2000 - ANALISI MATEMATICA
MAT/05 - matematica, informatica e statistica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LT03 - INGEGNERIA GESTIONALE (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Ciclo Annuale Unico
Exam type: Orale
Professor in charge: D'AVENIA PIETRO

Training objectives
To teach principles of Calculus.

Prerequisites
Notions of algebra, trigonometry and elementary functions.

Didactic Methods

Course programme
REAL NUMBER SYSTEM
COMPLEX NUMBERS
REAL FUNCTIONS
LIMITS OF REAL FUNCTIONS
CONTINUOUS FUNCTIONS
DIFFERENTIAL CALCULUS
INTEGRAL CALCULUS
NUMERICAL SERIES AND POWER SERIES
FUNCTIONS OF TWO VARIABLES
DOUBLE INTEGRALS
DIFFERENTIAL EQUATIONS

Reference Texts

2635 - ANALISI MATEMATICA
MAT/05 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT39 - INGEGNERIA DELL'AMBIENTE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GRECO CARLO

Training objectives
Provide students with some basic mathematical tools and methods for solving some standard mathematical problem.

Prerequisites
Elementary logic and set theory, elementary functions, inequalities.

Didactic Methods

Course programme
Logic and set theory.
Real functions of one real variable.
Limits and continuity. Differentiability, local maxima and minima, concavity
and convexity, function analysis.
Definite and indefinite integration, antiderivatives. Integration by part and substitution.
Infinite and infinitesimal functions. Generalized integrals. Taylor formula. Numerical series. Differential equations. Functions of several variables.
Partial derivatives.
Multiple integrals.

Reference Texts

2635 - ANALISI MATEMATICA
MAT/05 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT39 - INGEGNERIA DELL'AMBIENTE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GRECO CARLO

Training objectives
Provide students with some basic mathematical tools and methods for solving some standard mathematical problem.

Prerequisites
Elementary logic and set theory, elementary functions, inequalities.

Didactic Methods

Course programme
Logic and set theory.
Real functions of one real variable.
Limits and continuity. Differentiability, local maxima and minima, concavity
and convexity, function analysis.
Definite and indefinite integration, antiderivatives. Integration by part and substitution.
Infinite and infinitesimal functions. Generalized integrals. Taylor formula. Numerical series. Differential equations. Functions of several variables.
Partial derivatives.
Multiple integrals.

Reference Texts

2635 - ANALISI MATEMATICA
MAT/05 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT40 - INGEGNERIA DEI SISTEMI AEROSPAZIALI
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GRECO CARLO

Training objectives
Provide students with some basic mathematical tools and methods for solving some standard mathematical problem.

Prerequisites
Elementary logic and set theory, elementary functions, inequalities.

Didactic Methods

Course programme
Logic and set theory.
Real functions of one real variable.
Limits and continuity. Differentiability, local maxima and minima, concavity
and convexity, function analysis.
Definite and indefinite integration, antiderivatives. Integration by part and substitution.
Infinite and infinitesimal functions. Generalized integrals. Taylor formula. Numerical series. Differential equations. Functions of several variables.
Partial derivatives.
Multiple integrals.

Reference Texts
1) Dispense del corso.
2) Bramanti-Pagani-Salsa: Analisi Matematica 1 e Analisi Matematica 2, Zanichelli.
3) Marcellini-Sbordone: Esercitazioni di matematica, I° e II° Volume, Liguori.

2635 - ANALISI MATEMATICA
MAT/05 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT40 - INGEGNERIA DEI SISTEMI AEROSPAZIALI
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GRECO CARLO

Training objectives
Provide students with some basic mathematical tools and methods for solving some standard mathematical problem.

Prerequisites
Elementary logic and set theory, elementary functions, inequalities.

Didactic Methods

Course programme
Logic and set theory.
Real functions of one real variable.
Limits and continuity. Differentiability, local maxima and minima, concavity
and convexity, function analysis.
Definite and indefinite integration, antiderivatives. Integration by part and substitution.
Infinite and infinitesimal functions. Generalized integrals. Taylor formula. Numerical series. Differential equations. Functions of several variables.
Partial derivatives.
Multiple integrals.

Reference Texts
1) Dispense del corso.
2) Bramanti-Pagani-Salsa: Analisi Matematica 1 e Analisi Matematica 2, Zanichelli.
3) Marcellini-Sbordone: Esercitazioni di matematica, I° e II° Volume, Liguori.

2000 - ANALISI MATEMATICA
MAT/05 - matematica, informatica e statistica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula: PDS0-2015 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Ciclo Annuale Unico
Exam type: Orale
Professor in charge: CINGOLANI SILVIA

Training objectives
To provide the basic tools of differential and integral calculus for function of one or multiple real variables. To provide the basic methods of resolution of linear differential equations and to give an introduction to the qualitative study of first order differential equations.

Prerequisites
Arithmetic and basic algebra. Ability to solve algebraic and transcendental equation.

Didactic Methods
In class lectures with the aid of a OneNote Class Notebook on a netbook with a digitazer connected to an LCD projector

Course programme
Algebraic properties of real and complex numbers. The set of real number as a topological space.
Functions of one real variable.
Limits, continuous functions.
Differential calculus.
Integration.
Infinite series.
Differential calculus for functions of multiple real variables
Ordinary differential equations.
Multiple integrals

Reference Texts
M. Bertsch, R. Dal Passo, Elementi di Analisi Matematica, Aracne Editrice, Roma 2001
P. Marcellini, C. Sbordone, Elementi di Analisi Matematica uno, Liguori Editore, Napoli, 2002.
M. Bramanti, C.D. Pagani, S. Salsa, Matematica, Calcolo Infinitesimale e Algebra
lineare, Zanichelli Editore, Bologna, 2004
P. Marcellini, C. Sbordone, Esercitazioni di Matematica Vol. 1, parti 1 e 2 , Liguori
Editore, Napoli, 1995.
N. Fusco, P. Marcellini, C. Sbordone, Elementi di Analisi Matematica due, Liguori Editore, Napoli, 2001.
C.D. Pagani, S. Salsa, " Analisi matematica, Vol. 2" , 2° edizione, Zanichelli, 2015
P. Marcellini, C. Sbordone, " Esercitazioni di Matematica" , volumi 1 e 2 (in quattro tomi) Liguori Ed., 1995
S. Salsa, A. Squellati, " Esercizi di Analisi matematica 2" , (in 3 tomi) Zanichelli, 2011
T. M. Apostol " Calculus, volume 2" , 2nd edition, John Wiley & Sons, 1969

2001 - ANALISI MATEMATICA I
MAT/05 - Formazione scientifica di base

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	PALAGACHEV DIAN KOSTANDINOV

Training objectives

The purpose of the course is to provide the basic elements of differential and integral calculus for real functions of one and several variables, differential equations and their applications to the study of engineering problems.

Prerequisites

Students must have basic knowledge of arithmetic and elementary algebra, of elementary functions and should possess ability to solve algebraic and transcendent equations and inequalities.

Didactic Methods

Lessons, exercises

Course programme

The field R of the real numbers and its geometric representation.
The field C of the complex numbers.
Numerical sets.
Functions of one real variable.
The elementary functions.
Numeric sequences.
Limits of real functions.
Continuous functions.
Differential calculus of functions of one real variable.
Integral calculus of functions of one real variable.
Topology in R2 and R3.
Real functions of several variables.
Differential calculus of functions of several variables.
Differential equations.
Multiple integrals.
Differential geometry of curves.
Vector fields and differential forms.

Reference Texts

2001 - ANALISI MATEMATICA I
MAT/05 - matematica, informatica e statistica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula: PDS0-2015 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: BARTOLO ROSSELLA

Training objectives
To provide the basic tools of differential and integral calculus for one variable real functions.

Prerequisites
Elementary arithmetic and algebra. Ability in solving algebraic and transcendental equations.

Didactic Methods

Course programme
Algebraic and topological properties of real and complex numbers.
One variable real functions.
Limits and continuity
Numerical sequences
Differential calculus and Taylor formula
Integration

Reference Texts
P. Marcellini, C. Sbordone "Elementi di Analisi Matematica Uno", Liguori Editore
P. Marcellini, C. Sbordone "Esercitazioni di Matematica, Vol. I", Liguori Editore
M. Bramanti, C.D. Pagani, S.Salsa "Analisi Matematica 1", Zanichelli Editore

2001 - ANALISI MATEMATICA I
MAT/05 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	POMPONIO ALESSIO

Training objectives
To teach principles of Calculus.

Prerequisites
Notions of algebra, trigonometry and elementary functions.

Didactic Methods

Course programme
- REAL NUMBER SYSTEM. Axioms of real numbers. Natural, integer and rational numbers. Supremum, infimum, mininum and maximum of a numerical set. The Archimedean property. The principle of mathematical induction.
- COMPLEX NUMBERS. Definition of complex numbers, the imaginary unit. Calculations with complex numbers. The complex conjugate, modulus and argument of a complex number. The trigonometrical form of complex numbers. The De Moivre Formula. Roots of a complex number.
- REAL FUNCTIONS. Real functions and properties. Elementary functions. Minima and maxima.
- LIMITS OF REAL FUNCTIONS. Limit of a real function. Calculations with limits. Sign-preserving property theorem. Sequences and limits of sequences.
- CONTINUOUS FUNCTIONS. Continuous functions and properties. Sign-preserving property of continuous functions. Weierstrass Theorem. Bolzano Theorem. The intermediate value theorem. Continuity of elementary functions.
- DIFFERENTIAL CALCULUS. Derivative's definition. Geometrical and cinematic interpretation of derivatives. Rules of differentiation. Upper order derivatives. Fermat's Theorem. Rolle's Theorem. Lagrange's Theorem. De L' Hopital's Theorem and applications to limits. The monotonicity criterium. Concavity, convexity, inflection points. Convexity criterium. Taylor formula. Plot of a function.
- INTEGRAL CALCULUS. Riemann integral and property. Integrability of monotone, continuous and discontinuous functions. The fundamental theorem of integral calculus. The function primitive and property. The fundamental formula of integral calculus. Indefinite integral. Integral of elementary functions. Improper integral.
- NUMERICAL SERIES. Definitions and examples. Calculations with series. Necessary condition of convergence. Convergence test.

Reference Texts

2001 - ANALISI MATEMATICA I
MAT/05 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CERAMI GIOVANNA

Training objectives
To describe basic tools of differential and integral calculus for functions of one variable.

Prerequisites
Elementary arithmetic and algebra. To be able to solve algebraic and transcendental equations and inequalities.

Didactic Methods

Course programme
Topic n. 1: Basic Elements. Real and Complex numbers
Content details: : Sets: basic notions, union, intersection, Cartesian product of sets. Basic elements of mathematical logic. Real Numbers with their properties. Natural, integer, rational, numbers as subsets of the set of real numbers. Bounded and unbounded sets of real numbers. Maximum, minimum supremum and infimum of a set of real numbers. The real line and the Cartesian plane. Absolute value of a number. Intervals and neighborhoods in R. Accumulation points. Basic notions on powers, roots, exponentials, logarithms.
The field of Complex numbers. Modulus and Conjugate of a complex number. Trigonometric and exponential expression of a complex number. De Moivre formulas. Complex roots. Simple equations in the Complex field.
Topic n. 2: Sequences
Content details: Number sequences. Bounded sequences. Limit of a sequence. Uniqueness of the limit of a sequence. Boundedness of a convergent sequence. Comparison theorems. Limits Algebra. Monotone sequences and their regularity. The Nepero number.
Topic n. 3 Functions:
Content details:
Functions: basic notions. Inverse function. Composite functions. Graph of a function. Real valued functions of one variable. Monotone functions. Bounded functions. Even ,Odd, and, periodic functions. Functions algebra. Elementary functions. Maximum, minimum, supremum, infimum of a function. Translation and scaling of the graph. Limits. Uniqueness of the limit. Asymptotes. Comparison theorems. Theorems on limits algebra and on limits of composite functions. Limits Calculus. Infinitely small and large quantities and functions. Indeterminate forms. Continuous functions. Points of discontinuity. Continuity of elementary functions. Properties of continuous functions. Main theorems on continuous functions (Weierstrass, roots, intermediate values)
Topic n. 4: Differential Calculus
Content details:
Differentiation of a function. Derivative. Geometrical and Mechanical meaning of the derivative. Tangent to a graph curve. Higher order derivatives. Continuity of a derivable function. Basic rules for finding derivatives. Rules for differentiating elementary functions, composite functions and inverse functions. Differentials and linear approximation of a function. Extrema of a function. Fermat Theorem. Rolle theorem. Mean value Theorem and applications. Convex and concave functions. Points of inflection. Graphing of functions. Bernoulli-De L' Hopital theorem. Taylor' s formula.
Topic n. 5: Cauchy Riemann Integration theory
Content details:
The definite integral of a bounded function on a bounded set as limit of sums. Areas of plane figures. Main properties of a continuous function definite integral. Mean value theorem. Primitive of a function. Definite integral with variable upper limit. Main theorem of integral calculus and Newton Leibnitz formula. Indefinite integral. Integration by substitution and by parts. Integration of rational functions. Integration of certain irrational functions, of trigonometric functions and of certain transcendental functions.

Reference Texts

2551 - Archeologia e storia dell'arte greca
L-ANT/07 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Scienze dell'Ingegneria Civile e dell'Architettura
Study courses:	LM51CU - ARCHITETTURA (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BELLI ROBERTA

Training objectives

Primary object of the course is to supply the necessary and methodological instruments to comprehend the organization and evolution of the Greek civilization through the data supplied by the archaeological research and through the study of the main artistic production.

The knowledge of the main historical events of the Greek civilization together with a correct topics organization with their respective geographical coordinates, constitutes the fundamental prerequisite for a correct interpretation of the artistic forms of the examined period.

The theoretical learning concerns the principal phases of the development of the poleis in Greece, Asia Minor, Italy and Sicily, the knowledge of the archaeological documentation, and finally the comprehension of the Greek cultural phaenomenon.

The applications concerns the reading and interpretation of the archaeological documentation, for a more complex understanding of the formal language, the articulation of the Greek art, as well as exercises in library to acquire the tools and fundamental methodologies of the bibliographical research.

Prerequisites

Didactic Methods

Course programme

Preliminar discussion on general problems about Greek archaeology and the colonization phaenomenon. Chronological frame. The beginning of the Greek Art; the Geometric period. Greek poleis and their colonies: the Western colonization. The Archaic period: Urban settlements and sanctuaries; the case of Athens. Figurative arts: marble and bronze sculpture; pottery. Structures and characters of the polis in classical period. Democracy and figurative arts in Athens in Classical period. General features of Hellenismus in Greece, Magna Grecia and Sicily and in the oriental Greek World. Art and urban planning in the Hellenistic reigns

Reference Texts

2016 - ARCHITETTURA TECNICA
ICAR/10 - Architettura e urbanistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CONTE EMILIA

Training objectives

Knowledge of the basic contents in the field of building technology, in a large reference framework where design activity is carried out as a complex process, considering many interrelated factors, and using a sustainability perspective. Lectures are accompanied by design activities.

Prerequisites

Basic understanding of chemistry and mathematics. Knowledge of physics and architectural drawing (passing the related exams is required).

Didactic Methods

The course activities are based on lectures accompanied by design activities concerning a residential, single-family building. Students develop such design activities in team in the classroom under the supervision of the teacher.

Course programme

Lectures deal with disciplinary contents, using a different degree of investigation in relation to the objectives of the course. Synthetically, subjects of lectures are:
- Building process and performance approach in building
- Sustainability of buildings and principles of bioclimatic architecture
- Basic types of stress and deformation of solids
- Natural and artificial building materials
- Simple and complex construction principles
- The "building body" as a system and its sub-systems:
o   Foundations;
o   Structures;
o   Stairs;
o   External walls;
o   Ground floors, horizontal partitions, and roofs;
o   Windows;
o   (other) Partitions;
o   Finishing materials and elements;
o   HVAC, lighting, plumbing, elevator systems (basic indications).
- Designing without barriers
- Deterioration and maintenance
- Life Cycle Assessment.

Some of such contents are developed also through exercises.

Reference Texts

2338 - AUTOMAZIONE DEI SISTEMI ELETTRICI INDUSTRIALI
ING-IND/33 - Ingegneria elettrica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LM05 - INGEGNERIA ELETTRICA (D.M. 270/04)
Study plans/Curricula: LM05-21 - AUTOMAZIONE
Type: Caratterizzante
Total Credits: 12
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: SBRIZZAI ROBERTO

Training objectives
The subject intends to give tools for developing and designing the protection, measurement, control and supervision systems of electrical industrial plants.

Prerequisites
Good understanding (analysis and design) of distribution and utilization of electrical energy system.

Didactic Methods

Course programme
Criteria of choosing automation equipments
Functional schemes.
Power supply of electric motor and devices.
Electrical control circuits.
Norms available.
Data logging and acquisition Information networks: technologies, Ethernet, TCP/IP, WEB services, bus AS interface (AS-I). Cable systems.
Introduction to Programmable Logic Controller. Programming, configuration and languages.
Devices: switchboard equipments, power and energy meters, digital and analog data acquisition systems, TA/TV transformers.
Communication and supervision: server Ethernet, management, analysis and control, energy management in industrial plants. Energy and cost management.
Analysis, teleoperation, telemanagement and optimization of energy consumptions in local and remote power networks.
Safe operation. The main safety functions. The network safety.
Case studies.

Reference Texts
A. Lucchini, Integrazione e automazione delle funzioni impiantistiche, SAIE – Il sole 24 ore.
L. Bergamaschi, Manuale di programmazione dei PLC, Hoepli.

2324 - AZIONAMENTI A FLUIDO
ING-IND/08 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-21 - ENERGIA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	AMIRANTE RICCARDO

Training objectives

To acquire a basic knowledge in automation systems by fluid machines form a theoretical perspective as well as practical perspective. To develop industrial process by means of pneumatic, electro-pneumatics and hydraulic systems. To know advantages and disadvantages of pneumatic actuators in comparison with other types of actuators

Prerequisites

Knowledge of thermodynamic and fluid machines.

Didactic Methods

Course programme

Introduction to Pneumatics.
This topic describes what pneumatics is and compares it with other technologies of automation.
There is a general view of pneumatic, electric and hydraulic power systems, analyzing the advantages and disadvantages.
Pneumatic and hydraulic energy generation.
Pneumatic and Hydraulic drives. Network and Hydraulic elements dimensioning.
Design and selection of the elements of a Hydraulic system.
Pneumatic and Hydraulic ON/OFF and proportional valves.
Electro-pneumatics and Electro-hydraulics. Electric devices to control pneumatic and hydraulic circuits.
Pneumatic automation using PLC.

Reference Texts

1.   " FONDAMENTI DI PNEUMATICA" - Ed. MANNESMANN-REXROTH
2.   Guido BELFORTE - " PNEUMATICA" - Ed. Tecniche Nuove, 1998.
3.   " PNEUMATICA " - Ed. FESTO
4.   Dispense didattiche ed articoli scientifici disponibili in formato elettronico (.pdf) sul sito http://climeg.poliba.it

Amirante, R., Moscatelli, P.G., Catalano, L.A.
Evaluation of the flow forces on a direct (single stage) proportional valve by means of a computational fluid dynamic analysis
(2007) Energy Conversion and Management, 48 (3), pp. 942-953. Cited 62 times.
http://www.scopus.com/inward/record.url?eid=2-s2.0-33846271097&partnerID=40&md5=84ae15e77f6626786a6527150cdc3e63
DOI: 10.1016/j.enconman.2006.08.024
DOCUMENT TYPE: Article
SOURCE: Scopus
Amirante, R., Del Vescovo, G., Lippolis, A.
Evaluation of the flow forces on an open centre directional control valve by means of a computational fluid dynamic analysis
(2006) Energy Conversion and Management, 47 (13-14), pp. 1748-1760. Cited 62 times.
http://www.scopus.com/inward/record.url?eid=2-s2.0-33645450527&partnerID=40&md5=7cce405d1b9cf7ad6f2e3018d3a7f035
DOI: 10.1016/j.enconman.2005.10.005
DOCUMENT TYPE: Article
SOURCE: Scopus
Amirante, R., Del Vescovo, G., Lippolis, A.
Flow forces analysis of an open center hydraulic directional control valve sliding spool
(2006) Energy Conversion and Management, 47 (1), pp. 114-131. Cited 58 times.
http://www.scopus.com/inward/record.url?eid=2-s2.0-24944520802&partnerID=40&md5=ccfd839aedb13a68e76220a7b89ded47
DOI: 10.1016/j.enconman.2005.03.010
DOCUMENT TYPE: Article
SOURCE: Scopus

2345 - AZIONAMENTI ELETTRICI
ING-IND/32 - Ingegneria dell'automazione

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM06 - INGEGNERIA DELL'AUTOMAZIONE (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CUPERTINO FRANCESCO

Training objectives
At the end of the module the students will know how to
- analyse, also with the support of numeric simulations on a PC, vector controlled electric drives;
- configure and run electric driver with induction motors and PMSMs;
- use rapid prototyping techniques to implement control schemes for ac electric drives.

Prerequisites
Steady-state and transient analysis techniques of single-phase and three-phase circuits. Laplace transform. Transfer functions. Bode diagrams. Root locus. Basic use of Matlab and Simulink. Fundamentals of rotating electrical machines.

Didactic Methods

Course programme
I Module: Dynamic models of electrical machines CFU: 6
PROGRAMME:
The following electrical machines will be considered.
Brushless ac motors (12 hours).
Brushless dc motors (4 hours).
Synchronous reluctance motors (4 hours)
Induction motors (12 hours)
In particular, design elements, mathematical model in a-ß and d-q reference frames, and block diagrams for transient- and steady-state analysis will be covered.
Numerical applications: computer simulation of electrical machines using finite elements software (16 hours) and dynamic simulation using Matlab/Simulink (16 hours)
II Module: Control of electrical drives CFU: 6
PROGRAMME:
Electric drives with permanent magnet synchronous motors (PMSMs) (8 hours).
Vector control of electric drives with PMSMs: control of torque and flux components of stator current. Cascaded control of torque, speed and position. High speed control, flux weakening.
Mechanical loads, gearbox, control limits for oscillatory mechanical systems (6 hours).
Position set point characteristic with speed and acceleration limits (6 hours).
Electric drives with induction motors (8 hours).
Scalar control. Vector control of electric drives with induction motors: control of torque and flux components of stator current. Cascaded control of torque, speed and position. Cascaded control of the stator current component generating the rotor flux and the rotor flux. High speed control, flux weakening.
Electric drives with synchronous reluctance motors (2 hours)
Sensorless control of syncronous and asynchronous drives. (2 hours)
Electric drives protection systems. (2 hours).
Electromagnetic compatibility issues in electric drives (4 hours)
Laboratory team-works:
Rapid prototyping of control schemes for ac electric drives (6 hours).
Numerical applications:
design of control systems for AC drives, simulations of AC drives using Matlab & Simulink (16 hours)

Reference Texts
TESTI DI RIFERIMENTO PRINCIPALI:
H. Grob, J. Hamann, G. Wiegartner: "Azionamenti elettrici di avanzamento nell' automazione industriale", Tecniche Nuove, 2002.
L. Bonometti: "Convertitori di potenza e servomotori brushless", UTET, 2001.
ULTERIORI TESTI SUGGERITI:
R. Krishnan: "Electric Motor Drives: Modeling, Analysis, and Control", Prentice Hall, 2001.
G. Legnani, M. Tiboni, R. Adamini: "Meccanica degli azionamenti", Editrice Esculapio, 2002.
C. Melchiorri: "Traiettorie per Azionamenti Elettrici", Editrice Esculapio, 2001.
Dispense fornite dal docente.

2345 - AZIONAMENTI ELETTRICI
ING-IND/32 - Ingegneria dell'automazione

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM06 - INGEGNERIA DELL'AUTOMAZIONE (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CUPERTINO FRANCESCO

Training objectives
At the end of the module the students will know how to
- analyse, also with the support of numeric simulations on a PC, vector controlled electric drives;
- configure and run electric driver with induction motors and PMSMs;
- use rapid prototyping techniques to implement control schemes for ac electric drives.

Prerequisites
Steady-state and transient analysis techniques of single-phase and three-phase circuits. Laplace transform. Transfer functions. Bode diagrams. Root locus. Basic use of Matlab and Simulink. Fundamentals of rotating electrical machines.

Didactic Methods

Course programme
I Module: Dynamic models of electrical machines CFU: 6
PROGRAMME:
The following electrical machines will be considered.
Brushless ac motors (12 hours).
Brushless dc motors (4 hours).
Synchronous reluctance motors (4 hours)
Induction motors (12 hours)
In particular, design elements, mathematical model in a-ß and d-q reference frames, and block diagrams for transient- and steady-state analysis will be covered.
Numerical applications: computer simulation of electrical machines using finite elements software (16 hours) and dynamic simulation using Matlab/Simulink (16 hours)
II Module: Control of electrical drives CFU: 6
PROGRAMME:
Electric drives with permanent magnet synchronous motors (PMSMs) (8 hours).
Vector control of electric drives with PMSMs: control of torque and flux components of stator current. Cascaded control of torque, speed and position. High speed control, flux weakening.
Mechanical loads, gearbox, control limits for oscillatory mechanical systems (6 hours).
Position set point characteristic with speed and acceleration limits (6 hours).
Electric drives with induction motors (8 hours).
Scalar control. Vector control of electric drives with induction motors: control of torque and flux components of stator current. Cascaded control of torque, speed and position. Cascaded control of the stator current component generating the rotor flux and the rotor flux. High speed control, flux weakening.
Electric drives with synchronous reluctance motors (2 hours)
Sensorless control of syncronous and asynchronous drives. (2 hours)
Electric drives protection systems. (2 hours).
Electromagnetic compatibility issues in electric drives (4 hours)
Laboratory team-works:
Rapid prototyping of control schemes for ac electric drives (6 hours).
Numerical applications:
design of control systems for AC drives, simulations of AC drives using Matlab & Simulink (16 hours)

Reference Texts
TESTI DI RIFERIMENTO PRINCIPALI:
H. Grob, J. Hamann, G. Wiegartner: "Azionamenti elettrici di avanzamento nell' automazione industriale", Tecniche Nuove, 2002.
L. Bonometti: "Convertitori di potenza e servomotori brushless", UTET, 2001.
ULTERIORI TESTI SUGGERITI:
R. Krishnan: "Electric Motor Drives: Modeling, Analysis, and Control", Prentice Hall, 2001.
G. Legnani, M. Tiboni, R. Adamini: "Meccanica degli azionamenti", Editrice Esculapio, 2002.
C. Melchiorri: "Traiettorie per Azionamenti Elettrici", Editrice Esculapio, 2001.
Dispense fornite dal docente.

2345 - AZIONAMENTI ELETTRICI
ING-IND/32 - Ingegneria elettrica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM05 - INGEGNERIA ELETTRICA (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CUPERTINO FRANCESCO

Training objectives
At the end of the module the students will know how to
- analyse, also with the support of numeric simulations on a PC, vector controlled electric drives;
- configure and run electric driver with induction motors and PMSMs;
- use rapid prototyping techniques to implement control schemes for ac electric drives.

Prerequisites
Steady-state and transient analysis techniques of single-phase and three-phase circuits. Laplace transform. Transfer functions. Bode diagrams. Root locus. Basic use of Matlab and Simulink. Fundamentals of rotating electrical machines.

Didactic Methods

Course programme
I Module: Dynamic models of electrical machines CFU: 6
PROGRAMME:
The following electrical machines will be considered.
Brushless ac motors (12 hours).
Brushless dc motors (4 hours).
Synchronous reluctance motors (4 hours)
Induction motors (12 hours)
In particular, design elements, mathematical model in a-ß and d-q reference frames, and block diagrams for transient- and steady-state analysis will be covered.
Numerical applications: computer simulation of electrical machines using finite elements software (16 hours) and dynamic simulation using Matlab/Simulink (16 hours)
II Module: Control of electrical drives CFU: 6
PROGRAMME:
Electric drives with permanent magnet synchronous motors (PMSMs) (8 hours).
Vector control of electric drives with PMSMs: control of torque and flux components of stator current. Cascaded control of torque, speed and position. High speed control, flux weakening.
Mechanical loads, gearbox, control limits for oscillatory mechanical systems (6 hours).
Position set point characteristic with speed and acceleration limits (6 hours).
Electric drives with induction motors (8 hours).
Scalar control. Vector control of electric drives with induction motors: control of torque and flux components of stator current. Cascaded control of torque, speed and position. Cascaded control of the stator current component generating the rotor flux and the rotor flux. High speed control, flux weakening.
Electric drives with synchronous reluctance motors (2 hours)
Sensorless control of syncronous and asynchronous drives. (2 hours)
Electric drives protection systems. (2 hours).
Electromagnetic compatibility issues in electric drives (4 hours)
Laboratory team-works:
Rapid prototyping of control schemes for ac electric drives (6 hours).
Numerical applications:
design of control systems for AC drives, simulations of AC drives using Matlab & Simulink (16 hours)

Reference Texts
TESTI DI RIFERIMENTO PRINCIPALI:
H. Grob, J. Hamann, G. Wiegartner: "Azionamenti elettrici di avanzamento nell' automazione industriale", Tecniche Nuove, 2002.
L. Bonometti: "Convertitori di potenza e servomotori brushless", UTET, 2001.
ULTERIORI TESTI SUGGERITI:
R. Krishnan: "Electric Motor Drives: Modeling, Analysis, and Control", Prentice Hall, 2001.
G. Legnani, M. Tiboni, R. Adamini: "Meccanica degli azionamenti", Editrice Esculapio, 2002.
C. Melchiorri: "Traiettorie per Azionamenti Elettrici", Editrice Esculapio, 2001.
Dispense fornite dal docente.

2345 - AZIONAMENTI ELETTRICI
ING-IND/32 - Ingegneria elettrica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM05 - INGEGNERIA ELETTRICA (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CUPERTINO FRANCESCO

Training objectives
At the end of the module the students will know how to
- analyse, also with the support of numeric simulations on a PC, vector controlled electric drives;
- configure and run electric driver with induction motors and PMSMs;
- use rapid prototyping techniques to implement control schemes for ac electric drives.

Prerequisites
Steady-state and transient analysis techniques of single-phase and three-phase circuits. Laplace transform. Transfer functions. Bode diagrams. Root locus. Basic use of Matlab and Simulink. Fundamentals of rotating electrical machines.

Didactic Methods

Course programme
I Module: Dynamic models of electrical machines CFU: 6
PROGRAMME:
The following electrical machines will be considered.
Brushless ac motors (12 hours).
Brushless dc motors (4 hours).
Synchronous reluctance motors (4 hours)
Induction motors (12 hours)
In particular, design elements, mathematical model in a-ß and d-q reference frames, and block diagrams for transient- and steady-state analysis will be covered.
Numerical applications: computer simulation of electrical machines using finite elements software (16 hours) and dynamic simulation using Matlab/Simulink (16 hours)
II Module: Control of electrical drives CFU: 6
PROGRAMME:
Electric drives with permanent magnet synchronous motors (PMSMs) (8 hours).
Vector control of electric drives with PMSMs: control of torque and flux components of stator current. Cascaded control of torque, speed and position. High speed control, flux weakening.
Mechanical loads, gearbox, control limits for oscillatory mechanical systems (6 hours).
Position set point characteristic with speed and acceleration limits (6 hours).
Electric drives with induction motors (8 hours).
Scalar control. Vector control of electric drives with induction motors: control of torque and flux components of stator current. Cascaded control of torque, speed and position. Cascaded control of the stator current component generating the rotor flux and the rotor flux. High speed control, flux weakening.
Electric drives with synchronous reluctance motors (2 hours)
Sensorless control of syncronous and asynchronous drives. (2 hours)
Electric drives protection systems. (2 hours).
Electromagnetic compatibility issues in electric drives (4 hours)
Laboratory team-works:
Rapid prototyping of control schemes for ac electric drives (6 hours).
Numerical applications:
design of control systems for AC drives, simulations of AC drives using Matlab & Simulink (16 hours)

Reference Texts
TESTI DI RIFERIMENTO PRINCIPALI:
H. Grob, J. Hamann, G. Wiegartner: "Azionamenti elettrici di avanzamento nell' automazione industriale", Tecniche Nuove, 2002.
L. Bonometti: "Convertitori di potenza e servomotori brushless", UTET, 2001.
ULTERIORI TESTI SUGGERITI:
R. Krishnan: "Electric Motor Drives: Modeling, Analysis, and Control", Prentice Hall, 2001.
G. Legnani, M. Tiboni, R. Adamini: "Meccanica degli azionamenti", Editrice Esculapio, 2002.
C. Melchiorri: "Traiettorie per Azionamenti Elettrici", Editrice Esculapio, 2001.
Dispense fornite dal docente.

2185 - BASI DI DATI E SISTEMI INFORMATIVI
ING-INF/05 - Ingegneria informatica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula:	LT17-20 - SISTEMI E APPLICAZIONI INFORMATICHE
Type:	Caratterizzante
Total Credits:	9
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	LOSETO GIUSEPPE

Training objectives

The course introduces information systems for structured data management through DataBase Management Systems(DBMS), data modeling and query of databases. It also describes the main features of SQL language and provides theoretical and practical knowledge about data storing within relational databases (RDBs).

Main languages for the Web and Web-based Information Systems are also introduced. The course also provides theoretical and practical knowledge about retrieval of unstructured information from the web. Finally, it copes with emerging research issues, like the Semantic Web, by providing both theoretical and practical basic knowledge on such topics.

Prerequisites

Good knowledge of basic computer science

Didactic Methods

Course programme

(Databases)
Database design
Entity-Relationship Model
Relational Databases: model and languages
Relational Model: main features
Anomalies and Decomposition
Integrity constraints
Relational algebra
Database normalization
SQL for Relational Data Base Management System (RDBMS)
Assertions, Views, Triggers
Transactional databases
Programming database applications
SQL Embedded
Call Level Interface (CLI)
Stored Procedures: Oracle PL/SQL examples
Secondary Storage Management
Index Structures
Transaction Management
Distributed Architecture: Parallel and Distributed Databases
Two-Phase Commit and Locking procedures
On-Line Analytic Processing and Data Warehouses
(Information Systems)
Computer Networks
World Wide Web Architecture
Languages and Technologies for the Web
HTML and Web pages
CSS style sheets
XML (eXstensible Markup Language)
XPath e XQuery
Service Oriented Architectures (SOA)
Web Services
SOA languages and technologies
The Semantic Web
Web evolution
Languages for the Semantic Web
Data for the Semantic Web and Linked Open Data
Information Retrieval (IR) and Web IR
NoSQL Databases
  Main features and implementations
  Usage examples

Reference Texts

2419 - BIOCOMPATIBILITA' ELETTROMAGNETICA
ING-INF/02 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula:	LM04-21 - SISTEMI ELETTRONICI PER LE BIOTECNOLOGIE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	PRUDENZANO FRANCESCO

Training objectives

The aim of this course is to provide: i) a suitable knowledge of microwave, photonic and fiber optic applicators for biomedicine, ii) the basis knowledge of the biological effects due to the electromagnetic field application, iii) an adequate comprehension of methods and techniques for design of microwave, photonic and fiber optic applicators for biomedicine

Prerequisites

Basic knowledge of electromagnetic fields.

Didactic Methods

Course programme

Recall of microwave and optical sources, microwave devices, Z,Y,S, parameters; radiating systems, radiating aperture. Microwave applicators [10 ore]
Examples of microwave applicators. Bio-heat equation. Microwave thermotherapy and thermoablation [10]
Optical sources and applicators: optical fibers, microstructured optical fiber PCFs; erbium, ytterbium, holmium fiber lasers. Optical fiber and planar optics for sensing. [8]
Microwave tube. Linac particle ccelerators. Diagnostics and therapy. Proton therapy [6]
Laboratory: design via CST/FEMLAB and characterization of microwave and optical devices for biomedicine applicators [10]. Characterization via measurement [4]

Reference Texts

Dispense/Lecture notes.
R.E. Collin, Foundations for microwave Engineering. McGraw-Hill
Jordan Balmain, Electromagnetic Waves and Radiating Systems Prentice Hall Electrical engineering series
R. Sorrentino, G. Bianchi. Ingegneria delle microonde e radiofrequenze McGraw-Hill
Paraboni, Antenne McGraw Hill, 1999
T. P. Wangler, RF Linear Accelerators, 2nd ed., Wiley-VCH, 2008.
Computational Fourier Optics, SPIE press
Le fibre ottiche per telecomunicazioni , G. Vespasiano Editore: Telecom Italia
M.I.E Digonnet, Rare earth doped fiber laser and amplifier, Marcel Dekker INC New York.

2505 - CAMPI E CIRCUITI ELETTROMAGNETICI
ING-INF/02 - Ingegneria delle telecomunicazioni

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-22_TA - INGEGNERIA ELETTRONICA PER L'INDUSTRIA E L'AMBIENTE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	D'ORAZIO ANTONELLA

Training objectives

The aim of this course is to provide: i) a suitable knowledge of free space plane wave propagation and line propagation ii) comprehension of electromagnetism theorems iii) element for design of matched lines

Prerequisites

Knowledge of electromagnetism basic physics and electrical circuit theory

Didactic Methods

Course programme

1.   Transmission lines. Line parameters. Matched line, opened line loaded line. Single and double stub matching techniques. Use of software to CST, HFSS, COMSOL [20 ore]

2.   Recap on differential operators: div, grad, rot. Recap on differential equations for Electrostatics and Magnetostatics. Maxwell' s differential equations. Costitutive relations. Continuity of tangential fields and of normal fields at dielectric separation interfaces. Poynting vector. Electromagnetic theorems of [9 ore]

3.   Wave propagation solution of Maxwell' s equation in free space. Plane wave refraction and reflection. TE and TM, normal and oblique, incident plane wave, Snellius and Fresnel formulation. Brewster angle [19 ore]

Reference Texts

Dispense/Lecture notes. Jordan Balmain Electromagnetic Waves and Radiating Systems Prentice Hall Electrical engineering series Fondamenti di campi elettromagnetici Teoria e applicazioni, F.T. ULABY, McGraw-Hill. Campi Elettromagnetici e circuiti, G. Franceschetti, Boringhieri, Torino - Onde elettromagnetiche UTET C. G. Someda

2173 - CAMPI ELETTROMAGNETICI
ING-INF/02 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune - BARI
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	PETRUZZELLI VINCENZO

Training objectives

The course is aimed to investigate the general problems of the electromagnetic propagation with reference to the recent technological innovations in the fields of industrial, telecommunication and information engineering.

Prerequisites

Knowledge of derivative and integral operations, integration methods of ordinary differential equations, Fourier and Laplace transforms, fundamental principles of static and dynamical electromagnetic phenomena

Didactic Methods

Course programme

1.	Maxwell's equations, boundary conditions (0.75 CFU: 6T).
2.	Fundamental electromagnetic field theorems and equivalence principles (0.75 CFU: 6T).
3.	Propagation of plane waves in homogeneous lossless media. Polarization of electromagnetic waves in circular and rectangular coordinates. (1.5 CFU: 12T).
4.	Stationary waves (0.25 CFU: 2T).
5.	Reflection at metallic and dielectric interfaces (0.5 CFU: 4T). Propagation along metalic waveguides. TE, TM and TEM modes
6.	Reflection and refraction waves at dielectric and dielectric interfaces (0.5 CFU: 4T): Snell's law. Brewster's Angle, total reflection angle. Propagation along slab waveguides. TE e TM modes.
7.	Transmission lines and Smith's chart (1.75 CFU: 16T): The telegrafisti equations. Primary and secondary parameters. Impedance transformer. Impedance matching.

Reference Texts

1.	Appunti/dispense del corso in formato elettronico sul sito del DEI: http://ftp-dee.poliba.it:8000/Petruzzelli/.
2.	S. Ramo, R. J. Whinnery, T. Van Duzer: Fields and waves in communication electronics. J. Wiley and Sons.
3.	C. G. Someda: Onde elettromagnetiche. Ed. UTET.

2030 - CARTOGRAFIA NUMERICA
ICAR/06 - Ingegneria ambientale e del territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-21 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CAPRIOLI MAURO

Training objectives

The goal of the course is to give students the fundamental elements for the knowledge and the use of survey methods and the territory representation, useful for georeferencing data in GIS and for the territory monitoring.

Prerequisites

Mathematics , Physics , Geometry

Didactic Methods

Course programme

The goal of the course is to give students the fundamental elements for the knowledge and the use of survey methods and the territory representation, useful for georeferencing data in GIS and for the territory monitoring.

Reference Texts

M. CAPRIOLI: " Geomatica" – Ed. G. Laterza -Bari

-BEZOARI -MONTI -SELVINI : "RILEVAMENTO SPECIALE"-HOEPLI, MILANO.

-dispense del corso disponibili nel sito del Politecnico

2002 - CHIMICA
CHIM/07 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune - BARI
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GALLO VITO

Training objectives

To write and balance chemistry reactions; to carry out stoichiometric calculations, to learn the structural features of the matter as well as to face the issues of the chemical equilibrium and electrochemistry.

Prerequisites

Basic concepts from secondary school.

Didactic Methods

Course programme

PROGRAMME:

Lectures: (34 h)

1.   Fundamental laws of chemistry Empirical formula and molecular formula
2.   Atom and Chemical bond
3.   Chemical nomenclature and chemical reactions
4.   The states of matter, Solutions and colligative properties
5.   Chemical thermodynamics
6.   Chemical equilibrium in homogeneous systems, Equilibria in solution: pH
7.   Electrochemistry: galvanic cells and electrolysis

Numerical applications (14 h)

Reference Texts

Nobile F., Mastrorilli P., " La chimica di base con esercizi", C.E.A., Milano,2009.

2002 - CHIMICA
CHIM/07 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT40 - INGEGNERIA DEI SISTEMI AEROSPAZIALI
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GALLO VITO

Training objectives
To write and balance chemistry reactions; to carry out stoichiometric calculations, to learn the structural features of the matter as well as to face the issues of the chemical equilibrium and electrochemistry.

Prerequisites
Basic concepts from secondary school.

Didactic Methods

Course programme
Lectures: (34 h)
1.   Fundamental laws of chemistry Empirical formula and molecular formula
2.   Atom and Chemical bond
3.   Chemical nomenclature and chemical reactions
4.   The states of matter, Solutions and colligative properties
5.   Chemical thermodynamics
6.   Chemical equilibrium in homogeneous systems, Equilibria in solution: pH
7.   Electrochemistry: galvanic cells and electrolysis
Numerical applications (14 h)

Reference Texts
1.   Nobile F., Mastrorilli P., " La chimica di base con esercizi" , C.E.A., Milano,2009.

2002 - CHIMICA
CHIM/07 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SURANNA GIAN PAOLO

Training objectives
The course leads students to the understanding of the language of general chemistry and of the meaning of its fundamental laws.

Prerequisites
The notions of Mathematics, and physics taught in secondary school are a necessary prerequisite

Didactic Methods

Course programme
Definitions of matter, system, state of aggregation, elements, compounds. Fundamental laws of chemistry and molecular theory. Atomic number and mass number. Isotopes. Atomic weight, molecular weight and formula weight. Mole. Law of Dulong-Petit. Percentage by weight of elements in a compound. Determination of chemical formulas Atomic theory: radioactivity, Thomson model , Rutherford experiment, emission spectra and Rydberg equation. Bohr model. Quantum numbers n, l and m. Uncertainty principle of Heisenberg. De Broglie hypothesis. Wave theory for the electron. Schroedinger equation. Wave function, quantum numbers and their probabilistic meaning. Orbitals s, p, d, f. Aufbau. Periodic Table. Chemical bond. The ionic bond. The covalent bond. Valence Bond Theory. Lewis structures for H2, HF, F2, O2 and N2. Hybridization. structural formulas. Resonance. Molecular orbital. Metallic bond. oxidation number. Chemical nomenclature. Acid-base reactions, oxidation-reduction reactions Limiting reagent. Equivalence number and equivalent. Ideal gas laws. Vapor pressure. Solutions. Ways of expressing concentrations. Ideal solutions and Raoult's law. State diagram of H2O and CO2. Colligative properties. Thermochemistry: Enthalpy and Hess's law. Chemical equilibrium in the homogeneous phase. Factors affecting the equilibrium. Expression of K for heterogeneous equilibria. Gaseous dissociation. Degree of dissociacion.Electrolytic dissosiacion. Ostwald's law. Autoprotolysis of H2O and Kw. pH and pOH. Definition of acids and bases according to Bronsted. Calculation of pH of solutions. Galvanic cells: electrode potentials and electromotive force, Nernst equation. Electrolysis. Decomposition potential. Overpotential. Faraday's laws.

Reference Texts
Gli studenti interessati sono invitati ad accedere alla piattaforma e-learning del Politecnico con le loro credenziali esse tre. Il corso di chimica, con le indicazioni aggiornate anche sui libri di testo consigliati è reperibile a questo URL:
http://e-learning.poliba.it/course/view.php?id=16
Nel rispetto del regolamento vigente, le prove di esame seguiranno il seguente calendario.
Interruzione didattica TRA I DUE SEMESTRI (GENNAIO FEBBRAIO 2016: due appelli); Interruzione didattica del DEL SECONDO SEMESTRE (un appello); GIUGNO-LUGLIO (due appelli); SETTEMBRE (due appelli); interruzione didattica del PRIMO SEMESTRE (NOVEMBRE; un appello). Totale: OTTO APPELLI. Le date delle prove scritte che saranno via via definite precisamente, le aule, i risultati ed ogni comunicazione relativa agli appelli sarà resa nota agli studenti in tempo reale sul sito esse tre e anche sul portale e-larning (http://e-learning.poliba.it/course/view.php?id=16)

2546 - Chimica
CHIM/07 - Formazione scientifica di base

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DELL'ANNA MARIA MICHELA

Training objectives

To write and balance chemistry reactions; to carry out stoichiometric calculations, to learn the structural features of the matter as well as to face the issues of the chemical equilibrium and electrochemistry

Prerequisites

Basic concepts from secondary school

Didactic Methods

Course programme

Fundamental laws of chemistry

Basic concepts. The matter: atoms and molecules, elements and compounds.

Empirical formula and molecular formula

Atomic mass, mole and molar mass. Atom and Chemical bond

The atom. Atomic structure. Atomic orbitals and electronic configurations. The chemical bond. Ionic bonds. Covalent bonds. Electronegativity. Hybridation. Lewis structures. Intermolecular forces. The periodic table. Periodicity of atomic properties.

Chemical nomenclature and chemical reactions. IUPAC and traditional chemical nomenclature. Chemical reactions and stoichiometry.

The ideal gas laws. The gaseous state. Ideal gases and their law. Gas mixtures.

Solutions and colligative properties

The liquid state. Changes of state. Phase diagrams. The solutions. Colligative properties. Phase equilibria. Thermochemistry. Enthalpy. Spontaneity of the processes: free energy.

Chemical equilibrium in homogeneous systems

Chemical equilibrium. Homogeneous equilibria. Mass action law. Equilibrium constants.

Chemical kinetics

Equilibria in solution: pH. Ionic equilibria. Acids and bases. pH. Hydrolysis reactions.

Electrochemistry: galvanic cells and electrolysis

Electrochemistry. Electrochemical cells. Electrodic standard reduction potentials.

Reference Texts

Nobile F., Mastrorilli P., " La chimica di base con esercizi", C.E.A., Milano,2009.

2002 - CHIMICA
CHIM/07 - Fisica e chimica

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LT39 - INGEGNERIA DELL'AMBIENTE (D.M. 270/04)
Study plans/Curricula: PDS0-2015 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: GALLO VITO

Training objectives
To write and balance chemistry reactions; to carry out stoichiometric calculations, to learn the structural features of the matter as well as to face the issues of the chemical equilibrium and electrochemistry.

Prerequisites
Basic concepts from secondary school.

Didactic Methods

Course programme
Lectures: (34 h)
1.   Fundamental laws of chemistry Empirical formula and molecular formula
2.   Atom and Chemical bond
3.   Chemical nomenclature and chemical reactions
4.   The states of matter, Solutions and colligative properties
5.   Chemical thermodynamics
6.   Chemical equilibrium in homogeneous systems, Equilibria in solution: pH
7.   Electrochemistry: galvanic cells and electrolysis
Numerical applications (14 h)

Reference Texts
1.   Nobile F., Mastrorilli P., " La chimica di base con esercizi" , C.E.A., Milano,2009.

2002 - CHIMICA
CHIM/07 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SURANNA GIAN PAOLO

Training objectives

The course leads students to the understanding of the language of general chemistry and of the meaning of its fundamental laws.

Prerequisites

The notions of Mathematics, and physics taught in secondary school are a necessary prerequisite

Didactic Methods

Course programme

Definitions of matter, system, state of aggregation, elements, compounds. Fundamental laws of chemistry and molecular theory. Atomic number and mass number. Isotopes. Atomic weight, molecular weight and formula weight. Mole. Law of Dulong-Petit. Percentage by weight of elements in a compound. Determination of chemical formulas Atomic theory: radioactivity, Thomson model , Rutherford experiment, emission spectra and Rydberg equation. Bohr model. Quantum numbers n, l and m. Uncertainty principle of Heisenberg. De Broglie hypothesis. Wave theory for the electron. Schroedinger equation. Wave function, quantum numbers and their probabilistic meaning. Orbitals s, p, d, f. Aufbau. Periodic Table. Chemical bond. The ionic bond. The covalent bond. Valence Bond Theory. Lewis structures for H_2, HF, F_2, O_2 and N_2. Hybridization. structural formulas. Resonance. Molecular orbital. Metallic bond. oxidation number. Chemical nomenclature. Acid-base reactions, oxidation-reduction reactions Limiting reagent. Equivalence number and equivalent. Ideal gas laws. Vapor pressure. Solutions. Ways of expressing concentrations. Ideal solutions and Raoult's law. State diagram of H_2O and CO_2. Colligative properties. Thermochemistry: Enthalpy and Hess's law. Chemical equilibrium in the homogeneous phase. Factors affecting the equilibrium. Expression of K for heterogeneous equilibria. Gaseous dissociation. Degree of dissociacion.Electrolytic dissosiacion. Ostwald's law. Autoprotolysis of H_2O and Kw. pH and pOH. Definition of acids and bases according to Bronsted. Calculation of pH of solutions. Galvanic cells: electrode potentials and electromotive force, Nernst equation. Electrolysis. Decomposition potential. Overpotential. Faraday's laws.

Reference Texts

2610 - CHIMICA AMBIENTALE + TECNOLOGIE PER LA TUTELA AMBIENTALE
ING-IND/22 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-20 - AMBIENTALE
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	NOTARNICOLA MICHELE

Training objectives
ENVIRONMENTAL CHEMISTRY(Latronico M.)
Knowledge of the elements necessary for an understanding of thermodynamics of some reactions and methods of treatment of the multiphase equilibria. Knowledge of the behavior and chemical characteristics of the different environmental media (air, water), and the planetary effects of global warming and cooling.
Knowledge of indicators for the description of the environmental impact of human activities through deepening of inorganic and organic chemistry.
Knowledge of advanced instrumental analytical techniques of analysis.

