola

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Status of the course in the study Programme: Compulsory course for students in Civil Engineering.

Course description: The course, starting from a description of interpretative models for the city, describes tools and plans of the urban planning with a special focus on technical and giuridical features.

During the course are illustrated new ways to understand the city and territory using new technologies. A special focus is on the peculiarities and capabilities of the Geographical Information Systems (GIS).

Course aims: The student should learn the bases of the town planning discipline thought as a managing process of the urban and territorial transformations. In such sense particular attention is set in the didactic transfer in the definition of the systemic interpretative model that dynamically considers the city as a complex system.

Teaching method: Lectures, supported by transparencies and PC.

Prerequisites:

Teaching aids: Scripts referring to the course topics are distributed during lectures. The student can also obtain legislative references by downloading from URL: www.dipist.unina.it/rassegna.htm

Examination method: Oral examination, upon appointment.

Course registration: Yes through booking on available sheet at the students' secretarial office.

Examination registration: With the lecturer, personally or by phone.

Bibliography:

Dispense del corso.

Carbonara, L., 1992, *Le analisi urbanistiche*, La Nuova Italiana Scientifica, Roma.

Colombo, G., Pagano, F., Rossetti, M., 1997, *Manuale di Urbanistica*, Pirola Editore, Milano.

Fistola, R. 2000, *M.E-Tropolis, funzioni innovazioni trasformazioni della città*, Giannini, Napoli.

Lynch, K., 1972, *L'immagine della città*, Marsilio, Padova.

McLoughling, J.B., 1973, *La Pianificazione urbana e regionale*, Marsilio Editori, Padova.

Papa, R. 2000, *Lezioni di Urbanistica, Di.Pi.S.T., Napoli*.

Scandurra, E., 1991, *Tecniche urbanistiche per la pianificazione del territorio*, Clup, Milano.

Remarks: This lecture is addressed to students of all branches but particularly to those in Civil Engineering.