Prerequisites
Knowledge of the concepts of basic chemistry

Didactic Methods

Course programme
ENVIRONMENTAL CHEMISTRY(Latronico M.)
The course includes a continuous assessment of learning through short reports about some environmental issues and laboratory experiments.
The first law of thermodynamics. Spontaneity of processes from the thermodynamic functions of the system alone. The boundary curves of P / T: the Clapeyron equation. The reaction coordinate, and the activation energy. Photochemical reactions. Greenhouse effect and global warming. Chemistry and pollution of the troposphere. Stratospheric chemistry and ozone chemistry.
Laboratory experiments
Determination of the concentration of a strong acid.
Determination of carbonates and bicarbonates in a sample of water.
Determination of the amount of a metal ion in solution:
- complexometric titration: calcium and magnesium though EDTA;
- UV-Vis: copper through bicinchoninate;
- GF-AAS (Graphite Furnace Atomic Absorption Spectroscopy): copper
Identification of functional groups using IR (InfraRed) spectroscopy : carbon dioxide.
Notes on the analytical techniques for the determination of some pollutants graphite furnace AAS, spectroscopy UV, Vis, IR and gas chromatography.

Reference Texts
Recommended Texts
G.W.vanLoon, S.J.Duffy; Environmental Chemistry, Oxford
Stanley E. Manahan; Environmental Chemistry, Lewis publishers.

2610 - CHIMICA AMBIENTALE + TECNOLOGIE PER LA TUTELA AMBIENTALE
CHIM/07 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula: LM63-20 - AMBIENTALE
Type: Affine/Integrativa
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: NOTARNICOLA MICHELE

Training objectives
ENVIRONMENTAL CHEMISTRY(Latronico M.)
Knowledge of the elements necessary for an understanding of thermodynamics of some reactions and methods of treatment of the multiphase equilibria. Knowledge of the behavior and chemical characteristics of the different environmental media (air, water), and the planetary effects of global warming and cooling.
Knowledge of indicators for the description of the environmental impact of human activities through deepening of inorganic and organic chemistry.
Knowledge of advanced instrumental analytical techniques of analysis.

Prerequisites
Knowledge of the concepts of basic chemistry

Didactic Methods

Course programme
ENVIRONMENTAL CHEMISTRY(Latronico M.)
The course includes a continuous assessment of learning through short reports about some environmental issues and laboratory experiments.
The first law of thermodynamics. Spontaneity of processes from the thermodynamic functions of the system alone. The boundary curves of P / T: the Clapeyron equation. The reaction coordinate, and the activation energy. Photochemical reactions. Greenhouse effect and global warming. Chemistry and pollution of the troposphere. Stratospheric chemistry and ozone chemistry.
Laboratory experiments
Determination of the concentration of a strong acid.
Determination of carbonates and bicarbonates in a sample of water.
Determination of the amount of a metal ion in solution:
- complexometric titration: calcium and magnesium though EDTA;
- UV-Vis: copper through bicinchoninate;
- GF-AAS (Graphite Furnace Atomic Absorption Spectroscopy): copper
Identification of functional groups using IR (InfraRed) spectroscopy : carbon dioxide.
Notes on the analytical techniques for the determination of some pollutants graphite furnace AAS, spectroscopy UV, Vis, IR and gas chromatography.

Reference Texts
Recommended Texts
G.W.vanLoon, S.J.Duffy; Environmental Chemistry, Oxford
Stanley E. Manahan; Environmental Chemistry, Lewis publishers.

2025 - CHIMICA E COMPLEMENTI DI CHIMICA
CHIM/07 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	9
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	LATRONICO MARIO

Training objectives

To write and balance chemistry reactions; to carry out stoichiometric calculations, to learn the structural features of the matter as well as to face the issues of the chemical equilibrium, kinetics and electrochemistry.

Prerequisites

Basic concepts from secondary school

Didactic Methods

Course programme

Fundamental laws of chemistry. Atom, molecule, mole. Empirical formula and molecular formula. The electrical nature of matter. Atomic structure. Electronic configuration of elements and periodic table. Chemical bond. Formulas and chemical nomenclature. Chemical reactions. The states of matter. Solutions and colligative properties. Chemical thermodynamics. Chemical kinetics. Chemical equilibrium in homogeneous systems. Equilibria in solution: pH. Electrochemistry: galvanic cells and electrolysis. Some industrial process.

Reference Texts

Nobile F., Mastrorilli P., "La chimica di base con esercizi", C.E.A.
Laird B.B. "Chimica Generale", McGraw Hill
Tagliatesta P. "Chimica Generale e Inorganica", edi-ermes

2163 - COMPLEMENTI DI ANALISI MATEMATICA
MAT/05 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CAPONIO ERASMO

Training objectives
To provide basic tools and meaningful applications related to complex analysis, power and Fourier series, Laplace transform.

Prerequisites
The content of the courses Geometry and Algebra and Mathematical Analysis

Didactic Methods
In class lectures

Course programme
Complex functions: differentiability, Cauchy-Riemann equations.
Laplace tranform, applications.
Power series. Analytic functions.
Holomorphic fuctions, Cauchy integral formula, applications.
Laurent series, residues and applications.
Fourier series.

Reference Texts
V. De Cicco, D. Giachetti " Metodi Matematici per l'Ingegneria" , Esculapio, Bologna, 2011.
Appunti delle lezioni.
Ulteriori testi suggeriti:
G. C. Barozzi "Matematica per l'Ingegneria dell'Informazione", Zanichelli, Bologna, 2001.
M. Giaquinta e G.Modica " Note di Metodi Matematici per Ingegneria Informatica" , Pitagora Editrice, Bologna, 2007.
F. Gazzola, F. Tomarelli, M. Zanotti " Analytic Functions, Integral transform, Differential Equations" , Esculapio, Bologna, 2013.

2163 - COMPLEMENTI DI ANALISI MATEMATICA
MAT/05 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune - BARI
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CAPONIO ERASMO

Training objectives

To provide basic tools and meaningful applications related to complex analysis, power and Fourier series, Laplace transform.

Prerequisites

The content of the courses Geometry and Algebra and Mathematical Analysis

Didactic Methods

In class lectures

Course programme

Complex functions: differentiability, Cauchy-Riemann equations.
Laplace tranform, applications.
Power series. Analytic functions.
Holomorphic fuctions, Cauchy integral formula, applications.
Laurent series, residues and applications.
Fourier series.

Reference Texts

V. De Cicco, D. Giachetti " Metodi Matematici per l'Ingegneria" , Esculapio, Bologna, 2011.
Appunti delle lezioni.
Ulteriori testi suggeriti:
G. C. Barozzi "Matematica per l'Ingegneria dell'Informazione", Zanichelli, Bologna, 2001.
M. Giaquinta e G.Modica " Note di Metodi Matematici per Ingegneria Informatica" , Pitagora Editrice, Bologna, 2007.
F. Gazzola, F. Tomarelli, M. Zanotti " Analytic Functions, Integral transform, Differential Equations" , Esculapio, Bologna, 2013.

2561 - COMPLEMENTI DI ELETTRONICA ANALOGICA
ING-INF/01 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MARZOCCA CRISTOFORO

Training objectives

The course aims to provide the students with the expertise needed to complete the electronics background acquired in the courses of the first level degree. Reference circuit solutions for practical applications and issues raised by modern technologies are presented and discussed, along with powerful analysis methodologies.

Prerequisites

Basic electronics, operational amplifiers, fundamentals of control system theory.

Didactic Methods

Course programme

1.   Feedback circuits: analysis of feedback circuits with alternative methods, return ratio, asymptotic gain formula (Rosenstark's formula), Bode's formula, evaluation of terminal impedances with the Blackman's formula.

2.   Advanced topics on stability and compensation methods for operational amplifiers: circuits with two dominant poles, relationship between gain-bandwidth product and unity gain frequency, correlation between phase margin, Q factor of the closed loop poles, overshoot and settling time of the step response. Compensation methods for capacitive loads and OPAMP input parasitic capacitances: out-of-the-loop and "in-the-loop" methods, gain compensation, lead compensation, lead-lag compensation.

3.   Linear oscillators and stability of the oscillation frequency. Phase-shift, Bubba, Wien bridge, LC, three-point, negative-resistance oscillators, quartz oscillators. Limitation and control of the oscillation amplitude. Non linear oscillators: Schmitt trigger recall, OPAMP clock, triangle-wave oscillator and amplitude limiters. Monostable circuits and ring oscillators.

4.   Continuous time active filters: main specifications for the different filter types, synthesis methods, frequency transformations. Biquad filters and different circuit implementations: Sallen-Key, MFB, KHN, Tow-Thomas.

5.   Phase locked loops (PLL): operation principles, main architectures and configurations, basic building blocks: phase detector, VCO, loop filter. Phase-frequency detector, charge pump PLL.

Reference Texts

2500 - COMPONENTI E CIRCUITI OTTICI
ING-INF/02 - Ingegneria delle telecomunicazioni

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM14 - INGEGNERIA DELLE TELECOMUNICAZIONI (D.M. 270/04)
Study plans/Curricula:	LM14-20 - SISTEMI A RADIOFREQUENZA E OTTICI
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	PETRUZZELLI VINCENZO

Training objectives

The course is aimed to give the main concepts and the criteria for the design of optical components and systems to be used in the modern optical telecommunication systems

Prerequisites

Fundaments on the material properties. Knowledge of the integration methods of linear and non linear differential equations. Basis on the electromagnetic fields.

Didactic Methods

Course programme

1.   Materials for integrated optics and photonics (0.5 CFU): definitions and properties. Glasses, Polymers, Crystals, Semiconductors.
2.   Tensors and crystallography (1.5 CFU): Bravais gratings e point group. Crystal principal axes. Anisotropy and birefringency. Properties of Lithium Niobate. Electro-optic, acousto-optic, piezoelectric and pyroelectric effcts.
3.   Passive Optical Components (2 CFU): Branching waveguides. Modulators. Interferometers. Couplers, Switches.
4.   Optic fiber properties and applications in Telecommunications (1 CFU): Attenuation and dispersion in optical fibers. Techniques of optical fiber fabrication. Measurements on optical fibers. Dispersion fibers changed.
5.   Nonlinear optical components (1 CFU): Second harmonic generation. Pockels effect. Kerr effect. SPM. FWM. XPM. Optical non linear switching, frequency conversion and modulation.
6.   Soliton propagation (1 CFU): Blue and red-shift. GVD. Normal and anomalous dispersions. Dispersion and nonlinearity lengths. Fundamental soliton.
7.   Active Optical Components (2 CFU): Optical Transmitters: LED and Laser. Optical Fabry-Perot cavity and a single longitudinal mode cavities: laser DFB and DBR. Quantum well, quantum wire and quantum dot lasers. Optical fiber EDFA and semiconductor SOA amplifiers. Systems with optical amplifiers. Photodetectors and optical receivers
8.   Optical components for long-distance and high-capacity transmissions (1 CFU): TDM and WDM systems. Optical filters. Optical networks and circuits, add-drop ADM. Optical cross connect OXC.
9.   Numerical applications (2 CFU): Design of optical devices with electromagnetic solvers BPM, FDTD, etc.

Reference Texts

1.   Appunti/dispense del corso in formato elettronico sul sito del DEI: http://ftp-dee.poliba.it:8000/Petruzzelli.
2.   A. Cutolo: Optoelettronica, ottica, fotonica e laser.
3.   Scuola superiore G. Reiss Romoli: Le fibre ottiche per le telecomunicazioni.

2160 - COMUNICAZIONI ELETTRICHE
ING-INF/03 - Ingegneria delle telecomunicazioni

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune - BARI
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	CAMARDA PIETRO

Training objectives

The course provides the basic tools to improve conceptual, methodological and computational analysis of the first simple telecommunication systems.
It analyzes the characteristics of analog and digital modulations, considering simple analytical model for noise analysis.

Prerequisites

Mathematical Analysis. Fundamentals of Circuit Theory.

Didactic Methods

Lectures given in conventional manner, eventually supported by multimedia tools.

Course programme

- Transmission systems: basics. Noise temperature and noise figure. Noise of cascaded stages
- Analog and digital modulation with sinusoidal carrier. Amplitude modulation: DSB-SC, SSB, VSB, AM Standard, Quadrature. Phase and Frequency Modulation: Spectrum, multiplexing in frequency. Digital modulation : OOK, BPSK, DPSK, FSK. Elements of digital multi-level modulation: QPSK, MPSK, QAM, MSK, GMSK. OFDM modulation (notes). Spread spectrum systems (overview)
- Transmission of digital signals with pulse carrier. Pulse-amplitude modulation, line codes and spectra, inter-symbol interference, matched filter.
- Effects of noise in telecommunications systems. Performance of systems in base band. Coherent and non-coherent detection of binary digital signals. Signal to Noise (S / N) in analogue AM and FM.

Reference Texts

S. Haykin, M. Moher " Introduzione alle Telecomunicazioni Analogiche e Digitali" , Casa Editrice Ambrosiana.
John G. Proakis, Masoud Salehi " Communication Systems Engineering (2nd Edition), Prentice Hall;

2160 - COMUNICAZIONI ELETTRICHE
ING-INF/03 - Ingegneria delle telecomunicazioni

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	GRIECO LUIGI ALFREDO

Training objectives

The first module provides the basic concepts about signal theory that are preparatory to the second module, which explains the key design principles of analog and digital transmission systems.

Prerequisites

Background on mathematical analysis and physics.

Didactic Methods

Course programme
- Basic signals
- Fourier series and transforms
- Time-invariant linear systems
- Basic concepts on probability theory
- Continuous and discrete random variables
- Stochastic processes
- Spectral analysis of stochastic processes
- Basic principles of signal transmissions: sample theorem and quantization
- Basic concepts on information theory and Shannon theorem
- Basic concepts on error protection codes: the Hamming code
- Noise in amplifying systems
- Analog transmissions in baseband channels
- Analog transmissions in passband channels: modulation systems
- Basic concepts on RADAR systems
- Digital transmission systems

Reference Texts

M. Luise, G. M. Vitetta, Teoria dei Segnali, Terza edizione, Mc-Graw Hill, 2009.

Leon W. Couch, Fondamenti di telecomunicazioni. Sistemi di comunicazione analogici e digitali, Prentice Hall, settima edizione, 2008.

Simon Haykin, Michael Moher, Introduzione alle telecomunicazioni analogiche e digitali, CEA, 2007.

2160 - COMUNICAZIONI ELETTRICHE
ING-INF/03 - Ingegneria delle telecomunicazioni

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Ciclo Annuale Unico
Exam type: Orale
Professor in charge: GRIECO LUIGI ALFREDO

Training objectives
The first module provides the basic concepts about signal theory that are preparatory to the second module, which explains the key design principles of analog and digital transmission systems.

Prerequisites
Background on mathematical analysis and physics.

Didactic Methods

Course programme
- Basic signals
- Fourier series and transforms
- Time-invariant linear systems
- Basic concepts on probability theory
- Continuous and discrete random variables
- Stochastic processes
- Spectral analysis of stochastic processes
- Basic principles of signal transmissions: sample theorem and quantization
- Basic concepts on information theory and Shannon theorem
- Basic concepts on error protection codes: the Hamming code
- Noise in amplifying systems
- Analog transmissions in baseband channels
- Analog transmissions in passband channels: modulation systems
- Basic concepts on RADAR systems
- Digital transmission systems

Reference Texts
M. Luise, G. M. Vitetta, Teoria dei Segnali, Terza edizione, Mc-Graw Hill, 2009.
Leon W. Couch, Fondamenti di telecomunicazioni. Sistemi di comunicazione analogici e digitali, Prentice Hall, settima edizione, 2008.
Simon Haykin, Michael Moher, Introduzione alle telecomunicazioni analogiche e digitali, CEA, 2007.

2131 - CONTROLLI AUTOMATICI
ING-INF/04 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Affine/Integrativa
Total Credits:	9
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MAIONE GUIDO

Training objectives

The course provides basic modelling and analysis tools of linear time-invariant dynamic systems. It shows the principles of single-input single-output feedback control of dynamic systems. The main analysis techniques are provided for both the time and the frequency domain. In this way, it is possible to assess the performance of feedback controlled systems in terms of stability, precision, robustness, and transient behaviour.

Prerequisites

Good understanding of polynomials and roots, first and second order linear ordinary differential equations, complex numbers, complex functions of complex variables, algebra, calculus, physics, electrical circuits, Laplace transforms and inverse Laplace tr

Didactic Methods

The course includes lectures on theory, numerical exercises in the classroom, and some laboratory sessions for computer simulation. Projector equipment is sometimes used during lectures and single students are assisted in the dedicated reception hours.

Course programme

1. TERMINOLOGY, DEFINITIONS AND FUNDAMENTAL CONCEPTS
2. ELEMENTARY MODELLING OF DYNAMIC SYSTEMS
3. ANALYSIS IN THE TIME DOMAIN
4. THE FEEDBACK CONTROL PROBLEM
5. PROPERTIES OF FEEDBACK
6. ANALYSIS IN THE FREQUENCY DOMAIN
7. ROOT LOCUS METHOD
8. BASICS ON DESIGN METHODS AND PID CONTROLLERS
9. PC LABORATORY SESSIONS
10. Numerical examples and exercises cover all the course topics specified in sections from 1. to 7.
See the course program for a detailed description.

Reference Texts

G. Marro, Controlli automatici, Zanichelli Editore, Bologna.
ULTERIORI TESTI SUGGERITI
G. F. Franklin, J. D. Powell, A. Emami-Naeini, Controllo a retroazione di sistemi dinamici, vol. I, EdiSES, Napoli, 2004 (Feedback Control of Dynamic Systems, 4th ed., Prentice Hall, 2002).
P. Bolzern, R. Scattolini, N. Schiavoni, Fondamenti di controlli automatici, McGraw-Hill, Milano, 1998 (I edizione) o 2015 (IV edizione).
A. Cavallo, R. Setola, F. Vasca, La nuova guida operativa a Matlab, Simulink e Control Toolbox, Liguori Editore, 2002.
M. Tibaldi, Note introduttive a Matlab e Control Toolbox, Progetto Leonardo, Bologna, Soc. Ed. Esculapio, 1993.

2581 - CONTROLLO DI GESTIONE
ING-IND/35 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-21 - GESTIONE DI IMPRESA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	COSTANTINO NICOLA

Training objectives

This course aims at providing future management engineers with the fundamental knowledge, from both theoretical and practical perspectives, about management accounting.

Prerequisites

financial accounting

Didactic Methods

In class lectures, case studies, workshops and seminars held by academic and practice world.

Course programme

1. Financial accounting and Management accounting. Cost classification, configuration and behavior
2. Management accounting systems. Full costing: simple and complex techniques, innovative techniques: ABC, Balanced Scorecard, MBO, standard costs, variances, Direct costing, short term decisions
3. Budgeting process. Process and context of planning and control, Strategic planning and budgeting process, Performance assessment and Reporting

Reference Texts

Sistemi di controllo. Analisi economiche per le decisioni aziendali (14° edizione), R. N. Anthony, D. F. Hawkins, D. M. Macrì, K. A. Merchant, McGraw Hill, 2016

2581 - CONTROLLO DI GESTIONE
ING-IND/35 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-23 - TECNOLOGIA E PRODUZIONE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	COSTANTINO NICOLA

Training objectives

This course aims at providing future management engineers with the fundamental knowledge, from both theoretical and practical perspectives, about management accounting.

Prerequisites

financial accounting

Didactic Methods

In class lectures, case studies, workshops and seminars held by academic and practice world.

Course programme

1. Financial accounting and Management accounting. Cost classification, configuration and behavior
2. Management accounting systems. Full costing: simple and complex techniques, innovative techniques: ABC, Balanced Scorecard, MBO, standard costs, variances, Direct costing, short term decisions
3. Budgeting process. Process and context of planning and control, Strategic planning and budgeting process, Performance assessment and Reporting

Reference Texts

Sistemi di controllo. Analisi economiche per le decisioni aziendali (14° edizione), R. N. Anthony, D. F. Hawkins, D. M. Macrì, K. A. Merchant, McGraw Hill, 2016

2647 - COSTRUZIONI DI STRADE, FERR. ED AEROP.
ICAR/04 - Ingegneria civile

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula:	LM01-22 - VIE E TRASPORTI
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	RANIERI VITTORIO

Training objectives
To provide students with advanced knowledge of design and constructions of Roads, railways and airports

Prerequisites
Basic knowledge of design and constructions of Roads, railways and airports

Didactic Methods

Course programme
¿   interactions between a road infrastructure and the environment
¿   elements of a tecnica project
¿   technical and –economic documents
¿   pavements
•   types
o   flexible
o   semi-rigid
o   rigid
•   materials
o   typologies
o   mechanical behaviour
•   design
o   pavement catalogue
o   flexible pavements
o   rigid pavements
¿   preservation of the road bodies
•   types
•   hydraulic dimensioning
•   structural dimensioning criteria
¿   surface water runoff
¿   retaining walls
¿   completation works
•   road barriers
•   signposting

Reference Texts
- G. Tesoriere " Strade, ferrovie e aeroporti" - Vol. 1, Vol. 2 e Vol. 3, UTET
- P. Ferrari, F. Giannini.: Ingegneria Stradale, Vol 1, Vol 2. Ed. ISEDI
- M.Agostinacchio, D.Campa, S.Olita: Strade Ferrovie Aeroporti – EPC LIBRI Srl
- T. Esposito R. Mauro "Fondamenti di infrastrutture viarie" - Vol. 1 e Vol. 2, Hevelius
- F. Annunziata, M. Coni, F. Maltinti, F. Pinna, S. Portas " Progettazione stradale integrata", Zanichelli
- "Pavement analysis and design" Yang H. Huang
- C. Datei, G. Da Deppo "Le opere idrauliche nelle costruzioni stradali"
- Appunti del corso

2799 - COSTRUZIONI IN ZONA SISMICA
ICAR/09 - Ingegneria civile

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	UVA GIUSEPPINA

Training objectives

The course deals with the theoretical and applicatory aspects of Earthquake Engineering, with the aim of providing students with the basics and operational tools necessary for the study and design of earthquake-resistant buildings and for the vulnerability verification of existing buildings (with particular reference to the RC buildings and masonry buildings).

The part devoted to technical and design issues is systematically referred to the framework of the current seismic codes (Italian Technical Standards for Construction and Eurocode 8 [1,2]).

In addition to the lectures, the course includes practical lessons of collective type.

Prerequisites

Mechanics of Materials, Structural Analysis and Design.

Didactic Methods

The course provides general lectures, aimed at giving the theoretical basis of the course, and exercise lessons, devoted to learning activities (skills). Specifically, the exercise lessons are composed of two consecutive activities: during the first one,

Course programme

1. Introduction to the problem of seismic safety of structures (6h)
Lessons from the earthquakes of the past. Post damage observation: Failure mechanisms of traditional masonry buildings; Failure mechanisms of RC buildings.

2. The origins of Earthquakes (2h)
The origin of earthquakes. From the theory of continental drift to the theory of plate tectonics. Seismic waves. Local amplification phenomena. The measurement scales of earthquakes.

3. Earthquake Engineering and the territory: risk and seismic vulnerability of existing buildings (
Lesson hours: 88 h)
Risk, hazard and vulnerability. Elements at risk: sensitive and strategic buildings, the Historical and Monumental Heritage; Current building stock. Methods for the Vulnerabilitu Assessment at the Regional scale. The Method of the Vulnerability Index. Multilevel approach. Risk management and strategies for prevention and mitigation at the urban and regional scale. Examples and case studies.

4. Fundamentals of Dynamic of Structures (16h)
D' Alembert Principle. Lumped masses and distributed masses in dynamic models. Free vibrations of linear SDoF systems in undamped conditions. Hysteretic damping and viscous damping. Free vibrations of linear SDoF systems with viscous damping. Forced vibrations of SDoF systems without damping: response to step function, harmonic function. Response of linear SDOF to arbitrary excitation: impulse function, Duhamel' s Integral. Response of linear SDOF to earthquake excitation. Pseudo-velocity, displacement and pseudo-acceleration Response Spectra. Dynamics of MDof Systems. Modal Analysis. Equation of motion in principal coordinates and natural vibration modes.

5. Limit states and seismic action (14h)
Overview of European and Italian Seismic Codes. Probabilistic approach the definition of Seismic hazard. Limit states in seismic design. Evaluation of the seismic design action: elastic and inelastic response spectrum, design spectrum, behavior factor, performance based design. Use of accelerograms: natural, artificial and simulated accelerograms, Seismic load combination.

6. The modern approach to seismic-resistant design of buildings (6h)
Calibration of the seismic risk level: performance-based design. General criteria of seismic design. Conceptual design: morphology and structure of the building, regularity, ductility. Capacity Design. Non structural elements and facilities sensitive to absolute acceleration.

7. Methods of analysis (18h)
Structural modeling. Linear methods of analysis and verification: linear static analysis, dynamic modal analysis. Non-linear methods of analysis and verification: nonlinear static analysis, nonlinear dynamic analysis. Use of automatic computer programs for the structural modeling and analysis. Structural types.

8. Seismic-resistant design of RC buildings (22h)
Preliminary design and layout of the structure. Ductile/brittle mechanisms and structural elements. Design Criteria at LSU. Materials. Design and verification of the structural elements: beams, columns, nodes, shear walls (internal actions, capacity models, constructive details). Secondary elements and non-structural elements. Design Criteria for Foundation structures.

9. Seismic vulnerability and safety assessment of existing buildings (4h)
Knowledge path, knowledge levels and partial safety factors. Experimental appraisal of the quality of in place materials and structural elements: investigations and structural diagnostics. Methods of analysis. Use of computer programs for the automatic structural calculation. Safety verifications under anthropic action and under seismic actions. Coefficients of seismic vulnerability. Examples and case studies.

Reference Texts

1. Norme Tecniche per le Costruzioni – D.M. 14.01.08
2. Eurocodice 8.

3.   M. Mezzina, D. Raffaele, G. Uva, G. Marano (a cura di): Progettazione sismo-resistente di edifici in cemento armato. Ed. Città Studi di De Agostini scuola. (ITALY). 2011. (disponibile nella biblioteca del Dipartimento Dicatech)

4.   M. Mezzina, (a cura di). Fondamenti di Tecnica delle Costruzioni, Ed. Città Studi di De Agostini scuola. (ITALY). 2013. (disponibile nella biblioteca del Dipartimento Dicatech).

5.   Paulay, T., Priestley M.J.N. Seismic design of reinforced concrete and masonry buildings (1992). Wiley, NY.

6.   S. Casolo, F. Porco, G. Porco, G. Uva. Vulnerabilità strutturale e rischio sismico del Patrimonio Architettonico: indagini, analisi, modelli. Ed. Digilabs, ISBN9788875220211. Bari, dicembre 2008 (disponibile nella biblioteca del Dipartimento Dicatech).

7.   M. Mezzina, M. Aristodemo, L. Jurina, G. Uva (a cura di). Rischio sismico e strategie di mitigazione per i centri storici. Il caso di Laino Castello. Bari, Biblios editore. Luglio 2008. (disponibile nella biblioteca del Dipartimento Dicatech.

8.   M. Mezzina, G. Uva, R. Greco (a cura di). Sicurezza e conservazione delle prime costruzioni in calcestruzzo armato. Ed. Città Studi di De Agostini scuola. 2008. (disponibile nella biblioteca del Dipartimento Dicatech)
Appunti delle lezioni.

La bibliografia indicata è da ritenersi di base. Ulteriori informazioni verranno fornite durante il corso.

2293 - COSTRUZIONI IN ZONA SISMICA
ICAR/09 - Edilizia e ambiente

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM02 - INGEGNERIA DEI SISTEMI EDILIZI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	UVA GIUSEPPINA

Training objectives
The course deals with the theoretical and applicatory aspects of Earthquake Engineering, with the aim of providing students with the basics and operational tools necessary for the study and design of earthquake-resistant buildings and for the vulnerability verification of existing buildings (with particular reference to the RC buildings and masonry buildings).
The part devoted to technical and design issues is systematically referred to the framework of the current seismic codes (Italian Technical Standards for Construction and Eurocode 8 [1,2]).
In addition to the lectures, the course includes practical lessons of collective type.

Prerequisites
Mechanics of Materials, Structural Analysis and Design.

Didactic Methods
The course provides general lectures, aimed at giving the theoretical basis of the course, and exercise lessons, devoted to learning activities (skills). Specifically, the exercise lessons are composed of two consecutive activities: during the first one,

Course programme
1. Introduction to the problem of seismic safety of structures (6h)
Lessons from the earthquakes of the past. Post damage observation: Failure mechanisms of traditional masonry buildings; Failure mechanisms of RC buildings.
2.The origins of Earthquakes (2h)
The origin of earthquakes. From the theory of continental drift to the theory of plate tectonics. Seismic waves. Local amplification phenomena. The measurement scales of earthquakes.
3. Earthquake Engineering and the territory: risk and seismic vulnerability of existing buildings (
Lesson hours: 88 h)
Risk, hazard and vulnerability. Elements at risk: sensitive and strategic buildings, the Historical and Monumental Heritage; Current building stock. Methods for the Vulnerabilitu Assessment at the Regional scale. The Method of the Vulnerability Index. Multilevel approach. Risk management and strategies for prevention and mitigation at the urban and regional scale. Examples and case studies.
4. Fundamentals of Dynamic of Structures (16h)
D' Alembert Principle. Lumped masses and distributed masses in dynamic models. Free vibrations of linear SDoF systems in undamped conditions. Hysteretic damping and viscous damping. Free vibrations of linear SDoF systems with viscous damping. Forced vibrations of SDoF systems without damping: response to step function, harmonic function. Response of linear SDOF to arbitrary excitation: impulse function, Duhamel' s Integral. Response of linear SDOF to earthquake excitation. Pseudo-velocity, displacement and pseudo-acceleration Response Spectra. Dynamics of MDof Systems. Modal Analysis. Equation of motion in principal coordinates and natural vibration modes.
5. Limit states and seismic action (14h)
Overview of European and Italian Seismic Codes. Probabilistic approach the definition of Seismic hazard. Limit states in seismic design. Evaluation of the seismic design action: elastic and inelastic response spectrum, design spectrum, behavior factor, performance based design. Use of accelerograms: natural, artificial and simulated accelerograms, Seismic load combination.
6. The modern approach to seismic-resistant design of buildings (6h)
Calibration of the seismic risk level: performance-based design. General criteria of seismic design. Conceptual design: morphology and structure of the building, regularity, ductility. Capacity Design. Non structural elements and facilities sensitive to absolute acceleration.
7. Methods of analysis (18h)
Structural modeling. Linear methods of analysis and verification: linear static analysis, dynamic modal analysis. Non-linear methods of analysis and verification: nonlinear static analysis, nonlinear dynamic analysis. Use of automatic computer programs for the structural modeling and analysis. Structural types.
8. Seismic-resistant design of RC buildings (22h)
Preliminary design and layout of the structure. Ductile/brittle mechanisms and structural elements. Design Criteria at LSU. Materials. Design and verification of the structural elements: beams, columns, nodes, shear walls (internal actions, capacity models, constructive details). Secondary elements and non-structural elements. Design Criteria for Foundation structures.
9. Seismic vulnerability and safety assessment of existing buildings (4h)
Knowledge path, knowledge levels and partial safety factors. Experimental appraisal of the quality of in place materials and structural elements: investigations and structural diagnostics. Methods of analysis. Use of computer programs for the automatic structural calculation. Safety verifications under anthropic action and under seismic actions. Coefficients of seismic vulnerability. Examples and case studies.

Reference Texts
1.   Norme Tecniche per le Costruzioni – D.M. 14.01.08
2.   Eurocodice 8.

3.   M. Mezzina, D. Raffaele, G. Uva, G. Marano (a cura di): Progettazione sismo-resistente di edifici in cemento armato. Ed. Città Studi di De Agostini scuola. (ITALY). 2011. (disponibile nella biblioteca del Dipartimento Dicatech)
4.   M. Mezzina, (a cura di). Fondamenti di Tecnica delle Costruzioni, Ed. Città Studi di De Agostini scuola. (ITALY). 2013. (disponibile nella biblioteca del Dipartimento Dicatech).
5.   Paulay, T., Priestley M.J.N. Seismic design of reinforced concrete and masonry buildings (1992). Wiley, NY.
6.   S. Casolo, F. Porco, G. Porco, G. Uva. Vulnerabilità strutturale e rischio sismico del Patrimonio Architettonico: indagini, analisi, modelli. Ed. Digilabs, ISBN9788875220211. Bari, dicembre 2008 (disponibile nella biblioteca del Dipartimento Dicatech).
7.   M. Mezzina, M. Aristodemo, L. Jurina, G. Uva (a cura di). Rischio sismico e strategie di mitigazione per i centri storici. Il caso di Laino Castello. Bari, Biblios editore. Luglio 2008. (disponibile nella biblioteca del Dipartimento Dicatech.
8.   M. Mezzina, G. Uva, R. Greco (a cura di). Sicurezza e conservazione delle prime costruzioni in calcestruzzo armato. Ed. Città Studi di De Agostini scuola. 2008. (disponibile nella biblioteca del Dipartimento Dicatech)
Appunti delle lezioni.
La bibliografia indicata è da ritenersi di base. Ulteriori informazioni verranno fornite durante il corso.

2577 - COSTRUZIONI IN ZONA SISMICA E TECNICA DELLE COSTR. II
ICAR/09 - Ingegneria civile

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula:	LM01-21 - STRUTTURE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	RAFFAELE DOMENICO

Training objectives

The course is aimed at complete knowledge of the static structural typologies most frequently in civil engineering. It covers the basic theoretical aspects of reinforced concrete, prestressed concrete, steel and composite steel-concrete buildings and has the aim to convey to students the essential tools for the analysis and design of such structures. The project aspects treaties refer to current national and European technical codes (NTC, EC3). The Course foresees, close to theoretical lessons, also practical exercises of collective type in classroom, on the same matter of lessons.

Prerequisites

Bases of structural mechanics and structural analysis and design.

Didactic Methods

Course programme

The contents of the course can be summarized as follows

Topic n. 1:   Basic theoretical aspects of reinforced concrete elements.
Content details: (i) steel-concrete bond; (ii) cracking and Tension Stiffening mechanism; (iii) linear viscoelasticity principles, creep and shrinkage, step-by-step procedures and algebraic methods for the creep analysis; (iv) the box girders, the warping torsion and the effects due to transverse deformability; (v) buckling of reinforced concrete compressed columns.

Topic n. 2:   Basic theoretical aspects of prestressed concrete elements.
Content details: (i) materials and prestressing systems; (ii) loss of prestress (iii) comparison between a simply supported and a continuous prestressed concrete beam; (iv) design of sections for flexure; cable layouts (v) prestressing with bonded or unbounded tendons; (vi) shear in prestressed-concrete beams; (vii) composite elements.

Topic n. 3:   Basic theoretical aspects of steel buildings.
Content details: (i) The steel material. (ii) Definitions and classifications: members; connections and joint types. (iii) Classification of cross-sections: influence of instability; steel section classification criteria. (iv) Ultimate Limit States: tension members; compressed elements; elements subjected to simple and composed bending; elements subjected to shear; a short account of elements subjected to combined stress state; a short account for fatigue verification. (v) Serviceability Limit States: deflection control; vibration control. (vi) Bolted joints and welded joints analysis: bolted shear connections; bolted tension connections; tension plus shear connections; the welded connections verification. (vii) Recurring typologies of structural steel systems for civil and industrial buildings.

Topic n. 4:   Basic theoretical aspects of steel-concrete buildings.
Content details: (i) Introduction to composite steel and concrete; (ii) basic concepts and classification of sections; (iii) connection systems for steel and concrete composite elements; (iv) composite steel-concrete slabs; (v) composite steel-concrete beams; (vi) composite steel-concrete columns.

Reference Texts

1.   M. Mezzina, (a cura di). "Fondamenti di Tecnica delle Costruzioni", Città Studi Edizioni di De Agostini Scuola – Novara, 2013.
2.   M. Mezzina, D. Raffaele, A. Vitone, (a cura di) "Teoria e pratica delle costruzioni in cemento armato" Città Studi Edizioni di De Agostini Scuola – Novara, 2007.
3.   Ballio, Bernuzzi, Progettare costruzioni in acciaio, Ed. HOEPLI, 2004, Milano.
4.   Appunti delle Lezioni

2318 - DINAMICA E CONTROLLO DELLE MACCHINE
ING-IND/08 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-21 - ENERGIA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DAMBROSIO LORENZO

Training objectives

This course aims to teach principles of system dynamic analysis and the main design methodology of standard controllers applied to energetic systems, focusing on the basic concepts of stability and precision. Furthermore, the elementary notions of harmonic analysis will be provided. At the end of the course a successful student should have developed a good ability to determine the system I/O, enhancing the system stability and precision. Furthermore, he or she should be also able to design the main standard controllers.

Prerequisites

Good understanding of Calculus and energetic systems.

Didactic Methods

Course programme

General overview: mathematical model and I/O systems; differential equations and Laplace transform; first and second order systems. General properties of the control feedback systems: parametric variation sensitivity; disturbance sensitivity; static, velocity and acceleration errors. Stability theory: definitions and theorems: Routh criterion; Nyquist criterion; phase and amplitude margins. Harmonic analysis and Bode diagrams (1,25 CFU: 8l-4e). Root locus. Controllers design: standard controllers; observer controllers

Reference Texts

2770 - DISCRETE MATHEMATICS
MAT/03 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM14 - INGEGNERIA DELLE TELECOMUNICAZIONI (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	ABATANGELO VITO

Training objectives

The aim of this course is to provide some classical mathematical tools with application purposes. By means of techniques of Geometry, Algebra and Number Theory this course introduce some basics of Cryptography and Coding Theory.

Prerequisites

Basic knowledge of Geometry and Algebra, especially about vector spaces and linear systems. Basic principles of computer science.

Didactic Methods

Course programme
Finite sets and their cardinality [2 hours]
Combinatorics [4 hours]
Algebraic structures with particular focus on the finite case [2 hours]
Prime numbers [2 hours]
Euclidean algorithm of division and greatest common divisor [2 hours]
Residue classes and linear congruences [2 hours]
Finite fields and their extensions [3 hours]
Euler' s totient function and Euler theorem [2 hours]
Cryptology: encryption, authentication, cryptanalysis [2 hours]
Private-key cryptology [6 hours]
Public-key cryptology [6 hours]
Block codes, error-detecting codes and error-correcting codes [4 hours]
Linear codes [5 hours]
Perfect codes (trivial, Hamming, Golay) [3 hours]
Cyclic codes and BCH codes [3 hours]

Reference Texts
L. Berardi and A. Beutelspacher, Matematica discreta, Dai fondamenti alle applicazioni,
Ed. Franco Angeli – Milano (ISBN 88-464-4920-7)
R. Hill, A first course in coding theory, Oxford Applied Mathematics and Computing Science Series,
Clarendon Press – Oxford (ISBN 0-19-853803-0)
F.J. Mac Williams and N.J.A. Sloane, The theory of error-correcting codes,
Ed. North Holland, Amsterdam (ISBN 0-44-485193-3)
A.A. Bruen and M.A. Forcinito, Cryptography, Information Theory, and Error-Correction: A Handbook for the 21st Century, John Wiley & Sons (ISBN 0-47-165317-9)

2770 - DISCRETE MATHEMATICS
MAT/03 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM17 - INGEGNERIA INFORMATICA (D.M. 270/04)
Study plans/Curricula:	LM17-23 - PRODUCTIVE SYSTEMS
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	ABATANGELO VITO

Training objectives
The aim of this course is to provide some classical mathematical tools with application purposes. By means of techniques of Geometry, Algebra and Number Theory this course introduce some basics of Cryptography and Coding Theory.

Prerequisites
Basic knowledge of Geometry and Algebra, especially about vector spaces and linear systems. Basic principles of computer science.

Didactic Methods

Course programme
Finite sets and their cardinality [2 hours]
Combinatorics [4 hours]
Algebraic structures with particular focus on the finite case [2 hours]
Prime numbers [2 hours]
Euclidean algorithm of division and greatest common divisor   [2 hours]
Residue classes and linear congruences [2 hours]
Finite fields and their extensions [3 hours]
Euler' s totient function and Euler theorem [2 hours]
Cryptology: encryption, authentication, cryptanalysis   [2 hours]
Private-key cryptology   [6 hours]
Public-key cryptology   [6 hours]
Block codes, error-detecting codes and error-correcting codes [4 hours]
Linear codes   [5 hours]
Perfect codes (trivial, Hamming, Golay)   [3 hours]
Cyclic codes and BCH codes [3 hours]

Reference Texts

2006 - DISEGNO
ICAR/17 - Ingegneria civile

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SPINELLI DOMENICO

Training objectives
The course aims to stimulate critical awareness and provide scientific knowledge of the methods and techniques that allow you to switch from the three-dimensional complexity of the space, to the construction of a model, either graphic, material or digital.

Prerequisites
Basic knowledge of elementary geometry;
Control of the main techniques of manual drawing

Didactic Methods

Course programme
Syllabus – Lesson Topics
Topic n. 1: cylindricall projections: orthogonal projection
Content details: representation of the point, the line and of the plan; general conditions of belonging, of parallelism and of perpendicularity, problems of distance-corners, true greatness; representation of a circle; representation of polyhedrons, and section intersection of polyhedrons; notes on the representation of the conical surfaces
Topic n. 2: cylindrical projections: axonometric projections
Content details: oblique axonometric, fundamental triangle, theorem of Pohlke; orthogonal axonometric, isometric cavalier associated with orthogonal projections.
Topic n. 3: conical projections: Perspective
Content details: perspective, key variables, elements of reference, central and accidental perspective
Topic n. 4: Architectural survey: Notes on architectural survey
Content details: methods of take-over; direct method; The eidotipo (methods of implementation). Measurement tools. Take-over of the plan, method of trilateration.
Syllabus – Workshop Topics
Topic n. 1: orthogonal projection
Content details: application method for two-dimensional representation.
Exercises about building representation and graphics processing of the housing project.
Topic n. 2: axonometric and perspective projections
Content details: application methods of three-dimensional representation

Reference Texts

2051 - Disegno dell'architettura
ICAR/17 - Formazione di base nella storia e nella rappresentazione

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	VERDOSCIA CESARE

Training objectives

Acquire the ability, through the study of representation systems, to know and to interpret reports of shape and space of the architectural works and of the anthropomorphic transformations of the territory.

Prerequisites

Knowledge of methods of descriptive geometry.

Didactic Methods

Course programme

Topic n. 1: Graphic communication, Knowledge and qualification.

Lesson hours: 4

Content details: Visual processing; psychology of vision; Relationship between sensation and ideas; Object of the representation; self-communication and communication with others; levels of iconicity; Manipulation and/or processing.

Topic n. 2: Analysis and representation of the architectural organism.

Lesson hours: 10

Content details: Materials; vertical structures, horizontal structures flat and vaulted structures; structures and roofing materials, roof geometry, vertical connections, architectural orders and decorative painting plastic.

Topic n. 3: Geometric surfaces and their recognition in building structures.

Lesson hours: 10

Content details: Origin and classification of geometric surfaces. Classification and representation of certain types of masonry vaults: barrel, cruising, sailing, pavilion domes.

Topic n. 4: Techniques connotations of graphic and infographic language.

Lesson hours: 10

Content details: Reading and representation of the territorial maps, cartography IGM, Regional, Provincial, Municipal, Land Registry.

Topic n. 5: Architectural and Urban Survey.

Lesson hours: 20

Content details: Knowledge of the operations required to perform a correct survey and its graphic representation, in a suitable scale, of a piece of urban tissue or an architectural work.

Topic n. 6: Rules of graphics unification in relation to architectural drawing.

Lesson hours: 32

Content details: Scale reduction, types of elaborate of building drawing. Acquisition of the procedures for the architectural survey. Symbols and notation, paper supports, digital media. Tools and how to use them; contribution of computer for graphic expression.

Syllabus – Workshop Topics

Topic n. 1: Design for the construction of single family house (workgroup)

Workshop hours: 16

Content details: Each group of students will have to deal with the theme of the house, developing, on the basis of predetermined parameters, related to a specified number of beds and rooms , a solution of single family house.

Topic n. 2: Architectural survey and/or urban (workgroup)

Workshop hours: 24

Content details: Students will have the opportunity to realize a complete search, that will be synthesized in detection card in digital format, prepared according to precise instructions, which will be accompanied by all the documents collected and produced. The graphics must be made using the AUTOCAD software and delivered in digital format.

Reference Texts

2562 - DISPOSITIVI E SENSORI FOTONICI
ING-INF/01 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula:	LM04-21 - SISTEMI ELETTRONICI PER LE BIOTECNOLOGIE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	PASSARO VITTORIO

Training objectives

The aim of this course is an introduction of methods and techniques for design of photonic devices and systems in fiber optic telecommunication systems, optical signal processing and sensing.

Prerequisites

Basic knowledge of electronics and electromagnetic fields. Basic principles of optoelectronics.

Didactic Methods

Use of blackboard and slides.

Course programme

1. Material non-linearity properties: SPM, XPM, FWM, Raman and Brillouin effects. Chromatic dispersion. Non linear Schroedinger equation. [4 hours]
2. Linear and non-linear fiber photonic devices (EDFA and Raman amplifiers, circulators, isolators, couplers, ring resonators, gratings, etc..). Examples. [8 hours]
3. Optical modulation and RZ and NRZ formats. Transmitters. Detection and decision threshold. Electrical and optical noise sources and their influence. WDM telecommunications systems. Soliton and pseudo-linear regimes. Channel capacity. [8 hours]
4. Principles of optoelectronic sensing. Physical, chemical and biochemical photonic sensors. Fiber optic and integrated photonic sensors. Notes on integrated biophotonics. Examples. [14 hours]
5. Techniques for design and fabrication of silicon integrated photonic sensors. [4 hours]
6. CAD techniques for design and simulation of complete photonic systems (Optisystem). [2 hours]
7. Hardware experiments. Experimental apparatus description. DFB laser characterization @ 1550 nm/1310 nm (LVI vs. Temperature). Measurement set-up "DUT" (device under test) and "coupler 50/50" characterization @ 1550 nm/1310 nm. FBT Coupler @ 1550/1310 nm. FBT WDM @ 1550/1310 nm. Connectors and terminations (@ 1550 nm), APC, PC, return loss, back-reflections. Isolator @ 1550/1310 nm. Circulator @ 1550/1310 nm. Bragg Grating (¿-scan). Bragg Grating − temp. sensor (¿-scan). WDM system (@ 1550/1310 nm). WDM bidirectional system (@ 1550/1310 nm). Fiber attenuation (@ 1550/1310 nm). Fiber length (method 1 and 2). Chromatic dispersion. BER(COM) & Eye diagrams (Q-software). Dense WDM (DWDM) system (crosstalk with VOA). [8 hours].

Reference Texts

G.P. Agrawal, "Fiber-optic communication systems", John Wiley, 2002.
G.T. Reed, "Silicon Photonics: the state of the art", John Wiley & Sons, Chichester, 2008.
A. Cutolo, "Optoelettronica e fotonica", Aracne Ed., 2014.
V. Passaro, "Modeling of Photonic Devices", NOVA Science Publ., 2009.

2486 - DISPOSITIVI ELETTRONICI AVANZATI
ING-INF/01 - Ingegneria elettronica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: PERRI ANNA GINA

Training objectives
The aims of this course is to instill into students the study, the characterization and the design of the basic and of the most modern electronic devices.

Prerequisites
Fundamentals of Electronic Devices.

Didactic Methods

Course programme
Introduction to Quantum Mechanics; Electron Energy and States in Semiconductors; Conduction ad Valence Band Structure; Intrinsic and Extrinsic Semiconductors; Fermi-Dirac Statistics; Drift current; Diffusion current; Continuity Equation; Nonhomogeneous Semiconductors; Elements of Si and GaAs Technology; Prototype pn Homojunctions; PSPICE Model for Diodes; BJT as Amplifier; PSPICE Model for BJT; JFET and PSPICE Model for JFET; MOSFET; Heterojunction devices: MESFET, HEMT, HBT; Semiconductor memory devices; Quantum computing and related devices; Carbon Nanotubes; Submicrometer devices.

Reference Texts
TESTI DI RIFERIMENTO PRINCIPALI:
1) A. G. Perri: " Fondamenti di Dispositivi Elettronici" ; Ed. Progedit, settembre 2010, ISBN 978-88-6194-080-2.
2) A. G. Perri: " Dispositivi Elettronici Avanzati" ; Ed. Progedit, gennaio 2011, ISBN 978-88-6194-081-9.
3) A. G. Perri: " Problemi di Analisi e Progetto dei Dispositivi a Semiconduttore" , Ed. Progedit, settembre 2008, ISBN 978-88-6194-029-1.
4) A. G. Perri: " Fondamenti di Elettronica" , Ed. Progedit, febbraio 2009, ISBN 978-88-6194-029-2.
5) A. G. Perri: " Dispositivi Elettronici, Manuale di progettazione con simulazioni PSPICE" . Edizioni Progedit, Bari, 2012, ISBN 978-88-6194-117-5.
TESTI DI CONSULTAZIONE:
1) B. l. Anderson, R. Anderson: Fundamentals of Semiconductor Devices, Mc Graw Hill, 2005.
2) K.F. Brennan, A.S. Brown: Theory of Modern Electronic Semiconductor Devices, John Wiley & Sons, 2002.
3) Kwok K. Ng: Complete Guide of Semiconductor Devices. John Wiley & Sons, Inc., USA, 2002.
4) C.Y. Chang, S.M. Sze: ULSI Devices. John Wiley & Sons, Inc., USA, 2000.

2356 - ECONOMIA E GESTIONE DELL'INNOVAZIONE
ING-IND/35 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-23 - TECNOLOGIA E PRODUZIONE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	ALBINO VITO

Training objectives

The aim of the course is to provide students with the basic concepts and methodologies to understand and analyse the strategic processes of firm's technological innovation. The course will be distinguished into two main parts aimed at investigating the dynamics of technological innovation and the basic requirements for the development of an innovation strategy.

Prerequisites

Basics of microeconomics; Project management; Strategy and organization.

Didactic Methods

In class lectures and numerical applications.

Course programme

Definitions of strategy, innovation, and technology.
Sources of innovation.
Types of innovation and technological cycles.
First mover advantage.
Definition of strategic orientation.
Methodologies for selecting innovation projects.
Collaboration strategies.
Intellectual property protection.
Open innovation and crowdsourcing.
Crowdfunding.
Organizing innovation processes
Innovating through tradition.
Design driven innovation.
Case studies.

Reference Texts

Schilling M.A., "Gestione dell' innovazione", McGraw Hill, Milano, 2009.
Grandi A., Sombrero M., "Innovazione tecnologica e gestione di impresa. La gestione strategica dell' innovazione", Il Mulino, Bologna, 2005.

2356 - ECONOMIA E GESTIONE DELL'INNOVAZIONE
ING-IND/35 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-20 - IMPRENDITORIALITA' E INNOVAZIONE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	ALBINO VITO

Training objectives

The aim of the course is to provide students with the basic concepts and methodologies to understand and analyse the strategic processes of firm's technological innovation. The course will be distinguished into two main parts aimed at investigating the dynamics of technological innovation and the basic requirements for the development of an innovation strategy.

Prerequisites

Basics of microeconomics; Project management; Strategy and organization.

Didactic Methods

In class lectures and numerical applications.

Course programme

Definitions of strategy, innovation, and technology.
Sources of innovation.
Types of innovation and technological cycles.
First mover advantage.
Definition of strategic orientation.
Methodologies for selecting innovation projects.
Collaboration strategies.
Intellectual property protection.
Open innovation and crowdsourcing.
Crowdfunding.
Organizing innovation processes
Innovating through tradition.
Design driven innovation.
Case studies.

Reference Texts

Schilling M.A., "Gestione dell' innovazione", McGraw Hill, Milano, 2009.
Grandi A., Sombrero M., "Innovazione tecnologica e gestione di impresa. La gestione strategica dell' innovazione", Il Mulino, Bologna, 2005.

2177 - ELABORAZIONE NUMERICA DEI SEGNALI
ING-INF/03 - Ingegneria delle telecomunicazioni

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-21 - INGEGNERIA DELLE TELECOMUNICAZIONI
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	GUARAGNELLA CATALDO

Training objectives

The course of Digital Signal Processing introduces students to the basic methodologies used in systems for
numerical signal processing. The aim is primarily to achieve an operational level of theoretical knowledge, trying to link theory and practice with experimental exercises.

Prerequisites

Theory of deterministic signals
Random processes
Fourier transform
Systems: Linear/nonlinear, time-varying/time-invariant, static/dynamic
Transformation of signals by generic systems

Didactic Methods

Course programme

Linear time-invariant systems, impulse response, convolution and Fourier transform. Sampling theorem. Reconstruction of a sampled signal and aliasing. The sampling of the signals passes band.
Interpolation: interpolators of order zero and one. Interpolation and bicubic splines. Spectral properties of an interpolation filter.
Frequency analysis of discrete signals in time. Fourier transform for discrete-time signals (DTFT). Discrete Fourier Transform and the circular convolution. Techniques overlap and save and overlap and add.
Efficient algorithms for the calculation of the DFT: the FFT decimation in time and decimation in frequency. Efficiency in FFT and generalization of radix-2.
Z transform and its properties. Analysis of linear time invariant in the domain Z with a zero and / or a pole.
Representation by block diagrams of some discrete-time systems (filters only zeros and only pole).
Oversampling and decimation of an entire factor. Transition from one frequency to another with rational relationship.
Passage between two closely spaced frequencies. Polyphase filters.
FIR digital filters: method of the windows and of the sampling frequency. Draft FIR filters excellent in constant ripple (Parks-Mc Clellan).
IIR filters by the use of the bilinear transformation. IIR filter design using the facilities
reverberant.
Main structures of FIR and IIR filters and stability to the quantization of coefficients.
Outline of spectral analysis techniques: general concepts and non-parametric spectral estimation. Periodogram, techniques Tuckey and Blackman, Hamming windows.
Discrete-time systems feeded by random signals
Decision theory
Signal processing and estimation of parameters:
Autocorrelation function of a process and correlation functions of multiple processes
Covariance and correlation matrices
Estimate of the power spectrum of a process: the periodogram
Linear prediction, signal whitening and AR models; eq. Yule-Walker AR models and ARMA.
Estimation of the power spectrum obtained from observations on a limited time.
Conventional methods and parametric estimate of the power spectrum. Estimators AR, MA and ARMA.
Algorithms and Pisarenko MUSIC and relationships with models AR.
Multidimensional signals and systems:
2D discrete Fourier transform; sampling the two-dimensional; reconstruction of two-dimensional analog signal from the samples; use of the FFT in the processing of two-dimensional signals.
Applications:
SBC Subband Coding and outline of the wavelet
Outline the implementation of adaptive filters
The digital TV signal: sampling and quantization of the TV signal. Coding techniques of the TV signal.
OFDM and digital modulations
Digital terrestrial broadcasting, DVB-T and DVB-T2, hints to ATSC
Overview signal processing radar and synthetic aperture radar.
The module provides numerical exercises in Matlab/Octave
Upon request a training in the laboratory for the development of numerical processing in programmable digital logic (FPGA / DSP)

Reference Texts

1) Oppenheim & Schafer, Discrete-Time Signal Processing, Pearson Education, 3/E, ISBN-10: 0131988425, ISBN-13: 9780131988422
2) Dimitris G. Manolakis, Vinay K. Ingle, Applied Digital Signal Processing, Cambridge University Press, ISBN 978-0-521-11002-0
3) J.G. Proakis, D.G. Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, Prentice Hall, 1996
4) A. Papoulis, S. U. Pillai, Probability, Random Variables and Stochastic Processes, Mc Graw-Hill, fourth edition

2177 - ELABORAZIONE NUMERICA DEI SEGNALI
ING-INF/03 - Ingegneria delle telecomunicazioni

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula: LT04-21 - INGEGNERIA DELLE TELECOMUNICAZIONI
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Ciclo Annuale Unico
Exam type: Orale
Professor in charge: GUARAGNELLA CATALDO

Training objectives

The course of Digital Signal Processing introduces students to the basic methodologies used in systems for
numerical signal processing. The aim is primarily to achieve an operational level of theoretical knowledge, trying to link theory and practice with
experimental exercises.

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Didactic Methods

Course programme

Linear time-invariant systems, impulse response, convolution and Fourier transform. Sampling theorem. Reconstruction of a sampled signal and aliasing. The sampling of the signals passes band.
Interpolation: interpolators of order zero and one. Interpolation and bicubic splines. Spectral properties of an interpolation filter.
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Efficient algorithms for the calculation of the DFT: the FFT decimation in time and decimation in frequency. Efficiency in FFT and generalization of radix-2.
Z transform and its properties. Analysis of linear time invariant in the domain Z with a zero and / or a pole.
Representation by block diagrams of some discrete-time systems (filters only zeros and only pole).
Oversampling and decimation of an entire factor. Transition from one frequency to another with rational relationship.
Passage between two closely spaced frequencies. Polyphase filters.
FIR digital filters: method of the windows and of the sampling frequency. Draft FIR filters excellent in constant ripple (Parks-Mc Clellan).
IIR filters by the use of the bilinear transformation. IIR filter design using the facilities
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Main structures of FIR and IIR filters and stability to the quantization of coefficients.
Outline of spectral analysis techniques: general concepts and non-parametric spectral estimation. Periodogram, techniques Tuckey and Blackman, Hamming windows.
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The module provides numerical exercises in Matlab/Octave
Upon request a training in the laboratory for the development of numerical processing in programmable digital logic (FPGA / DSP)

Reference Texts

1) Oppenheim & Schafer, Discrete-Time Signal Processing, Pearson Education, 3/E, ISBN-10: 0131988425, ISBN-13: 9780131988422
2) Dimitris G. Manolakis, Vinay K. Ingle, Applied Digital Signal Processing, Cambridge University Press, ISBN 978-0-521-11002-0
3) J.G. Proakis, D.G. Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, Prentice Hall, 1996
4) A. Papoulis, S. U. Pillai, Probability, Random Variables and Stochastic Processes, Mc Graw-Hill, fourth edition

2177 - ELABORAZIONE NUMERICA DEI SEGNALI
ING-INF/03 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	GUARAGNELLA CATALDO

Training objectives

The course of Digital Signal Processing introduces students to the basic methodologies used in systems for
numerical signal processing. The aim is primarily to achieve an operational level of theoretical knowledge, trying to link theory and practice with
experimental exercises.

Prerequisites

Theory of deterministic signals
Random processes
Fourier transform
Systems: Linear/nonlinear, time-varying/time-invariant, static/dynamic
Transformation of signals by generic systems

Didactic Methods

Course programme

Linear time-invariant systems, impulse response, convolution and Fourier transform. Sampling theorem. Reconstruction of a sampled signal and aliasing. The sampling of the signals passes band.
Interpolation: interpolators of order zero and one. Interpolation and bicubic splines. Spectral properties of an interpolation filter.
Frequency analysis of discrete signals in time. Fourier transform for discrete-time signals (DTFT). Discrete Fourier Transform and the circular convolution. Techniques overlap and save and overlap and add.
Efficient algorithms for the calculation of the DFT: the FFT decimation in time and decimation in frequency. Efficiency in FFT and generalization of radix-2.
Z transform and its properties. Analysis of linear time invariant in the domain Z with a zero and / or a pole.
Representation by block diagrams of some discrete-time systems (filters only zeros and only pole).
Oversampling and decimation of an entire factor. Transition from one frequency to another with rational relationship.
Passage between two closely spaced frequencies. Polyphase filters.
FIR digital filters: method of the windows and of the sampling frequency. Draft FIR filters excellent in constant ripple (Parks-Mc Clellan).
IIR filters by the use of the bilinear transformation. IIR filter design using the facilities
reverberant.
Main structures of FIR and IIR filters and stability to the quantization of coefficients.
Outline of spectral analysis techniques: general concepts and non-parametric spectral estimation. Periodogram, techniques Tuckey and Blackman, Hamming windows.
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OFDM and digital modulations
Digital terrestrial broadcasting, DVB-T and DVB-T2, hints to ATSC
Overview signal processing radar and synthetic aperture radar.
The module provides numerical exercises in Matlab/Octave
Upon request a training in the laboratory for the development of numerical processing in programmable digital logic (FPGA / DSP)

Reference Texts

2177 - ELABORAZIONE NUMERICA DEI SEGNALI
ING-INF/03 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	GUARAGNELLA CATALDO

Training objectives

The course of Digital Signal Processing introduces students to the basic methodologies used in systems for
numerical signal processing. The aim is primarily to achieve an operational level of theoretical knowledge, trying to link theory and practice with experimental exercises.

Prerequisites

Theory of deterministic signals
Random processes
Fourier transform
Systems: Linear/nonlinear, time-varying/time-invariant, static/dynamic
Transformation of signals by generic systems

Didactic Methods

Course programme

Linear time-invariant systems, impulse response, convolution and Fourier transform. Sampling theorem. Reconstruction of a sampled signal and aliasing. The sampling of the signals passes band.
Interpolation: interpolators of order zero and one. Interpolation and bicubic splines. Spectral properties of an interpolation filter.
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Efficient algorithms for the calculation of the DFT: the FFT decimation in time and decimation in frequency. Efficiency in FFT and generalization of radix-2.
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SBC Subband Coding and outline of the wavelet
Outline the implementation of adaptive filters
The digital TV signal: sampling and quantization of the TV signal. Coding techniques of the TV signal.
OFDM and digital modulations
Digital terrestrial broadcasting, DVB-T and DVB-T2, hints to ATSC
Overview signal processing radar and synthetic aperture radar.
The module provides numerical exercises in Matlab/Octave
Upon request a training in the laboratory for the development of numerical processing in programmable digital logic (FPGA / DSP)

Reference Texts

2125 - ELETTRONICA APPLICATA
ING-INF/01 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Affine/Integrativa
Total Credits:	9
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MARZOCCA CRISTOFORO

Training objectives

First, the course aims to give the principles of the behaviour of the main electronic devices and of the basic electronic circuits. A further goal is to provide the students with the capability of assembling together the elementary stages and assessing their performance with ad hoc techniques. Last, a relevant field of expertise developed during the course is represented by the main applications of the operational amplifiers.

Prerequisites

Basic knowledge of maths and physics. Good understanding of circuit analysis techniques.

Didactic Methods

Course programme

1. Principles of semiconductor physics.
2. p-n junction, static and dynamic characteristics, simplified models, small signal model. Design of half and full-wave rectifiers with capacitance filter. Zener diodes and design of simple voltage regulators. Further diode applications.
3. Bipolar junction transistor models and characteristics. Design of the bias networks, small signal elementary amplifiers, cascaded stages, Darlington, cascode and differential amplifiers.
4. MOSFET models, characteristics and applications. MOSFET based small signal amplifiers. Comparison with bipolar transistors.
5. Operational amplifiers characteristics and main applications: principles of negative feedback, differential amplifiers, ideal OPAMP characteristics, inverting and non-inverting amplifier, differential amplifier, inverting adder, buffer, integrator and differentiator, simple first order filters.

Reference Texts

2128 - ELETTRONICA DI POTENZA
ING-IND/32 - Ingegneria elettrica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	9
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MONOPOLI VITO GIUSEPPE

Training objectives

The course covers the main equipments used for controlled static conversion of electrical energy and their most important applications. Of each scheme the operating characteristics and the design criteria are examined. The aim is to provide students with the tools to understand the working principle and design criteria of the most used power converters, depending also on their specific application.

Prerequisites

Calculus. Geometry. Electrotechnics. (Suggested)

Didactic Methods

Theoretical lectures, numerical exercises and laboratory tests.

Course programme

1. Power Semiconductor Devices: Steady-state characteristics. Switching characteristics. Ratings.
2. AC/DC Converters: Principles of phase-controlled converter operation. Single-phase rectifier full controlled. Three-phase full-wave rectifiers. Fourier Analysis. Simulation of the main conversion topologies using Matlab/Simulink.
3. DC/DC Converters: Chopper circuits for operation in one, two or four quadrants. Switching-mode regulators: Buck regulators, Boost regulators. Simulation of the main conversion topologies using Matlab/Simulink.
4. DC/AC Converters: Voltage-source single-phase and three-phase bridge inverters: control signals and operation for 180° conduction. PWM inverters: sinusoidal modulation. Simulation of the main conversion topologies using Matlab/Simulink.
5. AC/AC Converters: Cycloconverters. Frequency converters with d.c. link. Frequency and voltage control.

Reference Texts

1. M.H.RASHID: "Elettronica di potenza. Vol.1 - Dispositivi e circuiti " — Pearson Prentice Hall 2007
2. M.H.RASHID: "Elettronica di potenza. Vol.2 - Applicazioni. " — Pearson Prentice Hall 2008
3. N.MOHAN, T.M.UNDELAND, W.P.ROBBINS: " Elettronica di Potenza, convertitori e applicazioni", Hoepli 2005

2370 - ELETTRONICA PER SENSORI E TRASDUTTORI
ING-INF/01 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CORSI FRANCESCO

Training objectives

To describe the properties of a variety of sensors to measure temperature, position, deformation, strength, light intensity, ionizing radiations, etc. To define the most suitable front-end circuitry to process the signals produced by the various sensors, including low level signals affected by noise and by external interferences.

Prerequisites

Basic electronics, operational amplifiers, fundamentals of control system theory.

Didactic Methods

Course programme

Resistive, capacitive and inductive sensors. Linear Variable Differential Transformer. Measurement bridges. Instrumentation amplifier. EMI. Noise calculations. Isolation amplifiers. Rail-to-rail stages. Hall effect sensors. ISFET. Photodiodes and photodetectors. Wireless sensor networks. Spectroscopy systems. A/D converters. Medical imaging systems (PET, SPECT, Compton, etc.)

Reference Texts

C. Kitchin, L. Counts: "A Designer's Guide to Instrumentation Amplifiers". Analog Devices. 2004 (www.analog-devices.com).

W. Kester: "Practical Design Techniques for Sensor Signal Conditioning". Analog Devices. 1999.

S. Franco "Design with Operational Amplifiers and Analog Integrated Circuits". Mac Graw Hill. 2002.

Signal Conditioning Seminar Texas Instrument 2001 (www.ti.com)

D.H Sheingold: "Transducer Interfacing Handbook" Analog Devices, 1981.

2370 - ELETTRONICA PER SENSORI E TRASDUTTORI
ING-INF/01 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM06 - INGEGNERIA DELL'AUTOMAZIONE (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CORSI FRANCESCO

Training objectives

To describe the properties of a variety of sensors to measure temperature, position, deformation, strength, light intensity, ionizing radiations, etc. To define the most suitable front-end circuitry to process the signals produced by the various sensors, including low level signals affected by noise and by external interferences.

Prerequisites

Basic electronics, operational amplifiers, fundamentals of control system theory.

Didactic Methods

Course programme

Resistive, capacitive and inductive sensors. Linear Variable Differential Transformer. Measurement bridges. Instrumentation amplifier. EMI. Noise calculations. Isolation amplifiers. Rail-to-rail stages. Hall effect sensors. ISFET. Photodiodes and photodetectors. Wireless sensor networks. Spectroscopy systems. A/D converters. Medical imaging systems (PET, SPECT, Compton, etc.)

Reference Texts

C. Kitchin, L. Counts: "A Designer's Guide to Instrumentation Amplifiers". Analog Devices. 2004 (www.analog-devices.com).

W. Kester: "Practical Design Techniques for Sensor Signal Conditioning". Analog Devices. 1999.

S. Franco "Design with Operational Amplifiers and Analog Integrated Circuits". Mac Graw Hill. 2002.

Signal Conditioning Seminar Texas Instrument 2001 (www.ti.com)

D.H Sheingold: "Transducer Interfacing Handbook" Analog Devices, 1981.

2010 - ELETTROTECNICA
ING-IND/31 - Ingegneria elettrica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Caratterizzante
Total Credits: 12
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: VERGURA SILVANO

Training objectives
To teach the basic methods for the analysis of linear electrical and magnetic circuits in steady state and transient conditions.

Prerequisites
Algebra of real and complex numbers. Sinusoidal functions. Plane trigonometry. Basic concepts of electromagnetism. Ordinary differential equations.

Didactic Methods

Course programme
--DC circuits
Definition of one port component; the port variables and conventions. The port relation of passive and active elements. Power and energy at the port. Definition of electric circuit: node; mesh; graph of a circuit; tree; co-tree; independent nodes; fundamental meshes. The Kirchhoff's current and voltage laws. The Tellegen theorem. Series and parallel connections of one-port. The transformation of a ¿-connection of resistors in a Y-connection. The Thevenin and Norton theorems. The Millman theorem. The two-port elements: the four type of controlled sources. The analysis of non dynamic linear circuits: the port relations and the topological independent relations. The solution of a circuit by means of node equations or mesh equations.
--AC circuits
The skin effect. The port-relations of linear ideal resistor, capacitor and inductor. The port relations of coupled linear inductors. The ideal transformer. The port-relation of a current and a voltage generator. The port relations of the four type of controlled sources. Sinusoids and associate phasors. The phasorial current and voltage Kirchhoff lows. The phasorial port relations. Impedance and admittance. Phasor solution of circuits with sinusoidal excitation. Resonant circuits. Thevenin and Norton theorems. Millman theorem. Instantaneous and average power in AC circuits. Active, reactive, apparent and complex power. Power factor. Power factor correction. The Boucherot theorem. Passive two-port representations.
--Magnetic circuits
Magnetic properties of materials. Magnetization curve. Definition of magnetic circuit. Hopkinson law. Reluctance and permeance of a magnetic circuit. Inductance of a coil. Kirchhoff laws of magnetic circuits. Permanent magnets. Magnetic energy. Magnetic forces. AC behaviour of magnetic circuits. Hysteresis curve. Harmonics. Hysteresis and eddy current losses. Complex reluctane.
--Three-phase circuits
Symmetrical and balanced three-phase circuits. Phase and line variables. Instantaneous power. Active, reactive and complex power. Power measurement. Symmetrical unbalanced three-phase circuits. Invariance of measured active power – Aron method. Symmetrical components for the analysis of unsymmetrical and unbalanced circuits.
--Linear Circuits with periodic inputs
Fourier series of a periodic function. Superposition of effects and circuit solution. Active, reactive and deforming power.
--Transient analysis of circuits
Timing analysis of the first and second order circuits: zero input response and natural frequencies; zero state response with canonical inputs.

Reference Texts
G. Rizzoni, F. Vacca, S. Vergura, "Elettrotecnica - Principi e applicazioni", 3° Edizione, McGraw Hill, 2013.
S. Vergura, "Elettrotecnica", EDISES, 2° Edizione, 2012

2010 - ELETTROTECNICA
ING-IND/31 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Affine/Integrativa
Total Credits: 9
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: ACCIANI GIUSEPPE

Training objectives
To instill into pupils basic elements for the comprehension of elecrical circuits to be applied theoretically and experimentally in the field of telecommunicationsn systems.

Prerequisites
Linear algebraic and differential equation systems. Trigonometry. Matrices and vectors. Electrostatic and. Magneto static fundamental laws. Complex Numbers

Didactic Methods
Lectures given in the conventional manner eventually supported by multimedia, laboratory team-works, personalized feedback and coaching to improve every aspect of the student work.

Course programme
Electric circuit variables and fundamental laws. Circuit elements. Mono e two ports. Power and energy. Resistive Circuits. Circuits theorems. Topology in circuits analysis. Methods of circuits analysis. Response of first and second order circuits. Sinusoidal steady-state analysis.

Reference Texts
1) Richard C. Dorf, James A. Svoboda " Circuiti elettrici" Edizione italiana della Apogeo a cura di Dario D'Amore e Mauro Santomauro 2001
2) Balabanian, N. Electric Circuits, New York, McGraw-Hill, 1994
3) M. Vanvalkemburg, B.K. Kinariwala, " Linear circuits" ,Prentice Hall

2010 - ELETTROTECNICA
ING-IND/31 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula: LT16-20 - CIVILE
Type: Affine/Integrativa
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: CARPENTIERI MARIO

Training objectives
At the end of the course students will be able to analyze both DC and AC circuits, either single
or three phase systems, and the critical aspects of the electrical distribution.

Prerequisites
Mathematics and Physics.

Didactic Methods

Course programme
DC regime.
Units Systems, charge and current, voltage, power and energy, circuit elements, bipoles,
generators, resistors, Ohm's law, generalized Ohm's law, nodes, branches and loops,
fundamental theorem of network topology, Kirchhoff current law (KCL) and Kirchhoff
voltage law (KVL), series of resistors and voltage divider, parallel of resistors and current
divider. Transformations star-delta and delta-star. Network theorems: Linearity, principle of
superposition. Source transformation, Thevenin's theorem, Norton's theorem. Millman's
theorem. Maximum power transfer theorem, models of real generators. Definition of
dependent generator. Dependent generators of current and voltage. Computation of the
equivalent resistance in the presence of dependent generators. Capacitors and inductors:
physical principle of operation of the capacitors. Gauss' law. Plate, spherical and cylindrical
capacitor. Series and parallel of capacitors. Passivity, capacitor energy storage. Physical
principle of inductors working. The Biot-Savart law. Magneto-motion force. Hopkinson's law.
Lenz's law. Series and parallel of inductors. Passivity, inductor energy storage.
AC regime.
Periodic variables: average value, rms value, maximum value. Definition of rotating vector
and phasor, phasors and their properties, sinusoidal regime response. Relationship between
phasors for the circuit elements. Definition of impedance, admittance, conductance and
susceptance. Kirchhoff's laws in the frequency domain. Instantaneous power and average
power, fluctuating power, instantaneous active power and reactive instantaneous power,
active and reactive power, apparent power, complex power. Power factor. Maximum active power transfer theorem, conservation of the complex
power. Theorem of Boucherot. Total
and partial power factor correction. Three-phase symmetrical and balanced.
Circuits with magnetic coupling and electrical systems.
Mutual inductance. Energy in a coupling circuit. Linear transformers. Ideal transformers.
Autotransformers ideals. Distribution of electricity. Electric cable and scope. Grounding systems. Electrical safety and earth system.

Reference Texts
Custom publishing, M. Carpentieri, "Circuiti elettrici", Create, Mc-Graw-Hill.
C. Alexander, M. Sadiku, "Circuiti Elettrici" - McGraw-Hill.
G. Rizzoni, "Elettrotecnica" - McGraw-Hill.
S. Vergura, "Eserciziari per ingegneria – Elettrotecnica" - EdiSES.

2074 - ESTIMO
ICAR/22 - Edilizia e ambiente

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	D'AMATO MAURIZIO

Training objectives

The aim of the course is providing the basic knowledge of real estate market, urban rent and market segmentation, Fundamentals of Property Valuations based on International Valuation Standards and Introduction to Fundamentals of Real Estate Counseling. In the final part of the course an introduction to quantity surveying is provided

Prerequisites

An introductory knowledge on Economics, Building Design and Management of the Building Site

Didactic Methods

Course programme

Syllabus – Lesson Topics
Topic n. 1: Introduction to Real Estate Market
Content details: Definition of Real Estate Appraisal, Definition of Economic Goods and Utility Functions, Definition of Real Estate, Real Estate Market Segmentation, Urban Rent
Topic n. 2: Fundamental of Property Valuation
Content details: Basis of Value, Highest and Best Use and Most Probable Selling Price, Introduction to International and Italian Valuation Standards
Topic n. 3: Introduction to Property Valuation Methodologies
Content details: Distinction between Value and Price, Methodologies and Basis of Value, Different Approaches to Property Valuation: Market Income and Cost Approaches, Fundamentals of Market Comparison Approach, Fundamentals of Income Approach, Introduction to Financial Math, Direct Capitalization, Methodology of Determination of Overall Capitalization Rate, Fundamentals of Cost Approach, Construction and Reconstruction Costs.
Topic n. 4 Determination of Construction Cost
Content details: Construction and Reconstruction Cost, Replacement and Reproduction Cost, Quantity Surveying in Italy
Syllabus – Workshop/Laboratory Topics
Topic n. 1: Property Valuation
Content details: Application of Valuation Methodologies to a Practical Case
Topic n. 2: Quantity Surveying
Content details: Cost estimation of a bill of material for construction work

Reference Texts

2022 - FISICA GENERALE
FIS/01 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT40 - INGEGNERIA DEI SISTEMI AEROSPAZIALI
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	GIGLIETTO NICOLA

Training objectives
The course of Physics aims to give the students the knowledge of the laws of basic physics which are the basis for many of the courses they will attend to obtain the degree.

Prerequisites
Algebra, calculus, vectorial operations.

Didactic Methods

Course programme
Kinematics, vectors, motion in 1-D and 3-D. Rotational motion.
Newton's laws of motion. Conservative forces. Angular momentum, motion in presence of dissipative forces. Springs and oscillators, simple pendulum.
Work and kinetic energy, potential energy. Energy conservation principle.
Relative motion: reference frames, non inertial frames, fictitious forces.
Dynamics laws for multiple degree of freedom system of massive points: center of mass, angular momentum theorem, forces and torques, König's theorems. Barycenter.
Rigid body dynamics, mass moment of inertia, Huygens-Steneir theorem, mass-pendulum. Rotation of rigid bodies, rotations about moving points. Collisions, elastic and anelastic collisions, collisions involving rigid bodies.
Oscillations in general: summation of harmonic oscillations, forced oscillator, resonance, oscillator with dissipative forces.
Central forces and properties, gravitational force, Kepler's Laws.
Maxwell-Boltzmann distribution, temperature and average kinetic energy for perfect gas, entropy.
Static electricity: the structure of matter, charge interactions, conductor and insulators. Coulomb's Law, Electric Field, Gauss Law. Electric potential, electric field as gradient of electric potential, electric dipole. Properties of the conductors, capacitors.
Polarization, Gauss Law for dielectric materials.
Electric field and movement of charges: electric current and density.. Classic model of conduction. Ohm's Law, joule effect, Resistors Kirkchhoff's Laws.
Magnetic field movement of charge in magnetic field, Hall's effect. Ampere law, magnetic fields generated by current-carrying wire. Magnetic torque on current-carrying loops. Magnetic force on a wire. Biot-Savart's Law and Ampere Law, force between parallel wires. Ampere's Law for solenoid and toroid. Faraday's law and applications: auto and mutual induction, Ampere-Maxwell law, Maxwell equations.

Reference Texts
P. Mazzoldi, M. Nigro, C. Voci. Elementi di Fisica, vol. 1 e 2, Ed. EdiSES, Napoli.
Tipler, Mosca – Corso di Fisica vol.1 e 2, Ed. Zanichelli.
D. Halliday, R. Resnick, J. Walker. Fondamenti di Fisica, ed. Ambrosiana, Milano.

2022 - FISICA GENERALE
FIS/01 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT40 - INGEGNERIA DEI SISTEMI AEROSPAZIALI
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	GIGLIETTO NICOLA

Training objectives

The course of Physics aims to give the students the knowledge of the laws of basic physics which are the basis for many of the courses they will attend to obtain the degree.

Prerequisites

Algebra, calculus, vectorial operations.

Didactic Methods

Course programme

Kinematics, vectors, motion in 1-D and 3-D. Rotational motion.

Newton's laws of motion. Conservative forces. Angular momentum, motion in presence of dissipative forces. Springs and oscillators, simple pendulum.

Work and kinetic energy, potential energy. Energy conservation principle.

Relative motion: reference frames, non inertial frames, fictitious forces.

Dynamics laws for multiple degree of freedom system of massive points: center of mass, angular momentum theorem, forces and torques, König's theorems. Barycenter.

Rigid body dynamics, mass moment of inertia, Huygens-Steneir theorem, mass-pendulum. Rotation of rigid bodies, rotations about moving points. Collisions, elastic and anelastic collisions, collisions involving rigid bodies.

Oscillations in general: summation of harmonic oscillations, forced oscillator, resonance, oscillator with dissipative forces.

Central forces and properties, gravitational force, Kepler's Laws.

Maxwell-Boltzmann distribution, temperature and average kinetic energy for perfect gas, entropy.

Static electricity: the structure of matter, charge interactions, conductor and insulators. Coulomb's Law, Electric Field, Gauss Law. Electric potential, electric field as gradient of electric potential, electric dipole. Properties of the conductors, capacitors.

Polarization, Gauss Law for dielectric materials.

Electric field and movement of charges: electric current and density.. Classic model of conduction. Ohm's Law, joule effect, Resistors Kirkchhoff's Laws.

Magnetic field movement of charge in magnetic field, Hall's effect. Ampere law, magnetic fields generated by current-carrying wire. Magnetic torque on current-carrying loops. Magnetic force on a wire. Biot-Savart's Law and Ampere Law, force between parallel wires. Ampere's Law for solenoid and toroid. Faraday's law and applications: auto and mutual induction, Ampere-Maxwell law, Maxwell equations.

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P. Mazzoldi, M. Nigro, C. Voci. Elementi di Fisica, vol. 1 e 2, Ed. EdiSES, Napoli.

Tipler, Mosca – Corso di Fisica vol.1 e 2, Ed. Zanichelli.

D. Halliday, R. Resnick, J. Walker. Fondamenti di Fisica, ed. Ambrosiana, Milano.

2022 - FISICA GENERALE
FIS/01 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT39 - INGEGNERIA DELL'AMBIENTE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	GIGLIETTO NICOLA

Training objectives
The course of Physics aims to give the students the knowledge of the laws of basic physics which are the basis for many of the courses they will attend to obtain the degree.

Prerequisites
Algebra, calculus, vectorial operations.

Didactic Methods

Course programme
Kinematics, vectors, motion in 1-D and 3-D. Rotational motion.
Newton' s laws of motion. Conservative forces. Angular momentum, motion in presence of dissipative forces. Springs and oscillators, simple pendulum.
Work and kinetic energy, potential energy. Energy conservation principle.
Relative motion: reference frames, non inertial frames, fictitious forces.
Dynamics laws for multiple degree of freedom system of massive points: center of mass, angular momentum theorem, forces and torques, König' s theorems. Barycenter.
Rigid body dynamics, mass moment of inertia, Huygens-Steneir theorem, mass-pendulum. Rotation of rigid bodies, rotations about moving points. Collisions, elastic and anelastic collisions, collisions involving rigid bodies.
Oscillations in general: summation of harmonic oscillations, forced oscillator, resonance, oscillator with dissipative forces.
Central forces and properties, gravitational force, Kepler' s Laws.
Maxwell-Boltzmann distribution, temperature and average kinetic energy for perfect gas, entropy.
Static electricity: the structure of matter, charge interactions, conductor and insulators. Coulomb' s Law, Electric Field, Gauss Law. Electric potential, electric field as gradient of electric potential, electric dipole. Properties of the conductors, capacitors.
Polarization, Gauss Law for dielectric materials.
Electric field and movement of charges: electric current and density.. Classic model of conduction. Ohm' s Law, joule effect, Resistors Kirkchhoff' s Laws.
Magnetic field movement of charge in magnetic field, Hall' s effect. Ampere law, magnetic fields generated by current-carrying wire. Magnetic torque on current-carrying loops. Magnetic force on a wire. Biot-Savart' s Law and Ampere Law, force between parallel wires. Ampere' s Law for solenoid and toroid. Faraday' s law and applications: auto and mutual induction, Ampere-Maxwell law, Maxwell equations.

Reference Texts

2022 - FISICA GENERALE
FIS/01 - Fisica e chimica

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LT39 - INGEGNERIA DELL'AMBIENTE (D.M. 270/04)
Study plans/Curricula: PDS0-2015 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Ciclo Annuale Unico
Exam type: Orale
Professor in charge: GIGLIETTO NICOLA

Training objectives
The course of Physics aims to give the students the knowledge of the laws of basic physics which are the basis for many of the courses they will attend to obtain the degree.

Prerequisites
Algebra, calculus, vectorial operations.

Didactic Methods

Course programme
Kinematics, vectors, motion in 1-D and 3-D. Rotational motion.
Newton's laws of motion. Conservative forces. Angular momentum, motion in presence of dissipative forces. Springs and oscillators, simple pendulum.
Work and kinetic energy, potential energy. Energy conservation principle.
Relative motion: reference frames, non inertial frames, fictitious forces.
Dynamics laws for multiple degree of freedom system of massive points: center of mass, angular momentum theorem, forces and torques, König's theorems. Barycenter.
Rigid body dynamics, mass moment of inertia, Huygens-Steneir theorem, mass-pendulum. Rotation of rigid bodies, rotations about moving points. Collisions, elastic and anelastic collisions, collisions involving rigid bodies.
Oscillations in general: summation of harmonic oscillations, forced oscillator, resonance, oscillator with dissipative forces.
Central forces and properties, gravitational force, Kepler's Laws.
Maxwell-Boltzmann distribution, temperature and average kinetic energy for perfect gas, entropy.
Static electricity: the structure of matter, charge interactions, conductor and insulators. Coulomb's Law, Electric Field, Gauss Law. Electric potential, electric field as gradient of electric potential, electric dipole. Properties of the conductors, capacitors.
Polarization, Gauss Law for dielectric materials.
Electric field and movement of charges: electric current and density.. Classic model of conduction. Ohm's Law, joule effect, Resistors Kirkchhoff's Laws.
Magnetic field movement of charge in magnetic field, Hall's effect. Ampere law, magnetic fields generated by current-carrying wire. Magnetic torque on current-carrying loops. Magnetic force on a wire. Biot-Savart's Law and Ampere Law, force between parallel wires. Ampere's Law for solenoid and toroid. Faraday's law and applications: auto and mutual induction, Ampere-Maxwell law, Maxwell equations.

Reference Texts

2022 - FISICA GENERALE
FIS/01 - Fisica e chimica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LT03 - INGEGNERIA GESTIONALE (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: CREANZA DONATO MARIA

Training objectives
AIMS:
The course of Physics aims to give the students the knowledge of the laws of basic physics that are the basis for many of the courses they will attend in order to obtain the degree.

Prerequisites
Calculus.

Didactic Methods

Course programme
Syllabus (Section 1):
1.   The measurement in Physics
2.   Kinematics of pointlike particles
3.   Dynamics of pointlike particles
4.   Relative motion
5.   Systems of pointlike particles
6.   Rigid Bodies
7.   Collisions
8.   Oscillations
9.   Central Forces
THERMODINAMICS
Syllabus (Section 2):
ELETTROSTATICS
1.   Electric Force and electric field
2.   Work and electrostatic potential
3.   Gauss law
4.   Conductors e Dielectrics
5.   Electric current
MAGNETISM
6.   Magnetic field and magnetic force
7.   Ampere' s Law and sources of the magnetic field
8.   Magnetism and matter
ELECTROMAGNETISM
9.   Maxwell equations.

Reference Texts

2022 - FISICA GENERALE
FIS/01 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LT31-22 - MECCANICA
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GIGLIETTO NICOLA

Training objectives

The course of Physics aims to give the students the knowledge of the laws of basic physics which are the basis for many of the courses they will attend to obtain the degree.

Prerequisites

Algebra, calculus, vectorial operations.

Didactic Methods

Course programme

Kinematics, vectors, motion in 1-D and 3-D. Rotational motion.

Newton's laws of motion. Conservative forces. Angular momentum, motion in presence of dissipative forces. Springs and oscillators, simple pendulum.

Work and kinetic energy, potential energy. Energy conservation principle.

Relative motion: reference frames, non inertial frames, fictitious forces.

Dynamics laws for multiple degree of freedom system of massive points: center of mass, angular momentum theorem, forces and torques, König's theorems. Barycenter.

Rigid body dynamics, mass moment of inertia, Huygens-Steneir theorem, mass-pendulum. Rotation of rigid bodies, rotations about moving points. Collisions, elastic and anelastic collisions, collisions involving rigid bodies.

Oscillations in general: summation of harmonic oscillations, forced oscillator, resonance, oscillator with dissipative forces.

Central forces and properties, gravitational force, Kepler's Laws.

Maxwell-Boltzmann distribution, temperature and average kinetic energy for perfect gas, entropy.

Static electricity: the structure of matter, charge interactions, conductor and insulators. Coulomb's Law, Electric Field, Gauss Law. Electric potential, electric field as gradient of electric potential, electric dipole. Properties of the conductors, capacitors.

Polarization, Gauss Law for dielectric materials.

Electric field and movement of charges: electric current and density.. Classic model of conduction. Ohm's Law, joule effect, Resistors Kirkchhoff's Laws.

Magnetic field movement of charge in magnetic field, Hall's effect. Ampere law, magnetic fields generated by current-carrying wire. Magnetic torque on current-carrying loops. Magnetic force on a wire. Biot-Savart's Law and Ampere Law, force between parallel wires. Ampere's Law for solenoid and toroid. Faraday's law and applications: auto and mutual induction, Ampere-Maxwell law, Maxwell equations.

Reference Texts

2022 - FISICA GENERALE
FIS/01 - Fisica e chimica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LT03 - INGEGNERIA GESTIONALE (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: CREANZA DONATO MARIA

Training objectives
AIMS:
The course of Physics aims to give the students the knowledge of the laws of basic physics that are the basis for many of the courses they will attend in order to obtain the degree.

Prerequisites
Calculus.

Didactic Methods

Course programme
Syllabus (Section 1):
1.   The measurement in Physics
2.   Kinematics of pointlike particles
3.   Dynamics of pointlike particles
4.   Relative motion
5.   Systems of pointlike particles
6.   Rigid Bodies
7.   Collisions
8.   Oscillations
9.   Central Forces
THERMODINAMICS
Syllabus (Section 2):
ELETTROSTATICS
1.   Electric Force and electric field
2.   Work and electrostatic potential
3.   Gauss law
4.   Conductors e Dielectrics
5.   Electric current
MAGNETISM
6.   Magnetic field and magnetic force
7.   Ampere' s Law and sources of the magnetic field
8.   Magnetism and matter
ELECTROMAGNETISM
9.   Maxwell equations.

Reference Texts

2156 - FISICA GENERALE A
FIS/01 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BRAMBILLA MASSIMO

Training objectives

The aim is the achievement of a) knowledge of the fundamental phenomena in Mechanics, Fluiddynamics, Thermodynamics, Electrostatics and Electric Current Phenomena and b) the capability of applying such principles to simple applicative problems.

Prerequisites

PREREQUISITES:
Basic knowledge of Analysis, Geometry and Linear/Vectorial Algebra.

Didactic Methods

Course programme

1.   Measure and fundamental quantities in Physics.
2.   Mechanics of point particles, system of particles and rigid bodies. Collisions.
3.   Fluids at rest and in motion.
4.   Thermometry, calorimetry, transformations, cycles. Ideal gases and microscopic model.
5.   The three principles of thermodynamics, thermal engines and refrigerators, efficiencies. Entropy, unusable energy.
6.   Electrostatics: forces, fields and potentials. Laws of the irrotational and solenoidal e.s. field.
7.   Electric currents, classical theory of conduction, resistivity, circuits in d.c.

Reference Texts

Mazzoldi, Nigro, Voci, Elementi di Fisica voll.1 e 2, EdiSes, VI ed. 2010.
Halliday, Resnick, Walker, FONDAMENTI di FISICA Voll. 1 e 2 (V o VI edizione) Casa Editrice Ambrosiana, Milano
Esercizi da R.Serway, J.Jewett, Principi di Fisica, voll.1 e 2, Edises 2008

2156 - FISICA GENERALE A
FIS/01 - Fisica e chimica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula: PDS0-2015 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: SPAGNOLO VINCENZO LUIGI

Training objectives
To understand the main aspects of the classical mechanics, of the thermodynamics and of the electrostatics

Prerequisites
Good knowledge of fundamental mathematics: ability to solve first degree and quadratic equations and systems of linear equations, basic knowledge of geometric properties and of trigonometric functions and methods.

Didactic Methods

Course programme
The Physics and its scientific approach, physical quantities
Scalars and vectors,
Point masses kinematics,
Point masses dynamics,
Dynamics of systems of point masses,
Dynamics of rigid bodies,
Collisions dynamics.
Thermodynamics: thermodynamics coordinates, Temperature, Zero thermodynamics law, Thermodynamics transformation, Equation of state, Perfect gas, First thermodynamics law, Thermal machines, Second thermodynamics law, Entropy.
Electrostatics: Electric charge, Coulomb's law, Electric field, Electrostatic potential, Gauss' law, I Maxwell equation, Electric dipole, Conductors, Electrical capacitance, Capacitors, Electrostatic energy, Dielectrics.
Stationary electric current: Electrical resistance, Ohm's law, Joule effect, Electromotive force, Kirchhoff's circuit laws.

Reference Texts
P.Mazzoldi - M. Nigro - C. Voci - Fisica Vol. 1 Meccanica – Termodinamica - EdiSES Edizioni
P.Mazzoldi - M. Nigro - C. Voci - Fisica Vol. 2 Elettromagnetismo - EdiSES Edizioni
D. Halliday, R. Resnick, J. Walker, " Fisica 1- Vol I e II" - Ambrosiana

2156 - FISICA GENERALE A
FIS/01 - Fisica e chimica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula: PDS0-2015 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: SPAGNOLO VINCENZO LUIGI

Training objectives
To understand the main aspects of the classical mechanics, of the thermodynamics and of the electrostatics

Prerequisites
Good knowledge of fundamental mathematics: ability to solve first degree and quadratic equations and systems of linear equations, basic knowledge of geometric properties and of trigonometric functions and methods.

Didactic Methods

Course programme
The Physics and its scientific approach, physical quantities
Scalars and vectors,
Point masses kinematics,
Point masses dynamics,
Dynamics of systems of point masses,
Dynamics of rigid bodies,
Collisions dynamics.
Thermodynamics: thermodynamics coordinates, Temperature, Zero thermodynamics law, Thermodynamics transformation, Equation of state, Perfect gas, First thermodynamics law, Thermal machines, Second thermodynamics law, Entropy.
Electrostatics: Electric charge, Coulomb's law, Electric field, Electrostatic potential, Gauss' law, I Maxwell equation, Electric dipole, Conductors, Electrical capacitance, Capacitors, Electrostatic energy, Dielectrics.
Stationary electric current: Electrical resistance, Ohm's law, Joule effect, Electromotive force, Kirchhoff's circuit laws.

Reference Texts
P.Mazzoldi - M. Nigro - C. Voci - Fisica Vol. 1 Meccanica – Termodinamica - EdiSES Edizioni
P.Mazzoldi - M. Nigro - C. Voci - Fisica Vol. 2 Elettromagnetismo - EdiSES Edizioni
D. Halliday, R. Resnick, J. Walker, " Fisica 1- Vol I e II" - Ambrosiana

2156 - FISICA GENERALE A
FIS/01 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BRAMBILLA MASSIMO

Training objectives

The aim is the achievement of a) knowledge of the fundamental phenomena in Mechanics, Fluiddynamics, Thermodynamics, Electrostatics and Electric Current Phenomena and b) the capability of applying such principles to simple applicative problems.

Prerequisites

PREREQUISITES:
Basic knowledge of Analysis, Geometry and Linear/Vectorial Algebra.

Didactic Methods

Course programme

1. Measure and fundamental quantities in Physics.
2. Mechanics of point particles, system of particles and rigid bodies. Collisions.
3. Fluids at rest and in motion.
4. Thermometry, calorimetry, transformations, cycles. Ideal gases and microscopic model.
5. The three principles of thermodynamics, thermal engines and refrigerators, efficiencies. Entropy, unusable energy.
6. Electrostatics: forces, fields and potentials. Laws of the irrotational and solenoidal e.s. field.
7. Electric currents, classical theory of conduction, resistivity, circuits in d.c.

Reference Texts

Mazzoldi, Nigro, Voci, Elementi di Fisica voll.1 e 2, EdiSes, VI ed. 2010.
Halliday, Resnick, Walker, FONDAMENTI di FISICA Voll. 1 e 2 (V o VI edizione) Casa Editrice Ambrosiana, Milano
Esercizi da R.Serway, J.Jewett, Principi di Fisica, voll.1 e 2, Edises 2008

2161 - FISICA GENERALE B
FIS/01 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune - BARI
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CHIARADIA MARIA TERESA

Training objectives
The course aims to provide basic knowledge of Electromagnetism and Optics, the acquisition of methods and principles for the courses for which is a prerequisite.

Prerequisites
General Physics A. Mathematical Analysis.

Didactic Methods

Course programme
Magnetic Interaction: the Ampére law ; the Ampère-Laplace law.
Magnetic induction: the Faraday law; Analysis of RLC circuit.
Energy of the magnetic field.
Magnetization of matter.
The Ampère-Maxwell law; the Maxwell equations.
Electromagnetic Waves; Poynting vector.
Geometrical Optics: Huygens' s and Fermat' s principle.
Optical instruments: mirrors, lenses.
Interference, Diffraction.
Polarization of visible waves.

Reference Texts

2161 - FISICA GENERALE B
FIS/01 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CHIARADIA MARIA TERESA

Training objectives

The course aims to provide basic knowledge of Electromagnetism and Optics, the acquisition of methods and principles for the courses for which is a prerequisite

Prerequisites

General Physics A. Mathematical Analysis

Didactic Methods

Course programme

Magnetic Interaction: the Ampére law ; the Ampère-Laplace law.
Magnetic induction: the Faraday law; Analysis of RLC circuit.
Energy of the magnetic field.
Magnetization of matter.
The Ampère-Maxwell law; the Maxwell equations.
Electromagnetic Waves; Poynting vector.
Geometrical Optics: Huygens' s and Fermat' s principle.
Optical instruments: mirrors, lenses.
Interference, Diffraction.
Polarization of visible waves.

Reference Texts

2793 - FISICA GENERALE B
FIS/01 - Fisica e chimica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-22_TA - INGEGNERIA ELETTRONICA PER L'INDUSTRIA E L'AMBIENTE
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BRUNO GIUSEPPE EUGENIO

Training objectives

Understanding of the main phenomena in electromagnetism and optics through the study and analysis of their fundamental laws

Prerequisites

Good knowledgwe of basical mathematics: ability to solve first and second order equation and system of equations; knowledge of the main functions and trigonometric formulas. Knowledge of the classic mechanics, electrostatics and notions about the electric

Didactic Methods

Course programme

Magnetisms: magnetic field, force acting on charge and electric circuits. Ampere's theorem.
Electrodynamics: electromagnetic induction, the Maxwell laws, electromagnetic waves.
Optics: geometrical optics, physical optics. Interference and diffraction.

Reference Texts

2004 - FISICA GENERALE I
FIS/01 - Fisica e chimica

|	
Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SPAGNOLO VINCENZO LUIGI

Training objectives

The aim of the course is to give to the student an organic knowledge of the fundamental laws of classical mechanics (elementary dynamics and rigid bodies, short account of fluids; the student should become able to solve in an autonomous way simple problems.

Prerequisites

The knowledge of the elementary mathematics and of the differential and integral calculation is recommended.

Didactic Methods

Course programme

Syllabus – Lesson Topics

Topic n. 1: Physical Units, vectors and Elementary kinematics

Topic n. 2: Elementary dynamics, inertial and accelerated reference frames

Topic n. 3: Kinematics of discrete and continue mass distribution, Kinematics of the rigid body

Topic n. 4: Gravitation and Fluids

Reference Texts

2122 - FISICA TECNICA
ING-IND/11 - Ingegneria energetica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LT31-21_TA - INDUSTRIALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MARTELLOTTA FRANCESCO

Training objectives

To supply the students, by learning the laws of Thermodynamics and of Heat Transfer, with a methodological basis in order to analyze the behaviour of a thermodynamic system.

Prerequisites

Basic concepts of Calculus, Geometry and Algebra and of General Physics.

Didactic Methods

Course programme

Thermodynamics: Thermodynamic systems (closed systems and open systems). Thermodynamic properties, thermodynamic equilibrium and thermodynamic processes. Zeroth and First laws of thermodynamics. The p-v-T surface of a pure substance. Property tables and property diagrams. The ideal-gas model and the incompressibile substances model. The Second law of thermodynamics and entropy. (T, s) diagram and (h, s) diagram. Steady-flow work equation. Isentropic efficiencies.

Power and Refrigeration cycles: Rankine cycle, Joule-Brayton cycle, Otto cycle, Diesel cycle, Vapor-compression refrigeration cycle.

Psychrometry: Humid air, absolute and relative humidity, dew point and wet bulb temperature. Psychrometric chart. Elemetary transformation of humid air. Air conditioning cycles.

Heat Transfer: Steady heat conduction (plane wall, cylindrical wall, spherical wall, multilayer walls). Forced and natural convection: dimensionless numbers, empirical correlations. Thermal radiation: black body, gray surface, atmospheric and solar radiation, radiation heat transfer between black bodies and between gray surfaces. Combined mechanisms of heat transfer. Heat exchangers.

Reference Texts

2098 - FISICA TECNICA AMBIENTALE
ING-IND/11 - Edilizia e ambiente

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	FATO IDA

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts

Y.A.Cengel, 2009, Termodinamica e trasmissione del calore. McGraw-Hill Libri Italia

Moncada Lo Giudice G., De Santoli L., 2000, Progettazione di impianti tecnici, Casa Editrice Ambrosiana

Cirillo E., Martellotta F., 2012, Requisiti acustici passivi degli edifici, EdicomEdizioni

2098 - FISICA TECNICA AMBIENTALE
ING-IND/11 - Discipline fisico-tecniche ed impiantistiche per l'architettura

Academic year: 2015
Faculty: Dipartimento di Scienze dell'Ingegneria Civile e dell'Architettura
Study courses: LM53CU - INGEGNERIA EDILE ARCHITETTURA (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Base
Total Credits: 12
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: STEFANIZZI PIETRO

Training objectives
The course is aimed at providing technical knowledge, quantitative assessment tools and reference data in terms of quality of the confined environment and energy performance, as well as consistent building technologies.
The contents include the fundamentals of thermodynamics, heat transfer, thermal comfort, building thermophysics, air-conditioning systems.
The goal is aimed at allowing students:
- acknowledgement of hygrothermal environmental phenomena, in relation to human perception and to the preservation of building materials;
- ability to make informed choices in the physical-technical project of the building;
- Ability to identify the most suitable hvac systems for the building climatization.

Prerequisites
It is expected to know the fundamentals of Physics and Mathematics.

Didactic Methods
Lectures and exercitations to the blackboard, supported by slides.

Course programme
THERMODYNAMICS AND HEAT TRANSFER (6 ECTS)
Thermodynamic system and its properties.
Elements of statics and dynamics of fluids
Conservation equation of mass. Pressure losses in ducts and Moody diagram.
Conservation equation of energy for stationary flow in open systems.
Thermodynamic cycles. Direct steam cycle (Rankine).
Steam reverse cycle. Refrigerators and heat pumps.
The humid air, psychrometric properties and diagrams.
Moist air transformations, transformations in the UTA.
Heat transfer: heat conduction, convection, radiation.
Flat and cylindrical wall in constant thermal regime.
Thermal transients. Thermal conduction in steady periodic state.
Water vapor diffusion. Thermohygrometric performance according to UNI EN ISO 13788.
Thermo-physical properties of materials, the UNI EN ISO 10456. Properties of insulating materials.
BUILDING PHYSICS (3 ETCS)
Elements of building climatology. The climate data for the design (climatic zones, degree days).
Outlines of thermohygrometric comfort and IAQ (Indoor Air Quality).
Heat and mass balances of built environment: winter / summer conditions, environmental control modes.
Thermal performance of opaque envelope: thermal parameters in steady state and dynamic conditions.
Thermal performance of transparent envelope.
Thermal bridges.
Winter heat load in the design conditions (UNI EN 12831).
Energy demand for air conditioning.
Energy certification of buildings.
AIR CONDITIONING SYSTEMS (3 ETCS)
Installations for the air conditioning of buildings.
Water-based heating systems. Elements of sizing.
Air conditioning systems. Types and elements of sizing.
Demand Controlled Ventilation.
Renewable energy systems. Thermal and photovoltaic solar energy.
Numerical exercises
There are numerical exercises concerning: the behavior of simple thermodynamic systems, psychrometry, heat transfer in building components, control of condensation in building components, application of mass and energy balance in the built environment, thermal loss calculation under Winter design conditions.
Laboratory activities
There are laboratory activities about the measurement of temperature, humidity, air velocity and thermal transmittance of walls.

Reference Texts
-Cengel, Y.A., Termodinamica e Trasmissione del Calore, IV edizione, McGraw-Hill, 2013.

-Corrado V., Fabrizio E., Fondamenti di Termofisica dell' Edificio e Climatizzazione, CLUT, Torino, 2014.
-Corrado V., Fabrizio E., Applicazioni di Termofisica dell' Edificio e Climatizzazione, CLUT, Torino, 2009.
-Ulteriori riferimenti bibliografici, legislativi e normativi verranno forniti durante il corso.

2098 - FISICA TECNICA AMBIENTALE

ING-IND/11 - Ingegneria della sicurezza e protezione civile, ambientale e del territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-21 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	FATO IDA

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts

- Y.A.Cengel, 2009, Termodinamica e trasmissione del calore. McGraw-Hill Libri Italia
- Moncada Lo Giudice G., De Santoli L., 2000, Progettazione di impianti tecnici, Casa Editrice Ambrosiana
- Cirillo E., Martellotta F., 2012, Requisiti acustici passivi degli edifici, EdicomEdizioni

2138 - FISICA TECNICA E SISTEMI ENERGETICI
ING-IND/08 - Ingegneria energetica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT03 - INGEGNERIA GESTIONALE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	AMIRANTE RICCARDO

Training objectives

To supply the students, by learning the laws of Thermodynamics and of Heat Transfer, with a methodological basis in order to analyze the behaviour of a thermodynamic system.
*****
The course aims to provide the basic theoretical knowledge and calculation methods for the management and design of industrial systems aimed at the transformation and conversion of energy to the future management engineers.

Prerequisites

Basic concepts of Calculus, Geometry and Algebra and of General Physics.

Didactic Methods

portable PC; projector; course official notes.

Course programme

1nd module

Thermodynamics: Thermodynamic systems (closed systems and open systems). Thermodynamic properties, thermodynamic equilibrium and thermodynamic processes. Zeroth and First laws of thermodynamics. The p-v-T surface of a pure substance. Property tables and property diagrams. The ideal-gas model and the incompressibile substances model. The Second law of thermodynamics and entropy. (T, s) diagram and (h, s) diagram. Steady-flow work equation. Isentropic efficiencies.

Power and Refrigeration cycles: Rankine cycle, Joule-Brayton cycle, Otto cycle, Diesel cycle, Vapor-compression refrigeration cycle.

Psychrometry: Humid air, absolute and relative humidity, dew point and wet bulb temperature. Psychrometric chart. Elemetary transformation of humid air. Air conditioning cycles.

Heat Transfer: Steady heat conduction (plane wall, cylindrical wall, spherical wall, multilayer walls). Forced and natural convection: dimensionless numbers, empirical correlations. Thermal radiation: black body, gray surface, atmospheric and solar radiation, radiation heat transfer between black bodies and between gray surfaces. Combined mechanisms of heat transfer. Heat exchangers.

2nd module (Energy Systems)

1.   General characteristics of fluid machinery (0.8 ECTS: 4L-4E): Classification of turbomachinery. Turbomachinery efficiency. Real transformations and irreversible processes. Polytropic and isoentropic efficiencies. Velocity triangles in turbomachinery. Eulerian work in turbomachinery. Power plant energy conversion efficiensies. Textbook 3 pp. 1-52.

2.   Centrifugal pumps (1.1 ECTS: 6L-4E-1Lab): Components. Work, power and efficiencies. Centrifugal force field consequences. Rotor and diffuser. Work losses. Characteristic curves and performance map. Operating point. Cavitation. Parallel and series pump configurations. Textbook 3 pp. 53-88

3.   Hydraulic transmissions (0.5 CFU: 3L-2E-1Lab):
Overview constitutive machines, basic circuits, energy conversion, energy management. Textbook, p. 183-199.

4.   Internal Combustion Engine (1.4 ECTS: 8L-4E-1Lab): Classification, Architecture and operating principles. Work, power, mean effective pressure (mep). Specific consumption and efficiency. Ideal cycles: Otto, Diesel, Sabathe. Indicating cycle. Volumetric efficiency. General expression of the mean effective pressure. Load control mechanisms. Characteristic curves, mep dependency on inlet characteristics.(Didactic notes)

5.   Steam power plants (1 ECTS: 6L-4E): Thermodynamic cycles and layouts. The Rankine cycle. Methods to increase the efficiency of the Rankine cycle. Regenerative cycles. Condensers. Boilers. (Didactic notes)

6.   Gas-turbine power plants (1 ECTS: 6L-4E): Layouts and working principles. Classification: aeroengines and industrial gas turbines. Gas turbine evolution and applications. Simple and regenerative ideal cycles: efficiency and power. Thermically perfect gas. Simple and regenerative cycle: efficiency and power. (Didactic notes)

7.   Combined gas-steam power plants and cogeneration (0.7 ECTS: 4L-2E): Classification. Layouts. Efficiency and power. Unfired cycle and Exhaust fired cycle. Pinch-point. Principles of heat and power cogeneration. Applications: efficiency, shaft and thermal power. (Didactic notes)

Reference Texts

I Modulo
Y.A. Çengel: "Termodinamica e trasmissione del calore", Mc Graw Hill, Milano, 4a edizione 2013.
A. Cavallini, L. Mattarolo: "Termodinamica Applicata", Cleup, Padova.
Dispense Online
II Modulo
Catalano L. A., Napolitano M., "Elementi di macchine operatrici a fluido", Pitagora Editrice, Bologna, 1998.
Dispense didattiche disponibili in formato elettronico (.pdf) sul sito http://climeg.poliba.it
per ulteriori approfondimenti

2159 - FONDAMENTI DI AUTOMATICA
ING-INF/04 - Ingegneria dell'automazione

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	FANTI MARIA PIA

Training objectives

The course provides the essential tools to analyze and design feedback control system.

Prerequisites

Mathematical Analysis, Differential Calculus, Physics

Didactic Methods

Course programme

Module 1

Open loop and closed loop control systems. Essential components of a control loop. Mathematical models for mechanical, electrical, electromechanical and thermal dynamical systems. Classification criteria for dynamical models. Linearization. Laplace Transform. Transfer functions. Block diagrams. Poles, zeros and system response. First and second order dynamical systems. Effect of feedback on system dynamics. Steady state errors, disturbance rejection and sensitivity. Stability analysis. Routh criterion. Root locus

Module 2

Analysis of dynamical systems in the frequency domain. Frequency response. Bode plots. Bode Formula (10 hours). Nyquist plots and Nyquist stability criterion. Nyquist criterion and stability margins (10 hours). Controller design: objectives and design criteria.   Methods in frequency domain (PID, lead, lag and lead-lag compensators). PID tuning methods. Root locus design. PID design. (16 hours). Closed-loop control with time-delays. Smith predictor (6 hours). Case studies: motor control. Internet congestion control (4 hours). Laboratory experiments using matlab-simulimk (12 hours).

Reference Texts

METODI DI INSEGNAMENTO:

Lezioni ed esercitazioni alla lavagna. Esercitazioni di laboratorio con l' utilizzo di software di simulazione

CONOSCENZE E ABILITÀ ATTESE:

Al termine del corso gli allievi saranno in grado di progettare sistemi di controllo in retroazione.

SUPPORTI ALLA DIDATTICA:

PC, software di simulazione Matlab e Simulink, 1 videoproiettore, supporto web alla didattica

CONTROLLO DELL' APPRENDIMENTO E MODALITÀ D' ESAME:

Esoneri scritti relativi a teoria ed applicazioni; esame scritto relativo a teoria ed applicazioni per coloro che non superano gli esoneri; esame orale a richiesta dello studente o a discrezione del docente.

TESTI DI RIFERIMENTO PRINCIPALI:

-Gene F. Franklin, J. David Powell, Abbas Emami-Naeini, Feedback Control of Dynamic Systems, Addison-Wesley

- Dispense del docente

ULTERIORI TESTI SUGGERITI:

- Bolzern, Scattolini, Schiavoni, Fondamenti di Controlli Automatici, Mc Graw Hill

-L. Chisci, Fondamenti di Automatica, Città Studi

2478 - FONDAMENTI DI DISPOSITIVI ELETTRONICI
ING-INF/01 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune - BARI
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	PERRI ANNA GINA

Training objectives

The aims of this course is to instill into students the study, the characterization and the design of the basic electronic devices.

Prerequisites

Mathematics and Physics.

Didactic Methods

Course programme

Introduction to Quantum Mechanics; Electron Energy and States in Semiconductors; Conduction ad Valence Band Structure; Intrinsic and Extrinsic Semiconductors; Fermi-Dirac Statistics; Drift current; Diffusion current; Continuity Equation; Nonhomogeneous Semiconductors; Elements of Si Technology; Prototype pn Homojunctions; PSPICE Model for Diodes; BJT as Amplifier; PSPICE Model for BJT.

Reference Texts

TESTI DI RIFERIMENTO PRINCIPALI:

1) A. G. Perri: "Fondamenti di Dispositivi Elettronici"; Ed. Progedit, 2010, ISBN 978-88-6194-080-2.

2) A. G. Perri: "Dispositivi Elettronici Avanzati"; Ed. Progedit, 2011, ISBN 978-88-6194-081-9.

3) A. G. Perri: "Problemi di Analisi e Progetto dei Dispositivi a Semiconduttore", Ed. Progedit, 2008, ISBN 978-88-6194-029-1.

4) A. G. Perri: "Fondamenti di Elettronica", Ed. Progedit, 2009, ISBN 978-88-6194-029-2.

5) A. G. Perri: Dispositivi Elettronici, Manuale di progettazione con simulazioni PSPICE

Edizioni PROGEDIT, Bari, 2012, ISBN 978-88-6194-117-5.

TESTI DI CONSULTAZIONE:

1) B. l. Anderson, R. Anderson: Fundamentals of Semiconductor Devices, Mc Graw Hill, 2005.

2) K.F. Brennan, A.S. Brown: Theory of Modern Electronic Semiconductor Devices, John Wiley & Sons, 2002.

3) Kwok K. Ng: Complete Guide of Semiconductor Devices. John Wiley & Sons, Inc., USA, 2002.

4) C.Y. Chang, S.M. Sze: ULSI Devices. John Wiley & Sons, Inc., USA, 2000.

2164 - FONDAMENTI DI ELETTRONICA
ING-INF/01 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-21 - INGEGNERIA DELLE TELECOMUNICAZIONI
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	CORSI FRANCESCO

Training objectives

To teach concepts and methods for the analysis of the basic building blocks of analogue electronic circuits: elementary and multistage amplifiers, feedback circuits, oscillators.

Prerequisites

Good understanding of elementary linear electric circuits.

Didactic Methods

Course programme

1. MULTISTAGE AMPLIFIERS.
   Darlington and cascode amplifiers; the common collector-common base amplifier; differential amplifiers: voltage IN/OUT characteristic, dynamic analysis, common mode rejection ratio (CMRR), active loads.
2. FEEDBACK AMPLIFIERS.
   Feedback concept; two-port analysis: shunt-shunt, shunt-series, series-shunt and shunt-shunt configurations.
3. OPERATIONAL AMPLIFIERS (OP-AMPs).
   Ideal and non ideal characteristics; internal structure of the µA741 op-amp; OP-AMP performance: offset, gain, gain-bandwidth product, CMRR; linear and non linear applications of operational amplifiers.
4. STABILITY AND COMPENSATION OF FEEDBACK AMPLIFIERS.
   Frequency analysis of feedback amplifiers; stability of electrical networks; root locus analysis; Bode and Nyquist diagrams of the transfer Functions; compensation techniques; slew rate and settling time of an OP-AMP.
5. LINEAR AND NON LINEAR OSCILLATORS.

Reference Texts

A.S. Sedra, K. C. Smith: Microelectronics Circuits Fifth Ed. Oxford Press 2004; Course Notes.
P.R. Gray, R.G. Meyer: Analysis and Design of Analog Integrated Circuits. Fourth Ed. John Wiley 2003.

2164 - FONDAMENTI DI ELETTRONICA
ING-INF/01 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-20 - INGEGNERIA ELETTRONICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	CORSI FRANCESCO

Training objectives

To teach concepts and methods for the analysis of the basic building blocks of analogue electronic circuits: elementary and multistage amplifiers, feedback circuits, oscillators.

Prerequisites

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1. MULTISTAGE AMPLIFIERS.
    Darlington and cascode amplifiers; the common collector-common base amplifier; differential amplifiers: voltage IN/OUT characteristic, dynamic analysis, common mode rejection ratio (CMRR), active loads.
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    Ideal and non ideal characteristics; internal structure of the µA741 op-amp; OP-AMP performance: offset, gain, gain-bandwidth product, CMRR; linear and non linear applications of operational amplifiers.
4. STABILITY AND COMPENSATION OF FEEDBACK AMPLIFIERS.
    Frequency analysis of feedback amplifiers; stability of electrical networks; root locus analysis; Bode and Nyquist diagrams of the transfer Functions; compensation techniques; slew rate and settling time of an OP-AMP.
5. LINEAR AND NON LINEAR OSCILLATORS.

Reference Texts

A.S. Sedra, K. C. Smith: Microelectronics Circuits Fifth Ed. Oxford Press 2004; Course Notes.
P.R. Gray, R.G. Meyer: Analysis and Design of Analog Integrated Circuits. Fourth Ed. John Wiley 2003.

2164 - FONDAMENTI DI ELETTRONICA
ING-INF/01 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-22_TA - INGEGNERIA ELETTRONICA PER L'INDUSTRIA E L'AMBIENTE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	PASSARO VITTORIO

Training objectives

Fundamentals of electron device physics and design and characterization of Elementary Electronic Circuits.

Prerequisites

Fundamentals of Circuit Theory.

Didactic Methods

Use of blackboard and slides.

Course programme

1.   Fundamentals of Semiconductor Physics. Elements of Technology (2 hours).
2.   pn Junction: Theory (4 hours).
3.   Physics of Junction Diode: Theory and Applications (4 hours). Numerical applications (2 hours)
4.   Physics of Bipolar Junction Transistor (BJT): Principle of behaviour (4 hours).
5.   BJT's DC and Small Signal Model (2 hours)
6.   BJT's Bias Circuits: Theory (2 hours). Numerical applications (2 hours)
7.   Elementary Electronic Amplifier based on BJT: Theory (6 hours). Numerical applications (2 hours)
8.   Physics of Field Effect Transistor (MOSFET): Principle of behaviour (6 hours)
9.   MOSFET's DC and Small Signal Model (2 hours)
10.   MOSFET's Bias Circuits: Theory (2 hours). Numerical applications (2 hours)
11.   Elementary Electronic Amplifier based on MOSFET (4 hours). Numerical applications (2 hours).

Reference Texts

J. Millman, A. Grabel, "Microelettronica", McGraw-Hill, 1987.

P.E. Gray, R.G. Mayer,"Circuiti Integrati Analogici. Analisi e Progetto", McGraw-Hill Companies, 1987

2480 - FONDAMENTI DI ELETTRONICA DEI SISTEMI DIGITALI
ING-INF/01 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-20 - INGEGNERIA ELETTRONICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GIORGIO AGOSTINO

Training objectives

To instill into students the fundamentals of digital electronics and the design capabilities of complex combinatorial digital systems and elementary digital sequential systems. The application areas covered are those of the control logic, telecommunications, and mathematical calculation. There are studied programmable devices PROM, PLA, PAL, and the fundamentals of synchronous and asynchronous sequential machines with particular reference to the flip flop and the latch devices.

Prerequisites

Fundamentals of informatics (recommended only)

Didactic Methods

Course programme

1. Elements of Boolean Algebra and logic gates
2. Switching functions and minimization methods
3. Design method of combinatorial systems for control, telecommunications, processing and calculation
4. Semiconductor memories and integrated digital combinatorial systems and programmable combinatorial devices
5. Elements of sequential digital systems
6. Flip flop, latch, registers, counters

Reference Texts

A. Giorgio: Fondamenti di Elettronica dei Sistemi Digitali III ed. - ISBN: in attesa di moderazione.

A. Giorgio: Circuiti Logici Combinatori, ISBN: 978-88-9102-793-1

2166 - FONDAMENTI DI OPTOELETTRONICA
ING-INF/01 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-20 - INGEGNERIA ELETTRONICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	PASSARO VITTORIO

Training objectives

The aim of this course is an introduction of basic physical concepts for operation and design of main optoelectronic devices. Some seminars are also presented.

Prerequisites

Basic knowledge of electromagnetic fields. Basic principles of electron devices.

Didactic Methods

Use of blackboard.

Course programme

1.   The electromagnetic spectrum. Wave and particle nature of radiation. Schroedinger equation. Electromagnetic waves. Homogeneous and dispersive media. Snell law. Total internal reflection (TIR) condition. Antireflective layers and dielectric mirrors. Fabry-Perot cavity. Michelson interferometer. Single slit diffraction. Interference. Diffraction gratings. [10 hours]

2.   Radiation-matter interaction. Spontaneous and stimulated emission. Light absorption and amplification. Systems with 2, 3 and 4 energy levels. Rate equations. Conditions of laser oscillation and threshold. Transverse and longitudinal modes. Gas and solid state lasers. Pulsed lasers. [12 hours]

3.   Light emitting diode (LED) and its operation. Characteristics and properties. Materials for LED. Homojunction laser diodes. Threshold condition. Comparison between LED and lasers. [6 hours]

4.   Detectors and their parameters. Fhotoemissive and photoconductive devices. Photomultipliers. Photodetectors. Properties and materials. PN, PIN and avalanche photodiodes. Response times. Phototransistor. Photovoltaic cells. Equivalent circuit. Efficiency. [8 hours]

5.   Modulation of radiation. Electrooptic, acustooptic, thermooptic and plasma dispersion effects. Planar and 2D dielectric waveguides. Interferometers, couplers and ring resonators [4 hours]

6.   Finite and periodical potential well. QW and MQW structures. MQW laser. [4 hours]

7.   Numerical examples and exercises. [4 hours]

Reference Texts

J. Wilson, J. Hawkes, "Optoelectronics: an introduction", III ed., Prentice Hall, 1998.

A. Cutolo, "Optoelettronica e fotonica", Aracne Ed., 2014.

2158 - FONDAMENTI DI TEORIA DEI CIRCUITI
ING-IND/31 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune - BARI
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CARPENTIERI MARIO

Training objectives
At the end of the course students will be able to analyse both DC and AC circuits, either single or three phase systems. Students will be able to analyse also the transitory regime and the critical aspects of the electrical distribution.

Prerequisites
Mathematical Analysis. Geometry and algebra. General Physics A.

Didactic Methods

Course programme
1. Introduction.
2. Fundamental laws.
3. Fundamental principles.
4. Network theorems.
5. Capacitors and inductors.
6. First order circuits.
7. Alternate regime.
8. Analysis of AC regime and power.
9. Series and parallel resonance.
10. Balanced three-phase circuits.
11. Circuits with magnetic coupling.
12. Two-port networks.
Numerical exercises.

Reference Texts
TESTI DI RIFERIMENTO PRINCIPALI:
C. Alexander, M. Sadiku, "Circuiti Elettrici" - McGraw-Hill.
R. Perfetti, " Circuiti elettrici" − Zanichelli.
Appunti presi a lezione.
ULTERIORI TESTI SUGGERITI:
G. Rizzoni, "Elettrotecnica" - McGraw-Hill.
S. Vergura, "Eserciziari per ingegneria - Elettrotecnica" - EdiSES.

2757 - FORMAL LANGUAGES AND COMPILERS
ING-INF/05 - Ingegneria informatica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LM17 - INGEGNERIA INFORMATICA (D.M. 270/04)
Study plans/Curricula: LM17-22 - INFORMATION SYSTEMS
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: SCIOSCIA FLORIANO

Training objectives

Teaching the main concepts of formal language grammars and practical techniques for analysis, translation and verification of modern programming languages, both general-purpose and application-specific.

Prerequisites

Programming languages; software engineering.

Didactic Methods

Course programme

Programming languages and abstract machines; translators, compilers and interpreters; alphabet, strings, vocabulary, grammars and classification, regular and context-free grammars, Backus-Naur Form (BNF), automata. Compilers: lexical analysis, scanner implementation, syntax analysis, error management, parser implementation; semantic analysis, syntax-directed translation, attribute definitions; intermediate representation, code generation, code optimization. Elements of formal methods for system verification; model checking.

Reference Texts

2300 - G.I.S. E TELERILEVAMENTO
ICAR/06 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-20 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	TARANTINO EUFEMIA

Training objectives

The course is oriented towards giving the students in the first term a rigorous understanding of key theoretical issues and methodologies in GIS and Remote Sensing as well as the practical skills to implement them.

Prerequisites

No

Didactic Methods

Course programme

Syllabus – Lesson Topics

Topic n. 1: Remote Sensing

Content details: Basic Principles of Remote Sensing. Platforms and Sensors. Data Preprocessing: Radiometric, atmospheric and geometric corrections. Qualitative and quantitative Digital Image Processing: Digital filters; Band algebra; Classifications; Confusion matrix. RADAR and LIDAR sensors. Proximal sensing: Spectro-Radiometers 3D Laser scanners.

Topic n. 2: GIS

Content details: Reference Systems: Datum and Projections. Italian Technical and Cadastral Cartography. Traditional and Numeric Cartography. Fundamentals of GIS. Spatial Data Modeling. Graphic Representation of Spatial Data. Raster GIS Models. Vector GIS Models. GIS Architecture and Project. Data Input and Editing. GIS Data Management: Data Analysis and Modeling. 3D Modeling Surfaces. GIS Output. Data Quality Issues.

Syllabus – Workshop/Laboratory Topics

Topic n. 1: Remote Sensing

Content details: Satellite data preprocessing: geometric, radiometric and atmospheric corrections. Image enhancements: point and local operators, density slicing, etc. Quantitative analysis of satellite data: bands algebra, classifications, results accuracy.

Topic n. 2:

Content details: Georeferencing IGMI Cartography. Visualization and introduction to data processing in GIS. Thematic Representations. Graphics and Layout. Spatial and attribute queries. Tables management. Geoprocessing. Topologic analysis. Thematic cartography generation using ISTAT, land use, numeric cartography data. Raw data processing for 3D modeling. Data quality and accuracy.

Reference Texts

2014 - GEOLOGIA APPLICATA
GEO/05 - Ingegneria ambientale e del territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-20 - CIVILE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	FIDELIBUS MARIA DOLORES

Training objectives

To equip the student with basic knowledge of physical and mechanical characteristics of rocks, and elements of general geology relevant for correctly locating the engineering projects in the natural and human environment.

Prerequisites

Basic understanding of physics and chemistry

Didactic Methods

Course programme

1):Earth's interior. Plate tectonics. Palaeo-magnetism. Trenches, ridges and fracture zones. Seafloor spreading. Earthquakes and volcanoes distribution. Rocks and minerals. Polymorphism. Crystal systems. Physical properties of minerals. Structure of minerals. Rock cycle. Igneous rocks. Classification and nomenclature. Clays: chemical-physical properties. Atmospheric diagenesis. Weathering of rocks. Sedimentary rocks. Metamorphic rocks. Regional and contact metamorphism. Diagenesis of carbonate rocks: karstic processes. Geological time. Relative and absolute age. Principles of stratigraphy. Fossils. Geological time-table.

2):Folds. Anticlines, synclines, domes. Faults. Nomenclature of faults. Direct, inverse and transform faults. Orogenesis. Mass wasting. Classification and nomenclature of slope movements. Subsidence. Slope stability: influencing and triggering factors. Geological-structural survey.

3): Discontinuities and systems of discontinuities. Equiareal projections. Discontinuity description and surveys along transects. Rock mass classification

4): Darcy law. Intrinsic permeability and hydraulic conductivity. Permeability measure in laboratory and in the field. Aquifer formations. Aquifers, aquitards and aquicludes. Phreatic and confined aquifers; porous and fissured aquifers. Heterogeneity and anisotropy. Piezometers. Piezometric surfaces. Flow nets.

5): Applied petrography. Geophysical methods: electrical soundings, seismic soundings, acoustic logs. ground penetrating radar. Electromagnetic methods. Magnetometry. Gravimetry. Gamma logs. Nuclear probes. Well-logs: temperature and salinity logs.

6): Planning of geological surveys for the study of landslides and for the project of roads, dams and underground works. Monitoring methods. Case studies.

Workshop/Laboratory Topics: Geological maps and recognition of rocks

Reference Texts

2425 - GEOLOGIA APPLICATA ALLA DIFESA AMBIENTALE
GEO/05 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula: LT16-21 - AMBIENTALE
Type: Affine/Integrativa
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: GIASI CONCETTA IMMACOLATA

Training objectives
The aim of the course is to furnish both the principles useful to analyse and solve engineering geological problems in the frame of preservation and management of territory and groundwater resources

Prerequisites
Nobody

Didactic Methods

Course programme
Syllabus – Lesson Topics
Topic n. 1: Elements of geology
Lesson hours: 5
Content details:
Geology fundamentals
Main endogenous phenomena
Minerals
Rocks
Topic n. 2: Investigation technique
Lesson hours: 10
Content details:
Sample strategies
Drilling techniques
Geological survey
Geophysical investigations
Topic n. 3: Geological risk
Lesson hours: 20
Content details:
Desertification
Erosion
Subsidence
Landslides
Topic n. 4: elemetns of applied Hydrogeology
Lesson hours: 15
Content details:
Hydrogeology
Hydrogeology of Apulian
Topic n. 5: elemetns of applied geology
Lesson hours: 10
Content details:
Soils and aquifers pollution
Environmental behaviour of polluttants
Overview on the risk analysis

Reference Texts

2011 - GEOMATICA
ICAR/06 - Ingegneria ambientale e del territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-20 - CIVILE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CAPRIOLI MAURO

Training objectives
The goal of the course is to give students the fundamental elements for the knowledge and the use of survey methods and the territory representation, as base for the design, the survey and the control of Civil Engineering works, using conventional and satellite measures

Prerequisites
Mathematics , Physics , Geometry

Didactic Methods

Course programme
The goal of the course is to give students the fundamental elements for the knowledge and the use of survey methods and the territory representation, as base for the design, the survey and the control of Civil Engineering works, using conventional and satellite measures

Reference Texts
-M. CAPRIOLI: "GEOMATICA"-EDIZIONI GIUSEPPE LATERZA, BARI.
 -BEZOARI -MONTI -SELVINI : "RILEVAMENTO SPECIALE"-HOEPLI, MILANO
 -DISPENSE DEL CORSO DISPONIBILI NEL SITO DEL POLITECNICO

2038 - GEOMETRIA
MAT/03 - Formazione scientifica di base

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: VITERBO GIOVANNI

Training objectives
PROVIDE STUDENTS WHITH THE ESSENTIAL ELEMENTS OF LINEAR ALGEBRA AND ANALYTIC GEOMETRY OF THE PLANE AND SPACE.

Prerequisites
ELEMENTARY ALGEBRA (EQUATIONS, INEQUALITIES ALGEBRAIC AND TRASCENDENT) - EUCLIDEAN GEOMETRY.

Didactic Methods

Course programme
ELEMENTS OF FUNCTIONAL THEORY - MATRIX, DETERMINANS, LINEAR SYSTEM - VECTORIALS SPACES - LINEAR FUNCTIONS - ANALYTICAL GEOMETRY IN PLANE AND SPACE.

Reference Texts
DISPENSE DELLE LEZIONI - DOCENTE
TESTO: "LEZIONI DI GEOMETRIA E ALGEBRA LINEARE", AUTORE: VACCARO-CARFAGNA-PICCOLELLA, ED. ZANICHELLI

2593 - GEOMETRIA DESCRITTIVA
ICAR/17 - Formazione di base nella storia e nella rappresentazione

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SPINELLI DOMENICO

Training objectives

The course aims to stimulate critical awareness and provide scientific knowledge of the methods and techniques that allow you to switch from the three-dimensional complexity of the space, to the construction of a model, either graphic, material or digital.

Prerequisites

Basic knowledge of elementary geometry;
Control of the main techniques of manual drawing

Didactic Methods

Course programme
Syllabus – Lesson Topics
Topic n. 1: Elements of projective
Lesson hours: 02
Content details: fundamental geometric operations; improper lements.
Topic n. 2: cylindrical projections: orthogonal projection
Lesson hours: 16
Content details: representation of the point, the line and of the plan; general conditions of belonging, of parallelism and of perpendicularity, problems of distance-corners, true greatness; representation of a circle; representation of polyhedrons, and section intersection of polyhedrons; notes on the representation of the conical surfaces
Topic n. 3: cylindrical projections: axonometric projections
Lesson hours: 06
Content details: oblique axonometric, fundamental triangle, theorem of Pohlke; orthogonal axonometric, isometric cavalier associated with orthogonal projections.
Topic n. 4: conical projections: Perspective
Lesson hours: 04
Content details: perspective, key variables, elements of reference, central and accidental perspective.
Syllabus – Workshop Topics
Topic n. 1: orthogonal projection
Workshop hours: 10
Content details: application method for two-dimensional representation

Reference Texts

2003 - GEOMETRIA E ALGEBRA
MAT/03 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	VITERBO GIOVANNI

Training objectives
PROVIDE STUDENTS WHITH THE ESSENTIAL ELEMENTS OF LINEAR ALGEBRA AND ANALYTIC GEOMETRY OF THE PLANE AND SPACE.

Prerequisites
ELEMENTARY ALGEBRA (EQUATIONS, INEQUALITIES ALGEBRAIC AND TRASCENDENT) - EUCLIDEAN GEOMETRY

Didactic Methods

Course programme
ELEMENTS OF FUNCTIONAL THEORY - MATRIX, DETERMINANS, LINEAR SYSTEM - VECTORIALS SPACES - LINEAR FUNCTIONS - ANALYTICAL GEOMETRY IN PLANE AND SPACE.

Reference Texts
DISPENSE DELLE LEZIONI - DOCENTE
TESTO: "LEZIONI DI GEOMETRIA E ALGEBRA LINEARE", AUTORE: VACCARO-CARFAGNA-PICCOLELLA, ED. ZANICHELLI

2003 - GEOMETRIA E ALGEBRA
MAT/03 - matematica, informatica e statistica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula: PDS0-2015 - comune
Type: Base
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: ABATANGELO VITO

Training objectives
The aim of this course is to provide the basic elements of Geometry and Algebra either to use the powerful vector and matrix calculus (also over finite fields) and to allow the student a proper geometric interpretation for possible applications.

Prerequisites
The required prerequisites are the same as for admission tests at the Politecnico di Bari

Didactic Methods

Course programme
Groups, Residue classes, Fields. [4 hours]
Matrices, Determinants, Rank. [5 hours]
Linear equations, Systems of linear equations. [5 hours]
Geometric vectors, Operations with vectors. [5 hours]
Vector spaces over a field [5 hours]
Linear applications. [4 hours]
Eigenvalues, Eigenvectors, Diagonalization. [6 hours]
Plane analytic geometry. [2 hours]
Space analytic geometry. [12 hours]

Reference Texts
V. Abatangelo, B. Larato e A. Terrusi, Complementi ed esercizi di algebra, Laterza, Bari
(ISBN 978-88-420-9241-4)
A. Sanini, Elementi di Geometria, con esercizi – Editrice Levrotto & Bella, Torino (ISBN 8882180107)
S. Lipschutz, Algebra lineare, Collana Schaum, Mc Graw-Hill, (ISBN 8838650764)
F. Ayres, Algebra moderna, Collana Schaum, Mc Graw-Hill, (ISBN 8885255078)
F. Ayres, Matrici, Collana Schaum, Mc Graw-Hill, (ISBN 88-386-5022-5)
A. Cavicchioli and F. Spaggiari, Primo modulo di Geometria, Pitagora Ed. Bologna (ISBN 8837113560)

2003 - GEOMETRIA E ALGEBRA
MAT/03 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	LARATO BAMBINA

Training objectives

The aim of this course is to provide the basic elements of Geometry and Algebra either to use the powerful vector and matrix calculus (also over finite fields) and to allow the student a proper geometric interpretation for possible applications.

Prerequisites

The required prerequisites are the same as for admission tests at the Politecnico di Bari

Didactic Methods

Course programme

Groups, Residue classes, Fields. [4 hours]
Matrices, Determinants, Rank. [5 hours]
Linear equations, Systems of linear equations. [5 hours]
Geometric vectors, Operations with vectors. [5 hours]
Vector spaces over a field [5 hours]
Linear applications. [4 hours]
Eigenvalues, Eigenvectors, Diagonalization. [6 hours]
Plane analytic geometry. [2 hours]
Space analytic geometry. [12 hours]

Reference Texts

2017 - GEOTECNICA
ICAR/07 - Ingegneria della sicurezza e protezione civile, ambientale e del territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-20 - CIVILE
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	COTECCHIA FEDERICA

Training objectives

Knowledge of the processes active in the soils and in the soil-structure interaction for a safe design .

Prerequisites

Knowledge of Physics, Mathematics, Continuum Mechanics, Hydraulics .

Didactic Methods

70 per cent of the course is delivered as lectures, 20 per cent as in class excercises and 10 per cent as alboratories

Course programme

Elements of Geology of the rocks and soils; processes of formation of the land; the clay minerals.

Physical properties of soils; Soil classification tests: grain size distribution, Atterberg limits. Porosity, water content and related parameters. Total stress and effective stress invariants, pore pressures, capillarity. In situ stress states. Stress and strain paths. Normally consolidated and over-consolidated soils. Seepage analysis.Drained

and undrained conditions. Consolidation analysis. Mechanical soil tests|: Oedometer, Triaxial and Direct Shear tests. Mechanical behaviour of soils: reversible and irreversible behaviour; critical state; peak strength of dilative soils (dilatancy theory); Roscoe and Hvorslev state boundary surfaces;strength envelopes and parameters: peak strength, critical state and residual.

In situ investigations and tests: soil strata investigation; piezometric survey; SPT, CPT, plate loading test.

Rankine active and passive failure; earth pressure calculation according to the Coulomb method and the

Rankine method; influence of the soil-wall friction; water pressure. Basic design of retaining structures: walls;sheet-piles(anchored and non-anchored).Stability of excavations.Bearing capacity calculation for shallow foundations and for pile foundations.

Theory of Boussinesq and calculation of settlements. Basic slope stability analyses.

Reference Texts

Materiale didattico consigliato(Reference books):

Lancellotta R. " Geotecnica" II edizione, Zanichelli

Colombo P. - Colleselli F.,Elementi di Geotecnica, Zanichelli

Burghignoli A. - "Lezioni di Meccanica delle Terre" ESA

Atkinson J.H. & Bransby P.L. - " The Mechanics of Soils; An introduction to Critical State Soil Mechanics" McGraw Hil.I contenuti didattici sono presenti in maniera alternativa in tutti e tre i testi consigliati. Si fa presente che si può scaricare il programma esteso del corso dal profilo docente dal sito del dipartimento DICATECh.

Tale programma oltre ai contenuti da studiare fornisce anche specifici indirizzi in alternativa ai tre testi consigliati.Integrazioni esplicative ai testi sono disponibili presso l'Ing. N. Melidoro (sezione di geotecnia del DICATHECh) o presso la Sig.ra A. Corposanto (segreteria didattica del DICATHECh)

Diario degli Esami anno 2015/2016 (Examinations timetable year 2015/16):

21 Gennaio, 23 Febbraio, 11 Aprile, 15 Giugno, 6 Luglio, 20 settembre,4 novembre, 5 Dicembre.

Commissione di esame anno 2015/16 (Board of examiners year 2015/16)

Presidente: Federica Cotecchia

Componente: Francesco Cafaro

Supplente: Claudia Vitone, Supplente: Osvaldo Bottiglieri.

Ricevimento studenti (Students receiving)

giornate (days): L'orario di ricevimento è tutti i giorni, tranne il mercoledi e il giovedi, dalle 12.30 alle 13.30 e dalle 15.00 alle 16.00.

Nel caso il docente risulti impegnato per altri motivi istituzionali, l'orario permette allo studente di essere ricevuto nei giorni immediatamente successivi.

dalle ore (start time): dalle 12.30 o dalle 15.00 alle ore (end time): alle 13.30 e alle 16.00

2017 - GEOTECNICA
ICAR/07 - Ingegneria della sicurezza e protezione delle costruzioni edili

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BOTTIGLIERI OSVALDO

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts
1. Burghignoli A. – Lezioni di meccanica delle terre
2. Lancellotta R.: Geotecnica - II Edizione, Zanichelli Edizioni
3. Colombo P. & Colleselli F.: Elementi di Geotecnica - III Edizione, Zanichelli Edizioni
4. Craig R.F.: Soil Mechanics, Chapman & Hall Eds

2017 - GEOTECNICA
ICAR/07 - Ingegneria della sicurezza e protezione civile, ambientale e del territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-21 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	COTECCHIA FEDERICA

Training objectives
Knowledge of the processes active in the soils and in the soil-structure interaction for a safe design .

Prerequisites
Knowledge of Physics, Mathematics, Continuum Mechanics, Hydraulics .

Didactic Methods
70 per cent of the course is delivered as lectures, 20 per cent as in class excercises and 10 per cent as alboratories

Course programme
Elements of Geology of the rocks and soils; processes of formation of the land; the clay minerals.
Physical properties of soils; Soil classification tests: grain size distribution, Atterberg limits. Porosity, water content and related parameters. Total stress and effective stress invariants, pore pressures, capillarity. In situ stress states. Stress and strain paths. Normally consolidated and over-consolidated soils. Seepage analysis.Drained
and undrained conditions. Consolidation analysis. Mechanical soil tests|: Oedometer, Triaxial and Direct Shear tests. Mechanical behaviour of soils: reversible and irreversible behaviour; critical state; peak strength of dilative soils (dilatancy theory); Roscoe and Hvorslev state boundary surfaces;strength envelopes and parameters: peak strength, critical state and residual.
In situ investigations and tests: soil strata investigation; piezometric survey; SPT, CPT, plate loading test.
Rankine active and passive failure; earth pressure calculation according to the Coulomb method and the
Rankine method; influence of the soil-wall friction; water pressure. Basic design of retaining structures: walls;sheet-piles(anchored and non-anchored).Stability of excavations.Bearing capacity calculation for shallow foundations and for pile foundations.
Theory of Boussinesq and calculation of settlements. Basic slope stability analyses.

Reference Texts
Materiale didattico consigliato(Reference books):
Lancellotta R. "Geotecnica" II edizione, Zanichelli
Colombo P. - Colleselli F.,Elementi di Geotecnica, Zanichelli
Burghignoli A. - "Lezioni di Meccanica delle Terre" ESA
Atkinson J.H. & Bransby P.L. - " The Mechanics of Soils; An introduction to Critical State Soil Mechanics" McGraw Hil.I contenuti didattici sono presenti in maniera alternativa in tutti e tre i testi consigliati. Si fa presente che si può scaricare il programma esteso del corso dal profilo docente dal sito del dipartimento DICATECh.
Tale programma oltre ai contenuti da studiare fornisce anche specifici indirizzi in alternativa ai tre testi consigliati.Integrazioni esplicative ai testi sono disponibili presso l'Ing. N. Melidoro (sezione di geotecnia del DICATHECh) o presso la Sig.ra A. Corposanto (segreteria didattica del DICATHECh)
Diario degli Esami anno 2015/2016 (Examinations timetable year 2015/16):
21 Gennaio, 23 Febbraio, 11 Aprile, 15 Giugno, 6 Luglio, 20 settembre,4 novembre, 5 Dicembre.
Commissione di esame anno 2015/16 (Board of examiners year 2015/16)
Presidente: Federica Cotecchia
Componente: Francesco Cafaro
Supplente: Claudia Vitone, Supplente: Osvaldo Bottiglieri.
Ricevimento studenti (Students receiving)
giornate (days): L'orario di ricevimento è tutti i giorni, tranne il mercoledi e il giovedi, dalle 12.30 alle 13.30 e dalle 15.00 alle 16.00.
Nel caso il docente risulti impegnato per altri motivi istituzionali, l'orario permette allo studente di essere ricevuto nei giorni immediatamente successivi.
dalle ore (start time): dalle 12.30 o dalle 15.00 alle ore (end time): alle 13.30 e alle 16.00

2615 - GEOTECNICA AMBIENTALE + COMPLEMENTI DI GEOTECNICA
ICAR/07 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-21_TA - AMBIENTE E TERRITORIO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	INTERNO' GAETANO

Training objectives

At the end of the course of Applied Geotechnics the students will dominate the basic principles and methodologies for the
geotechnical characterisation and the definition of the geotechnical model. Moreover, they will be
able to solve some of the foundation engineering related problems, with particular reference to the
design of shallow and deep foundations.
The Course of Environmental Geotechnics will be useful for making the course the students capable of dealing with a polluted site, in particular by
dominating the principles and methodologies for its geotechnical characterisation and the definition of the geotechnical model. Moreover, they will
be able to solve some of the foundation engineering and environmental geotechnical related problems.

Prerequisites

Geotechnics. Basic knowledge of Structural Mechanics, Structural Design and Hydraulics.

Didactic Methods

Course programme

Basic concepts of Geotechnics and soil mechanics. Geotechnical in situ investigations and
monitoring. Analysis and design of shallow foundations: typologies, analysis of the collapse
mechanisms, bearing capacity, settlements analysis, criteria for settlements admittance. Analysis
and design of deep foundations: limit axial load for a single pile, group effect. Piles under traction.
Large diameter piles. Codes and regulations.

Reference Texts

2359 - GESTIONE AMBIENTALE DEI SISTEMI DI PRODUZIONE
ING-IND/17 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-21 - GESTIONE DI IMPRESA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MOSSA GIORGIO

Training objectives
To teach principles of environmental performance evaluation of production systems and methods and tools for industrial eco-efficiency.

Prerequisites
Industrial plants

Didactic Methods

Course programme
1.   Environmental impact of production systems (0.25 ECTS). Environmental strategies and management tools. National laws and regulations.
2.   Environmental management systems (EMS) (1.5 ECTS). International standards and regulations. Environmental management systems design and actuation. Integrated management systems (quality – health and safety- environment). Case studies.
3.   Environmental performance evaluation (EPE) (0.5 ECTS). International standards and regulations. Environmental condition and performance indicators. Audit.
4.   Eco-efficiency of production systems (0.5 ECTS). Process approach: energy and mass balance. Environmental aspects and priority identification. Models and tools for environmental performance evaluation and environmental data management Environmental accounting.
5.   Environmental certification of product (0.75 CFU). Environmental labels. Regulation (CE) N. 66/2010 – Ecolabel. Life Cycle Assessment (LCA): principles and methods. Case studies.
6.   Integrated Pollution Prevention and Control (1.5 CFU). EU Directive "IPPC". Integrated Environmental Authorization for plant. Best Available Techniques. Air Pollution: models, control equipment & systems.
7.   The environmental impact of production sites and the search for consensus (1.0 CFU). Plant location. Multi-criteria analysis. Environmental impact assessment (EIA).

Reference Texts
Course notes available on: http://climeg.poliba.it/moodle/course/view.php?id=21
D'Incognito, V., 2005. "Guida allo sviluppo dei sistemi di gestione ambientale. Norma ISO 14001. Ed. 2004" Franco Angeli
ANPA, Linee Guida per l'Applicazione del Regolamento CEE 1836/93 (EMAS) e della normativa ISO14001 da parte della Piccola e Media Impresa.

2359 - GESTIONE AMBIENTALE DEI SISTEMI DI PRODUZIONE
ING-IND/17 - Ingegneria gestionale

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula: LM13-22 - OPERATIONS MANAGEMENT
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: MOSSA GIORGIO

Training objectives
To teach principles of environmental performance evaluation of production systems and methods and tools for industrial eco-efficiency.

Prerequisites
Industrial plants

Didactic Methods

Course programme
1.   Environmental impact of production systems (0.25 ECTS). Environmental strategies and management tools. National laws and regulations.
2.   Environmental management systems (EMS) (1.5 ECTS). International standards and regulations. Environmental management systems design and actuation. Integrated management systems (quality – health and safety- environment). Case studies.
3.   Environmental performance evaluation (EPE) (0.5 ECTS). International standards and regulations. Environmental condition and performance indicators. Audit.
4.   Eco-efficiency of production systems (0.5 ECTS). Process approach: energy and mass balance. Environmental aspects and priority identification. Models and tools for environmental performance evaluation and environmental data management Environmental accounting.
5.   Environmental certification of product (0.75 CFU). Environmental labels. Regulation (CE) N. 66/2010 – Ecolabel. Life Cycle Assessment (LCA): principles and methods. Case studies.
6.   Integrated Pollution Prevention and Control (1.5 CFU). EU Directive "IPPC". Integrated Environmental Authorization for plant. Best Available Techniques. Air Pollution: models, control equipment & systems.
7.   The environmental impact of production sites and the search for consensus (1.0 CFU). Plant location. Multi-criteria analysis. Environmental impact assessment (EIA).

Reference Texts

2305 - GESTIONE DEI BACINI IDROGRAFICI
ICAR/02 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-20 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	FRATINO UMBERTO

Training objectives

The course aims to develop methodological aspects and practical applications for completing the education of the environmental engineer in the field of natural resource management having special attention to the conservation, maintenance and control of the river hydraulics.

Prerequisites

None

Didactic Methods

Course programme

Legislation and physical properties of a watershed: European, National and Regional Laws. River basin authorities and RBMPs (River Basin Management Plans). Geomorphological and morphometric characterization of river basins. River networks. Outline of fractal properties of a basin.
Flood control: methods for estimating the flow rates and flood water volumes. Regional approach. Synthetic hydrographs. Flood routing. De Saint Venant equations and solving methods: finite difference and method of characteristics. Simplified models: kinematic and parabolic models. Floodplain areas. The flow resistance: rigid and flexible vegetation. 1D and 2D flow models: key features and applications.
Sediment transport: Incipient motion condition and bed-forms. Sediment transport at bottom: Meyer Peter Muller and Einstein approaches. Solid suspended flows. Outline of debris and mud flows. Soil erosion by water: empirical, conceptual and physical based models for estimating the soil loss.

Reference Texts

2355 - GESTIONE DELLA PRODUZIONE INDUSTRIALE
ING-IND/17 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-21 - GESTIONE DI IMPRESA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MUMMOLO GIOVANNI

Training objectives
This course aims at endow second level management engineers with operations management issues.
Students will be confident with forecasting methods, project scheduling and investment projects appraisal.

Prerequisites
Industrial plants.

Didactic Methods

Course programme
Production systems (0.25 CFU):
- Paradigms and taxonomy of production systems.
Strategic planning (0.75 CFU):
- Long term production planning. Flexibility, versatility and agility.
Forecasting analysis (1.75 CFU):
- Forecasting analysis. Time-series models: constant / linear trend, simple/double moving average, seasonal models.
Financial and economic analysis of investment projects (1.25 CFU):
- Amortization schedule. Cash flow analysis. Investments project appraisal. Decision Theory applied to cash
flow analysis; decision trees. Make or buy decisions.
Project scheduling (1.75 CFU):
- Project planning and control. Project scheduling. Basics of Engineering Contracts.
Management of public services (0.25 CFU):
- The contracts. The Green Public Procurement

Reference Texts
1. Brandolese A., Pozzetti A. e Sianesi, A., Gestione della produzione industriale, Hoepli;
2. Chase R., Jacobs F.R., Aquilano N., Grando A., Sianesi A., Operations Management nella produzione e
nei servizi, McGraw-Hill;
3. Montgomery, D.C., Johnson L. A., Forecasting and Time Series Analysis, McGraw-Hill;
4. Production/Operations Management: Concepts, structure & Analysis, R. Tersine, North-Holland;
5. Dispense didattiche e slides del corso sono disponibili in formato elettronico (pdf) sul sito: http://climeg.poliba.it

2355 - GESTIONE DELLA PRODUZIONE INDUSTRIALE
ING-IND/17 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-23 - TECNOLOGIA E PRODUZIONE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MUMMOLO GIOVANNI

Training objectives
This course aims at endow second level management engineers with operations management issues.
Students will be confident with forecasting methods, project scheduling and investment projects appraisal.

Prerequisites
Industrial plants.

Didactic Methods

Course programme
Production systems (0.25 CFU):
- Paradigms and taxonomy of production systems.
Strategic planning (0.75 CFU):
- Long term production planning. Flexibility, versatility and agility.
Forecasting analysis (1.75 CFU):
- Forecasting analysis. Time-series models: constant / linear trend, simple/double moving average, seasonal models.
Financial and economic analysis of investment projects (1.25 CFU):
- Amortization schedule. Cash flow analysis. Investments project appraisal. Decision Theory applied to cash
flow analysis; decision trees. Make or buy decisions.
Project scheduling (1.75 CFU):
- Project planning and control. Project scheduling. Basics of Engineering Contracts.
Management of public services (0.25 CFU):
- The contracts. The Green Public Procurement

Reference Texts

2355 - GESTIONE DELLA PRODUZIONE INDUSTRIALE
ING-IND/17 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-22 - OPERATIONS MANAGEMENT
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MUMMOLO GIOVANNI

Training objectives

This course aims at endow second level management engineers with operations management issues.
Students will be confident with forecasting methods, project scheduling and investment projects appraisal.

Prerequisites

Industrial plants.

Didactic Methods

Course programme

Production systems (0.25 CFU):
- Paradigms and taxonomy of production systems.
Strategic planning (0.75 CFU):
- Long term production planning. Flexibility, versatility and agility.
Forecasting analysis (1.75 CFU):
- Forecasting analysis. Time-series models: constant / linear trend, simple/double moving average, seasonal models.
Financial and economic analysis of investment projects (1.25 CFU):
- Amortization schedule. Cash flow analysis. Investments project appraisal. Decision Theory applied to cash
flow analysis; decision trees. Make or buy decisions.
Project scheduling (1.75 CFU):
- Project planning and control. Project scheduling. Basics of Engineering Contracts.
Management of public services (0.25 CFU):
- The contracts. The Green Public Procurement

Reference Texts

2009 - IDRAULICA
ICAR/01 - Ingegneria ambientale e del territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-22_TA - AMBIENTE E TERRITORIO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MOSSA MICHELE

Training objectives

The course deals with fundamental issues in the Degree Class of Civil and Environmental Engineering, of which is an essential and distinctive educational activity. The teaching of hydraulics provides engineering students with the basics of the fluid mechanics and tools of the applied hydraulics. The program is divided into four parts. In the first part the basic principles of fluid mechanics and hydraulics laws governing the fluid motion are provided.

In the second part the typical applications of steady and unsteady flows in pipes, local and net head loss and the unsteady flows in are presented. In the third part the course provides the students with the basics of the steady flows in open channels.

In the third part the open-channel topics are presented and typical problems are solved, with the analysis of the steady flow, the gradually varied flow profiles and the unsteady flow.

In the fourth part the course aims to provide the fundamentals of physical hydraulic modeling, with the principles of the dimensional analysis, the geometric, kinematic and dynamic similarity. In addition, students are given the skills necessary for understanding the fluid dynamics through laboratory training.

In addition, students are given the skills necessary for understanding the fluid dynamics through laboratory training.

Prerequisites

See your academic regulations.

Didactic Methods

Course programme

Summary of the program

BASICS OF HYDRAULICS

Preliminary remarks. Physical properties of fluids. Hydrostatic.

Equilibrium of a fluid element and integral relation for a control volume.

Hydrostatic forces on plane and curved surfaces.

Kinematics of fluids. Conservation of mass with differential and integral relations.

Dynamics of frictionless and Newtonian flows. Turbulent flows. Differential and integral equations of linear momentum. Forces in dynamic conditions.

VISCOUS FLOW IN DUCTS

Velocity and discharge measurements.

Steady flows in long circular ducts.

Total and local head losses.

Pipe network: typical design and check problems.

Unsteady flows in ducts.

OPEN CHANNEL FLOWS

Specific energy.

Steady flows in open channels.

Uniform flows and design of channels.

Gradually varied and unsteady flows.

PHYSICAL HYDRAULIC MODELING

Basics. Dimensional analysis and Pi theorem.

Geometric, kinematic and dynamic similarity.

Principles of the physical model construction.

For the detailed program of the class and further details, please visit the web site www.michelemossa.it at the page Didactics and Classes.

Reference Texts

2009 - IDRAULICA
ICAR/01 - Ingegneria ambientale e del territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-20 - CIVILE
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CHIAIA GIANCARLO

Training objectives

After providing students with the conceptual tools for understanding the laws of statics, kinematics and dynamics of fluids, the course tackle the problems related to the design and verification of pressure and free surface hydraulic infrastructure. The course deals with some problems related to unsteady inelastic and mentions the phenomenon of water hammer. It refers finally to the seepage and limit themselves to dealing with simple cases characterized by homogeneous and isotropic porous aquifers and pumping schemes with radial symmetry.

Prerequisites

Knowledge of calculus, physics and mechanics

Didactic Methods

Course programme

MORE DETAILS IN http://www.dicatech.poliba.it/index.php?id=80&idp=396.
FLUID PROPERTIES
Stresses in a continuum. Fluid properties. Henry's Law. Flow regimes.
FLUID STATICS
Stresses in still fluids. Equation of the statics of fluids. Static Momentum Equation. Fluid statics heavy and incompressible. Shove on flat and curve walls. Mariotte's formula.
KINEMATICS OF FLUIDS
Methodological Approach. Eulerian and Lagrangian description of the flow field. Types of movement. Mass conservation equation. Global equation of dynamic equilibrium. Gradually varied flow.
BERNOULLI'S THEOREM
Bernoulli's theorem. Remarkable applications. Theorem Extensions to a current. Jet action on a plane and curve wall.. Pelton turbines. Hydroelectric facilities. Operation of a pumping system and a turbine.
THE NAVIER-STOKES EQUATION
Stress tensor. Local equation of motion for a viscous fluid. Navier-Stokes equations. Momentum Equation for a viscous fluid. Dragging action of a current.
PRESSURE PIPELINES FLOW
General characteristics of uniform flow. The laminar and turbulent flow. Average values. Momentum equation referred to the average parameters. Turbulent stresses. Dimensional analysis applied to the pressure flow. Reynolds number. The Harp of Nikuradse. Experimental and Practical formulas. The urban Pipelines Network. Economy criteria for the design of open networks of pipelines. Economy criteria for the design of pipelines with pumping systems.
UNSTEADY FLOW
Difference between elastic and inelastic approach to the study of unsteady flow. The complete formulation of unsteady elastic flow. Simplified equations of unsteady elastic. Instantaneous opening of a valve. Allievi formula. Michaud formula..The perturbation celerity: Mass fluctuation in an hydroelectric plant.
OPEN CHANNEL FLOW
Channels: generality. Free surface flow characteristics. The uniform and permanent motion. The concept of specific energy. Features of Energy in a section. Subcritical and supercritical flows. Equation of motion for permanent bed of any shape. The hydraulic jump. Notable examples of permanent motion profiles.
SEEPAGE
Basic Concepts: porosity, permeability, hydraulic conductivity. The Laplace equation for three- dimensional seepage. Applications to cases with radial symmetry: pumping from free surface and confined aquifers. Coastal aquifers.

Reference Texts

2009 - IDRAULICA
ICAR/01 - Ingegneria ambientale e del territorio

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula: LT16-22_TA - AMBIENTE E TERRITORIO
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: MOSSA MICHELE

Training objectives
The course deals with fundamental issues in the Degree Class of Civil and Environmental Engineering, of which is an essential and distinctive educational activity. The teaching of hydraulics provides engineering students with the basics of the fluid mechanics and tools of the applied hydraulics. The program is divided into four parts. In the first part the basic principles of fluid mechanics and hydraulics laws governing the fluid motion are provided.
In the second part the typical applications of steady and unsteady flows in pipes, local and net head loss and the unsteady flows in are presented. In the third part the course provides the students with the basics of the steady flows in open channels.
In the third part the open-channel topics are presented and typical problems are solved, with the analysis of the steady flow, the gradually varied flow profiles and the unsteady flow.
In the fourth part the course aims to provide the fundamentals of physical hydraulic modeling, with the principles of the dimensional analysis, the geometric, kinematic and dynamic similarity. In addition, students are given the skills necessary for understanding the fluid dynamics through laboratory training.
In addition, students are given the skills necessary for understanding the fluid dynamics through laboratory training.

Prerequisites
See your academic regulations.

Didactic Methods

Course programme
Summary of the program
BASICS OF HYDRAULICS
    Preliminary remarks. Physical properties of fluids. Hydrostatic.
    Equilibrium of a fluid element and integral relation for a control volume.
    Hydrostatic forces on plane and curved surfaces.
    Kinematics of fluids. Conservation of mass with differential and integral relations.
    Dynamics of frictionless and Newtonian flows. Turbulent flows. Differential and integral equations of linear momentum. Forces in dynamic conditions.
VISCOUS FLOW IN DUCTS
    Velocity and discharge measurements.
    Steady flows in long circular ducts.
    Total and local head losses.
    Pipe network: typical design and check problems.
    Unsteady flows in ducts.

OPEN CHANNEL FLOWS
    Specific energy.
    Steady flows in open channels.
    Uniform flows and design of channels.
    Gradually varied and unsteady flows.
PHYSICAL HYDRAULIC MODELING
    Basics. Dimensional analysis and Pi theorem.
    Geometric, kinematic and dynamic similarity.
    Principles of the physical model construction.
For the detailed program of the class and further details, please visit the web site www.michelemossa.it at the page Didactics and Classes.

Reference Texts

2028 - IDRAULICA AMBIENTALE
ICAR/01 - Ingegneria ambientale e del territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-21 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MOSSA MICHELE

Training objectives

The course deals with fundamental issues in the Degree Class of Civil and Environmental Engineering, of which is an essential and distinctive educational activity. The teaching of hydraulics provides engineering students with the basics of the fluid mechanics and tools of the applied hydraulics. The program is divided into four parts. In the first part the basic principles of fluid mechanics and hydraulics laws governing the fluid motion are provided.

In the second part the typical applications of steady and unsteady flows in pipes, local and net head loss and the unsteady flows in are presented. In the third part the course provides the students with the basics of the steady flows in open channels.

In the third part the open-channel topics are presented and typical problems are solved, with the analysis of the steady flow, the gradually varied flow profiles and the unsteady flow.

In the fourth part the course aims to provide the fundamentals of physical hydraulic modeling, with the principles of the dimensional analysis, the geometric, kinematic and dynamic similarity. In addition, students are given the skills necessary for understanding the fluid dynamics through laboratory training.

In addition, students are given the skills necessary for understanding the fluid dynamics through laboratory training.

Prerequisites

See your academic regulations.

Didactic Methods

Course programme

BASICS OF HYDRAULICS
    Preliminary remarks. Physical properties of fluids. Hydrostatic.
    Equilibrium of a fluid element and integral relation for a control volume.
    Hydrostatic forces on plane and curved surfaces.
    Kinematics of fluids. Conservation of mass with differential and integral relations.
    Dynamics of frictionless and Newtonian flows. Turbulent flows. Differential and integral equations of linear momentum. Forces in dynamic conditions.

VISCOUS FLOW IN DUCTS
    Velocity and discharge measurements.
    Steady flows in long circular ducts.
    Total and local head losses.
    Pipe network: typical design and check problems.
    Unsteady flows in ducts.

OPEN CHANNEL FLOWS
    Specific energy.
    Steady flows in open channels.
    Uniform flows and design of channels.
    Gradually varied and unsteady flows.

PHYSICAL HYDRAULIC MODELING
    Basics. Dimensional analysis and Pi theorem.
    Geometric, kinematic and dynamic similarity.
    Principles of the physical model construction.

Reference Texts

2438 - IDRAULICA MARITTIMA
ICAR/01 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-21_TA - AMBIENTE E TERRITORIO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BEN MEFTAH MOULDI

Training objectives

The course of Maritime Hydraulics is for students of the second degree in Environmental and Territorial Engineering. The course aims to provide a basic background on the wave mechanics, coastal processes and fundamental principles that underlie the practice of coastal engineering. Observing, analyzing and predicting marine waves are fundamental for the analysis of beach erosion and coastal risks near river mouths or estuaries, particularly sensitive and important for the environment preservation. The course also presents elements on the observation techniques (measurement of oceanographic parameters), on the design of coastal protection systems and on the method of plane-wave construction.

Prerequisites

Didactic Methods

Theoretical lectures, Credit number 4: Didactics (32 hours), Studying (68 hours)
Exercises, Credit number 1: Didactics (16 hours), Studying (9 hours)
Laboratory training, Credit number 1: Didactics (16 hours), Studying (9 hours)

Course programme

Topic n. 1: Coastal Zone Definition and Mathematical Compendium
Content details: Coastal environment. Coast/dune. Beach ore shore (backshore, foreshore). Surf zone (sea water level, high water level, low water level). Berms. Sea bottom.
Mathematical compendium: hyperbolic functions (hyperbolic sine, hyperbolic cosine, hyperbolic tangent, graphs of hyperbolic functions)
Topic n. 2: Mechanics of Wave Motion
Content details: Wave representation in the time and frequency domain. Classification of waves. Theory of Airy. Wave height, length and period. Wave elevation. Celerity of a wave. Deep, intermediate and shallow waters. Pressure distribution with the theory of Airy. Orbital wave velocities: deep, intermediate and shallow waters. Wave group and celerity. Reflection of a wave. Total reflection (clapotis). Standing waves. Reflection caused by a vertical sea-wall and a breakwater: reflection caused by bathymetric variation and by bars at the sea bottom. Energy of a wave and energy flux. Shoaling and refraction coefficients. Wave breaking. Breaking wave diagrams of Goda. Diffraction. Diagrams of Wiegel and Johnson. Graphical method of the wave diffraction.
Topic n. 3: Observation Techniques
Content details: Estimation of the sea state by observers. Measurements using tools. Measurement techniques: in situ techniques (wave buoys, wave poles, tide gauges, echo-sounders, current meters, pressure transducers). Remote-sensing techniques.
Topic n. 4: Forecast for Waves - Plane-Wave
Content details: Beaufort wind scale and Douglas sea scale. Wind classification. Sea current classification. Wave characteristics: typical spectra, wave height (zero-downcrossings or zero-upcrossings). Typical wind data provided by ENAV. Geographical and effective fetch. Wind direction, velocity and duration of a event. SMB diagram: fetch-limited and duration-limited cases. Significant height and period. Tenani method for wave-plane construction.
Topic n. 5: Design of Coastal Defense Structures
Content details: Vertical sea-walls: net pressure, momentum of the total pressure acting on the structure, safety factor.
Design of breakwaters (rubble mound structures): typical section of the breakwater, classification of material used for construction, advantage and disadvantage of breakwaters, structure design, formula of Hudson.
Topic n. 6: Practical Exercises
Content details: Exercises on mechanics of wave motion (wave height, wave length, wave period, wave celerity, pressure distribution, flow velocity, flow acceleration, trajectory of the water particles, wave energy).
Exercises on wave reflection, on wave diffraction (diagrams of Wiegel, diagrams of Johnson, method of Iribarren) on wave refraction and on the wave breaking (diagrams of Goda).
Exercises on coastal defense structures

Topic n. 7: Wave-Plane Construction Project
Content details: Geographic framing of the study area (area in examination, angular sector of the area, division into subsector, bathymetry). Meteo-marine characteristics of the target area. Statistical analysis of the wind data (intensity, direction and duration). Determination of the events. Determination of the fetch. Determination of the wave height and period of a given event using SMB chart (Sverdrup Munk Bretschneider). Significant wave height and period. Tenani Method for the wave-plane construction.

Reference Texts

Dispense del docente
V. Milano, Idraulica Marittima, Maggioli Editore.
CERC, Shore Protection Manual.
G. Matteotti, Lineamenti di Costruzione Marittime
L. Franco, Manuale di Idraulica Marittima Ormea.

2575 - IDROGEOLOGIA
GEO/05 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula: LM01-20 - IDRAULICA
Type: Affine/Integrativa
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: TINELLI ROCCALDO

Training objectives
To furnish the skill of reading the hydrogeological map and the correct ground water management

Prerequisites
Good understanding of Chemistry, Hydraulic and Applied Geology

Didactic Methods

Course programme
- Water cycle. Hydrologic balance
- Hydrogeologic formations: aquifer and groundwater
- Aquifer as storage: tipes, morfology, granulometry, porosity, VRE, storage, map
- Aquifer as pipeline: Darcy' s law, coefficient of permeability. Laboratory and field measurement of permeability, transmissivity, storavity, hydraulic diffusivity.Dispersivity
- Groundwater flow: flow line, equipotential line, flow net. Piezometric map. Gruondwater discharge. Fluctuation of groundwater table.
- Methods for constructing well and observation well. Completion, development, sanitary protection, maintenance of well
- Pumping test. Effects of pumping on flow net. Steady unidiretional flow, steady radial flow. Unsteady radial flow. Nonequilibrium equations . Partially penetranting wells
- Surface and subsurface investigations of groundwater. Geosismic and geoelectrical methods. Loggings.
- Contamination. Vulnerability and protection of aquifers.
- Hydrogeochemic and groundwater quality
- Coastal Aquifers. Springs: types, capture, protection

Reference Texts
Celico – Prospezioni idrogeologiche - Ed Liguori
Civita – Idrogeologia applicata e ambientale – Ed Ambrosiana
Testi di consultazione
Beretta – Idrogeologia per il disinquinamento delle acque sotterranee - Ed Pitagora
Castany – Traité pratique des eaux souterraines – Ed. Dunod
Chiesa – Pozzi per acqua – Ed Hoepli
Chiesa – Idraulica delle acque di falda – Ed Flaccovio
Custodio – Llamas - Idrogeologia sotterranea – ED Flaccovio
Hamill-Bell – Acque sotterranee – Ed Flaccovio

2575 - IDROGEOLOGIA
GEO/05 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula: LM01-22 - VIE E TRASPORTI
Type: Affine/Integrativa
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: TINELLI ROCCALDO

Training objectives

To furnish the skill of reading the hydrogeological map and the correct ground water management

Prerequisites

Good understanding of Chemistry, Hydraulic and Applied Geology

Didactic Methods

Course programme

- Water cycle. Hydrologic balance
- Hydrogeologic formations: aquifer and groundwater
- Aquifer as storage: tipes, morfology, granulometry, porosity, VRE, storage, map
- Aquifer as pipeline: Darcy' s law, coefficient of permeability. Laboratory and field measurement of permeability, transmissivity, storavity, hydraulic diffusivity.Dispersivity
- Groundwater flow: flow line, equipotential line, flow net. Piezometric map. Gruondwater discharge. Fluctuation of groundwater table.
- Methods for constructing well and observation well. Completion, development, sanitary protection, maintenance of well
- Pumping test. Effects of pumping on flow net. Steady unidiretional flow, steady radial flow. Unsteady radial flow. Nonequilibrium equations . Partially penetranting wells
- Surface and subsurface investigations of groundwater. Geosismic and geoelectrical methods. Loggings.
- Contamination. Vulnerability and protection of aquifers.
- Hydrogeochemic and groundwater quality
- Coastal Aquifers. Springs: types, capture, protection

Reference Texts

2155 - IMPIANTI MECCANICI I
ING-IND/17 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LT31-20 - MECCANICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DIGIESI SALVATORE

Training objectives

To teach principles and techniques for plant layout and for internal logistics designing.

Prerequisites

Mechanic of materials, Energy Systems I and Fluid Machinery I, Manufacturing I.

Didactic Methods

Course programme

1. Introduction

Definition of industrial plant. Classification of industrial plants.

2. Plant layout

Plant layout study output. Layouts types; product layout, process layout, fixed point layout, mixed layout. Equipment requirements evaluation in product and process layout. Line balancing problem. Innovative techniques for plant layout problem solving.

3. Industrial buildings

Industrial buildings types. Industrial buildings elements. Internal lighting. Heating.

4. Internal logistics

Classification of internal transportation means. Unit load. Belt conveyors. Power hoists and winches. Overhead crane. Trolleys. Roller conveyor. Elevators. Vibrating conveyor. Pneumatic conveyor.

5. Piping

Piping system components: pipe, flange, gaskets, connections, pipe supports, steel compensators, steam traps. Pipe material selection and process design. Components procurement. Mechanical classification – pipelines enumeration – P & I diagrams – services diagrams – pipelines list – materials list. Master e Key plans – Plot plan – planar sketches.

Stress-analysis: allowable stresses – simplified analysis. Pipes wraps. Controls and tests – start-up arrangement.

Flow control system elements. Control valves selection criteria. Inherent and operating flow characteristic of a control valves.

Reference Texts

2155 - IMPIANTI MECCANICI I
ING-IND/17 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LT31-20 - MECCANICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	IAVAGNILIO RAFFELLO PIO

Training objectives
To teach principles and techniques for plant layout and for internal logistics designing.

Prerequisites
Mechanic of materials, Energy Systems I and Fluid Machinery I, Manufacturing I.

Didactic Methods

Course programme
1. Introduction
Definition of industrial plant. Classification of industrial plants.
2. Plant layout
Plant layout study output. Layouts types; product layout, process layout, fixed point layout, mixed layout. Equipment requirements evaluation in product and process layout. Line balancing problem. Innovative techniques for plant layout problem solving.
3. Industrial buildings
Industrial buildings types. Industrial buildings elements. Internal lighting. Heating.
4. Internal logistics
Classification of internal transportation means. Unit load. Belt conveyors. Power hoists and winches. Overhead crane. Trolleys. Roller conveyor. Elevators. Vibrating conveyor. Pneumatic conveyor.
5. Piping
Piping system components: pipe, flange, gaskets, connections, pipe supports, steel compensators, steam traps. Pipe material selection and process design. Components procurement. Mechanical classification – pipelines enumeration – P & I diagrams – services diagrams – pipelines list – materials list. Master e Key plans – Plot plan – planar sketches.
Stress-analysis: allowable stresses – simplified analysis. Pipes wraps. Controls and tests – start-up arrangement.
Flow control system elements. Control valves selection criteria. Inherent and operating flow characteristic of a control valves.

Reference Texts

2320 - IMPIANTI MECCANICI II
ING-IND/17 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-22 - COSTRUTTIVO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MUMMOLO GIOVANNI

Training objectives

To teach principles and techniques for industrial service facilities designing.

Prerequisites

Mechanical Plant I.

Didactic Methods

Course programme

1. Industrial service facilities: fluid transport (1 CFU – 4l, 8e)
Water supplying, storage and distribution. Fire equipment. Compressed air production and distribution. Different pneumatic services.
2. Electrical and lighting systems (1 CFU – 6l, 4e)
Electrical energy distribution systems. Selection and sizing criteria of electrical wires, engines, transformer, alternator, power control centers. Power factor correction of electrical loads. Industrial lighting. Lighting system design.
3. Heating systems (1 CFU – 6l, 4e)
Heating system operation. Thermal power station sizing. Flue gas stack design. Air conditioning principles. Air conditioned system components.
4. Wastewater and flue gas treatment and disposing (1 CFU – 6l, 4e)
Introduction to treatment plants of wastewater and sewages. Air pollution classification. Air pollutant caption and abatement systems. Odour abatement principles.
5. Waste disposal (0.75 CFU – 6l)
Classification and composition of municipal and industrial solid waste. Disposal plants: landfills, incinerators, composting plants. Waste management.
6. Noise and vibration (1.25 CFU – 8l, 4e)
Basic quantities. Measurements. Laws and standards. Noise risk assessment techniques (CHABA, OSHA). Industrial noise reduction. Exposure to vibrations: laws and standards. Damping devices. Damping foundations.

Reference Texts

2320 - IMPIANTI MECCANICI II
ING-IND/17 - Ingegneria meccanica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula: LM30-21 - ENERGIA
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: MUMMOLO GIOVANNI

Training objectives
To teach principles and techniques for industrial service facilities designing.

Prerequisites
Mechanical Plant I.

Didactic Methods

Course programme
1. Industrial service facilities: fluid transport (1 CFU – 4l, 8e)
Water supplying, storage and distribution. Fire equipment. Compressed air production and distribution. Different pneumatic services.
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Electrical energy distribution systems. Selection and sizing criteria of electrical wires, engines, transformer, alternator, power control centers. Power factor correction of electrical loads. Industrial lighting. Lighting system design.
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Heating system operation. Thermal power station sizing. Flue gas stack design. Air conditioning principles. Air conditioned system components.
4. Wastewater and flue gas treatment and disposing (1 CFU – 6l, 4e)
Introduction to treatment plants of wastewater and sewages. Air pollution classification. Air pollutant caption and abatement systems. Odour abatement principles.
5. Waste disposal (0.75 CFU – 6l)
Classification and composition of municipal and industrial solid waste. Disposal plants: landfills, incinerators, composting plants. Waste management.
6. Noise and vibration (1.25 CFU – 8l, 4e)
Basic quantities. Measurements. Laws and standards. Noise risk assessment techniques (CHABA, OSHA). Industrial noise reduction. Exposure to vibrations: laws and standards. Damping devices. Damping foundations.

Reference Texts

2320 - IMPIANTI MECCANICI II
ING-IND/17 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-24 - AERONAUTICO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MUMMOLO GIOVANNI

Training objectives
To teach principles and techniques for industrial service facilities designing.

Prerequisites
Mechanical Plant I.

Didactic Methods

Course programme
1. Industrial service facilities: fluid transport (1 CFU – 4l, 8e)
Water supplying, storage and distribution. Fire equipment. Compressed air production and distribution. Different pneumatic services.
2. Electrical and lighting systems (1 CFU – 6l, 4e)
Electrical energy distribution systems. Selection and sizing criteria of electrical wires, engines, transformer, alternator, power control centers. Power factor correction of electrical loads. Industrial lighting. Lighting system design.
3. Heating systems (1 CFU – 6l, 4e)
Heating system operation. Thermal power station sizing. Flue gas stack design. Air conditioning principles. Air conditioned system components.
4. Wastewater and flue gas treatment and disposing (1 CFU – 6l, 4e)
Introduction to treatment plants of wastewater and sewages. Air pollution classification. Air pollutant caption and abatement systems. Odour abatement principles.
5. Waste disposal (0.75 CFU – 6l)
Classification and composition of municipal and industrial solid waste. Disposal plants: landfills, incinerators, composting plants. Waste management.
6. Noise and vibration (1.25 CFU – 8l, 4e)
Basic quantities. Measurements. Laws and standards. Noise risk assessment techniques (CHABA, OSHA). Industrial noise reduction. Exposure to vibrations: laws and standards. Damping devices. Damping foundations.

Reference Texts

2320 - IMPIANTI MECCANICI II
ING-IND/17 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-20 - TECNOLOGICO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MUMMOLO GIOVANNI

Training objectives

To teach principles and techniques for industrial service facilities designing.

Prerequisites

Mechanical Plant I.

Didactic Methods

Course programme

1. Industrial service facilities: fluid transport (1 CFU – 4l, 8e)
Water supplying, storage and distribution. Fire equipment. Compressed air production and distribution. Different pneumatic services.
2. Electrical and lighting systems (1 CFU – 6l, 4e)
Electrical energy distribution systems. Selection and sizing criteria of electrical wires, engines, transformer, alternator, power control centers. Power factor correction of electrical loads. Industrial lighting. Lighting system design.
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Heating system operation. Thermal power station sizing. Flue gas stack design. Air conditioning principles. Air conditioned system components.
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6. Noise and vibration (1.25 CFU – 8l, 4e)
Basic quantities. Measurements. Laws and standards. Noise risk assessment techniques (CHABA, OSHA). Industrial noise reduction. Exposure to vibrations: laws and standards. Damping devices. Damping foundations.

Reference Texts

1.A. Monte Elementi di impianti industriali, Vol 2. Ed. Libreria Cortina Torino, IV ed., 2009.
2.S. Cavallone, Impianti Elettrici.(*)
3.S. Cavallone, G. Mummolo. Compendio di esercitazioni di impianti industriali. 2004.(*)
4.S. Digiesi. Metodi di risoluzione delle reti a maglie. 2008. (*)
(*) http://climeg.poliba.it/course/view.php?id=68

2587 - INDUSTRIALIZZAZIONE RAPIDA
ING-IND/16 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-23 - TECNOLOGIA E PRODUZIONE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GALANTUCCI LUIGI MARIA

Training objectives

This course has the scope to supply the acquaintances of the new methodologies of Rapid Manufacturing,3D Printing, Reverse Engineering and more in a generalized manner Time Compression, for the innovation of the methods and the reduction of the times of development and fabrication of new products.

Prerequisites

None

Didactic Methods

Lessons and practices in classroom supported from video projector and software, laboratory team-works, personalized feedback and coaching to improve every aspect of the student's work.

Course programme

Lessons (32 h):
1.   Introduction to the advanced design of products, processes and production system.
2.   Product design: The use of the CAD 3D for the Rapid Prototyping
3.   Design and planning of the process: Group Technology, Computer Aided Process Planning (CAPP) variant and generative.
4.   Production system design
5.   CAD/CAM Interfaces and systems; information of product-process-system. The standard STEP and STEP-NC.
6.   Fabrication of products with complex geometries with processes that require the design of molds (automotive, shoe, tlc).
7.   Methods for the generation of complex geometry products.
8.   Technologies and methods for the rapid prototyping/rapid tooling.
9.   Technologies and methods for the rapid/layer manufacturing.
10.   Cost analysis for rapid manufacturing and prototyping.
11.   Technologies and methods for the reverse engineering.

Practices (8 h): Use of software for the 3D modelling, Rapid Prototying and Reverse Engineering.

Laboratories (12 h): The course, to complement of the theoretical formation, includes also lab practices (numerical, applications of dedicated software, etc.) and a specific activity of laboratory with RP and RE workstations.

Reference Texts

TESTI DI RIFERIMENTO PRINCIPALI:

1. T. C. Chang, R. A. Wisk, H.P. Wang: "Computer Aided Manufacturing", 2nd ed. 1997 (cap. 9 pp. 315-344, cap. 12 pp. 471-514, cap. 13 515-589, appendix D, E).

2. A. Gatto, L. Iuliano: "Prototipazione Rapida - la tecnologia per la competizione globale", Tecniche Nuove, Milano, 1998

3. Prototipazione Rapida e Ingegneria Inversa - Dispensa dal corso scaricabile dal sito web.

4. Rapid Prototyping and Reverse Engineering - Dispensa dal corso scaricabile dal sito web.

5. Dati contenuti nel Sito della Associazione Italiana di Prototipazione Rapida: www.apri-rapid.it/

ULTERIORI TESTI SUGGERITI: § D. T. Pham, S. S. Dimov: Rapid Manufacturing: The Technologies and Applications of Rapid Prototyping and Rapid Tooling¿, Springer ¿ Verlag, 2001

§ P.D. Hilton, P. F. Jacobs: "Rapid tooling -Technologies and industrial applications", Marcel Dekker, 2000

§ K. A. Ingle: "Reverse Engineering", McGraw-Hill, 1994

§ J.A. Mc Donald, C.J. Ryall, D.I. Wimpenny: "Rapid prototyping casebook", Professiona Engineering Pubhishing, 2001

2587 - INDUSTRIALIZZAZIONE RAPIDA
ING-IND/16 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-20 - IMPRENDITORIALITA' E INNOVAZIONE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GALANTUCCI LUIGI MARIA

Training objectives

This course has the scope to supply the acquaintances of the new methodologies of Rapid Manufacturing,3D Printing, Reverse Engineering and more in a generalized manner Time Compression, for the innovation of the methods and the reduction of the times of development and fabrication of new products.

Prerequisites

None

Didactic Methods

Lessons and practices in classroom supported from video projector and software, laboratory team-works, personalized feedback and coaching to improve every aspect of the student's work.

Course programme

Lessons (32 h):
1.   Introduction to the advanced design of products, processes and production system.
2.   Product design: The use of the CAD 3D for the Rapid Prototyping
3.   Design and planning of the process: Group Technology, Computer Aided Process Planning (CAPP) variant and generative.
4.   Production system design
5.   CAD/CAM Interfaces and systems; information of product-process-system. The standard STEP and STEP-NC.
6.   Fabrication of products with complex geometries with processes that require the design of molds (automotive, shoe, tlc).
7.   Methods for the generation of complex geometry products.
8.   Technologies and methods for the rapid prototyping/rapid tooling.
9.   Technologies and methods for the rapid/layer manufacturing.
10.   Cost analysis for rapid manufacturing and prototyping.
11.   Technologies and methods for the reverse engineering.

Practices (8 h): Use of software for the 3D modelling, Rapid Prototying and Reverse Engineering.

Laboratories (12 h): The course, to complement of the theoretical formation, includes also lab practices (numerical, applications of dedicated software, etc.) and a specific activity of laboratory with RP and RE workstations.

Reference Texts

TESTI DI RIFERIMENTO PRINCIPALI:

1. T. C. Chang, R. A. Wisk, H.P. Wang: "Computer Aided Manufacturing", 2nd ed. 1997 (cap. 9 pp. 315-344, cap. 12 pp. 471-514, cap. 13 515-589, appendix D, E).

2. A. Gatto, L. Iuliano: "Prototipazione Rapida - la tecnologia per la competizione globale", Tecniche Nuove, Milano, 1998

3. Prototipazione Rapida e Ingegneria Inversa - Dispensa dal corso scaricabile dal sito web.

4. Rapid Prototyping and Reverse Engineering - Dispensa dal corso scaricabile dal sito web.

5. Dati contenuti nel Sito della Associazione Italiana di Prototipazione Rapida: www.apri-rapid.it/

ULTERIORI TESTI SUGGERITI: § D. T. Pham, S. S. Dimov: Rapid Manufacturing: The Technologies and Applications of Rapid Prototyping and Rapid Tooling¿, Springer ¿ Verlag, 2001

§ P.D. Hilton, P. F. Jacobs: "Rapid tooling -Technologies and industrial applications", Marcel Dekker, 2000

§ K. A. Ingle: "Reverse Engineering", McGraw-Hill, 1994

§ J.A. Mc Donald, C.J. Ryall, D.I. Wimpenny: "Rapid prototyping casebook", Professiona Engineering Pubhishing, 2001

2587 - INDUSTRIALIZZAZIONE RAPIDA
ING-IND/16 - Ingegneria gestionale

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula: LM13-21 - GESTIONE DI IMPRESA
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: GALANTUCCI LUIGI MARIA

Training objectives
This course has the scope to supply the acquaintances of the new methodologies of Rapid Manufacturing,3D Printing, Reverse Engineering and more in a generalized manner Time Compression, for the innovation of the methods and the reduction of the times of development and fabrication of new products.

Prerequisites
None

Didactic Methods
Lessons and practices in classroom supported from video projector and software, laboratory team-works, personalized feedback and coaching to improve every aspect of the student's work.

Course programme
Lessons (32 h):
1.   Introduction to the advanced design of products, processes and production system.
2.   Product design: The use of the CAD 3D for the Rapid Prototyping
3.   Design and planning of the process: Group Technology, Computer Aided Process Planning (CAPP) variant and generative.
4.   Production system design
5.   CAD/CAM Interfaces and systems; information of product-process-system. The standard STEP and STEP-NC.
6.   Fabrication of products with complex geometries with processes that require the design of molds (automotive, shoe, tlc).
7.   Methods for the generation of complex geometry products.
8.   Technologies and methods for the rapid prototyping/rapid tooling.
9.   Technologies and methods for the rapid/layer manufacturing.
10.   Cost analysis for rapid manufacturing and prototyping.
11.   Technologies and methods for the reverse engineering.
Practices (8 h): Use of software for the 3D modelling, Rapid Prototying and Reverse Engineering.
Laboratories (12 h): The course, to complement of the theoretical formation, includes also lab practices (numerical, applications of dedicated software, etc.) and a specific activity of laboratory with RP and RE workstations.

Reference Texts
TESTI DI RIFERIMENTO PRINCIPALI:
1. T. C. Chang, R. A. Wisk, H.P. Wang: "Computer Aided Manufacturing", 2nd ed. 1997 (cap. 9 pp. 315-344, cap. 12 pp. 471-514, cap. 13 515-589, appendix D, E).
2. A. Gatto, L. Iuliano: "Prototipazione Rapida - la tecnologia per la competizione globale", Tecniche Nuove, Milano, 1998
3. Prototipazione Rapida e Ingegneria Inversa - Dispensa dal corso scaricabile dal sito web.
4. Rapid Prototyping and Reverse Engineering - Dispensa dal corso scaricabile dal sito web.
5. Dati contenuti nel Sito della Associazione Italiana di Prototipazione Rapida: www.apri-rapid.it/
ULTERIORI TESTI SUGGERITI: § D. T. Pham, S. S. Dimov: Rapid Manufacturing: The Technologies and Applications of Rapid Prototyping and Rapid Tooling¿, Springer ¿ Verlag, 2001
§ P.D. Hilton, P. F. Jacobs: "Rapid tooling -Technologies and industrial applications", Marcel Dekker, 2000
§ K. A. Ingle: "Reverse Engineering", McGraw-Hill, 1994
§ J.A. Mc Donald, C.J. Ryall, D.I. Wimpenny: "Rapid prototyping casebook", Professiona Engineering Pubhishing, 2001

2510 - INGEGNERIA SANITARIA AMBIENTALE
ICAR/03 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-21_TA - AMBIENTE E TERRITORIO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	RANIERI EZIO

Training objectives

The course aims to provide students with the deep requisite tools for the definition and the implementation of appropriate technical protection of the environment with particular reference to the criteria for dimensioning systems for the control and reduction of pollution caused by human activity, relative to water, air, soil.

Prerequisites

Hydraulic, Chemistry

Didactic Methods

Course programme

Pollution phenomena (10 hours): Legislation. Transport phenomena and diffusion of pollutants in surface water and groundwater. Auto-purification of water bodies: Sag curve, applications, and exercises.

Drinking Water (15 hours): Legislation. Drawings of the fundamental phases of water treatment: pre-treatment, flocculation, adsorption on activated carbon. Disinfection: chlorination, ozonation, UV and alternative methods. Construction costs and management. Design solutions.

Wastewater (35 hours): Characteristics of civil and industrial wastewater. Legislation. Wastewater Treatment Plants mechanical biological treatment drawings. Analysis and design of the phases of screening, grit removal, sedimentation, activated sludge oxidation, nitrification and denitrification. Systems for the supply and the diffusion of oxygen. Alternative systems of biological oxidation. Disinfection: chlorination, ozonation, UV, alternative systems. Sludge: chemical-physical, mechanical and thermal. Techniques and control measures in the works. Natural treatments of sewage treatment wetlands, plant technologies. Tertiary treatment for reuse. Techniques for the disposal of wastewater, design solutions. Cost of systems and management.

Solid waste (25 hours): Standards and criteria for the classification and collection. Design criteria of landfills: production of biogas. Collection and treatment of leachate. Systems for recovery and recycling: recycling, composting, refuse-derived fuel.

Contaminated Sited Reclamation (20 hours): Legislation. Characterization of the site. Methods of investigation and environmental risk assessment. Remediation technologies.

Air Emissions (15 hours): Sketches related to the technologies of treatment of air and odor emissions.

Reference Texts

2510 - INGEGNERIA SANITARIA AMBIENTALE
ICAR/03 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-21_TA - AMBIENTE E TERRITORIO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	RANIERI EZIO

Training objectives

The course aims to provide students with the deep requisite tools for the definition and the implementation of appropriate technical protection of the environment with particular reference to the criteria for dimensioning systems for the control and reduction of pollution caused by human activity, relative to water, air, soil.

Prerequisites

Hydraulic, Chemistry

Didactic Methods

Course programme

Pollution phenomena (10 hours): Legislation. Transport phenomena and diffusion of pollutants in surface water and groundwater. Auto-purification of water bodies: Sag curve, applications, and exercises.

Drinking Water (15 hours): Legislation. Drawings of the fundamental phases of water treatment: pre-treatment, flocculation, adsorption on activated carbon. Disinfection: chlorination, ozonation, UV and alternative methods. Construction costs and management. Design solutions.

Wastewater (35 hours): Characteristics of civil and industrial wastewater. Legislation. Wastewater Treatment Plants mechanical biological treatment drawings. Analysis and design of the phases of screening, grit removal, sedimentation, activated sludge oxidation, nitrification and denitrification. Systems for the supply and the diffusion of oxygen. Alternative systems of biological oxidation. Disinfection: chlorination, ozonation, UV, alternative systems. Sludge: chemical-physical, mechanical and thermal. Techniques and control measures in the works. Natural treatments of sewage treatment wetlands, plant technologies. Tertiary treatment for reuse. Techniques for the disposal of wastewater, design solutions. Cost of systems and management.

Solid waste (25 hours): Standards and criteria for the classification and collection. Design criteria of landfills: production of biogas. Collection and treatment of leachate. Systems for recovery and recycling: recycling, composting, refuse-derived fuel.

Contaminated Sited Reclamation (20 hours): Legislation. Characterization of the site. Methods of investigation and environmental risk assessment. Remediation technologies.

Air Emissions (15 hours): Sketches related to the technologies of treatment of air and odor emissions.

Reference Texts

2557 - INTERNET OF THINGS
ING-INF/03 - Ingegneria delle telecomunicazioni

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LM14 - INGEGNERIA DELLE TELECOMUNICAZIONI (D.M. 270/04)
Study plans/Curricula: LM14-21 - SISTEMI E RETI DI TELECOMUNICAZIONI
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: GRIECO LUIGI ALFREDO

Training objectives
The aim of this course is to introduce and describe the architectures, the enabling technologies, and the design guidelines for packet switching networks in the Internet of Things. Theoretical concepts will be verified thorugh experimentation campaigns in the activities carried out in the laboratory.

Prerequisites
Basic knowledge of packet switching networks.

Didactic Methods

Course programme
Internet fundamentals (2 hours): basic concepts, telecommunication networks, protocol architectures, TCP/IP.
Introduction to the IoT (2 hours): architectural and system requirements, energy efficiency, fault tolerance, Quality of Service, and application domains.
Radio Frequency Identification (2 hours): tag, multiple access, applications, EPC standard.
IPv6 (8 ore): addressing, routing, and datagram format.
Networking protocols for the Internet of Things (6 hours): 802.15, ZigBee, Wireless HART, 6LoWPAN, RPL, CoAP, Wireless Sensor Network, and industrial IoT.
Telecommunication networks in industrial applications (4 hours): HART. Standard IEC/ISA SP50. Industrial Ethernet. Foundation Fieldbus, WorldFIP, SERCOS. CAN, TTCAN, FLexray, LIN. Profibus, P-Net, Ethernet power link, Lonworks. IEC 61850. Power Line Communication.
Activities in laboratory (24 hours): experimental analysis of IoT systems using the OpenWSN platform.

Reference Texts
O. Hersent et al. The Internet of Things: Key Applications and Protocols, Wiley; 2nd ed, 2012.
D. Uckelmann et al. Architecting the Internet of Things, Springer, 1st ed. 2011.
Z. Shelby. 6LoWPAN: The Wireless Embedded Internet. Wiley; 1st ed. 2010.
L. Yan et al. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Systems. Auerbach Publications. 2008.

2557 - INTERNET OF THINGS
ING-INF/03 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM17 - INGEGNERIA INFORMATICA (D.M. 270/04)
Study plans/Curricula:	LM17-22 - INFORMATION SYSTEMS
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GRIECO LUIGI ALFREDO

Training objectives

The aim of this course is to introduce and describe the architectures, the enabling technologies, and the design guidelines for packet switching networks in the Internet of Things. Theoretical concepts will be verified thorugh experimentation campaigns in the activities carried out in the laboratory.

Prerequisites

Basic knowledge of packet switching networks.

Didactic Methods

Course programme

Internet fundamentals (2 hours): basic concepts, telecommunication networks, protocol architectures, TCP/IP.

Introduction to the IoT (2 hours): architectural and system requirements, energy efficiency, fault tolerance, Quality of Service, and application domains.

Radio Frequency Identification (2 hours): tag, multiple access, applications, EPC standard.

IPv6 (8 ore): addressing, routing, and datagram format.

Networking protocols for the Internet of Things (6 hours): 802.15, ZigBee, Wireless HART, 6LoWPAN, RPL, CoAP, Wireless Sensor Network, and industrial IoT.

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Activities in laboratory (24 hours): experimental analysis of IoT systems using the OpenWSN platform.

Reference Texts

O. Hersent et al. The Internet of Things: Key Applications and Protocols, Wiley; 2nd ed, 2012.

D. Uckelmann et al. Architecting the Internet of Things, Springer, 1st ed. 2011.

Z. Shelby. 6LoWPAN: The Wireless Embedded Internet. Wiley; 1st ed. 2010.

L. Yan et al. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Systems. Auerbach Publications. 2008.

2557 - INTERNET OF THINGS
ING-INF/03 - Ingegneria delle telecomunicazioni

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM14 - INGEGNERIA DELLE TELECOMUNICAZIONI (D.M. 270/04)
Study plans/Curricula:	PDS0-2015 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GRIECO LUIGI ALFREDO

Training objectives

The aim of this course is to introduce and describe the architectures, the enabling technologies, and the design guidelines for packet switching networks in the Internet of Things. Theoretical concepts will be verified thorugh experimentation campaigns in the activities carried out in the laboratory.

Prerequisites

Basic knowledge of packet switching networks.

Didactic Methods

Course programme

Internet fundamentals (2 hours): basic concepts, telecommunication networks, protocol architectures, TCP/IP.

Introduction to the IoT (2 hours): architectural and system requirements, energy efficiency, fault tolerance, Quality of Service, and application domains.

Radio Frequency Identification (2 hours): tag, multiple access, applications, EPC standard.

IPv6 (8 ore): addressing, routing, and datagram format.

Networking protocols for the Internet of Things (6 hours): 802.15, ZigBee, Wireless HART, 6LoWPAN, RPL, CoAP, Wireless Sensor Network, and industrial IoT.

Telecommunication networks in industrial applications (4 hours): HART. Standard IEC/ISA SP50. Industrial Ethernet. Foundation Fieldbus, WorldFIP, SERCOS. CAN, TTCAN, FLexray, LIN. Profibus, P-Net, Ethernet power link, Lonworks. IEC 61850. Power Line Communication.

Activities in laboratory (24 hours): experimental analysis of IoT systems using the OpenWSN platform.

Reference Texts

O. Hersent et al. The Internet of Things: Key Applications and Protocols, Wiley; 2nd ed, 2012.

D. Uckelmann et al. Architecting the Internet of Things, Springer, 1st ed. 2011.

Z. Shelby. 6LoWPAN: The Wireless Embedded Internet. Wiley; 1st ed. 2010.

L. Yan et al. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Systems. Auerbach Publications. 2008.

2557 - INTERNET OF THINGS
ING-INF/03 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LM06 - INGEGNERIA DELL'AUTOMAZIONE (D.M. 270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Affine/Integrativa
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: GRIECO LUIGI ALFREDO

Training objectives

The aim of this course is to introduce and describe the architectures, the enabling technologies, and the design guidelines for packet switching networks in the Internet of Things. Theoretical concepts will be verified thorugh experimentation campaigns in the activities carried out in the laboratory.

Prerequisites

Basic knowledge of packet switching networks.

Didactic Methods

Course programme

Internet fundamentals (2 hours): basic concepts, telecommunication networks, protocol architectures, TCP/IP.
Introduction to the IoT (2 hours): architectural and system requirements, energy efficiency, fault tolerance, Quality of Service, and application domains.
Radio Frequency Identification (2 hours): tag, multiple access, applications, EPC standard.
IPv6 (8 ore): addressing, routing, and datagram format.
Networking protocols for the Internet of Things (6 hours): 802.15, ZigBee, Wireless HART, 6LoWPAN, RPL, CoAP, Wireless Sensor Network, and industrial IoT.
Telecommunication networks in industrial applications (4 hours): HART. Standard IEC/ISA SP50. Industrial Ethernet. Foundation Fieldbus, WorldFIP, SERCOS. CAN, TTCAN, FLexray, LIN. Profibus, P-Net, Ethernet power link, Lonworks. IEC 61850. Power Line Communication.
Activities in laboratory (24 hours): experimental analysis of IoT systems using the OpenWSN platform.

Reference Texts

O. Hersent et al. The Internet of Things: Key Applications and Protocols, Wiley; 2nd ed, 2012.
D. Uckelmann et al. Architecting the Internet of Things, Springer, 1st ed. 2011.
Z. Shelby. 6LoWPAN: The Wireless Embedded Internet. Wiley; 1st ed. 2010.
L. Yan et al. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Systems. Auerbach Publications. 2008.

2576 - IRRIGAZIONE E DRENAGGIO
ICAR/02 - Ingegneria civile

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula:	LM01-20 - IDRAULICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	FRATINO UMBERTO

Training objectives

The course aims to develop methodological aspects and practical applications for completing the education of the civil engineer in the field of water management in agriculture having special attention to the engineering approach for correctly designing and managing irrigation networks.

Prerequisites

None

Didactic Methods

Course programme

Hydrological cycle. Hydrological processes at different spatial and temporal scales. Evaporation. Potential evaporation. Penman equation. Transpiration. Blaney - Criddle, Hargraeves and FAO_Penman-Monteith equations. Groundwater balance. Effective infiltration capacity.

The hydrological balance and the irrigation crop requirements. The irrigation systems. Irrigation efficiency. Irrigation distribution networks. Distribution module and specific discharge. Clement approach, network and hydrant elasticity.

Irrigation methods: irrigation flooding, surface irrigation, subsurface irrigation, sprinkler irrigation and drip irrigation. Drainage systems.

Reference Texts

2193 - Laboratorio di Restauro

ICAR/19 - Teorie e tecniche per il restauro architettonico

Academic year:	2015
Faculty:	Dipartimento di Scienze dell'Ingegneria Civile e dell'Architettura
Study courses:	LM51CU - ARCHITETTURA (D.M. 270/04)
Study plans/Curricula:	PDS0-2009 - comune
Type:	Caratterizzante
Total Credits:	9
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	MARTINES GIACOMO

Training objectives

The Restoration Studio is aimed at providing proper methodological tools for facing the problems of Architectural Restoration, whose project is strictly related to the knowledge of the monument (from the historical, structural and technologic point of view). In this sense, fundamental is the moment of the analysis, which finds in the survey the necessary condition for every further investigation. The applicative project which follows the analysis phase is aimed at the conservation and protection of the historical significance of monuments, but can not disregard their material and structural foundation.

Prerequisites

Didactic Methods

Course programme

The Restoration Studio is composed of two teachings: Architectural Restoration, Theory and Techniques of Construction in their historical development, whose theoretical lessons and applied activities are developed in a strict coordination. Theoretical learning is aimed at the knowledge of the construction and of its different connotations, and at the definition of a methodology for the intervention which is coherent with the theoretical principles of conservation of the historical image of the monument. Applied activities are related both to the documentation of the monument in the actual conditions (architectural survey) and to the development of the restoration project, which directly derives from the formal, constructive and structural model.

Reference Texts

2193 - Laboratorio di Restauro
ICAR/09 - Analisi e progettazione strutturale per l'architettura

Academic year:	2015
Faculty:	Dipartimento di Scienze dell'Ingegneria Civile e dell'Architettura
Study courses:	LM51CU - ARCHITETTURA (D.M. 270/04)
Study plans/Curricula:	PDS0-2009 - comune
Type:	Caratterizzante
Total Credits:	3
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	MARTINES GIACOMO

Training objectives

The Restoration Studio is aimed at providing proper methodological tools for facing the problems of Architectural Restoration, whose project is strictly related to the knowledge of the monument (from the historical, structural and technologic point of view). In this sense, fundamental is the moment of the analysis, which finds in the survey the necessary condition for every further investigation. The applicative project which follows the analysis phase is aimed at the conservation and protection of the historical significance of monuments, but can not disregard their material and structural foundation.

Prerequisites

Didactic Methods

Course programme

The Restoration Studio is composed of two teachings: Architectural Restoration, Theory and Techniques of Construction in their historical development, whose theoretical lessons and applied activities are developed in a strict coordination. Theoretical learning is aimed at the knowledge of the construction and of its different connotations, and at the definition of a methodology for the intervention which is coherent with the theoretical principles of conservation of the historical image of the monument. Applied activities are related both to the documentation of the monument in the actual conditions (architectural survey) and to the development of the restoration project, which directly derives from the formal, constructive and structural model.

Reference Texts

2494 - LABORATORIO DI SISTEMI ELETTRONICI DIGITALI

ING-INF/01 - Altre Conoscenze Utili per l'Inserimento Nel Mondo del Lavoro

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Altro
Total Credits: 3
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: GIORGIO AGOSTINO

Training objectives

The aim of this course is the learning of methods and project environments / simulation / debugging of digital systems mainly through the use of integrated project environments (IDE) and laboratory design kit.

Prerequisites

Fundamentals of digital systems electronics (recommended only)

Didactic Methods

Course programme

Reminders about the fundamentals of digital electronic systems
Methods and environments for the design of digital systems,
    Design flow and debug of digital systems
    Fundamentals of Verilog HDL
    Exercises on the description of digital systems in Verilog
    Quartus II design environment and tools by Altera: ModelSim, QSYS, Programmer, Program Monitor, Waveform editor for creating testbenches
    Lab projects, creating test bench (debug) and simulation environment Quartus II & tools
    Laboratory kit Terasic DE1_SoC - Cyclone V FPGA board from Altera
    Lab Exercises about the implementation of digital systems on board DE1_SoC
    Development environment Matlab & tool
        Matlab, Simulink Fixed Point designers, HDL coder, DSPBuilder
        Practical implementation of digital systems in Matlab & tools
Laboratory exercises summary

Reference Texts

E. Napoli, Progetto di Sistemi Elettronici Digitali basati su FPGA, ed. Esculapio, 2011, ISBN: 9788874884162
W. J. Palm, Matlab: una introduzione per gli ingegneri, McGrawHill, 2011, ISBN: 9788838664663

2625 - LAVORAZIONI DI MATERIALI AERONAUTICI
ING-IND/16 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-24 - AERONAUTICO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SPINA ROBERTO

Training objectives

The discipline is part of the teachings of the 2nd year of the Master of Science in Mechanical Engineering. The performance characteristics of modern aircrafts are, to a great extent, dependent on advanced materials and by the manufacturing technologies used, with the aim of obtaining increased performance. The discipline provides a systematic treatment of materials and production processes used to manufacture and assemble aircraft structures.

Prerequisites

Manufacturing Process II

Didactic Methods

Course programme

Outline of functional characteristics (1 CFU)

Evolution of aircraft, research of functional, product development, design of the base line, automatic synthesis of design, technology verification, structural optimization, the reference scenario, load forecasting, unified equation, range aircraft, environmental audits.

Processing of Materials (5 credits)

Introduction. Aluminum, Magnesium and Beryllium, Titanium, High strength steels, super-alloys, polymer matrix composites, metal matrix composites, ceramic matrix composites, structural assembly.

Reference Texts

2381 - LINGUAGGI E TECNOLOGIE WEB
ING-INF/05 - Ingegneria informatica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM17 - INGEGNERIA INFORMATICA (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DI LECCE VINCENZO

Training objectives

The course module introduces the core technologies of the Web and Web-based information systems. It presents the major types of applications, including systems for e-commerce and e-business. It covers theoretical and practical aspects of mining unstructured web information. Finally covers emerging issues, such as Web 2.0, providing the theoretical and applicative basis to address these new paradigms.

Prerequisites

Fundamentals of Computer Science and Information Systems.

Didactic Methods

Course programme

World Wide Web: HTTP protocol; Information Retrieval Systems; Layer, tier and middleware, design methodologies; Enterprise Application Integration (EAI); Service Oriented Architecture (SOA) and Web services; Technologies for SOA: WSDL, SOAP, UDDI; Service description, service discovery, interaction, composition and coordination of Web services; Web 2.0; E-commerce; NoSQL technologies; Linked Open Data.

Reference Texts

TESTI DI RIFERIMENTO PRINCIPALI:
-Materiale didattico fornito dal docente
-Alonso, Casati, Kuno e Machiraju, Web Services, Springer, 2004
ULTERIORI TESTI SUGGERITI:
-Di Noia, De Virgilio, Di Sciascio, Donini, Semantic Web: tra ontologie e Open Data, Apogeo, 2013

2380 - LOGICA E INTELLIGENZA ARTIFICIALE
ING-INF/05 - Ingegneria informatica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM17 - INGEGNERIA INFORMATICA (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DI NOIA TOMMASO

Training objectives

Algorithms and appproaches to design and solve typical Artificial Intelligence problems.

Prerequisites

Algorithms and data structures; recursive programming; Mathematical analysis

Didactic Methods

Course programme

Intelligent Agents;
Solving Problems by Searching;
Local Search Algorithms and Optimization Problems;
Searching with Nondeterministic Actions;
Adversarial Search;
Constraint Satisfaction Problems;
Logical Agents;
First-Order Logic;
Logic Programming;
Prolog;
Inference in First-Order Logic;
Knowledge Representation;
Description Logics;
Quantifying Uncertainty;
Probabilistic Reasoning;
Learning from Examples – Design of a Machine Learning system;
Linear regression;
Logistic Regression;
Non linear classification algorithms;
Support Vector Machine;
Neural Networks;
KNN;
Statistical learning;
Naive Bayesian Classifier;
Principal Component Analisys;
SVD;
Clustering;
K-means;
GMM;
Outlier detection;
Recommender Systems;

Reference Texts

* Intelligenza artificiale. Un approccio moderno. Vol. 1 (terza edizione) - Russell Stuart J.; Norvig Peter
* Intelligenza artificiale. Un approccio moderno. Vol. 2 (seconda edizione) - Russell Stuart J.; Norvig Peter
* Intelligenza artificiale - Nils J. Nilsson
* Learn Prolog Now! - Patrick Blackburn, Johan Bos, and Kristina Striegnitz
* Pattern Recognition and Machine Learning - Christopher Bishop

2549 - Luce, Suono, Clima
ING-IND/11 - Formazione tecnologica

Academic year:	2015
Faculty:	Dipartimento di Scienze dell'Ingegneria Civile e dell'Architettura
Study courses:	LT50 - DISEGNO INDUSTRIALE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MARTELLOTTA FRANCESCO

Training objectives

The class aims at providing the students the instruments to qualitatively understand and quantitatively analyse, phenomena related with thermal exchange, sound and light technology. The effect on human being will also be considered together with the fundamentals of each physical phenomenon. The class is organized in teaching modules arranged (more or less) on a weekly basis. At the end of each module, students (organized in small groups) are requested to present a research on design products dealing with the topics discussed.

Prerequisites

Basic concepts of mathematics and physics.

Didactic Methods

Course programme

Climate

Fundamentals of energetic. Temperature. Principles of thermodynamics. Humid air. Heat exchange: conduction, convection, and radiance. Thermal comfort: methabolic rate, clothing, and micro-climate. Local thermal comfort.

Light

Definitions and measurement units of photometric measures. Colorimetry. Human vision. Lamp classification. Luminaries. Lighting desing concepts.

Sound

Fundamentals of sound propagation. Human hearing and basic psyichoacoustic concepts. Wave-surface interaction: sound absorption and diffusion. Masuring sound absorption. Room acoustics concepts: controlling reverberation through sound absorbing materials.

Reference Texts

2312 - MACCHINE A FLUIDO II E SISTEMI ENERGETICI II
ING-IND/08 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-23_TA - INDUSTRIALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CAMPOREALE SERGIO MARIO

Training objectives

AIMS:

This course aims at providing a wide knowledge of the technologies used nowadays in thermal power plants. Main subjects are steam plants, gas turbines, combined-cycle gas turbines, combined heat and power production. Future trends in "clean coal" technologies and "carbon sequestration" as well as distributed heat and power generation by means of micro gas turbines and fuel cells are subjects critically examined in the course. Basics of nuclear plants are also treated The course aims at giving the students elements for performance analysis of thermal power plants and for the design of their main components, making use of specific software, and for economic estimation. Emphasis is also given to the exergy method for the analysis and the optimization of energy conversion systems.

Prerequisites

Fundamentals of Fluid-dynamics, Energy Systems, Fluid Machinery.

Didactic Methods

Course programme

1. Energy sources: Energy consumption and availability of fossil energy sources. Renewable energy sources. Distributed power generation. Electric power demand.
2. Exergy Method: Exergy and irreversibility. Application of the exergy method to steady-flow energy conversion systems. Exergy analysis of chemical reacting systems.
3. Steam generators: Classification. Air-flue gas circuit and water-steam circuit. Corrosion. Fuels and burners. Furnace, evaporator, super-heater, economizer, air pre-heater.
4. Heavy-duty and aero-derivative gas turbines: Technology development and performance. Cooling system techniques. Micro-gas turbines. Off-design performance and regulation.
5. Combined cycle gas turbines and repowering: Fired and unfired schemes. Single and multiple pressure levels. Heat recovery boiler. Duct burner. Performance analysis. Novel cycles: STIG and other evaporative cycles. Repowering. CO2 sequestration.
6. Combined Heat and power Generation. Primary Energy Saving (PES). Co-generation by means of gas turbines and internal combustion engines. Trigeneration.
7. Fuel Cells and Hydrogen Power: Theory and classification of the main fuel cell types. Thermodynamics of a fuel cell. Ideal performance. Acutal performance and fuel cell efficiency. Hybrid fuel cell-gt micro gas turbine schemes. Hydrogen production from fossil fuels and renewable sources.
8. Pollutant emissions: Pollutant emitted by combustion process and environment impact. Measurement units of pollutants. After-treatment.
9. Renewable energy: Concentrated solar power plants. Wind energy

Reference Texts

2124 - MACCHINE ELETTRICHE
ING-IND/32 - Ingegneria dell'automazione

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula:	LT17-21 - AUTOMAZIONE
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	STASI SILVIO

Training objectives

To teach principles of AC and DC motors and generators, and transformers, and their electromagnetic, mechanical, and thermal behaviour.

Prerequisites

Good understanding of steady-state and transient analysis techniques of single-phase and three-phase circuits.

Didactic Methods

Lectures, supported by transparencies and projector, laboratory team-works, personalized feedback and coaching to improve every aspect of the student's work.

Course programme

1. Analysis of RL circuit in coordinates a-ß. Complex equivalent circuit. Vector diagram in a stationary a-ß and in a rotating d-q reference frame. Analysis of a symmetric three-phase circuit in coordinates a-ß. Vector diagram.

2. Two-winding transformer. Core losses and magnetising current. Leakage reactance. Equivalent circuit. Phasor diagram. Voltage drop. Three-phase transformer. Inrush and short-circuit currents. Open-circuit and short-circuit tests. Determination of equivalent circuit parameters. Efficiency. Autotransformers. Instrument transformers.

3. Cylindrical-rotor synchronous machine. Representation of airgap m.m.f. waves. Phase and mutual inductances. Magnetizing and synchronous inductances. Vector equations. Steady-state equivalent circuit. Rotating magnetic fields. Phasor diagram of cylindrical-rotor synchronous generator. Torque, power versus angle characteristic. Open-circuit, short-circuit, and zero power-factor tests. Potier triangle. Saturation effects. Salient-pole machine. Reluctance and mutual inductance torques. Phasor diagram. Features and application of synchronous motor.

4. Three-phase induction machines. Wound rotors and squirrel cage rotors. Vector equations, slip frequency. Magnetizing inductance. Steady-state equivalent circuit. Slip-torque relationship. No-load and locked rotor tests. Determination of equivalent-circuit parameters. Efficiency. Starting and braking, speed control. Variable voltage and frequency control. Asynchronous generator. Single-phase induction motors.

5. DC machines: armature windings, field excitation, armature reaction. Interpoles, compensating winding. Separately excited machine, shunt machine, series machine, compound machine. Load characteristics of generators. Speed-torque characteristics of motors. Motor starting and braking, speed control.

6. Laboratory activity: electrical-machine tests.

7. Numerical applications: execution criteria of electrical-machine tests.

Reference Texts

A.E. Fitzgerald, C. Kingsley, and A. Kusko: Electric Machinery, New York: McGraw-Hill Book Company, 1971.

L.W. Matsch and J.D. Morgan: Electromagnetic and Electromechanical Machines, New York: John Wiley & Sons, 1987.

2124 - MACCHINE ELETTRICHE
ING-IND/32 - Ingegneria elettrica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Caratterizzante
Total Credits: 12
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: STASI SILVIO

Training objectives

To teach principles of AC and DC motors and generators, and transformers, and their electromagnetic, mechanical, and thermal behaviour.

Prerequisites

Good understanding of steady-state and transient analysis techniques of single-phase and three-phase
circuits.

Didactic Methods

Lectures, supported by transparencies and projector, laboratory team-works, personalized feedback and coaching to improve every aspect of the student's work.

Course programme

1. Analysis of RL circuit in coordinates a-ß. Complex equivalent circuit. Vector diagram in a stationary a-ß and in a rotating d-q reference frame. Analysis of a symmetric three-phase circuit in coordinates a-ß. Vector diagram.
2. Two-winding transformer. Core losses and magnetising current. Leakage reactance. Equivalent circuit. Phasor diagram. Voltage drop. Three-phase transformer. Inrush and short-circuit currents. Open-circuit and short-circuit tests. Determination of equivalent circuit parameters. Efficiency. Autotransformers. Instrument transformers.
3. Cylindrical-rotor synchronous machine. Representation of airgap m.m.f. waves. Phase and mutual inductances. Magnetizing and synchronous inductances. Vector equations. Steady-state equivalent circuit. Rotating magnetic fields. Phasor diagram of cylindrical-rotor synchronous generator. Torque, power versus angle characteristic. Open-circuit, short-circuit, and zero power-factor tests. Potier triangle. Saturation effects. Salient-pole machine. Reluctance and mutual inductance torques. Phasor diagram. Features and application of synchronous motor.
4. Three-phase induction machines. Wound rotors and squirrel cage rotors. Vector equations, slip frequency. Magnetizing inductance. Steady-state equivalent circuit. Slip-torque relationship. No-load and locked rotor tests. Determination of equivalent-circuit parameters. Efficiency. Starting and braking, speed control. Variable voltage and frequency control. Asynchronous generator. Single-phase induction motors.
5. DC machines: armature windings, field excitation, armature reaction. Interpoles, compensating winding. Separately excited machine, shunt machine, series machine, compound machine. Load characteristics of generators. Speed-torque characteristics of motors. Motor starting and braking, speed control.
6. Laboratory activity: electrical-machine tests.
7. Numerical applications: execution criteria of electrical-machine tests.

Reference Texts

2357 - MARKETING E MODELLI DI E-BUSINESS
ING-IND/35 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-21 - GESTIONE DI IMPRESA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GORGOGLIONE MICHELE

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts

Farris P.W., Bendle N.T., Pfeifer P.E., Reibstein D.J., Marketing Metrics: 50+ Metrics Every Executive Should Master, Wharton School Publishing – Pearson, 2006

Lilien G.L. e Rangaswamy A., Marketing Engineering, Prentice-Hall, 2002

Myers J.H., Segmentation & Positioning for Strategic Marketing Decisions, South-Western Educational, 1996

Kotler P. e Keller K.L., Il marketing del nuovo millennio, Pearson Prentice Hall, 2010

Gorgoglione M., Personalizzare le relazioni con i clienti. Guida per imprenditori e manager alle frontiere del business, Franco Angeli, 2011

Tuten T.L. e Solomon M.R., Social Media Marketing, Pearson Italia, 2014

2334 - MATERIALI PER L'INGEGNERIA ELETTRICA
ING-IND/31 - Ingegneria elettrica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM05 - INGEGNERIA ELETTRICA (D.M. 270/04)
Study plans/Curricula:	LM05-21 - AUTOMAZIONE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	ACCIANI GIUSEPPE

Training objectives

To present a current overview of traditional and innovative materials in use in the field of electrical, electronics engineering and ICT. Particular emphasis is given to innovative materials such as piezoelectric ceramics, materials for PV panels, shape memory alloys (SMA) and to superconductivity. Part of the course is devoted to the management and disposal of Waste from Electrical and Electronic Equipment.

Prerequisites

Good understanding of chemistry, physics and electrotechnics

Didactic Methods

Lectures, supported by transparencies and projector, laboratory team-works

Course programme

- MATERIALS USED IN ELECTRICAL ENGINEERING: . Active materials. Defects and impurities, their effect on the electrical properties [2 hours]
- ELECTRICAL CONDUCTORS: Resistivity. Matthiessen rule. Choice of a conductor. Electrical tests. Copper and its alloys. Aluminium and its alloys. Lightweight alloys. Lead. Nickel. Pond. Materials for contacts. Thermistors. Varistors. Conducting polymers. Materials for thermocouples. Resistors and potentiometers [6 hours]
- MAGNETIC MATERIALS: Classifications. Fundamental properties. Magnetostriction. Steels and cast irons. Alloys of iron. Ferrites. Rolled steels for electrical machines. Permanent magnets. Ferromagnetic shape memory alloys. Inductors. [6 hours]
- SUPERCONDUCTING MATERIALS Meissner effect and classical theories. High-temperature superconductors .. Crioresistivity. Organic superC. Biomagnetism, Magneto-resistors. [4 hours]
- DIELECTRIC MATERIALS Polarization. Loss and relaxation. Complex permittivity. Ferroelectricity. Piezoelectricity. Conduction and breakdown. Statistical methods applied to discharge. . Electrical testing. Thermal testing. Classification of insulating materials and their aging. Solid insulating materials:, Ceramic materials, piezoelectric materials. PZT. Polymeric materials. Materials for Energy Harvesting. Thermoplastic and thermosetting resins. Elastomers. Silicones.
Capacitors. characteristic parameters. Technology of signal and power capacitors. Paper, mica, film (plastic) and electrolyte capacitors, Energy Storage Capacitors. Variable capacitors. . [12 hours]
- . SEMICONDUCTORS PN junction. Solar cells , LED. OLED, LCD. Chromogenic materials [6 hours]
- NOTES ON NANO TECHNOLOGY AND NANOTUBES [2 hours]
- WEEE management and disposal of Waste from Electrical and Electronic Equipment [4 hours]
- LABORATORY TEAM-WORK for year project [12 hours]

Reference Texts

- Solymar, Walsh: "Lectures on the Electrical Properties of Materials" . Oxford University Press
- "Innovative Materials" Ed. by P. Vincenzini, Techna
- L. Simoni "Proprietà dielettriche e scarica" CLUEB
L.. O' Handley R.C. "Modern Magnetic Materials" John Wiley and Sons, 2000
Smith Ralph C. "Smart Material Systems" SIAM 2005

2129 - MECCANICA APPLICATA
ING-IND/13 - Ingegneria dell'automazione

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT17 - INGEGNERIA INFORMATICA E DELL'AUTOMAZIONE (D.M.270/04)
Study plans/Curricula:	LT17-21 - AUTOMAZIONE
Type:	Caratterizzante
Total Credits:	9
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MANTRIOTA GIACOMO

Training objectives

The student acquires knowledge of the course on topics related to the definition and analysis, from the point of view of kinematics and dynamics, of individual components and mechanical devices of machines. At the same time the lessons are aimed at learning the choice and design of mechanical components for usage within complex mechanical systems.

Through numerical exercises, the student will become familiar with the most common characteristic parameters of the machines, appreciating orders of magnitude.

Prerequisites

Kinematics and Dynamics of a particle. Integration of second-order differential equations.

Didactic Methods

Course programme

REFERENCES: Geometry of the masses. Bullets of geometry of the masses in space. Ellipsoid of inertia and its properties. Geometric behavior and mechanical constraints. Kinematics of rigid bodies. Rigid motion plan. Statics of the material point. Statics of material systems.

KINEMATICS AND DYNAMICS OF MECHANISMS: Kinematics and dynamics of planar mechanisms. Crank. Wishbones. Mechanisms for quick return. Mechanisms for automatic machines.

ADHESION AND FRICTION: Introduction to the phenomenon of friction. Sliding friction. Friction in the pins. Phenomenon of rolling friction. Jamming.

TRANSMISSION OF MOTION BY FLEXIBLE. Types of flexible, flat belts and V-belts, timing belts, ropes. Pulleys. Fundamental equation in the transmission with flexible. Forcing the belt. Torque and maximum power transmittable. Applications.

GEARS AND DRIVES. Types. Profiles of the teeth. Geometry of cylindrical gears with straight teeth. Meshing reel-dentures. Forces exchanged between teeth. Ordinary gear trains. Epicyclic gear trains.

BRAKES AND CLUTCHES. Brakes and clutches; Distribution of pressure in a brake according to the theory of Romiti; Drum brakes, disc, tape..

LUBRICATION: fluid viscosity; Reynolds equation. Examples. Journal and axial bearing. Hydrostatic bearings

TRANSIENT IN MECHANICAL SYSTEMS. Couple engine load: direct, with speed reducer with clutch. Stability. Efficiency.

PERFORMANCE OF THE MECHANICAL SYSTEMS: Dynamic equations. Modelling and simulation of mechanical systems. Principles of mechanical drives. Efficiency of mechanical drives. Dynamics of rotating machines. Cyclic motion.

Reference Texts

2129 - MECCANICA APPLICATA
ING-IND/13 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MANTRIOTA GIACOMO

Training objectives

The student acquires knowledge of the course on topics related to the definition and analysis, from the point of view of kinematics and dynamics, of individual components and mechanical devices of machines. At the same time the lessons are aimed at learning the choice and design of mechanical components for usage within complex mechanical systems.

Through numerical exercises, the student will become familiar with the most common characteristic parameters of the machines, appreciating orders of magnitude

Prerequisites

Kinematics and Dynamics of a particle. Integration of second-order differential

Didactic Methods

Course programme

REFERENCES: Geometry of the masses. Bullets of geometry of the masses in space. Ellipsoid of inertia and its properties. Geometric behavior and mechanical constraints. Kinematics of a point. Kinematics of rigid bodies. Rigid motion plan. Statics of the material point. Statics of material systems. Dynamics of a particle. Dynamics of systems of part

KINEMATICS AND DYNAMICS OF MECHANISMS: Kinematics and dynamics of planar mechanisms. Crank. Wishbones. Mechanisms for quick return. Mechanisms for automatic machines. Articulated systems in open kinematic chain. Main applications.

ADHESION AND FRICTION: Introduction to the phenomenon of friction. Sliding friction. Friction in the pins. Phenomenon of rolling friction. Jamming. Applications with rolling friction and sliding friction. Examples and applications

TRANSMISSION OF MOTION BY FLEXIBLE. Types of flexible, flat belts and V-belts, timing belts, ropes. Pulleys. Fundamental equation in the transmission with flexible. Forcing the belt. Torque and maximum power transmittable. Applications.

GEARS AND DRIVES. Types. Profiles of the teeth. Geometry of cylindrical gears with straight teeth. Meshing reel-dentures. Forces exchanged between teeth. Ordinary gear trains. Epicyclic gear trains. Main applications.

BRAKES AND CLUTCHES. Brakes and clutches; Distribution of pressure in a brake according to the theory of Romiti; Drum brakes, disc, tape. Clutches flat and conical energy dissipated during the graft.

TRANSIENT IN MECHANICAL SYSTEMS. Couple engine load: direct, with speed reducer with clutch. Systems in periodic regime; Degree of irregularities; sizing of a flywheel

MECHANICAL VIBRATIONS. Classical solution of differential equations; Analysis of mechanical systems in the time domain and frequency; Free and forced vibrations of systems to a degree of freedom, Vibrations for oscillation of constraint and for rotating eccentric mass; Transmissibility.

Reference Texts

2151 - MECCANICA APPLICATA ALLE MACCHINE I
ING-IND/13 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LT31-20 - MECCANICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MANGIALARDI LUIGI

Training objectives

The student acquires knowledge of the course on topics related to the definition and analysis, from the point of view of kinematics and dynamics, of individual components and mechanical devices of machines. At the same time the lessons are aimed at learning the choice and design of mechanical components for usage within complex mechanical systems.

Through numerical exercises, the student will become familiar with the most common characteristic parameters of the machines, appreciating orders of magnitude.

Prerequisites

Lessons from the first year, and in particular Rational Mechanics and Industrial Technical Drawing.

Didactic Methods

Course programme

Syllabus (Section 1):

1. KINEMATICS AND DYNAMICS OF MECHANISMS PLANS

Kinematics and dynamics of planar mechanisms. Crank. Wishbones. Mechanisms for quick return. Mechanisms for automatic machines. Systems in articulated open kinematic chain. Main applications.

2. GEARS AND DRIVES

Types. Profiles of the teeth. Geometry of cylindrical gears with straight teeth. Meshing reel-dentures. Interference. Minimum number of teeth. Axis helical tooth gear wheels. Bevel. Forces exchanged between teeth. Ordinary gear trains. Epicyclic gear trains. Helical planetary gears. Differential bevel gear. Models of power lost. Main applications.

3. ADHESION AND FRICTION

Introduction to the phenomenon of friction. Sliding friction. Friction in the pins. Phenomenon of rolling friction. Jamming. Applications with rolling friction and sliding friction. Examples and applications.

4. TRANSMISSION OF MOTION BY FLEXIBLE

Types of flexible, flat belts and V-belts, timing belts, ropes. Pulleys. Fundamental equation in the transmission with flexible. Forcing the belt. Torque and maximum power transmittable. Applications.

5. BRAKES AND CLUTCHES

Brakes and clutches; Distribution of pressure in a brake according to the theory of Romiti; Drum brakes, disc, tape. Clutches flat and conical energy dissipated during the graft.

6. JOINTS

Joints, their classification. Single and double Cardan joint. Rzeppa joint, joint Bendix.

7. MECHANICAL VIBRATIONS

Classical solution of differential equations; Analysis of mechanical systems in the time domain and frequency; Free and forced vibrations of systems to a degree of freedom, Vibrations for oscillation of constraint and for rotating eccentric mass; Transmissibility. Vibration isolation.

Reference Texts

2151 - MECCANICA APPLICATA ALLE MACCHINE I
ING-IND/13 - Ingegneria meccanica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula: LT31-20 - MECCANICA
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: MANGIALARDI LUIGI

Training objectives

The student acquires knowledge of the course on topics related to the definition and analysis, from the point of view of kinematics and dynamics, of individual components and mechanical devices of machines. At the same time the lessons are aimed at learning the choice and design of mechanical components for usage within complex mechanical systems.

Through numerical exercises, the student will become familiar with the most common characteristic parameters of the machines, appreciating orders of magnitude.

Prerequisites

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Didactic Methods

Course programme

Syllabus (Section 1):

1. KINEMATICS AND DYNAMICS OF MECHANISMS PLANS

Kinematics and dynamics of planar mechanisms. Crank. Wishbones. Mechanisms for quick return. Mechanisms for automatic machines. Systems in articulated open kinematic chain. Main applications.

2. GEARS AND DRIVES

Types. Profiles of the teeth. Geometry of cylindrical gears with straight teeth. Meshing reel-dentures. Interference. Minimum number of teeth. Axis helical tooth gear wheels. Bevel. Forces exchanged between teeth. Ordinary gear trains. Epicyclic gear trains. Helical planetary gears. Differential bevel gear. Models of power lost. Main applications.

3. ADHESION AND FRICTION

Introduction to the phenomenon of friction. Sliding friction. Friction in the pins. Phenomenon of rolling friction. Jamming. Applications with rolling friction and sliding friction. Examples and applications.

4. TRANSMISSION OF MOTION BY FLEXIBLE

Types of flexible, flat belts and V-belts, timing belts, ropes. Pulleys. Fundamental equation in the transmission with flexible. Forcing the belt. Torque and maximum power transmittable. Applications.

5. BRAKES AND CLUTCHES

Brakes and clutches; Distribution of pressure in a brake according to the theory of Romiti; Drum brakes, disc, tape. Clutches flat and conical energy dissipated during the graft.

6. JOINTS

Joints, their classification. Single and double Cardan joint. Rzeppa joint, joint Bendix.

7. MECHANICAL VIBRATIONS

Classical solution of differential equations; Analysis of mechanical systems in the time domain and frequency; Free and forced vibrations of systems to a degree of freedom, Vibrations for oscillation of constraint and for rotating eccentric mass; Transmissibility. Vibration isolation.

Reference Texts

2148 - MECCANICA DEI MATERIALI E PROGETTAZIONE MECCANICA I
ING-IND/14 - Ingegneria meccanica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula: LT31-21_TA - INDUSTRIALE
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: CIAVARELLA MICHELE

Training objectives

The course aims to provide knowledge about the mechanical behavior of metals, ceramics and composites in applications with constant stress, variable stress, in the presence of creep and of defects. Further, it and provide the elements and basic methodologies for design of trasmissions and of simple mechanical structures.

Prerequisites

Analytical mechanics, mechanical drawing, applied mechanics

Didactic Methods

Course programme

1. Mohr's circle. Plane stress and plane strain. Overview of resistance criteria. Stress and strain in notch and cracks. Linear Elastic Fracture mechanics. Thin and thick pipes and pressure vessels. Rotating disks. Hertzian contact stresses.
2. Mechanics of materials: Mechanic properties of materials. Metallic, ceramic, polymeric, composite materials. Static strength in mechanical components. Fatigue of materials. Fatigue tests. Wohler's curves. Random fatigue. Notch effect. Creep
3. Main machine components.
Spur gears. Materials for spur gears. Lewis' formula. Fatigue and surface fatigue in gears. Helical and bevel gears. Power screws. Shafts and axles. Keys, splines. Bolted and riveted joints. Welded joints. Rolling bearings. Bending and torsion springs. Helical springs.

Reference Texts

2148 - MECCANICA DEI MATERIALI E PROGETTAZIONE MECCANICA I
ING-IND/14 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LT31-21_TA - INDUSTRIALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CIAVARELLA MICHELE

Training objectives

The course aims to provide knowledge about the mechanical behavior of metals, ceramics and composites in applications with constant stress, variable stress, in the presence of creep and of defects. Further, it and provide the elements and basic methodologies for design of trasmissions and of simple mechanical structures.

Prerequisites

Analytical mechanics, mechanical drawing, applied mechanics

Didactic Methods

Course programme

1. Mohr' s circle. Plane stress and plane strain. Overview of resistance criteria. Stress and strain in notch and cracks. Linear Elastic Fracture mechanics. Thin and thick pipes and pressure vessels. Rotating disks. Hertzian contact stresses.
2. Mechanics of materials: Mechanic properties of materials. Metallic, ceramic, polymeric, composite materials. Static strength in mechanical components. Fatigue of materials. Fatigue tests. Wohler' s curves. Random fatigue. Notch effect. Creep
3. Main machine components.
Spur gears. Materials for spur gears. Lewis' formula. Fatigue and surface fatigue in gears. Helical and bevel gears. Power screws. Shafts and axles. Keys, splines. Bolted and riveted joints. Welded joints. Rolling bearings. Bending and torsion springs. Helical springs.

Reference Texts

2634 - MECCANICA DEL VEICOLO E PROGETTAZIONE ASSISTITA DI STRUTTURE MECCANICHE
ING-IND/13 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-22 - COSTRUTTIVO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MANGIALARDI LUIGI

Training objectives

Module I: Mechanics of the Vehicle

The module deals with the kinematics and dynamics of road vehicle and, therefore, pay particular attention to the organs which constrain the motion and performance: tires, suspension, brakes and transmission line.

Module II: Computer-Aided Design of Mechanical Structures.

This course aims at providing general knowledge and basic methodologies to design mechanical structures with the aid of the most recent techniques of design based on the finite element method (FEM). Moreover, this course aims at providing the basic knowledge to use FE commercial software (in particular, ANSYS).

Prerequisites

Module I: Mechanics of the Vehicle.

Prior knowledge required for the course are those related to the notions of "Mechanics applied to Machines II", "Fluid Machinery II and Energy Systems II", "Mechanical Design II and Construction of Machines", Electrical

Didactic Methods

Module II: Computer-Aided Design of Mechanical Structures

Theoretical lectures, class exercises with the aid of computer. Personalized feedback and coaching to improve student's work.

Course programme

Module I: Mechanics of the Vehicle.

Forces exchanged between vehicles and road: the constitution of the tire, nomenclature and classification, distribution of wheel-ground contact pressure, rolling resistance forces exchanged between the wheel and the ground in the longitudinal and transverse and combined dynamic behaviour.

• Aerodynamic actions: friction-induced and shape, lift and pitching moment; aerodynamic field around the vehicle; appropriate forms to reduce the resistance.

• Vehicle dynamics: calculation of benefits in rectilinear motion, performance of vehicles with internal combustion engines and electrical systems, the choice of transmission ratios.

• Braking on straight roads: braking in real conditions, brake force distribution and anti-skid systems with mechanical and electronic controls.

• Suspension of motor vehicle: classification of the suspension kinematics, roll centre, valuation metrics.

• Curvilinear Trajectories: model linearized with three degrees of freedom for two-axle vehicles (bicycle model), the margin of stability, neutral behaviour, over and under steer.

Module II: Computer-Aided Design of Mechanical Structures.

- Introduction to solid and structural mechanics: Governing equations (equilibrium, constitutive, compatibility) for the continuum (0.3 ECTS).

- Introduction to finite element method: Hamilton principle. Shape functions. Reproduction property and convergence property of the FEM (h-convergence, p-convergence) (0.1 ECTS).

- Stiffness matrix and mass matrix. Equilibrium equations of the element in the local and global coordinate system. Assembly of global FE equations (0.2 ECTS).

- Numerical methods to solve the motion equation. Central difference explicit method. Newmark implicit method (0.4 ECTS).

- Modal and spectral analysis (0.5 ECTS).

- Truss elements, Beam elements, 2D solid elements, Plate elements, Shell elements, 3D solid elements.

- Special purpose elements (singularity element and infinite element) and modelling techniques (use of symmetry, mesh compatibility, modelling of offset, modelling of supports, modelling of joints, multipoint constraints equations: Lagrange multiplier method, penalty method) (0.2 ECTS).

- Weighted residual approach for FEM (0.8 ECTS).

- Introduction to ANSYS. Input file: preprocessing, solution, postprocessing. Solid modelling in ANSYS.

Examples: truss elements, beam elements, 2D plane strain and plane stress elements, shell 3D solid elements. Transient problems. Contact problems. Linear elastic fracture mechanics problems. Buckling analysis. Substructuring analysis. Thermo-mechanical coupled problems (2 ECTS).

Reference Texts

2634 - MECCANICA DEL VEICOLO E PROGETTAZIONE ASSISTITA DI STRUTTURE MECCANICHE
ING-IND/14 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-22 - COSTRUTTIVO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MANGIALARDI LUIGI

Training objectives

Module I: Mechanics of the Vehicle
The module deals with the kinematics and dynamics of road vehicle and, therefore, pay particular attention to the organs which constrain the motion and performance: tires, suspension, brakes and transmission line.
Module II: Computer-Aided Design of Mechanical Structures.
This course aims at providing general knowledge and basic methodologies to design mechanical structures with the aid of the most recent techniques of design based on the finite element method (FEM). Moreover, this course aims at providing the basic knowledge to use FE commercial software (in particular, ANSYS).

Prerequisites

Module I: Mechanics of the Vehicle.
Prior knowledge required for the course are those related to the notions of "Mechanics applied to Machines II", "Fluid Machinery II and Energy Systems II", "Mechanical Design II and Construction of Machines", Electrical

Didactic Methods

Module II: Computer-Aided Design of Mechanical Structures
Theoretical lectures, class exercises with the aid of computer. Personalized feedback and coaching to improve student's work.

Course programme

Module I: Mechanics of the Vehicle.
Forces exchanged between vehicles and road: the constitution of the tire, nomenclature and classification, distribution of wheel-ground contact pressure, rolling resistance forces exchanged between the wheel and the ground in the longitudinal and transverse and combined dynamic behaviour.
• Aerodynamic actions: friction-induced and shape, lift and pitching moment; aerodynamic field around the vehicle; appropriate forms to reduce the resistance.
• Vehicle dynamics: calculation of benefits in rectilinear motion, performance of vehicles with internal combustion engines and electrical systems, the choice of transmission ratios.
• Braking on straight roads: braking in real conditions, brake force distribution and anti-skid systems with mechanical and electronic controls.
• Suspension of motor vehicle: classification of the suspension kinematics, roll centre, valuation metrics.
• Curvilinear Trajectories: model linearized with three degrees of freedom for two-axle vehicles (bicycle model), the margin of stability, neutral behaviour, over and under steer.
Module II: Computer-Aided Design of Mechanical Structures.
- Introduction to solid and structural mechanics: Governing equations (equilibrium, constitutive, compatibility) for the continuum (0.3 ECTS).
- Introduction to finite element method: Hamilton principle. Shape functions. Reproduction property and convergence property of the FEM (h-convergence, p-convergence) (0.1 ECTS).
- Stiffness matrix and mass matrix. Equilibrium equations of the element in the local and global coordinate system. Assembly of global FE equations (0.2 ECTS).
- Numerical methods to solve the motion equation. Central difference explicit method. Newmark implicit method (0.4 ECTS).
- Modal and spectral analysis (0.5 ECTS).
- Truss elements, Beam elements, 2D solid elements, Plate elements, Shell elements, 3D solid elements.
- Special purpose elements (singularity element and infinite element) and modelling techniques (use of symmetry, mesh compatibility, modelling of offset, modelling of supports, modelling of joints, multipoint constraints equations: Lagrange multiplier method, penalty method) (0.2 ECTS).
- Weighted residual approach for FEM (0.8 ECTS).
- Introduction to ANSYS. Input file: preprocessing, solution, postprocessing. Solid modelling in ANSYS.
Examples: truss elements, beam elements, 2D plane strain and plane stress elements, shell 3D solid elements. Transient problems. Contact problems. Linear elastic fracture mechanics problems. Buckling analysis. Substructuring analysis. Thermo-mechanical coupled problems (2 ECTS).

Reference Texts

2118 - METODI DI RAPPRESENTAZIONE TECNICA
ING-IND/15 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	UVA ANTONIO EMMANUELE

Training objectives

The main aim of the course is to provide the techniques for the technical representation of industrial contents according to the UNI-ISO-CEN standards.

Prerequisites

None

Didactic Methods

Course programme

History and evolution of technical drawing. Classification of technical drawings. Standards. Graphic representations: multiview, sectioning, dimensioning. UNI standards for technical drawings. Production and quality of parts: general principles of manufacturing and shapes: dimensional, surface and geometrical tolerancing. Fundamentals of machine components: functional, realistic and symbolic representation of: threads, nuts and bolts; shafts and hubs, bearings, parallel and taper keys, splines; gear wheels and belts. Practical classes: technical sketches and 2D AutoCAD to produce digital drawings of parts and assemblies.

Reference Texts

2118 - METODI DI RAPPRESENTAZIONE TECNICA
ING-IND/15 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT03 - INGEGNERIA GESTIONALE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	UVA ANTONIO EMMANUELE

Training objectives
The main aim of the course is to provide the techniques for the technical representation of industrial contents according to the UNI-ISO-CEN standards.

Prerequisites
None

Didactic Methods

Course programme
History and evolution of technical drawing. Classification of technical drawings. Standards. Graphic representations: multiview, sectioning, dimensioning. UNI standards for technical drawings. Production and quality of parts: general principles of manufacturing and shapes: dimensional, surface and geometrical tolerancing. Fundamentals of machine components: functional, realistic and symbolic representation of: threads, nuts and bolts; shafts and hubs, bearings, parallel and taper keys, splines; gear wheels and belts. Practical classes: technical sketches and 2D AutoCAD to produce digital drawings of parts and assemblies.

Reference Texts

2118 - METODI DI RAPPRESENTAZIONE TECNICA
ING-IND/15 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LT31-22 - MECCANICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MONNO GIUSEPPE

Training objectives

The main aim of the course is to provide the techniques for the technical representation of industrial contents according to the UNI-ISO-CEN standards.

Prerequisites

None

Didactic Methods

Course programme

History and evolution of technical drawing. Classification of technical drawings. Standards. Graphic representations: multiview, sectioning, dimensioning. UNI standards for technical drawings. Production and quality of parts: general principles of manufacturing and shapes: dimensional, surface and geometrical tolerancing. Fundamentals of machine components: functional, realistic and symbolic representation of: threads, nuts and bolts; shafts and hubs, bearings, parallel and taper keys, splines; gear wheels and belts. Practical classes: technical sketches and 2D AutoCAD to produce digital drawings of parts and assemblies.

Reference Texts

2126 - METODI NUMERICI PER L'INGEGNERIA
MAT/08 - matematica, informatica e statistica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Base
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	POLITI TIZIANO

Training objectives

The aim is to allow students to solve differential problems using Laplace and Fourier transforms and to solve numerically some basic problems (root finding, data, integral and functions approximations, linear systems).

Prerequisites

Basic properties of complex numbers. Calculus, Basic theory of real functions, Derivatives and Integral. Linear systems theory.

Didactic Methods

Course programme

1. Complex numbers. Euler's formula. Complex variable functions: exponential, sine, cosine and logarithm. The Laplace transform and related properties. The Inverse Laplace Transform. Convolution Theorem. Partial fractions expansion. The residuals' method. Solution of differential equations, differential systems, boundary value problems and integral equations by the Laplace Transform. Fourier Series. Complex form of Fourier series. Finite Fourier Transform. Solution of Partial Differential Equations by Fourier Transform.
Computer representation of Numbers. Floating Point numbers. Mantissa and characteristic. Relative and Absolute error. The bisection method. The Regula falsi method. One-point iteration methods. Newton's method. Numerical solution of triangular systems. Gauss method. Computational cost of Gauss method. Pivoting strategies. LU decomposition. Crout and Doolittle techniques. Lagrange interpolation polynomial. Error for Lagrange interpolation polynomial. The Runge function. The trapezidal Quadrature Formulas. Trapezoidal Rule and Simpson's Rule. The composite trapezoidal rule. A priori error estimate for composite trapezoidal rule. Midpoint rule.

Reference Texts

M. Spiegel, Trasformata di Laplace, Collana Schaum.

G. Naldi, L. Pareschi, G. Russo, Introduzione al Calcolo Scientifico, McGraw-Hill, 2001.

A. Quarteroni, F. Saleri, Introduzione al Calcolo Scientifico, Springer-Verlag 2006.

2175 - MICROONDE E ANTENNE
ING-INF/02 - Ingegneria delle telecomunicazioni

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula: LT04-21 - INGEGNERIA DELLE TELECOMUNICAZIONI
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Ciclo Annuale Unico
Exam type: Orale
Professor in charge: PRUDENZANO FRANCESCO

Training objectives
The aim of this course is to provide: i) a suitable knowledge antennas and radio propagation ii) comprehension of electromagnetic radiation iii) design of simple antennas

Prerequisites
Knowledge of electromagnetism, Electromagnetics. Communication Systems. Basic physics and electrical circuit theory

Didactic Methods

Course programme
Antenna Parameters. Free Space Path loss. Mathematical formulation. Wire antennas: Short dipole, long and half-wavelength dipoles, standing and traveling wave antennas, wire antennas   Loop antennas. Huygensʾs source. Aperture antennas; vector potential F for determining the fields; radiation from a rectangular waveguide that is opening into the free space; radiation from a horn antenna; beamwidth of the horn antenna. (25 ECTS) Array antennas; array factor; the directivity and beamwidth of an array antenna. Broadside array antennas; endfire array antennas; phased array antenna systems (scanning arrays); designing an array antenna system having a specified characteristic. Array antennas with non-uniform excitations; binomial arrays; the beam width of a binomial array. Yagi-Uda - log-periodical antennas. Characterization and measurement of Antennas (9 ECTS)

Reference Texts
Dispense/Lecture notes - A. Paraboni: Antenne, McGraw-Hill Italia. - Marzano Pierdicca, Fondamenti di Antenne Carocci

2175 - MICROONDE E ANTENNE
ING-INF/02 - Ingegneria delle telecomunicazioni

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-20 - INGEGNERIA ELETTRONICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	PRUDENZANO FRANCESCO

Training objectives

The aim of this course is to provide: i) a suitable knowledge antennas and radio propagation ii) comprehension of electromagnetic radiation iii) design of simple antennas

Prerequisites

Knowledge of electromagnetism, Electromagnetics. Communication Systems. Basic physics and electrical circuit theory

Didactic Methods

Course programme

Antenna Parameters. Free Space Path loss. Mathematical formulation. Wire antennas: Short dipole, long and half-wavelength dipoles, standing and traveling wave antennas, wire antennas   Loop antennas. Huygens's source. Aperture antennas; vector potential F for determining the fields; radiation from a rectangular waveguide that is opening into the free space; radiation from a horn antenna; beamwidth of the horn antenna. (25 ECTS) Array antennas; array factor; the directivity and beamwidth of an array antenna. Broadside array antennas; endfire array antennas; phased array antenna systems (scanning arrays); designing an array antenna system having a specified characteristic. Array antennas with non-uniform excitations; binomial arrays; the beam width of a binomial array. Yagi-Uda - log-periodical antennas. Characterization and measurement of Antennas (9 ECTS)

Reference Texts

Dispense/Lecture notes - A. Paraboni: Antenne, McGraw-Hill Italia. - Marzano Pierdicca, Fondamenti di Antenne Carocci

2589 - MIGLIORAMENTO CONTINUO DI PROCESSI SOSTENIBILI
ING-IND/16 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-22 - OPERATIONS MANAGEMENT
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DASSISTI MICHELE

Training objectives

The student will gain clear comprehension of sustainability issues in manufacturing and production systems. The student will gain skills on successfully recognising, measure and apply sustainable solutions to different manufacturing processes. The student will gain competences on analysis of complex real production situations, on the use of advanced methodologies and non-conventional tools for designing and implementing continuous process actions. The teaching methodology adopted will foster into the student a self-reliance attitude as well as critical approach to analyse manufacturing situations and to solve related sustainability problems.

The course fosters the training on industrial competences through the specific agreements with industrial companies of the territories. Students attending the course can have the privilege to be selected for specific trainings on continuous improvement processes within the same companies.

Prerequisites

English. Competencies on Quality, Statistics for Engineers, Chemistry, Physics, Manufacturing Technologies, Production Systems.

Didactic Methods

The course promotes problem-based learning by collaborative thinking, learning by doing and student centred learning in the assisted laboratories works.

Mentoring of the lecturer supporting the collaborative thinking.

Possible personal feedback and co

Course programme

SUSTAINABILITY
SUSTAINABILITY ASSESSMENT
MEASUREMENT:
ASSESSMENT APPROACHES:
REPORTING:
SUSTAINABILITY DEPLOYMENT
MANUFACTURING STRATEGIES
TECHNOLOGICAL APPROACHES
SCIENTIFIC DECISIONAL APPROACHES
SUSTAINABILITY IMPROVEMENT & INNOVATION
CASE STUDIES

Reference Texts

- DASSISTI Michele, SESTANTE, Mc. Graw-Hill, ISBN: 9781308102962
- ATTOLICO, Luciano. Innovazione Lean: strategie per valorizzare persone, prodotti e processi. HOEPLI EDITORE, 2012. ISBN 978-88-203-4511-2
- Montgomery, Douglas C. Design and analysis of experiments. John Wiley & Sons, 2008.
- Teacher᾽s notes and suggested references

2589 - MIGLIORAMENTO CONTINUO DI PROCESSI SOSTENIBILI
ING-IND/16 - Ingegneria gestionale

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula: LM13-23 - TECNOLOGIA E PRODUZIONE
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: DASSISTI MICHELE

Training objectives

The student will gain clear comprehension of sustainability issues in manufacturing and production systems. The student will gain skills on successfully recognising, measure and apply sustainable solutions to different manufacturing processes. The student will gain competences on analysis of complex real production situations, on the use of advanced methodologies and non-conventional tools for designing and implementing continuous process actions. The teaching methodology adopted will foster into the student a self-reliance attitude as well as critical approach to analyse manufacturing situations and to solve related sustainability problems.

The course fosters the training on industrial competences through the specific agreements with industrial companies of the territories. Students attending the course can have the privilege to be selected for specific trainings on continuous improvement processes within the same companies.

Prerequisites

English. Competencies on Quality, Statistics for Engineers, Chemistry, Physics, Manufacturing Technologies, Production Systems.

Didactic Methods

The course promotes problem-based learning by collaborative thinking, learning by doing and student centred learning in the assisted laboratories works.

Mentoring of the lecturer supporting the collaborative thinking.

Possible personal feedback and co

Course programme

SUSTAINABILITY
SUSTAINABILITY ASSESSMENT
MEASUREMENT:
ASSESSMENT APPROACHES:
REPORTING:
SUSTAINABILITY DEPLOYMENT
MANUFACTURING STRATEGIES
TECHNOLOGICAL APPROACHES
SCIENTIFIC DECISIONAL APPROACHES
SUSTAINABILITY IMPROVEMENT & INNOVATION
CASE STUDIES

Reference Texts

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- ATTOLICO, Luciano. Innovazione Lean: strategie per valorizzare persone, prodotti e processi. HOEPLI EDITORE, 2012. ISBN 978-88-203-4511-2
- Montgomery, Douglas C. Design and analysis of experiments. John Wiley & Sons, 2008.
- Teacherʼs notes and suggested references

2589 - MIGLIORAMENTO CONTINUO DI PROCESSI SOSTENIBILI
ING-IND/16 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-22 - OPERATIONS MANAGEMENT
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DASSISTI MICHELE

Training objectives

The student will gain clear comprehension of sustainability issues in manufacturing and production systems. The student will gain skills on successfully recognising, measure and apply sustainable solutions to different manufacturing processes. The student will gain competences on analysis of complex real production situations, on the use of advanced methodologies and non-conventional tools for designing and implementing continuous process actions.   The teaching methodology adopted will foster into the student a self-reliance attitude as well as critical approach to analyse manufacturing situations and to solve related sustainability problems.

The course fosters the training on industrial competences through the specific agreements with industrial companies of the territories. Students attending the course can have the privilege to be selected for specific trainings on continuous improvement processes within the same companies.

Prerequisites

English. Competencies on Quality, Statistics for Engineers, Chemistry, Physics, Manufacturing Technologies, Production Systems.

Didactic Methods

The course promotes problem-based learning by collaborative thinking, learning by doing and student centred learning in the assisted laboratories works.
Mentoring of the lecturer supporting the collaborative thinking.
Possible personal feedback and co

Course programme

SUSTAINABILITY
SUSTAINABILITY ASSESSMENT
MEASUREMENT:
ASSESSMENT APPROACHES:
REPORTING:
SUSTAINABILITY DEPLOYMENT
MANUFACTURING STRATEGIES
TECHNOLOGICAL APPROACHES
SCIENTIFIC DECISIONAL APPROACHES
SUSTAINABILITY IMPROVEMENT & INNOVATION
CASE STUDIES

Reference Texts

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- ATTOLICO, Luciano. Innovazione Lean: strategie per valorizzare persone, prodotti e processi. HOEPLI EDITORE, 2012. ISBN 978-88-203-4511-2
- Montgomery, Douglas C. Design and analysis of experiments. John Wiley & Sons, 2008.
- Teacherʹs notes and suggested references

2589 - MIGLIORAMENTO CONTINUO DI PROCESSI SOSTENIBILI
ING-IND/16 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-23 - TECNOLOGIA E PRODUZIONE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DASSISTI MICHELE

Training objectives

The student will gain clear comprehension of sustainability issues in manufacturing and production systems. The student will gain skills on successfully recognising, measure and apply sustainable solutions to different manufacturing processes. The student will gain competences on analysis of complex real production situations, on the use of advanced methodologies and non-conventional tools for designing and implementing continuous process actions. The teaching methodology adopted will foster into the student a self-reliance attitude as well as critical approach to analyse manufacturing situations and to solve related sustainability problems.

The course fosters the training on industrial competences through the specific agreements with industrial companies of the territories. Students attending the course can have the privilege to be selected for specific trainings on continuous improvement processes within the same companies.

Prerequisites

English. Competencies on Quality, Statistics for Engineers, Chemistry, Physics, Manufacturing Technologies, Production Systems.

Didactic Methods

The course promotes problem-based learning by collaborative thinking, learning by doing and student centred learning in the assisted laboratories works.

Mentoring of the lecturer supporting the collaborative thinking.

Possible personal feedback and co

Course programme

SUSTAINABILITY
SUSTAINABILITY ASSESSMENT
MEASUREMENT:
ASSESSMENT APPROACHES:
REPORTING:
SUSTAINABILITY DEPLOYMENT
MANUFACTURING STRATEGIES
TECHNOLOGICAL APPROACHES
SCIENTIFIC DECISIONAL APPROACHES
SUSTAINABILITY IMPROVEMENT & INNOVATION
CASE STUDIES

Reference Texts

- DASSISTI Michele, SESTANTE, Mc. Graw-Hill, ISBN: 9781308102962
- ATTOLICO, Luciano. Innovazione Lean: strategie per valorizzare persone, prodotti e processi. HOEPLI EDITORE, 2012. ISBN 978-88-203-4511-2
- Montgomery, Douglas C. Design and analysis of experiments. John Wiley & Sons, 2008.
- Teacherʼs notes and suggested references

2567 - MISURE E CONTROLLI AMBIENTALI
ICAR/01 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-20 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MALCANGIO DANIELA

Training objectives

After the introduction of the measure concept and error theory, the course deals with the main gauges and data survey and acquisition instruments, considering hydraulic instruments mainly. Than, notions on environmental systems control are given.

Prerequisites

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Didactic Methods

Course programme

Environmental measurements.

The hydraulic measures for the hydraulic sources assessment, the system test, the experimental research and control of hydraulic and industrial systems.

A quantity direct and indirect measure. Measure errors. Random and systematic errors, precision and reliability of a measure. Absolute and relative error. Mean and standard deviation value of a data series. Frequency density. Gaussian distribution. Precision module meaning. Mean square error of a finite and infinite number of measures. Uncertainty range of a direct measure. Absolute and relative errors in indirect measures, error propagation.

Transducer characteristics. Static and dynamic calibration curve. Mathematical and statistic interpolation of experimental data. Full scale error.

Measuring range. Reversal error. Sensitivity. Frequency response. Measurements of periodic, random and temporary quantities. Quantity spectrum. Use of the personal computer for the measure acquisition. A/D and D/A converters. Local and remote measurements.

Level and depth measurements. Pressure measurements. Velocity measurements. Flow rate measurements in pressure pipes. Flow rate measurements in open channels.

Environmental controls.

Control of hydraulic systems. The measure activity in the monitoring of environmental systems and parameters. Reference regulation. Processes of disposal and transport of pollutant effluents in shallow and deep water bodies and in atmosphere, with particular attention to the definition of the characteristic dynamics phenomena of receiving fluid bodies. Environmental modeling.

Reference Texts

2168 - MISURE E STRUMENTAZIONE ELETTRONICA
ING-INF/07 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-20 - INGEGNERIA ELETTRONICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GIAQUINTO NICOLA

Training objectives
At the end of the course, students should be able to: (i) use correctly basic electronic instrumentation; (ii) design, prepare and utilise typical circuits in electronic measurement; (iii) evaluate the measurement uncertainty; (iv) present correctly the results of measurements.

Prerequisites
Basic differential and integral calculus. Basic theory of probability and of continuous random variables. Basic circuit theory. Basic linear system theory.

Didactic Methods

Course programme
A) ERRORS AND UNCERTAINTY IN MEASUREMENTS
Error as a random variable; standard and expanded uncertainty, worst-case uncertainty, laws of propagation of errors and uncertainties.
B) LABORATORY INSTRUMENTATION
Use of power supply, waveform generator, multimeter, oscilloscope. Digital programmable instrumentation. Static and dynamic metrological characteristics of commercial instruments.
C) NORMATIVE AND LEGISLATIVE ASPECTS
Metre Convention, international organization of metrology, International Systems of measurement units (SI).
D) MEASUREMENTS ON CIRCUITS IN CONSTANT CONDITIONS
Probes, load effect, typical expedients in measurements of constant voltages and currents. Measurements of resistance and of static V-I characteristics. Measurement of very small resistances (conductors) and very large ones (dielectric). Bridge methods. Typical applications to sensors (temperature and strain sensors).
E) MEASUREMENT ON CIRCUITS IN SINUSOIDAL AND IN TRANSIENT CONDITIONS
Probes, load effect and typical expedients in measurements of variable voltages and currents. Frequency compensation. Measurement of impedance and of dynamic V-I characteristic.
F) LABORATORY PRACTICE
Basic usage of the digital oscilloscope. Measurement of V-I characteristics using the oscilloscope. Two-wire and four-wires resistance measurements. Measurements on coaxial cables using reflectometric techniques. Measurements of step response and frequency response on linear time-invariant circuits. Measurements of step response, frequency response, gain and offset on amplifiers built with OP-AMPS.
G) PROJECT WORK
Reports on the laboratory measurements, to prepare at home in teams.

Reference Texts
ITALIANO
Materiale didattico prodotto autonomamente dal docente su teoria, esercizi numerici, ed esercitazioni di laboratorio.
Manuali degli strumenti utilizzati in laboratorio.
Application notes dei costruttori di strumenti.
Il riferimento per tutto il materiale didattico è https://sites.google.com/site/giaquintopoliba
ENGLISH
Courseware produced independently by the teacher, covering theory, numerical exercises and laboratory practises.
Manuals of the instrumentation used in the laboratory.
Application notes of the instruments manufacturers.
The reference site for all the courseware is https://sites.google.com/site/giaquintopoliba

2168 - MISURE E STRUMENTAZIONE ELETTRONICA
ING-INF/07 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula:	LT04-21 - INGEGNERIA DELLE TELECOMUNICAZIONI
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GIAQUINTO NICOLA

Training objectives

At the end of the course, students should be able to: (i) use correctly basic electronic instrumentation; (ii) design, prepare and utilise typical circuits in electronic measurement; (iii) evaluate the measurement uncertainty; (iv) present correctly the results of measurements.

Prerequisites

Basic differential and integral calculus. Basic theory of probability and of continuous random variables. Basic circuit theory. Basic linear system theory.

Didactic Methods

Course programme

A) ERRORS AND UNCERTAINTY IN MEASUREMENTS

Error as a random variable; standard and expanded uncertainty, worst-case uncertainty, laws of propagation of errors and uncertainties.

B) LABORATORY INSTRUMENTATION

Use of power supply, waveform generator, multimeter, oscilloscope. Digital programmable instrumentation. Static and dynamic metrological characteristics of commercial instruments.

C) NORMATIVE AND LEGISLATIVE ASPECTS

Metre Convention, international organization of metrology, International Systems of measurement units (SI).

D) MEASUREMENTS ON CIRCUITS IN CONSTANT CONDITIONS

Probes, load effect, typical expedients in measurements of constant voltages and currents. Measurements of resistance and of static V-I characteristics. Measurement of very small resistances (conductors) and very large ones (dielectric). Bridge methods. Typical applications to sensors (temperature and strain sensors).

E) MEASUREMENT ON CIRCUITS IN SINUSOIDAL AND IN TRANSIENT CONDITIONS

Probes, load effect and typical expedients in measurements of variable voltages and currents. Frequency compensation. Measurement of impedance and of dynamic V-I characteristic.

F) LABORATORY PRACTICE

Basic usage of the digital oscilloscope. Measurement of V-I characteristics using the oscilloscope. Two-wire and four-wires resistance measurements. Measurements on coaxial cables using reflectometric techniques. Measurements of step response and frequency response on linear time-invariant circuits. Measurements of step response, frequency response, gain and offset on amplifiers built with OP-AMPS.

G) PROJECT WORK

Reports on the laboratory measurements, to prepare at home in teams.

Reference Texts

2504 - MISURE ELETTRONICHE
ING-INF/07 - Ingegneria elettronica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT04 - INGEGNERIA ELETTRONICA E DELLE TELECOMUNICAZIONI (D.M.270/04)
Study plans/Curricula: LT04-22_TA - INGEGNERIA ELETTRONICA PER L'INDUSTRIA E L'AMBIENTE
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Ciclo Annuale Unico
Exam type: Orale
Professor in charge: ANDRIA GREGORIO

Training objectives
AIMS:
The subject aims to give the basic elements to study and utilize correctly: i) measurement methods in CC and CA; ii) analogue and digital instrumentation and components.
EXPECTED KNOWLEDGES AND SKILLS:
Ability to correctly express the result of a measurement with the units of measure and the indication of the uncertainty, Ability to use basic measurement electronic instrumentation.

Prerequisites
Mathematical Analysis, Physics, Fundamentals of Circuit Theory.

Didactic Methods

Course programme
MOD I
Theory:
• Permanent Magnet Moving Coil Instrument
• Multi range instrumentation with shunt resistor.
• Resistance measurement with 4 wire method and guard ring method
• AC measurement, half wave and full wave rectification circuit, peak detector circuit
• Electro dynamical instruments
• Electromagnetic instruments
• Thermal instruments
• True RMS instruments
Numerical exercises
Laboratory activities
• Misura di resistenza con metodo di confronto delle cadute di tensione
Misure di segnali con sonde
• Half wave and full wave rectification circuit,
• Peak detector circuit
• RC filter frequency response
• Repeated Measures and statistical analysis of errors
• Resistance measurement with voltage comparison method.
• Signal measurement with oscilloscope probes
MOD II
Theory:
• DC Measurement methods
• Load Effects
• Measurement of resistance with bride circuits
• Static and dynamic characterization of measurement devices
• Fundamental of Analog /digital conversion
• Virtual instrument
Numerical exercises
Laboratory activities
• Resistance measurements with Wheatstone bride.
• Development of virtual instruments

Reference Texts
1) Dispense del corso, disponibili sul sito misure-dee-poliba
2) M.Savino: Fondamenti di scienza delle misure, NIS Editore
3) Bava, Ottoboni, Svelto: Fondamenti della misurazione, Esculapio, Bologna
4) W.Henry: Electronic Systems and Instrumentation, J. Wiley and Sons
5) C.F.Coombs: Electronic instrument handbook. McGraw Hill
6) T.T.Lang: Computerized Instrumentation - J. Wiley and Sons.

2590 - MODELLAZIONE DEI SISTEMI PRODUTTIVI
ING-IND/16 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-23 - TECNOLOGIA E PRODUZIONE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SPINA ROBERTO

Training objectives

Discipline is part of the teachings of the 2nd year of the Master of Science in Management Engineering. The framework provides a systematic treatment of the inherent advanced production systems, an overall summary of the production problems particularly oriented to the design and modeling of such systems. In the definition of the course program, also, in order to ensure an organic vision with a causal link to the whole production process, it was thought to provide the guideline of the description of the entire life cycle of the product, from conception and planning to its implementation on a production system. This approach allows the discussion of themes of architectures for production systems like Lean and Reconfigurable Open.

Prerequisites

Manufacturing Processes

Didactic Methods

Course programme

Elements of integration into production systems (3 credits)
Manufacturing, production systems, integration, Scheduling, CIM. Automation of production systems. The components of the production systems. Architecture of Innovative Production Systems
Lean Production Systems (Lean). Reconfigurable Manufacturing Systems (Reconfigurable). Production Systems Open (Open).
Production systems and their modeling (3 credits)
Introduction. Type of system. Principles and laws of the systems. Types and uses of models of representation. Modeling of production systems. Formulation of the problem. Production systems generic. Designing the average values. Detailed design. Queuing theory. Advanced algorithms for clustering. Case studies. Discrete element simulation
Introduction. Models for events. Models for the process. Modeling of specific systems. Simulation systems. Implementation of the models. Analysis of results. Case studies.

Reference Texts

2590 - MODELLAZIONE DEI SISTEMI PRODUTTIVI
ING-IND/16 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula:	LM13-22 - OPERATIONS MANAGEMENT
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SPINA ROBERTO

Training objectives

Discipline is part of the teachings of the 2nd year of the Master of Science in Management Engineering. The framework provides a systematic treatment of the inherent advanced production systems, an overall summary of the production problems particularly oriented to the design and modeling of such systems. In the definition of the course program, also, in order to ensure an organic vision with a causal link to the whole production process, it was thought to provide the guideline of the description of the entire life cycle of the product, from conception and planning to its implementation on a production system. This approach allows the discussion of themes of architectures for production systems like Lean and Reconfigurable Open.

Prerequisites

Manufacturing Processes

Didactic Methods

Course programme

Elements of integration into production systems (3 credits)
Manufacturing, production systems, integration, Scheduling, CIM. Automation of production systems. The components of the production systems. Architecture of Innovative Production Systems
Lean Production Systems (Lean). Reconfigurable Manufacturing Systems (Reconfigurable). Production Systems Open (Open).
Production systems and their modeling (3 credits)
Introduction. Type of system. Principles and laws of the systems. Types and uses of models of representation. Modeling of production systems. Formulation of the problem. Production systems generic. Designing the average values. Detailed design. Queuing theory. Advanced algorithms for clustering. Case studies. Discrete element simulation
Introduction. Models for events. Models for the process. Modeling of specific systems. Simulation systems. Implementation of the models. Analysis of results. Case studies.

Reference Texts

Automation, Production Systems and Computer-Integrated Manufacturing, 2009, ISBN: 978-0132393218, Pearson International Ed., Autore: M.P. Groover.
Modellazione dei Sistemi Produttivi (Volume I), 2006, ISBN: 88-371-1659-4, Pitagora Editrice Bologna, Autori: D. Milanato, R.Pinto.
Modellazione dei Sistemi Produttivi (Volume II), 2009, ISBN: 88-371-1776-0, Pitagora Editrice Bologna, Autori: M. Macchi, S. Terzi.
Lean Manufacturing, 2007, ISBN: 978-88-464-8603-5, Franco Angeli Editore, Autore: C. Donin.

2521 - OLEODINAMICA E PNEUMATICA
ING-IND/08 - Ingegneria meccanica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula: LM30-23_TA - INDUSTRIALE
Type: Caratterizzante
Total Credits: 12
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: LIPPOLIS ANTONIO DONATO

Training objectives
The course objective is to provide the students with a non superficial knowledge of fluid power component and systems.

Prerequisites
Physics, Mechanics and Fluid Dynamics.

Didactic Methods

Course programme
1) INTRODUCTION
Symbols for hydraulic and pneumatic components
2) HYDRAULIC FLUIDS
Characteristics of fluids: viscosity, kinematics viscosity, viscosity index, seal compatibility, density, compressibility, bulk modulus, dissolved and entrained air, water demulsibility, fire point, auto ignition temperature.
3) PUMPS
External gear pumps, internal gear pumps, screw pumps, vane pumps, radial piston pumps, axial piston pumps, angled piston pumps. Fixed and variable displacement pumps. Control pump and loadsensing systems.
4) MOTORS
High speed motors. Low speed high torque motors.
5) CYLINDERS
Single- and double-acting cylinder, duplex cylinder, multi-position cylinder, tandem cylinder, telescopic cylinder. Mounting systems.
6) HYDRAULIC ACCUMULATORS
Introduction. Gas-loaded accumulators: bladder and membrane accumulators. Design of accumulators. Safety regulations. Installation examples.
7) CHECK VALVES
Spring-loaded check valve, pilot-controlled check valve, prefill valve.
8) DIRECTIONAL CONTROL VALVES
Spool valve and poppet valve. Manual, pneumatic, hydraulic and electrical control. Directly operated and pilot-operated directional valve. Spring or hydraulic offset.
9) PRESSURE CONTROL VALVES
Pressure relief valve: directly operated and pilot controlled. Sequence valve, unloading valve. Pressure-reducing valve: directly and pilot-operated valve, 2- and 3-way valve.
10) FLOW CONTROL VALVES
Throttle valves: pressure and viscosity dependence. 2- and 3-way flow control valves.
11) FILTERS
Filter types, disposable element, filtration ratio, efficiency, filter pressure drop. Contamination classes (ISO 4406).
12) SERVO-VALVES
Proportional magnets, Force motor. Hysteresis. Under-lap, zero-lap, overlap. The four-way valve, pressure control hydraulic servo-valve, flow control hydraulic servo-valve. The power-assisted steering.

Reference Texts
[1] Dispense didattiche, disponibili in formato elettronico (pdf).
[2] H. Speich, A. Bucciarelli - "l' Oleodinamica" - ed. tecniche nuove.
[3] AA. VV. - "IL MANUALE DI OLEODINAMICA" - Voll. 1-4, Ed. Mannesmann-Rexroth.Rexroth.
[4] Nervegna N.: "Oleodinamica e pneumatica", vol I e II – Politeko 2000.
AA.VV. - "FONDAMENTI DI PNEUMATICA" - Ed. MANNESMANN-REXROTH
Guido BELFORTE - "PNEUMATICA" - Ed. Tecniche Nuove
Luigi ROSSI - "SISTEMI ED AUTOMAZIONE" - Di Piero editore.

2602 - PIANIFICAZIONE E TRASFORMAZIONE URBANA
ICAR/20 - Architettura ed urbanistica

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LM02 - INGEGNERIA DEI SISTEMI EDILIZI (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Caratterizzante
Total Credits: 12
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: CAMARDA DOMENICO

Training objectives

The main objective is oriented to learn methods and different approaches to planning and urban transformation, to support public decision-making.
In particular, the course looks at different approaches to planning focusing particularly on participatory decision-making processes and tools to build knowledge for decision support, also with reference to planning institutional framework.
To achieve these results, the course develops in two teaching modules including lectures, experiments and possible exercise sessions and verification.

Prerequisites

The course follows the official propaedeutic organization of the University.

Didactic Methods

The course consists of lectures, readings, audiovisual materials and some application exercises

Course programme

To achieve these results, the course is developed in the following three modules including lectures, experimentation and tests:
I. Planning history and theories
1. Elements of planning history
2. Theories of planning: traditions and perspectives
3. The profession of planner
II. Dynamics and Governance of Urban and Territorial Transformations
4. Elements of spatial economy
5. The Government of territorial transformations: issues and approaches in a European perspective
III. Methodologies for Decision and Planning Support
6. Planning Support Systems
7. Planning and urban transformation in practice. Case studies, experiments. Exercises and tests.

Reference Texts

2435 - PIANIFICAZIONE TERRITORIALE
ICAR/20 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-21_TA - AMBIENTE E TERRITORIO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BARBANENTE ANGELA

Training objectives

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Prerequisites

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Didactic Methods

Course programme

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Reference Texts
1° Modulo
Donald A. Schon, Il professionista riflessivo, Bari, Dedalo, 1993 (Parte prima e parte seconda, capitolo 3).
Luca Gaeta, Umberto Janin Rivolin, Luigi Mazza, Governo del territorio e pianificazione spaziale, Novara, CittàStudi Edizioni, 2013, Parte seconda (capitoli 6-9).
Roberto Camagni, Principi di economia urbana e territoriale, Carocci, Milano, 2011, capitoli 1-5
Enzo Scandurra, L' ambiente dell' uomo, ETAS Libri, Roma, parti prima e seconda.
Approfondimenti:
John Friedmann, Pianificazione e dominio pubblico: dalla conoscenza, Dedalo, Bari, 1993.
Saskia Sassen, Le città nell' economia globale, il Mulino, Bologna, 1994.
Roberta Capello, Economia regionale. Localizzazione, crescita regionale e sviluppo locale, il Mulino, Bologna, 2015.
2° Modulo
Bernardino Romano, Pianificazione sostenibile del territorio, Verdone editore, 2014, pp. 201-230.
Dispense della docente.
Approfondimenti:
Roberto Camagni, Principi di economia urbana e territoriale, Carocci, Milano, 2011, Capitoli 8. La dinamica urbana: i modelli ecologico-biologici e 9. Dinamica e auto-organizzazione.
3° Modulo
Maria Cristina Gibelli, Tre famiglie di piani strategici, Urbanistica, 106, 1996.
Alberto Magnaghi, Il progetto locale, Bollati Boringhieri, Torino, 2010.
Bernardino Romano, Pianificazione sostenibile del territorio, Verdone editore, 2014, 5° capitolo.
Angela Barbanente, Valutazione dei piani e degli interventi edilizi complessi, in Id. (a cura di) La valutazione nella pianificazione urbana e regionale, Bari, CNR-IRIS, 1992.
Materiali online.
Approfondimenti:
Indovina F. (2005), Governare la città con l' urbanistica. Guida agli strumenti di pianificazione urbana e del territorio, Maggioli Editore, Rimini.

2435 - PIANIFICAZIONE TERRITORIALE
ICAR/20 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-21_TA - AMBIENTE E TERRITORIO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BARBANENTE ANGELA

Training objectives

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Prerequisites

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Didactic Methods

Course programme

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Reference Texts
1° Modulo
Donald A. Schon, Il professionista riflessivo, Bari, Dedalo, 1993 (Parte prima e parte seconda, capitolo 3).
Luca Gaeta, Umberto Janin Rivolin, Luigi Mazza, Governo del territorio e pianificazione spaziale, Novara, CittàStudi Edizioni, 2013, Parte seconda (capitoli 6-9).
Roberto Camagni, Principi di economia urbana e territoriale, Carocci, Milano, 2011, capitoli 1-5
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John Friedmann, Pianificazione e dominio pubblico: dalla conoscenza, Dedalo, Bari, 1993.
Saskia Sassen, Le città nell' economia globale, il Mulino, Bologna, 1994.
Roberta Capello, Economia regionale. Localizzazione, crescita regionale e sviluppo locale, il Mulino, Bologna, 2015.
2° Modulo
Bernardino Romano, Pianificazione sostenibile del territorio, Verdone editore, 2014, pp. 201-230.
Dispense della docente.
Approfondimenti:
Roberto Camagni, Principi di economia urbana e territoriale, Carocci, Milano, 2011, Capitoli 8. La dinamica urbana: i modelli ecologico-biologici e 9. Dinamica e auto-organizzazione.
3° Modulo
Maria Cristina Gibelli, Tre famiglie di piani strategici, Urbanistica, 106, 1996.
Alberto Magnaghi, Il progetto locale, Bollati Boringhieri, Torino, 2010.
Bernardino Romano, Pianificazione sostenibile del territorio, Verdone editore, 2014, 5° capitolo.
Angela Barbanente, Valutazione dei piani e degli interventi edilizi complessi, in Id. (a cura di) La valutazione nella pianificazione urbana e regionale, Bari, CNR-IRIS, 1992.
Materiali online.
Approfondimenti:
Indovina F. (2005), Governare la città con l' urbanistica. Guida agli strumenti di pianificazione urbana e del territorio, Maggioli Editore, Rimini.

2435 - PIANIFICAZIONE TERRITORIALE
ICAR/20 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-20 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BARBANENTE ANGELA

Training objectives

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Prerequisites

Didactic Methods

Course programme

Reference Texts
1° Modulo
Donald A. Schon, Il professionista riflessivo, Bari, Dedalo, 1993 (Parti prima e seconda, capitolo 3).
Luca Gaeta, Umberto Janin Rivolin, Luigi Mazza, Governo del territorio e pianificazione spaziale, Novara, CittàStudi Edizioni, 2013, Parte seconda (capitoli 6-9).
Approfondimenti:
John Friedmann, Pianificazione e dominio pubblico: dalla conoscenza, Dedalo, Bari, 1993.
Saskia Sassen, Le città nell' economia globale, il Mulino, Bologna, 1994.
Roberta Capello, Economia regionale. Localizzazione, crescita regionale e sviluppo locale, il Mulino, Bologna, 2015.
2° Modulo
Maria Cristina Gibelli, Tre famiglie di piani strategici, Urbanistica, 106, 1996.
Alberto Magnaghi, Il progetto locale, Bollati Boringhieri, Torino, 2010.
Bernardino Romano, Pianificazione sostenibile del territorio, Verdone editore, 2014, 5° capitolo.
Angela Barbanente, Valutazione dei piani e degli interventi edilizi complessi, in Id. (a cura di) La valutazione nella pianificazione urbana e regionale, Bari, CNR-IRIS, 1992.
Materiali online.
Approfondimenti:
Indovina F. (2005), Governare la città con l' urbanistica. Guida agli strumenti di pianificazione urbana e del territorio, Maggioli Editore, Rimini.

2299 - PREVENZIONE, CONTROLLO E RISCHIO AMBIENTALE
GEO/05 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-20 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	FIDELIBUS MARIA DOLORES

Training objectives
The course will provide the understanding of many aspects of hydrogeological environments aimed at developing methodological approaches suitable for their optimal control in natural and anthropic contexts and in the preliminary stage of investigation for the design of engineering works

Prerequisites
Fundamentals of Applied Geology and Chemistry

Didactic Methods

Course programme
1) Phenomenological and conceptual models: scientific method, interdisciplinary and cross-disciplinary knowledge in the study of water resources. Hydrocomplexity. Natural systems and their dynamics. Study scale.
2) Groundwater Hydraulics: - Porosity and permeability: problems of downscaling and upscaling. Heterogeneous and anisotropic systems. Hydrogeological systems, hydrogeological units and aquifers. Measure of hydraulic head. Piezometric surfaces: fluctuations and influencing factors. Flow nets: geological and hydraulic border conditions. Local, intermediate and regional flow systems. Relationships between surface- and ground waters.
3) Study methods in hydrogeology - Atmospheric water, surface water and groundwater. Reactive and non-reactive tracers. Geochemical characteristics of natural waters. Hydrochemical facies. Stable isotopes: isotope fractionation, meteoric water line, effects of temperature, continental, altitude, and latitude effects. Natural radioactive tracers: age of water. Physical tracers: temperature of groundwater. Heat transport, conductive and advective flow. Reconstruction of thermal fields. Mass transport. Retoxification factors in relation to the variation of geo-environmental border conditons.
4) Coastal aquifers. Laws of Ghyben-Herzberg, Hubbert, Lusczinsky. Environmental head. Fluctuations of the transition zone.
5) Groundwater Monitoring - Planning of monitoring nets at hydrogeological basin scale. Monitoring of coastal aquifers: EC- T profiles in observation-wells. Safe yield and over-exploitation concepts. Monitoring and control of groundwater in landslides and during preliminary studies for civil works.
Laboratory: Flow nets and flow systems

Reference Texts

2134 - PRINCIPI DI INGEGNERIA ELETTRICA
ING-IND/31 - Ingegneria elettrica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula: LT31-20 - MECCANICA
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: DE SCISCIOLO GRAZIANO

Training objectives
To instill into students the study, the characterization and the design of the LTI electric circuits. To instill into pupils basic elements for the comprehension of LTI electrical circuits to be applied theoretically and experimentally in the field of electrical Systems and electrical Safety.

Prerequisites
Linear algebraic and differential equation systems. Trigonometry. Matrices and vectors. Electrostatic and Magneto static fundamental laws. Complex Numbers.

Didactic Methods
Lectures given in the conventional manner eventually supported by informatic multimedia, personalized feedback and coaching to improve every aspect of the student work.

Course programme
1.   Fundamentals of Electric Circuits
2.   Network Analysis
3.   AC Network Analysis. AC Power
4.   Transient Analysis
5.   Three-Phase Circuits
6.   Principles of Electro Mechanics and Power   Distribution
7.   Electrical Safety

Reference Texts
G. Rizzoni, F. Vacca, S. Vergura, "Elettrotecnica - Principi e applicazioni", 3° Edizione, McGraw Hill, 2013.
S. Vergura, "Elettrotecnica", EDISES, 2° Edizione, 2012.

2134 - PRINCIPI DI INGEGNERIA ELETTRICA
ING-IND/31 - Ingegneria elettrica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT03 - INGEGNERIA GESTIONALE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DE SCISCIOLO GRAZIANO

Training objectives

To instill into students the study, the characterization and the design of the LTI electric circuits. To instill into pupils basic elements for the comprehension of LTI electrical circuits to be applied theoretically and experimentally in the field of electrical Systems and electrical Safety.

Prerequisites

Linear algebraic and differential equation systems. Trigonometry. Matrices and vectors. Electrostatic and Magneto static fundamental laws. Complex Numbers.

Didactic Methods

Lectures given in the conventional manner eventually supported by informatic multimedia, personalized feedback and coaching to improve every aspect of the student work.

Course programme

1. Fundamentals of Electric Circuits
2. Network Analysis
3. Transient Analysis
4. AC Network Analysis. AC Power
5. Three-Phase Circuit
6. Principles of Electro Mechanics and Power Distribution.

Reference Texts

- R. Perfetti, "Circuiti elettrici", II edizione, Zanichelli, Bologna, 2013.
- G. Rizzoni, F. Vacca, S. Vergura, "Elettrotecnica - Principi e applicazioni", III edizione, Mc Graw Hill, 2013.
- S. Vergura, "Elettrotecnica", II edizione, EDISES, 2012.

2424 - PRODUZIONE ASSISTITA DAL CALCOLATORE
ING-IND/16 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-20 - TECNOLOGICO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GALANTUCCI LUIGI MARIA

Training objectives

Prerequisites
Bachelor Degree in Mechanical or Industrial Engineering

Didactic Methods

Course programme

Reference Texts
Testi Consigliati:
1. Giusti, M. Santochi: "Tecnologia meccanica e studi di fabbricazione", Ambrosiana Milano, 2Ed. 2000, Cap.1 pp 1-5, Cap. 2 pp. 7-55, Cap. 9 pp. 495-553, Cap. 10 pp. 564-639.
2. F. Grimaldi: "CNC MACCHINE UTENSILI A CONTROLLO NUMERICO", Editore Ulrico Hoelpi Milano (pp. 1-260) 2a ed.
3. T. C. Chang, R. A. Wisk, H.P. Wang: "COMPUTER AIDED MANUFACTURING", Prentice Hall, 2nd ed. 1998 (cap. 1 pp. 1-13, cap. 3 pp. 59-86, cap. 5 pp. 200-209, cap. 9 pp. 315-344).
Dispense dal sito:
4. Azionamenti elettrici
5. Interpolatori
6. Collaudo MU a CN
7. Viti di potenza (prof. Demelio)
8. Dimensionamento funzionale e tolleranze
9. Attrezzature di bloccaggio pezzi
10. Manuale Tornio CNC VSC 990 T
11. Manuale CNC Siemens 802D sl
12. Getting Start FeatureCam
Esercitazioni guidate dal sito:
ISOCOURSE Cnc Simulator
Esempio di lavorazione con FEATURECAM
Siti Web:
Guida per la ricerca di utensili: http://www.coroguide.com/ Catalogo utensili: http://www.coromant.sandvik.com/ Cncsimulator: http://www.cncsimulator.com FeatureCam: http://www.featurecam.com/
Siti che contengono disegni CAD di attrezzature:
http://www.halder.com/ http://www.nicotrameccanica.it/

2596 - PRODUZIONE EDILIZIA E CANTIERE
ICAR/11 - Ingegneria della sicurezza e protezione delle costruzioni edili

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Caratterizzante
Total Credits: 12
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: PIERUCCI ALESSANDRA

Training objectives
The course aims to provide the knowledge required for the design, construction and management of building sites, dealing with the issues related to the various procedural steps that contribute to the realization of the work, to the skills of the several stakeholders involved in the construction activity, to the verification of human resources and of materials, to the implementation of Project Management strategies and to the organization of safety and work injuries, from the design, through the production to the management of buildings.

Prerequisites
Fundamentals of Building Technology. Notions of Technical-Environmental Physics and of Materials Technology and Applied Chemistry

Didactic Methods
Classroom lessons, exercises on the construction site documentation and tutoring in the form of assistance to groups

Course programme
The construction phase of the buildings in the production life cycle
Environmental sustainability in building production
The general protection measures in the workplace and in construction sites
Legislative Decree 81/08 and subsequent amendments on health and safety in the workplaces
The project management of the design phase
The machineries of the construction site
Professional risks and evaluation methods
Occupational diseases and work injuries
The actors of the building process
Predicting techniques and management of time and cost
The organization of the security in the construction site
The Safety Coordination Plan
The Operational Safety Plan
Security in the management phase of buildings
The scaffoldings
The construction site management: technical, economic, temporal and administrative issues
The demolition / renovation yard and the design for disassembling

Reference Texts
D. Lgs n. 81 del 9 aprile 2008, Testo unico in materia di salute e sicurezza sul lavoro
Bruno M., Cantieri. Metodi e strumenti di gestione e organizzazione, Legislazione Tecnica Editore Srl, Roma, 2016
Di Castri G., Project Management per l' edilizia, Dario Flaccovio Editore, Palermo, 2009
Lavagna M., Life Cycle Assessment in edilizia, Hoepli, Milano, 2012
Gangemi V., Riciclare in Architettura, Clean Edizioni, 2004
Bertolini L., Materiali da costruzione. Struttura, proprietà e tecnologie di produzione, Città studi edizioni, Novara, 2010

2750 - PRODUZIONE NELLA FABBRICA DIGITALE
ING-IND/16 - Ingegneria gestionale

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LM13 - INGEGNERIA GESTIONALE (D.M. 270/04)
Study plans/Curricula: LM13-21 - GESTIONE DI IMPRESA
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: PERCOCO GIANLUCA

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts

F. Grimaldi: "CNC MACCHINE UTENSILI A CONTROLLO NUMERICO", Editore Ulrico Hoelpi Milano (pp. 1-260) 2a ed.

2   Kandray, Daniel E. (2010). Programmable Automation   Technologies - An Introduction to CNC, Robotics and PLCs.
         Industrial Press.

2139 - PROGETTAZIONE DEI PROCESSI PRODUTTIVI E QUALITA' DEI PROCESSI PRODUTTIVI
ING-IND/16 - Ingegneria gestionale

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT03 - INGEGNERIA GESTIONALE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DASSISTI MICHELE

Training objectives

Provide systematic frame of methodologies to implement a Total Quality Management action.
Provide a corpus of knowledge on qualitative and quantitative techniques for manufacturing process quality assurance.
To assure the student with the capability to control production processes and to guarantee quality assurance.

Prerequisites

Maths, Geometry, Informatics, Material Technologies, Mechanical Technology

Didactic Methods

Course programme

1. Total Quality Management, Management Systems and sustainability (0.5 Credits)
The concept of Quality. Technical terms for quality engineering. Quality costs. Total Quality Management (TQM). Process management. Continuous process improvement. Six Sigma. Quality Management Systems: norms and their certification. Integrated Management Systems for Quality, Environment and Safety; life cycle assessment. Quality Awards and self-assessment.
2. Non-quantitative methods for Quality assurance (0,5 Credits)
Problem-solving tools (brainstorming; Pareto diagram; Ishikawa diagram; force field method; dispersion diagram, defect concentration diagram). Graphical methods for data collection. Descriptive tools for data. Quality Function Deployment.   Benchmarking.
3. Basic statistics (1 Credits)
Probability. Conditional Probability. Total probability theorem. Bayes theorem. Probability rules. Stochastic independence. Discrete and continue stochastic variables. Cumulative distribution function. Discrete and continue probability density functions (p.d.f.). Tchebycheff inequality. Moments; mean and variance. P.d.f. of one stochastic variable discrete (binomial , hypergeometric , Poisson, Pascal) and continue (normal, lognormal, exponential, gamma, Weibull). Sample distribution. Large number law. Central limit theorem. Statistical inference. Hypothesis testing. Probability charts.
4. Statistical Process Control (3,5 Credits)
Statistical process control with uncorrelated data (SPC). Variability. Sampling. Engineering and statistic process control. SPC with correlated data. General concepts on control charts. Control limits selections. Trends in control charts. Control charts of mean and range. Control charts of mean and range and standard deviations. Control charts for attributes: type fraction of non conforming and type of number of non-conforming entities. Process capability analysis. Capability studies of measurement systems. Moving average charts. Control charts for short-run. CUSUM. EWMA. Control charts selection. Economic design of control charts.

Reference Texts

2617 - PROTEZIONE IDRAULICA DEL TERRITORIO
ICAR/02 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-21_TA - AMBIENTE E TERRITORIO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GIOIA ANDREA

Training objectives

The course aims to provide basic knowledge about the sustainable protection of the territory, with particular attention to the analysis of climate-soil-vegetation interaction for river basin management and hydraulic-hydrologic models for flood evaluation and risk mitigation evaluation.

Prerequisites

Hydraulic, hydraulic structures

Didactic Methods

Course programme

Topic n. 1: Introduction.
The catchment, water cycle and soil-atmosphere interactions.
Topic n. 2: The legislative framework.
The water frame work directive, the basin management plan and other Regional, National and European directives.
Topic n. 3: River basin descriptors:
Geographic information systems and physical river basin descriptors
Topic n. 4: Model for climate soil-vegetation-interaction evaluation.
Empirical, conceptual & physical models; lumped, distributed and semi-distributed models; stochastic & deterministic models.
Topic n. 5: Water balance and flood evaluation.
Water balance equation; time step and evaluation of different components; mechanisms of runoff generation, potential, reference and actual evapotranspiration, hydraulic behaviour of unsaturated soil.
Topic n. 6: hydraulic risk.
Hydraulic-hydrologic models for flood evaluation and risk mitigation: analysis of mono dimensional approach (Hec Ras) and two-dimensional model for flood propagation (flow-2D).

Reference Texts

- U. Maione, U. Moisello: "Le piene fluviali", La G oliardica Pavese, Pavia
- U. Moisello: "Idrologia Tecnica" - La Goliardica Pavese, Pavia
- V. Ferro: "La sistemazione dei bacini idrografici" - McGraw - Hill
- S. Manfreda, V. Iacobellis, M. Fiorentino, " Appunti di Idrologia superficiale", Aracne ed.,
Roma

2600 - RECUPERO DEGLI EDIFICI STORICI + MANUTENZIONE E CONSERVAZIONE DEL PATRIMONIO EDILIZIO ESISTENTE

ICAR/10 - Architettura ed urbanistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM02 - INGEGNERIA DEI SISTEMI EDILIZI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	FATIGUSO FABIO

Training objectives

The course aims to provide the students with the basic methodological, cultural, historical, technical and scientific qualification to project the restoration, the refurbishment and the maintenance of the existing building heritage, with particular reference to the technical, constructional, technological, managerial aspects and to the innovation and sustainability of the interventions.

Prerequisites

Survey and representation of buildings. Mechanical behavior of materials, structures and constructions. Environmental and technological systems. Elements and sub-systems of the building system. Methods and processes of building structures.

Didactic Methods

Course programme

1° Module: Moments and issues of the refurbishment in his historical aspects. Building instability and settlings. Provisional works and masonry reinforcement. Building knowledge, survey and diagnostics.

2° Module: The refurbishment from the historical centres to the building existing heritage. Refurbishment and requalification of mixed structures and reinforced concrete structures. Building maintenance. Moisture pathologies and interventions. The performance recovery of the buildings according to the law in force between tradition and innovation.

Workshop: Maintenance/Refurbishment working design (Developing (in work groups of 4/5 people), under the guidance of the teacher, the working project for maintenance/refurbishment of building, with specific reference to the Public Works law in force).

Reference Texts

2600 - RECUPERO DEGLI EDIFICI STORICI + MANUTENZIONE E CONSERVAZIONE DEL PATRIMONIO EDILIZIO ESISTENTE

ICAR/10 - Architettura ed urbanistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM02 - INGEGNERIA DEI SISTEMI EDILIZI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	FATIGUSO FABIO

Training objectives

The course aims to provide the students with the basic methodological, cultural, historical, technical and scientific qualification to project the restoration, the refurbishment and the maintenance of the existing building heritage, with particular reference to the technical, constructional, technological, managerial aspects and to the innovation and sustainability of the interventions.

Prerequisites

Survey and representation of buildings. Mechanical behavior of materials, structures and constructions. Environmental and technological systems. Elements and sub-systems of the building system. Methods and processes of building structures.

Didactic Methods

Course programme

1° Module: Moments and issues of the refurbishment in his historical aspects. Building instability and settlings. Provisional works and masonry reinforcement. Building knowledge, survey and diagnostics.

2° Module: The refurbishment from the historical centres to the building existing heritage. Refurbishment and requalification of mixed structures and reinforced concrete structures. Building maintenance. Moisture pathologies and interventions. The performance recovery of the buildings according to the law in force between tradition and innovation.

Workshop: Maintenance/Refurbishment working design (Developing (in work groups of 4/5 people), under the guidance of the teacher, the working project for maintenance/refurbishment of building, with specific reference to the Public Works law in force).

Reference Texts

2611 - REGIME E PROTEZIONE DEI LITORALI
ICAR/02 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-20 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DAMIANI LEONARDO

Training objectives

The class aims to provide: information on morphological evolution under storm surges and influence of maritime works on costal evolution; design guidelines for coastal protection works and ports

Prerequisites

Hydraulics, Geology and Geotechnics, Topography

Didactic Methods

Course programme

Topic n. 1: Regular waves - Lesson hours: 30
Classification of waves, wave characteristics, linear theory, outlines of
nonlinear waves, wave group, wave evolution (shoaling, refraction, breaking, diffraction, reflection), the effects of storm surges in the surf and shore zones (set up, run up, undertow currents, filtration).
Topic n. 2: Coastal zone description and Sea Waves - Lesson hours: 35
physiographic unit, concept of fetch, measure in situ and monitoring
instruments and methodology, the wind regime, the wind data; Sea waves: Statistical analysis of storm surges (probabilistic theories and spectral analysis), the wave height characteristics, storm surge forecast and hindcast, storm morphologically equivalent, the tides.
Topic n. 3: Coastal regime and protection - Lesson hours: 30
coastal morphology, beach prophiles, sediment transport (cross-shore and longshore), the evolution of the beaches, hints to the problems of high coasts, rigid systems of coastal protection (plain works, detached longitudinal and transverse), coastal management, soft interventions (the beach nourishment, the reconstruction of the dunes, etc.).
Topic n. 4: Ports and other marittime works - Lesson hours: 25
Content details: layout of a port, definitions and foundations of existing legislation, the classification of ports, Port Master Plan, sizing of harbors, the ship and the fleet of project, the port structures and facilities (breakwaters, berth and mooring docks), types and characteristics of the port terminals, marinas, dredging works, dredging: sediment characyeristics, dredging machines and tecniques; submarines pipeline: diffusion, pipelines and diffuser design criteria.

Reference Texts

2013 - SCIENZA DELLE COSTRUZIONI
ICAR/08 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses: LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula: LT31-20 - MECCANICA
Type: Affine/Integrativa
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: LA RAGIONE LUIGI

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts
A. Sollazzo, U. Ricciuti. Scienza delle Costruzioni, Vol. 1, "Statica del corpo rigido", UTET, 1983.
A. Sollazzo, S. Marzano. Scienza delle Costruzioni, Vol. 2, Elementi di meccanica dei continui e resistenza dei materiali", UTET, 1988.
A. Sollazzo, M. Mezzina, Scienza delle Costruzioni, Vol. 3,Teoria e tecnica delle travi , UTET, 1993.

2597 - SCIENZA DELLE COSTRUZIONI II
ICAR/08 - Edilizia e ambiente

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM02 - INGEGNERIA DEI SISTEMI EDILIZI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	LA RAGIONE LUIGI

Training objectives

The goal of the course is to achieve a deep knowledge on solid mechanics applied to beams. Major emphasis will be devoted to the theorem of virtual work and concept of energy in a elastic body. Constitutive relations in elasto-plastic regime will studied. Instability and column problem will be posed.

Prerequisites

Matrix and tensor analysis. Solutions for simple elastic bodies like beams.

Didactic Methods

Course programme

Linear theory of elasticity: kinematics, stress and balance of momentum. Work theorems and stored energy.
Inelasticity: yield function for ductile materials. Incremental stress-strain relation in a plastic regime.
Stability of structures. Euler's formula. Design of columns under a centric load.

Reference Texts

A. Sollazzo, S. Marzano. Scienza delle Costruzioni, Vol. 2, Elementi di meccanica dei continui e resistenza dei materiali", UTET, 1988.
A. Sollazzo, M. Mezzina, Scienza delle Costruzioni, Vol. 3,Teoria e tecnica delle travi , UTET, 1993.
L. Corradi Dell' Acqua " Meccanica delle Strutture, vol. 1 McGraw Hill Companies 1992

2015 - SCIENZA E TECNOLOGIA DEI MATERIALI
ING-IND/22 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-20 - CIVILE
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	PETRELLA ANDREA

Training objectives

The aim of the course is to give an overview of main classes of materials for engineering applications, with specific reference to production technologies, mechanical, physical and chemical properties.

Prerequisites

General and Inorganic Chemistry knowledge

Didactic Methods

Course programme

Topic n. 1: State diagrams

Content details: Constitution and microstructure of a solid, heterogeneous systems, phase rule, binary diagrams: liquid miscible and solid unmiscible, complete miscibility (liquid and solid), partial miscibility at solid state, formation of binary compounds with congruent and uncongruent melting point.

Topic n. 2: Steel siderurgy

Content details: Cast iron production, steel production, Fe/Fe3C state diagram, hardness, resilience and ¿/¿ curve of steel, thermal treatments of steel, surface thermal treatments.

Topic n. 3: Hydraulic ligands

Content details: CEM I (Portland cement), production, setting and hardening, physical properties, resistance to chemical aggression, CEM IV (pozzolanic cement), CEM III (slag cement), aluminous cement, special Portland cements, classes of cements (UNI ENV 197), technical tests on cements, hydraulic lime, concrete: preparation and properties.

Topic n. 4: Glass/Polymers and elastomers

Content details: Glass structure, glass production, types of glass, chemical, physical, optical and mechanical properties of glass, physical and chemical temper of the glass, safety glass. Polymerization, polymer crystallinity, glass transition temperature, thermoplastic and thermosetting polymers, elastomers, fibres, physical and chemical properties, composites.

Topic n. 5: Metal corrosion

Dry corrosion, electrochemical corrosion, redox potential and electrochemical series, galvanic cell, stress-corrosion, fatigue-corrosion, thermodinamics, Pourbaix diagram, kinetics, differential aeration corrosion, cathodic protection, anodic protection, coatings.

Reference Texts

M. Lucco Borlera, C. Brisi, Tecnologia dei materiali e chimica applicata, Levrotto e Bella Editore.

B. Marchese, Tecnologia dei materiali e chimica applicata, Liguori Editore.

C. Brisi, Chimica applicata, Levrotto e Bella Editore.

W. Smith, Scienza e tecnologia dei materiali, Mc Graw-Hill Editore.

L. Bertolini, Materiali da costruzione, Città Studi Edizioni.

2601 - SERVIZI TECNOLOGICI E DA FONTI RINNOVABILI
ICAR/10 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LM02 - INGEGNERIA DEI SISTEMI EDILIZI (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Affine/Integrativa
Total Credits: 12
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: IANNONE FRANCESCO

Training objectives
Acquisition of a scientific and technical knowledge on the types, technology and performance of plant components and renewables, also in relation to integration with the building structures and "passive design" strategies and techniques. Capacity of designing and preliminary dimensioning of major plant subsystems and renewable sources ("active" and "passive") in relation to the performances of buildings.

Prerequisites
Knowledge of building structures and basic elements of building physics.

Didactic Methods

Course programme
-Building services types and technologies: plumbing, gas-fittings, flues
-Building services types and technologies: indoor climate control (Indoor Air Quality and thermal comfort)
-Building services types and technologies: power supply for lighting and appliances
-Solar systems types and technologies for producing thermal and electrical energy
-Types and technologies of passive heating systems (direct gain, indirect gains, mixed types) and passive cooling systems (solar shadings, natural ventilation, geothermal energy, evaporative cooling)
-Workshop on designing and dimensioning of plumbing, heating and electrical services, solar thermal and photovoltaics

Reference Texts
V.G. Colaianni. Impianti tecnici dell' edilizia. F.Angeli, Milano
A.Gallizio. Impianti sanitari. Hoepli, Milano
N. Zinna. Manuale degli impianti idrotermosanitari. Tecniche Nuove ed., Milano
V.G. Colaianni. Il benessere e la sicurezza negli edifici. Microclima, incendio, sicurezza, energia solare. F.Angeli, Milano
N.Rossi. Manuale del termotecnico. Fondamenti. Riscaldamento. Condizionamento. Refrigerazione. Hoepli, Milano
C.Pizzetti. Condizionamento dell' aria e refrigerazione. Casa Editrice Ambrosiana, Milano
G.Davini. Gli impianti elettrici civili. Tecniche nuove, Milano
E.Coppi, G.Paleari. Norme CEI. Hoepli, Milano
S.V. Szokolay. Introduzione alla progettazione sostenibile. Hoepli ed., Milano

2605 - SICUREZZA E RETI
ING-INF/03 - Ingegneria delle telecomunicazioni

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LM14 - INGEGNERIA DELLE TELECOMUNICAZIONI (D.M. 270/04)
Study plans/Curricula: LM14-21 - SISTEMI E RETI DI TELECOMUNICAZIONI
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Ciclo Annuale Unico
Exam type: Orale
Professor in charge: BOGGIA GENNARO

Training objectives
I° Module: Network Security
Study of protocols and architecture to provide security in telecommunication networks. Knowledge about current standards on security. Methodological approach for secure network design.

Prerequisites
I° Module: Network Security
Background on Telecommunication Networks and Discrete Mathematics

Didactic Methods

Course programme
I° Module: Network Security
- General introduction on network security.
- Cryptography with public and private key.
- Network authentication systems.
- IP network security.
- Security in Wireless LAN
- Firewall and Intrusion Detection System.
- Attacks and botnets.
- Distributed authorization systems
- Security in IoT systems and Future Internet architectures

Reference Texts
W. Stallings, Crittografia e Sicurezza delle reti, Mc-Graw Hill, 2004

2313 - SIMULAZIONE E PROTOTIPAZIONE VIRTUALE
ING-IND/15 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LM30 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LM30-23_TA - INDUSTRIALE
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	FIORENTINO MICHELE

Training objectives

Provide theoretical and practical methods for product virtualization. The theory involves computer assisted product development methods, elements of computer graphics, analytical and procedural primitives, modeling methods and CAD data formats. The practical part interests 3D parametric modeling of mechanical parts and assemblies, virtual simulation and associative drafting, with compulsory assignments.

Prerequisites

Methods of technical representation, 2D CAD modelling, mechanics of solids, kinematics, production technologies.

Didactic Methods

In class and laboratory lectures supported by the use of a computer and a projector.

Course programme

1.   Product Virtualization tools: objectives, history and evolution of digital mock up: paper drawings, CAD systems, EDM, PDM, PLM and real-time simulations in virtual and augmented reality.
2.   Elements of computer graphics: digital elements for engineering: colors, images, video, compression techniques, 3D mesh, blobs, metaballs, procedural, fractals and particle systems. The graphics pipeline, resolution, aliasing, rendering techniques (shading, raytracing, radiosity, etc.), textures, virtual cameras, lighting, animations.
3.   Modeling geometric primitives: Representations of 2D and 3D curves: intrinsic, natural equations, concepts of curvature and torsion. Representation of implicit, explicit, parametric and analytic surfaces: surfaces of revolution, ruled, conical, quadrics, Hermite , Bezier , B-spline , NURBS, and subdivision . Tools for analysis of surfaces, Gaussian curvature and Media, environment mapping, continuity, C and G, form features.
4.   Representation of solids: wireframe, B -Rep and CSG, euler equations, from geometry based to knowledge-based modeling: parametric systems, variational, feature-based and associative.
5.   Interoperability and data exchange: problems, approaches, present and future standards: STL, IGES, STEP, PDF3D, Vrml, JT, and COLLADA. Product virtualization: part workspace, multi-body modeling, virtual materials, assembly design, FEM and kinematic, drafting, BOM. Functional and aesthetic simulation.

Reference Texts

1.   Teacher lecture notes, multimedia tutorials.
2.   Mastering CAD/CAM, Zeid, Ibrahim, ISBN: 0072976810, Pub Date: 2004-05-03, McGraw-Hill
3.   Fondamenti Di Computer Graphics, Zingaretti, Editore: Pitagora, ISBN: 8837114869, 2004
4.   CATIA V5-6R2013 for Designers, 828 pagine, ISBN-10: 1936646897.

2415 - SISTEMI DI MISURA E CERTIFICAZIONE
ING-INF/07 - Ingegneria elettronica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula:	LM04-20 - SISTEMI ELETTRONICI
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Ciclo Annuale Unico
Exam type:	Orale
Professor in charge:	GIAQUINTO NICOLA

Training objectives
MODULE N. 2 (RELIABILITY AND QUALITY CERTIFICATION):
At the end of the course, students should be able to: (i) design a statistical process control system, to achieve specified targets of quality of production; (ii) assess, and bring to the required level, the reliability of products and of production processes; (iii) understand the issues of quality certification, and consider them in designing and manufacturing products.

Prerequisites
MODULE N. 2 (RELIABILITY AND QUALITY CERTIFICATION):
Differential and integral calculus, theory of probability and of continuous and discrete random variables, basic knowledge of the international organization of metrology.

Didactic Methods
Theoretical lectures and practice, in the classroom and in the laboratory. Demonstrations of concepts using computer support (Matlab with Instrument Control Toolbox, Statistics Toolbox, ecc.). Personalized tutoring.

Course programme
MODULE N. 2 (RELIABILITY AND QUALITY CERTIFICATION):
1. Review of basic probability and statistics theory.
2. Reliability. Fundamentals, functions describing reliability, unreliability, failure rate, etc. Reliability parameters MTTF, MTBF, MTTR, Availability, etc. Estimation of reliability parameters. Techniques to increase reliability and combinatorial reliability.
3. Statistical quality control. Theory of hypothesis testing and applications to quality control: variable and attribute control charts, sampling plans and lot rectification. Point and interval estimations of quality parameters. Technical standards related to statistical control.
4. Quality certification. The European framework about quality. Italian Quality System: SINCERT, SINAL, SNT, FIDEA, ACCREDIA. Conformity assessment and accreditation. Evolution of the ISO 9000 family of standards. Quality management of measuring instruments. Empowerment.
5. Laboratory. Applications of statistical control to the characterization of measuring instruments. Exercises and applications, to develop partly in the laboratory, and partly at home.

Reference Texts
II MODULO / MODULE N. 2
ITALIANO:
Appunti del corso, formulari e programmi Matlab preparati dal docente. Gli appunti sono in parte disponibili sul sito https://sites.google.com/site/giaquintopoliba/, in parte distribuiti durante il corso.
ENGLISH:
Lecture notes, summaries of formulae and Matlab programs prepared by the teacher. Lecture notes are partly available on the site https://sites.google.com/site/giaquintopoliba/, and partly distributed during the course.

2395 - SISTEMI DI TELECOMUNICAZIONE
ING-INF/03 - Ingegneria delle telecomunicazioni

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM14 - INGEGNERIA DELLE TELECOMUNICAZIONI (D.M. 270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GUCCIONE PIETRO

Training objectives

Goal of the class is to provide an insight in the analysis and design of Digital Communication Systems. The subject of digital communications involves, at the present, many research fields: Theory of Probability and Stochastic Processes, Detection Theory, Information Theory, physics of the channel and some knowledge of hardware and software. Bases of most of these subjects are supposed to be known for a fair comprehension of the class.

Prerequisites

The class is organized in 20 (more or less balanced and autonomous) lectures.
Throughout the class large room is given to wireless communications, which are widely used, representing a promising and challenging ways for the up-to-date digital communicatio

Didactic Methods

Course programme

1. Simplified model of a digital communication 1
Introduction to lectures and overview of digital communications. Basic elements of the transmitting and receiving blocks of a digital communication.
2. Simplified model of a digital communication 2
Simplified design of a digital communication system and computation of the error probability of a binary NRZ.
3. Baseband modulation schemes
Baseband modulation schemes. Baseband multilevel schemes. Power spectral density of digital modulation schemes. Amplitude, Frequency, Phase Shift Keying. Coherent and incoherent receivers.
4. Passband modulation schemes
Multilevel digital communications schemes: M-FSK, MPSK, MQAM. Minimum Shift Keying.
5. Introduction to detection
Representation of baseband and passband signal in a vector space. Minimum distance criterion with/without ISI. Sufficient statistics for a general AWGN channel with ISI. Pre-cursor equalizer, whitened matching filter.
6. Introduction to equalization
The maximum Likelihood Sequence Detector. Discrete model for Linear and Decision Feedback Equalization. Transmission encoding Equalization
7. MSE equalization
General equalization schemes, equalizers performance parameters. MSE Equalizers in Linear and Decision Feedback configurations.
8. Adaptive equalization
Blind Equalization, Adaptive Equalization and Stochastic gradient-descending algorithm. General scheme of a receiver with carrier recovery and symbol timing estimation
9. Carrier recovery
Carrier phase estimation, phase locked-loop schemes. Instability due to noise and equalizer in the receiving schemes.
10. Symbol timing estimation
Techniques of timing estimation. Non-decision direct estimations, ML gradient-descent estimation.
11. Statistical characterization of a radio channel
Statistical characterization of a radio channel: time-varying channel impulse response, correlation and power spectral density. Characterization of narrowband and wideband fading models. Behavior of a digital signal within a non selective in frequency and slowly fading channel.
12. Specific Modulation Schemes for radio channels 1
Data transmission using multiple carriers. OFDM
13. Specific Modulation Schemes for radio channels 2
Spreading spectrum: direct sequence SS. Principle and model. Maximum length shift register and scrambling configurations. DSSS rejection of interferences.
14. Specific Modulation Schemes for radio channels 3
Recovery of coding sequence for DSSS. Code Division Multiple Access. Frequency Hopping SS
15. MIMO systems
Vector and Matrix model of a MIMO channel. MIMO Gaussian channel. Digital receiver for a MIMO transmission, adaptive filtering, space-temporal separation. Maximum Likelihood receivers and spatial diversity.
16. Introduction to information theory 1
Mathematical model for information sources: measures for information, asymptotic equipartition theorem, Entropy of memoryless sources Conditional entropy, relative entropy and mutual information.
17. Introduction to information theory 2
Entropy for continuous sources, entropy for sources with memory. The Shannon theorem. Schemes of Universal Coding, Huffman Coding, Lempel-Ziv Coding. Numerical transmission in power-limited and band-limited states. Performances of the systems.
18. Linear Codes 1

Basics to linear block codes, Hamming codes, Hamming distance of a code. Soft and hard decoding and performances of decoders. Generator Matrix and Parity Check Matrix.

19.   Linear Codes 2

Viterbi decoding, Maximum a Posteriori decoding, bit-to-bit decoding. Punctured Convolutional Codes and Convolutional Codes performances.

20.   Capacity Approaching Codes

Low-density parity check codes, Turbo Codes. Multi-level signaling codes: the Trellis codes.

Reference Texts

Main reference:

[1] J.G. Proakis, Digital Communications, McGraw-Hill, 5th Ed.

Other references:

[2] A. Goldsmith, Wireless Communications, Cambridge University Press, 2005

[3] T.M. Cover, J.A. Thomas, Elements of Information Theory, Wiley Series in Telecommunications and Signal Processing, 2nd Ed.

[4] J. R.Barry, E. A. Lee,D. G. Messerschmitt, " Digital Communication" , 3rd Ed., Kluwer Academic Publishers, MA USA, 2004.

Exam and other information

2582 - SISTEMI DI TRASPORTO
ICAR/05 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-21_TA - AMBIENTE E TERRITORIO
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	OTTOMANELLI MICHELE

Training objectives

The course aims at providing the students with a basic picture of the quantitative tools for desining and planning of transport systems. Methods for transport supply and demand simulation are discussed as well as the models for environmental impacts and performance of transportation activities.

Prerequisites

Calculus, Algebra, Probability Theory and Statistics

Didactic Methods

Course programme

Mobility and transportation general issues. Italian laws and norms in transportation planning. Introduction to transportation systems: Definition of transport system and its representation.

Framework of mathematical models of transport systems. Transportation Supply models. Performance and inpacts functions. Examples and numerical applications.

Models for the simulation traffic air and noise pollution:Examples and numerical applications.

Travel demand models: Random utility based models for users choice behaviour simulation: theoretical backgroung, main randum utility models (multinomial logig, Nested logit, C-Logit, Probit). Montecarlo simulation method. Some properties of random utility models. Sistems of models for the travel demand estimation. Four-Steps sistem of models: Emission models, trip distribution model, modal split model, route choice model (road and transist systems) Methodologies for travel demand estimation: direct estimation of currend demand. Sample surveys tipologies. Travel demand estimators.

Static traffic assignment models. Network performance indicators. Examples and applications.

Reference Texts

2536 - SISTEMI SATELLITARI PER IL TELERILEVAMENTO E LA LOCALIZZAZIONE
FIS/01 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses:	LM04 - INGEGNERIA ELETTRONICA (D.M. 270/04)
Study plans/Curricula:	LM04-20 - SISTEMI ELETTRONICI
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	NITTI DAVIDE OSCAR

Training objectives

The aim of this course is to provide a solid theoretical understanding to the use and design of satellite systems for Earth Observation, including both active and passive Remote Sensing systems and GNSS positioning techniques.

Prerequisites

Basic knowledge of Mechanics, Electromagnetic Fields, Optics, Digital Signal Processing.

Didactic Methods

Course programme

1. ORBITAL MECHANICS [12 hours]. Newton's theory of "Universal Gravitation". Newton's Three Laws of Motion. Constants of the motion. Orbital trajectories. Coordinate systems and transformations. Reference ellipsoids. Geoid, local and global datum. Classical Orbital parameters. Methods for orbit determination from observations. Methods for the determination of the satellite position and velocity as a function of time. LEO, MEO, HEO; geostationary orbits; sun-synchronous orbits; Molniya orbits. Orbital maneuvers: Hohman transfer; phasing and chasing maneuvers; apse line rotation; plane change maneuvers.

2. GLOBAL POSITIONING SYSTEMS [12 hours]. The GPS constellation. The GPS signal. Code anf Phase observations. Atmospheric effects. Combinations Geometry Free, Wide Lane, Narrow lane, Ionospheric Free. Hatch filter. Absolute Positioning: the Bancroft solution; cinematic and static solutions; least square method. Introduction to the relative positioning: single and double differences.

3. PASSIVE REMOTE SENSING (VIS/NIR) [8 hours]. Radiation theory. Irradiance. Radiance. Lambertian radiator. Diffuse emission and reflection: spectral emittance; brilliance temperature; reflectance, transmittance, absorbance. Radiative transfer in the atmosphere. Diffusion mechanisms: Rayleigh, Mie, non selective. Point Spread Function. Optical Transfer Function. Refractive and reflective telescopes. Geometric and chromatic aberrations. Performances indexes of an optical system. Scanners. Multispectral and hyperspectral sensors.

4. MICROWAVE ACTIVE REMOTE SENSING: SAR [8 hours]. Bistatic and monostatic radars. CW and pulsed radars. Chirp pulse, (de)modulation I-Q, range compression and adaptive filter. Ambiguity. Radar Equation. Side-Looking Aperture Radar (SLAR). Perspective deformations. Real Aperture Antennas (RAR); synthetic aperture antennas (SAR). SAR acquisition modes. Spatial resolution of focused data; Doppler bandwidth. Point scatterers, distributed scatterers. Backscattering coefficient, speckle. Roughness: Rayleigh and Fraunhofer criteria.

5. MICROWAVE ACTIVE REMOTE SENSING: SAR Interferometry [8 hours]. Interferometric phase. Flat-earth contribution. Phase-height conversion, geometric baseline, height of ambiguity. Phase Unwrapping and DEM generation. Displacement measurements with differential interferometric technique. PDF of the InSAR phase field, Cramér-Rao limit. Coherence. Decorrelation sources. Atmospheric Phase Screen.

Reference Texts

[1] Howard D. Curtis. Orbital Mechanics for Engineering Students. ELSEVIER, 2005.
[2] L. Biagi, "I fondamentali del GPS". Geomatics Workbooks Vol. 8, 2009.
[3] Wim H. Bakker et al., Principles of Remote Sensing - An introductory textbook, ITC, Enschede, Netherlands, 2009
[4] Andrea Monti Guarnieri. Appunti di teoria e tecniche radar. CUSL, 2003.
[5] A. Ferretti et al., InSAR Principles: Guidelines for SAR Interferometry Processing and Interpretation. ESA TM-19.
FURTHER BIBLIOGRAPHY:
[6] Bate, Mueller, White. Fundamentals of Astrodynamics. Dover, 1971.
[7] G. Corsini, Dispense sul Telerilevamento Passivo, Università di Pisa.
[8] Giorgio Franceschetti, Riccardo Lanari. Synthetic aperture radar processing. CRC press, 1999.

2598 - SOSTENIBILITA' DEI PROCESSI E SISTEMI EDILIZI + MANAGEMENT DEL PROGETTO E DELLA COSTRUZIONE
ICAR/11 - Architettura ed urbanistica

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LM02 - INGEGNERIA DEI SISTEMI EDILIZI (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: DELL'OSSO GUIDO RAFFAELE

Training objectives
TEACHING MODULE:
SUSTAINABILITY OF PROCESSES AND BUILDING SYSTEMS
Ability to recognize and manage the significant elements for the characterization of sustainable building processes and systems , with particular attention to the use of evaluation methods that analyze the life cycle.
TEACHING MODULE:
DESIGN MANAGEMENT AND CONSTRUCTION
Train professionals in the building process, pay attention to management issues of construction companies and public authorities, with expertise in the areas of procurement, project management and construction management.

Prerequisites
TEACHING MODULE:
SUSTAINABILITY OF PROCESSES AND BUILDING SYSTEMS
Knowledge of technical physics, materials technology and architectural design.
TEACHING MODULE:
DESIGN MANAGEMENT AND CONSTRUCTION
Knowledge of the design and construction management metho

Didactic Methods

Course programme
TEACHING MODULE:
SUSTAINABILITY OF PROCESSES AND BUILDING SYSTEMS
Topic n. 1:
The paradigm of sustainability
Content details:
Environmental, social and economic sustainability.
Ecological footprint and biocapacity of the planet.
The theory on the limits of development.
Sustainable development, the impact and responses in the construction industry: from the energy crises of the 70s to environmental emergencies of the 2000s.
Topic n. 2:
From design, to the life cycle of the building, to the building process.
Content details:
Sustainability of processes and building systems: intrinsic energy content, consumption and resources during use, the residual potential performance and recyclability.
Bioclimatic architecture
Waste from construction and demolition
Building automation for sustainability
Reconfigurability and reversibility of the building organisms.
Topic n. 3:
Sustainability assessments
Content details:
The ITACA Protocol and its application: Categories and criteria for evaluation areas: site quality, resource consumption, environmental loads, indoor environmental quality, quality of service.
The evaluation according to the method L.E.E.D.
Life Cycle Assessment.
Workshop/Laboratory Topics
Sustainability assessments by Protocollo Itaca
Content details:
Application of the Protocollo Itaca-Puglia to the project of a new building or of existin building.
TEACHING MODULE:
DESIGN MANAGEMENT AND CONSTRUCTION
Topic n. 1:
Management of the building' s project
Content details:

Attributes of the new construction project and building restoration.
Characterization of the project through systems of Building Information Modeling.
The project management.
The quality control of the project.
Topic n. 2:
Management of the construction
Content details:
The project operating
The structure and the quality system of the construction company.
Technologies, procedures and innovative construction systems
The construction management.
Durability in buildings: assessment of the duration, functional analysis, factorial method, propensity reliability and reliability elementary.
Topic n. 3:
The legislation on public works
Content details:
Programming and public-works project.
The management of the implementation phase
The completion of the procedures for the award.
Arrangements for the implementation of public works
Workshop/Laboratory Topic:
Building Information Modeling
Content details:
Application to case studies of BIM systems for the management of the attributes of the project and the building process.

Reference Texts

MODULO DI SOSTENIBILITA' DI PROCESSI E SISTEMI EDILIZI
D. e D. Meadows, J. Randers - I nuovi limiti dello sviluppo - Oscar Saggi Mondadori - Milano, 2004
G.R. Dell'Osso, a cura di - Architettura bioclimatica e sostenibilità nella casa per i paesi del Mediterraneo -Editore Il Tacco d'Itali -Casarano, 2009
G.R. Dell' Osso, A. Pierucci – Building Automation e Sostenibilità in edilizia – Maggioli Editore – Santarcangelo di Romagna, 2013
G.R. Dell' Osso. F. Iannone, A. Pierucci – Elementi di sostenibilità degli organismi edilizi – Maggioli Editore – Santarcangelo di Romagna, 2015.
MODULO DI MANAGEMENT DEL PROGETTO E DELLA COSTRUZIONE
A.Gottfried – Ergotecnica edile – Hoepli – Milano 2013
B.Baldi, M. Sanvito – La gestione della qualità nel processo edilizio – UNI – Bologna 2001
A.Osello – Il futuro del disegno con il BIM – Flaccovio Editore - 2012

2598 - SOSTENIBILITA' DEI PROCESSI E SISTEMI EDILIZI + MANAGEMENT DEL PROGETTO E DELLA COSTRUZIONE

ICAR/11 - Architettura ed urbanistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM02 - INGEGNERIA DEI SISTEMI EDILIZI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	DELL'OSSO GUIDO RAFFAELE

Training objectives
TEACHING MODULE:
SUSTAINABILITY OF PROCESSES AND BUILDING SYSTEMS
Ability to recognize and manage the significant elements for the characterization of sustainable building processes and systems , with particular attention to the use of evaluation methods that analyze the life cycle.
TEACHING MODULE:
DESIGN MANAGEMENT AND CONSTRUCTION
Train professionals in the building process, pay attention to management issues of construction companies and public authorities, with expertise in the areas of procurement, project management and construction management.

Prerequisites
TEACHING MODULE:
SUSTAINABILITY OF PROCESSES AND BUILDING SYSTEMS
Knowledge of technical physics, materials technology and architectural design.
TEACHING MODULE:
DESIGN MANAGEMENT AND CONSTRUCTION
Knowledge of the design and construction management metho

Didactic Methods

Course programme
TEACHING MODULE:
SUSTAINABILITY OF PROCESSES AND BUILDING SYSTEMS
Topic n. 1:
The paradigm of sustainability
Content details:
Environmental, social and economic sustainability.
Ecological footprint and biocapacity of the planet.
The theory on the limits of development.
Sustainable development, the impact and responses in the construction industry: from the energy crises of the 70s to environmental emergencies of the 2000s.
Topic n. 2:
From design, to the life cycle of the building, to the building process.
Content details:
Sustainability of processes and building systems: intrinsic energy content, consumption and resources during use, the residual potential performance and recyclability.
Bioclimatic architecture
Waste from construction and demolition
Building automation for sustainability
Reconfigurability and reversibility of the building organisms.
Topic n. 3:
Sustainability assessments
Content details:
The ITACA Protocol and its application: Categories and criteria for evaluation areas: site quality, resource consumption, environmental loads, indoor environmental quality, quality of service.
The evaluation according to the method L.E.E.D.
Life Cycle Assessment.
Workshop/Laboratory Topics
Sustainability assessments by Protocollo Itaca
Content details:
Application of the Protocollo Itaca-Puglia to the project of a new building or of existin building.
TEACHING MODULE:
DESIGN MANAGEMENT AND CONSTRUCTION
Topic n. 1:
Management of the building' s project
Content details:

Attributes of the new construction project and building restoration.
Characterization of the project through systems of Building Information Modeling.
The project management.
The quality control of the project.
Topic n. 2:
Management of the construction
Content details:
The project operating
The structure and the quality system of the construction company.
Technologies, procedures and innovative construction systems
The construction management.
Durability in buildings: assessment of the duration, functional analysis, factorial method, propensity reliability and reliability elementary.
Topic n. 3:
The legislation on public works
Content details:
Programming and public-works project.
The management of the implementation phase
The completion of the procedures for the award.
Arrangements for the implementation of public works
Workshop/Laboratory Topic:
Building Information Modeling
Content details:
Application to case studies of BIM systems for the management of the attributes of the project and the building process.

Reference Texts
MODULO DI SOSTENIBILITA' DI PROCESSI E SISTEMI EDILIZI
D. e D. Meadows, J. Randers - I nuovi limiti dello sviluppo - Oscar Saggi Mondadori - Milano, 2004
G.R. Dell'Osso, a cura di - Architettura bioclimatica e sostenibilità nella casa per i paesi del Mediterraneo -Editore Il Tacco d'Itali -Casarano, 2009
G.R. Dell' Osso, A. Pierucci – Building Automation e Sostenibilità in edilizia – Maggioli Editore – Santarcangelo di Romagna, 2013
G.R. Dell' Osso. F. Iannone, A. Pierucci – Elementi di sostenibilità degli organismi edilizi – Maggioli Editore – Santarcangelo di Romagna, 2015.
MODULO DI MANAGEMENT DEL PROGETTO E DELLA COSTRUZIONE
A.Gottfried – Ergotecnica edile – Hoepli – Milano 2013
B.Baldi, M. Sanvito – La gestione della qualità nel processo edilizio – UNI – Bologna 2001
A.Osello – Il futuro del disegno con il BIM – Flaccovio Editore - 2012

2612 - SOSTENIBILITA' DELLE INFRASTRUTTURE VIARIE
ICAR/04 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-20 - AMBIENTALE
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	BERLOCO NICOLA

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts
Caratteristiche funzionali e costruttive delle infrastrutture per la mobilità pedonale - Ranzo A., Di Mascio P.; Vademecum della ciclabilità - Reti ciclabili in area mediterranea - Regione Puglia; Progettare le intersezioni - Canale Sascia, Distefano Natalia, Leonardi Salvatore, Pappalardo Giuseppina; Il paesaggio "attraversato" - Inserimento paesaggistico delle grandi infrastrutture lineari - Lorenzo Vallerini; Valutazione di impatto ambientale - Renato Lamberti; materiale didattico a supporto delle lezioni

2584 - STABILITA' DEI PENDII E OPERE DI SOSTEGNO
ICAR/07 - Ingegneria per l'ambiente e territorio

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM63 - INGEGNERIA PER L'AMBIENTE E IL TERRITORIO (D.M. 270/04)
Study plans/Curricula:	LM63-20 - AMBIENTALE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CAFARO FRANCESCO

Training objectives
SLOPE STABILITY
Knowledge about the slope failure processes, landslide risk mitigation strategies and engineering stabilization procedures.
SOIL RETAINING STRUCTURES
The course aims at teaching how to design retaining structures and excavations, starting from the definition of a suitable geotechnical model for the soil.

Prerequisites
SLOPE STABILITY
Physics, Matemathics, Continuum Mechanics, Hydraulics, Geotechnics.
SOIL RETAINING STRUCTURES
Basic Geotechnics. Foundations.

Didactic Methods
80per cent of the course as lectures, 10 per cent as in class excercises and 10 per cent as site course

Course programme
SLOPE STABILITY
Geomorphological features of slopes. Classification of landslides. Failure mechanisms and progressive failure. Factors affecting the slope stability and causes of landsliding. Slope investigations, surveying and monitoring; interpretation of investigation data and definition of the geological and geotechnical model. Laboratory testing for the measurement of the strength and deformation parameters of the slope soils/rocks. Seepage analysis; influence of rainfalls. Slope stability analyses: indefinite slope; method of friction circle and stability charts; methods of: Fellenius, Bishop simplified; Janbu; Morgestern & Price. Back analysis of failure. Stabilization measures: profile modification; drainage; methods for increasing shear strength; retaining structures. Case histories. Application of the study to a given real case. Field trip.
SOIL RETAINING STRUCTURES
Outline of earth pressure: Rankine' s problem. Theory of Coulomb. Recent theories. Earth pressure calculation for seismic conditions.
The walls. Types. Design criteria. Pseudostatic methods and simplified dynamics methods. Some concepts of structural design. Earthfill. Drains.
Sheet piling and diaphragm. Soil excavations and stress paths. Rock excavations. Dewatering and problems related to seepage. Design criteria. Serviceability. Construction. Anchors. Multianchored diaphragms. Outline of calculation by finite element codes.

Reference Texts
STABILITA' DEI PENDII - SLOPE STABILITY.
Materiale didattico fortemente consigliato:
Cruden D.M. & Varnes D.J. (1996) - Landslide types and processes. In: Landslides,investigation and mitigation, Turner A.K. & Schuster R.L.(eds.), Transportation Research Board, Special Report 247.
Hutchinson J.N.(1988)-General Report:Morphological and geotechnical parameters oflandslides in relation to geology and hydrogeology.Tanzini M.(2001)Fenomeni franosi e opere di stabilizzazione.Dario Flaccovio Editore.Griffiths D.V.& LaneP.A.(1999).Slope stability analysis by finite elements. Géotechnique, 49(3),pp.387-403.Picarelli L.(2000). Meccanismi di deformazione e rottura dei pendii.Hevelius edizioni.
Potts D.M.,Kovacevic N.& Vaughan P.R.(1997).Delayed collapse of cut slopes in stiff clay.Géotechnique, 47(5), pp. 953-982.Tanzini M.(2001).Fenomeni franosi e opere di stabilizzazione.Dario Flaccovio Editore.
Cotecchia F.,Pedone G.,Bottiglieri O.,Santaloia F., Vitone C.(2014)."Slope-atmosphere interaction in a tectonized clayey slope".R.I.G.
Airò Farulla C.(2001).Analisi di stabilità dei pendii. Hevelius edizioni.Tanzini M.(2001).Fenomeni franosi e opere di stabilizzazione. Dario Flaccovio Editore.Desideri A.,Miliziano S.,Rampello S. (1997).Drenaggi a gravità per la stabilizzazione dei   pendii. Hevelius edizioni.
Il materiale didattico fortemente consigliato, insieme ad altro materiale didattico utile è disponibile presso l'Ing. N. Melidoro (sezione di geotecnica) o/e presso la Sig.ra A.Corposanto (segretaeria didattica del DICATECh).
I testi dell'Hevelius dinanzi elencati sono altresì disponibili presso le biblioteche del DICATECh e del ex Facoltà di Ingegneria. Una versione estesa del programma del corso è scaricabile dal profilo docente del sitoweb del DICATECh. In tale versione estesa del programma sono forniti indirizzi specifici alla consultazione del materiale didattico.

2584 - STABILITA' DEI PENDII E OPERE DI SOSTEGNO
ICAR/07 - Ingegneria civile

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula:	LM01-23 - GEOTECNICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	CAFARO FRANCESCO

Training objectives
SLOPE STABILITY
Knowledge about the slope failure processes, landslide risk mitigation strategies and engineering stabilization procedures.
SOIL RETAINING STRUCTURES
The course aims at teaching how to design retaining structures and excavations, starting from the definition of a suitable geotechnical model for the soil.

Prerequisites
SLOPE STABILITY
Physics, Matemathics, Continuum Mechanics, Hydraulics, Geotechnics.
SOIL RETAINING STRUCTURES
Basic Geotechnics. Foundations.

Didactic Methods
80per cent of the course as lectures, 10 per cent as in class excercises and 10 per cent as site course

Course programme
SLOPE STABILITY
Geomorphological features of slopes. Classification of landslides. Failure mechanisms and progressive failure. Factors affecting the slope stability and causes of landsliding. Slope investigations, surveying and monitoring; interpretation of investigation data and definition of the geological and geotechnical model. Laboratory testing for the measurement of the strength and deformation parameters of the slope soils/rocks. Seepage analysis; influence of rainfalls. Slope stability analyses: indefinite slope; method of friction circle and stability charts; methods of: Fellenius, Bishop simplified; Janbu; Morgestern & Price. Back analysis of failure. Stabilization measures: profile modification; drainage; methods for increasing shear strength; retaining structures. Case histories. Application of the study to a given real case. Field trip.
SOIL RETAINING STRUCTURES
Outline of earth pressure: Rankine's problem. Theory of Coulomb. Recent theories. Earth pressure calculation for seismic conditions.
The walls. Types. Design criteria. Pseudostatic methods and simplified dynamics methods. Some concepts of structural design. Earthfill. Drains.
Sheet piling and diaphragm. Soil excavations and stress paths. Rock excavations. Dewatering and problems related to seepage. Design criteria. Serviceability. Construction. Anchors. Multianchored diaphragms. Outline of calculation by finite element codes.

Reference Texts
STABILITA' DEI PENDII - SLOPE STABILITY.
Materiale didattico fortemente consigliato:
Cruden D.M. & Varnes D.J. (1996) - Landslide types and processes. In: Landslides,investigation and mitigation, Turner A.K. & Schuster R.L.(eds.), Transportation Research Board, Special Report 247.
Hutchinson J.N.(1988)-General Report:Morphological and geotechnical parameters oflandslides in relation to geology and hydrogeology.Tanzini M.(2001)Fenomeni franosi e opere di stabilizzazione.Dario Flaccovio Editore.Griffiths D.V.& LaneP.A.(1999).Slope stability analysis by finite elements.
Géotechnique,   49(3),pp.387-403.Picarelli L.(2000). Meccanismi di deformazione e rottura dei pendii.Hevelius edizioni.
Potts D.M.,Kovacevic N.& Vaughan P.R.(1997).Delayed collapse of cut slopes in stiff clay.Géotechnique, 47(5), pp. 953-982.Tanzini M.(2001).Fenomeni franosi e opere di stabilizzazione.Dario Flaccovio Editore.
Cotecchia F.,Pedone G.,Bottiglieri O.,Santaloia F., Vitone C.(2014)."Slope-atmosphere interaction in a tectonized clayey slope".R.I.G.
Airò Farulla C.(2001).Analisi di stabilità dei pendii. Hevelius edizioni.Tanzini M.(2001).Fenomeni franosi e opere di stabilizzazione. Dario Flaccovio Editore.Desideri A.,Miliziano S.,Rampello S. (1997).Drenaggi a gravità per la stabilizzazione dei   pendii. Hevelius edizioni.
Il materiale didattico fortemente consigliato, insieme ad altro materiale didattico utile è disponibile presso l'Ing. N. Melidoro (sezione di geotecnica) o/e presso la Sig.ra A.Corposanto (segretaeria didattica del DICATECh).
I testi dell'Hevelius dinanzi elencati sono altresì disponibili presso le biblioteche del DICATECh e del ex Facoltà di Ingegneria. Una versione estesa del programma del corso è scaricabile dal profilo docente del sitoweb del DICATECh. In tale versione estesa del programma sono forniti indirizzi specifici alla consultazione del materiale didattico.

2020 - TECNICA DELLE COSTRUZIONI
ICAR/09 - Ingegneria civile

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula:	LT16-20 - CIVILE
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	GRECO RITA

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts

[1]   Decreto Ministeriale 14 gennaio 2008. "Norme tecniche per le costruzioni", Ministero delle Infrastrutture e dei Trasporti, G.U. n. 29 del 4 febbraio 2008, Supplemento Ordinario n. 30. 2008.

[2]   Circolare 2 febbraio 2009, n. 617 approvata dal Consiglio Superiore dei Lavori Pubblici. Istruzioni per l' applicazione delle «Nuove norme tecniche per le costruzioni» di cui al Decreto Ministeriale 14 gennaio 2008. Ministero delle Infrastrutture e dei Trasporti.

[3]   M. Mezzina (a cura di). "Fondamenti di Tecnica delle Costruzioni", in corso di pubblicazione

[4]   Pozzati P., Teoria e Tecnica delle strutture. UTET, Torino, 1972.

[5]   M. Mezzina (a cura di). "Costruire con il cemento armato", Utet Libreria, Torino. ISBN: 88-7750-658-x.

[6]   M. Mezzina, D. Raffaele, A. Vitone (a cura di). "Teoria e pratica delle costruzioni in cemento armato - Vol. I", Ed. Città Studi di De Agostini scuola. ISBN: 978-88-251-7304-8. 2007

[7]   M. Mezzina, D. Raffaele, A. Vitone (a cura di). "Teoria e pratica delle costruzioni in cemento armato- Vol. II", Ed. Città Studi di De Agostini scuola. ISBN: 978-88-251-7315-4. 2007

[8]   J. McGregor "Reinforced Concrete Mechanics and Design", 3° ed., Prentice Hall, New York 1997

2032 - TECNICA URBANISTICA
ICAR/20 - Architettura e urbanistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	12
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	MONNO VALERIA

Training objectives

This course provides the conceptual and technical basis to develop plans and projects aimed at promoting the regenerative transformation of cities and territories. It analyses the evolution of theories, procedures, methods and tools which are currently used in the practice of urban planning relating them to crucial problems characterising the contemporary processes of urbanisation. In particular, it deals with the crucial topics and challenges underlying sustainability and emerging socio-ecological interpretations of urbanisation. Cases of study and workshops are intended to help students to analyse urban and regional transformations and cope with crucial issues underlying planning processes and urban design. The coupling of theory and practice aims at developing both critical interpretative capacities and creative technical skill enabling an innovative and regenerative design of cities and territories. Preliminary knowledge on the environmental assessment of plans and projects are also exposed as a support to regenerative planning and design processes.

Prerequisites

Didactic Methods

Besides key lectures, the course includes seminaries and laboratories aimed at improving analytical and practical skills.

Course programme

- Urban transformation and the evolution of planning theories

Contemporary dynamics of urbanization. Urban and regional planning as an evolving field of study. From utopian models to the collaborative strategic approach. Unsolved problems and new challenges. Democracy, ethics and planning.

- The environmental crisis

Causes and features of environmental crisis. Sustainability and its evolution in theory and practice. Towards regenerative transformations. The environmental dimension in urban and regional planning. New interpretative models of urbanisation. Systemic and socio-ecological approaches. Sustainable cities: models and guidelines. Eco-districs- eco- neighborhood.

- Governing urban and regional transformations

National and regional legislation. From the master plan to new forms of urban planning. Urban regeneration. Plans for urban sustainability. Landscape planning.

- Analysing and interpreting urban and territorial transformations

Methods and techniques for an integrated analysis of the cultural, social, economic, environmental dimensions of urban and regional systems. Acquisition and representation of lay knowledge. Cities and territories as socio-ecological systems. Indicators and interpretive frameworks for sustainability. Vulnerability, risk and resilience.

_ Designing the urban transformation

Decision making processes and actors' involvement. Planning and evaluation. Scenario building and planning. Techniques and tools for planning and design the urban space. Methods and techniques to integrate the environmental dimension in urban planning and design. EIA and SEA.

Reference Texts

Camarda A. (2014), Urbanistica: fondamenti, procedure e criticità, Il Sole24Ore, Milano.

Fuccella, R. (1995), Elementi di urbanistica, Firenze, Alinea.

Marcandino A. (2001) Urbanistica Tecnica. Manuale per le indagini, le proiezioni, le diagnosi e il progetto, Il Sole24Ore, Milano.

Indovina, F. (2005), Governare la città con l' urbanistica, Repubblica Di San Marino: Maggioli.

Scandurra, E. (1994), L' ambiente dell' uomo, Roma: Etas.

Secchi B. (2000), Prima Lezione di Urbanistica, Bari. Laterza.

Liberati A., (2011), Edilizia e urbanistica, Cedam, Milano.

Lynch K. (1990), Progettare la città, Milano: Etas.

Natali C. (2004), L'analisi delle risorse nella formazione del piano strutturale, Ed. Alinea, Firenze.

Spagnoli L. (2012), Storia dell' urbanistica moderna. 2. Dall' età della borghesia alla globalizzazione 1815-2010), Zanichelli, Milano.

Salzano E., Fondamenti di urbanistica, Laterza, Bari 2003.

2565 - TECNOLOGIA DEI MATERIALI + CHIMICA E TECNOLOGIA DELLE ACQUE
ING-IND/22 - Attività formative affini o integrative

Academic year: 2015
Faculty: Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses: LT16 - INGEGNERIA CIVILE E AMBIENTALE (D.M. 270/04)
Study plans/Curricula: LT16-21 - AMBIENTALE
Type: Affine/Integrativa
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Secondo Ciclo Semestrale
Exam type: Orale
Professor in charge: DE GISI SABINO

Training objectives
Module I: Materials Technology
The aim of the course is to give an overview of main classes of materials for engineering applications, with specific reference to production technologies, mechanical, physical and chemical properties.
Module II: Water Chemistry and Technology
The aim of this course is to investigate the main technologies for the treatment of drinking water and municipal wastewater.

Prerequisites
Module I: Materials Technology
General and Inorganic Chemistry knowledge.
Module II: Water Chemistry and Technologies
Chemistry and General Physics knowledge.

Didactic Methods

Course programme
Lesson Topics
Module 1: Materials Technology
Topic 1: State diagrams
Content details: Constitution and microstructure of a solid, heterogeneous systems, phase rule, binary diagrams: liquid miscible and solid unmiscible, complete miscibility (liquid and solid), partial miscibility at solid state, formation of binary compounds with congruent and uncongruent melting point.
Topic 2: Steel siderurgy
Content details: Cast iron production, steel production, Fe/Fe_3C state diagram, hardness, resilience and ¿/¿ curve of steel, thermal treatments of steel, surface thermal treatments.
Topic 3: Hydraulic ligands
Content details: CEM I (Portland cement), production, setting and hardening, physical properties, resistance to chemical aggression, CEM IV (pozzolanic cement), CEM III (slag cement), aluminous cement, special Portland cements, classes of cements (UNI ENV 197), technical tests on cements, hydraulic lime, concrete: preparation and properties.
Topic 4: Glass/Polymers and elastomers
Content details: Glass structure, glass production, types of glass, chemical, physical, optical and mechanical properties of glass, physical and chemical temper of the glass, safety glass. Polymerization, polymer crystallinity, glass transition temperature, thermoplastic and thermosetting polymers, elastomers, fibres, physical and chemical properties, composites.
Topic 5: Metal corrosion
Dry corrosion, electrochemical corrosion, redox potential and electrochemical series, galvanic cell, stress-corrosion, fatigue-corrosion, thermodinamics, Pourbaix diagram, kinetics, differential aeration corrosion, cathodic protection, anodic protection, coatings.
Module II: Water Chemistry and Technology.
Topic 1: Drinking water.
General information; Classification of natural waters; Physical, chemical and microbiological characteristics of drinking water; Unit processes for the treatment of surface water; Unit processes for the treatment of groundwater; Engineering of drinking water treatment plants.
Topic 2: Municipal wastewater.
General information; Qualitative and quantitative analysis of domestic and industrial wastewater; Treatment schemes for municipal wastewater; Screening, grit removal, de-oiling, pre-aeration and equalization/homogenization units; Primary sedimentation; Activated sludge processes for organic substance removal and for nutrients (nitrogen and phosphorus) control; Secondary sedimentation; Volume and surface filtration, activated carbon adsorption, disinfection and control of disinfection by-products (DBPs); Sludge line: thickening, aerobic and chemical stabilization, anaerobic digestion, mechanical and natural dehydration, heat drying; Technologies for the treatment of domestic wastewater considering small communities.
Topic 3: Legislative aspects.
General information; Deepening of Part III of Legislative Decree 152/2006 and D.M. 185/2003 (on the reuse of treated wastewater).
Seminars: The course includes the involvement of industry experts through several seminars.
Exercises: Exercises, equal to 30%, are aimed to the dimensioning of the main processing units.

Reference Texts
Modulo I: Tecnologia dei Materiali
M. Lucco Borlera, C. Brisi, Tecnologia dei materiali e chimica applicata, Levrotto e Bella Editore.
B. Marchese, Tecnologia dei materiali e chimica applicata, Liguori Editore.
C. Brisi, Chimica applicata, Levrotto e Bella Editore.
W. Smith, Scienza e tecnologia dei materiali, Mc Graw-Hill Editore.

L. Bertolini, Materiali da costruzione, Città Studi Edizioni.

Modulo II: Chimica e Tecnologia delle Acque.

L. Masotti (2014). Depurazione delle acque. Il Sole 24 ore, ISBN: 9788850652020.

G. De Feo, S. De Gisi, M. Galasso (2012). Acque reflue. Dario Flaccovio Editore, ISBN 9788857901183.

C. Collivignarelli, S. Sorlini (2009). Potabilizzazione delle acque, Dario Flaccovio Editore, ISBN 9788877588562.

L. Bonomo (2008). Trattamenti delle acque reflue, Mc Graw Hill Education, ISBN: 9788838673085.

G. Tchobanoglous, F.L. Burton, H.D. Stensel (2003). Wastewater Engineering: Treatment and Reuse. Metcalf & Eddy, ISBN-13: 978-0070418783.

2031 - TECNOLOGIA DEI MATERIALI E CHIMICA APPLICATA
ING-IND/22 - Edilizia e ambiente

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	PETRELLA ANDREA

Training objectives

The aim of the course is to give an overview of main classes of materials for engineering applications, with specific reference to production technologies, mechanical, physical and chemical properties.

Prerequisites

General and Inorganic Chemistry knowledge

Didactic Methods

Course programme

Lesson Topics

Topic n. 1: State diagrams

Content details: Constitution and microstructure of a solid, heterogeneous systems, phase rule, binary diagrams: liquid miscible and solid unmiscible, complete miscibility (liquid and solid), partial miscibility at solid state, formation of binary compounds with congruent and uncongruent melting point.

Topic n. 2: Steel siderurgy and metal corrosion

Content details: Cast iron production, steel production, Fe/Fe3C state diagram, hardness, resilience and ¿/¿ curve of steel, thermal treatments of steel, surface thermal treatments. Dry corrosion, electrochemical corrosion, redox potential and electrochemical series, galvanic cell, stress-corrosion, fatigue-corrosion, thermodinamics, Pourbaix diagram, kinetics, differential aeration corrosion, cathodic protection, anodic protection, coatings.

Topic n. 3: Hydraulic ligands

Content details: CEM I (Portland cement), production, setting and hardening, physical properties, resistance to chemical aggression, CEM IV (pozzolanic cement), CEM III (slag cement), aluminous cement, special Portland cements, classes of cements (UNI ENV 197), technical tests on cements, hydraulic lime, concrete: preparation and properties.

Topic n. 4: Glass

Content details: Glass structure, glass production, types of glass, chemical, physical, optical and mechanical properties of glass, physical and chemical temper of the glass, safety glass.

Topic n. 5: Polymers and elastomers

Content details: Polymerization, polymer crystallinity, glass transition temperature, thermoplastic and thermosetting polymers, elastomers, fibres, physical and chemical properties, composites.

Reference Texts

M. Lucco Borlera, C. Brisi, Tecnologia dei materiali e chimica applicata, Levrotto e Bella Editore.

B. Marchese, Tecnologia dei materiali e chimica applicata, Liguori Editore.

C. Brisi, Chimica applicata, Levrotto e Bella Editore.

W. Smith, Scienza e tecnologia dei materiali, Mc Graw-Hill Editore.

L. Bertolini, Materiali da costruzione, Città Studi Edizioni.

2466 - TECNOLOGIA GENERALE DEI MATERIALI
ING-IND/16 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LT31-20 - MECCANICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	TRICARICO LUIGI

Training objectives

The course has the aim to illustrate the main characteristics of the materials, the measure of their mechanical and technological properties and the suitable thermal treatments which meet the material workability and the functional requirements of the part.

Prerequisites

Basic and general concepts of Chemistry and Physics.

Didactic Methods

Course programme

Introduction to Metallic Materials: Structure of crystalline solids: ideal crystal structures in metals; theoretical density; polymorphism; solidification mechanisms; monocrystalline and polycrystalline solids. Imperfections in crystalline solids: vacancies and self-interstitial defects; impurities in solids; dislocations; interfacial defects. Microscopic examinations. Stationary and non-stationary diffusion; mechanisms.

2. Properties of Materials and their Measurement: Behaviour of metal alloys under mechanical stresses. Mechanisms of relaxation and strengthening. Measurement of mechanical properties.

3. Binary phase diagrams and Phase Transformations: Binary phase diagrams. Isomorphic systems and systems with partial miscibility in the solid state. Gibbs phase rule and invariant reactions. The system Fe-Fe3C. Changes in microstructure and properties in the iron-carbon alloys. Kinetics of the transformations in the solid state, isothermal transformation diagrams (TTT) and continuous cooling diagrams (CCT). Pearlitic, bainitic and martensitic structures. Influence of carbon content on the mechanical properties of microconstituents. Microstructures achieved by heating: spheroidite; tempered martensite.

4. Heat treatment of metals and engineering materials classification: Heat treatment of metals: stress relief tempering, tempering, annealing (full, isothermal, coalescence, recrystallization), normalizing, quenching (direct, martempering, austempering). Thermochemical treatments: carburizing and nitriding. Hardenability and Jominy test. Designation of the steels according to the most widespread standards. Classification of engineering materials: ferrous alloys (steels, carburizing and nitriding steel; hints on tool steels, stainless steels and cast irons).

Reference Texts

2466 - TECNOLOGIA GENERALE DEI MATERIALI
ING-IND/16 - Ingegneria meccanica

Academic year:	2015
Faculty:	Dipartimento di Ingegneria Meccanica, Matematica e Management
Study courses:	LT31 - INGEGNERIA MECCANICA (D.M. 270/04)
Study plans/Curricula:	LT31-20 - MECCANICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SORGENTE DONATO

Training objectives

The course has the aim to illustrate the main characteristics of the materials, the measure of their mechanical and technological properties and the suitable thermal treatments which meet the material workability and the functional requirements of the part.

Prerequisites

Basic and general concepts of Chemistry and Physics.

Didactic Methods

Course programme

1. Introduction to Metallic Materials (1.25 ECTS Credits = 1.00L + 0.25E)
2. Properties of Materials and their Measurement (2.25 ECTS Credits = 1.5L + 0.75E)
3. Binary phase diagrams and Phase Transformations (1.625 ECTS Credits = 1.25L + 0.375E)
4. Heat treatment of metals and engineering materials classification (0.875 ECTS Credits = 0.75L + 0.125E)

Reference Texts

2303 - TECNOLOGIE PER LA TUTELA AMBIENTALE
ING-IND/22 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula:	LM01-22 - VIE E TRASPORTI
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	PETRELLA ANDREA

Training objectives

Part I of the course deals with fundamentals and principles of unit operations for water and wastewater treatment. Basic information is finalized to natural water (surface, groundwater) treatment for drinking purposes (potabilization) and softening operations.
Part II of the course deals with principles of municipal wastewater treatment with details on design operations. Eutrophication phenomena, nutrients removal and wastewater reuse operations for multipurpose destination is part of the course. The course is finished with design of a full scale municipal wastewater installation.

Prerequisites

General Chemistry and General Physics Courses

Didactic Methods

Course programme

Natural waters, Water balance, Natural water cycle, Natural water composition, Wastewater composition and characteristics, Water Softening, Coagulation, Flocculation, Clarification, Potabilization. Principles of wastewater treatments, Primary, treatments, Secondary treatments, tertiary treatments, Water eutrophication, Wastewater reuse. Design of a wastewater installation

Reference Texts

C.Collivignarelli; S.Sorlini; Potabilizzazione delle Acque. Processi e Tecnologie.
Dario Flaccovio Ed., Palermo, 2009.
Metcalf&Eddy; Ingegneria delle Acque Reflue. Trattamento e Riuso.
 IV Ed. McGraw-Hill Pub.Co, Milano, 2006
R.Passino:Manuale di Conduzione degli Impianti di Depurazione delle
 Acque. Zanichelli/Esac, Milano, 1999
E.Ribaldone Bianucci: Il Trattamento delle Acque Reflue Civili,
 Hoepli, 1995.
Degremont; Water Treatment Handbook, VI Ed. Lavoisier Pub. Paris,
 1991.

2303 - TECNOLOGIE PER LA TUTELA AMBIENTALE
ING-IND/22 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula:	LM01-20 - IDRAULICA
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	PETRELLA ANDREA

Training objectives

Part I of the course deals with fundamentals and principles of unit operations for water and wastewater treatment. Basic information is finalized to natural water (surface, groundwater) treatment for drinking purposes (potabilization) and softening operations.
Part II of the course deals with principles of municipal wastewater treatment with details on design operations. Eutrophication phenomena, nutrients removal and wastewater reuse operations for multipurpose destination is part of the course. The course is finished with design of a full scale municipal wastewater installation.

Prerequisites

General Chemistry and General Physics Courses

Didactic Methods

Course programme

Natural waters, Water balance, Natural water cycle, Natural water composition, Wastewater composition and characteristics, Water Softening, Coagulation, Flocculation, Clarification, Potabilization. Principles of wastewater treatments, Primary, treatments, Secondary treatments, tertiary treatments, Water eutrophication, Wastewater reuse. Design of a wastewater installation

Reference Texts

C.Collivignarelli; S.Sorlini; Potabilizzazione delle Acque. Processi e Tecnologie.
Dario Flaccovio Ed., Palermo, 2009.
Metcalf&Eddy; Ingegneria delle Acque Reflue. Trattamento e Riuso.
 IV Ed. McGraw-Hill Pub.Co, Milano, 2006
R.Passino:Manuale di Conduzione degli Impianti di Depurazione delle
 Acque. Zanichelli/Esac, Milano, 1999
E.Ribaldone Bianucci: Il Trattamento delle Acque Reflue Civili,
 Hoepli, 1995.
Degremont; Water Treatment Handbook, VI Ed. Lavoisier Pub. Paris,
 1991.

2580 - TEORIA E PROGETTO DI PONTI
ICAR/09 - Ingegneria civile

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula:	LM01-23 - GEOTECNICA
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	RAFFAELE DOMENICO

Training objectives

The course includes basic aspects related to the analysis and design of bridge structures, with reference to the typologies of usual employment. Are also briefly presented issues concerning the long-span bridges, with particular reference to the arch bridges and cable-stayed bridges

The primary objectives of the course are designed to provide students with the fundamentals of the viaduct with precast prestressed concrete girders and steel-concrete composite decks, and mainly concern:

1) the acquisition of basic knowledge for the design (taking into account also the seismic aspects) with particular reference to the technological, construction, sizing and calculation problems;

2) learning criteria roadmap towards appropriate and rational design choices;

3) seismic assessment of existing bridges.

The student is led to the development of the structural design of a simple type road/railway bridge.

Prerequisites

Bases of structural mechanics and structural analysis and design

Didactic Methods

Course programme

The course is divided into 6 parts.

Topic n. 1:   In Part I, after a brief historical introduction, are taken up and explored basic concepts of influence lines theory.

Content details: (i) historical evolution of the bridges; (ii) typological classifications and principles of construction; (iii) the theory of influence lines and surfaces.

Topic n. 2:   Part II is entirely devoted to the analysis of the chapter n. 5 of the Italian Technical Codes relating to the design of the road and rail bridges; in this part is also analyzed the behavior and the dimensioning of bridge bearings and joints.

Content details: (i) loads on bridges (traffic loads, wind loads, thermal loadings,..); (ii) the principles of operation, selection, arrangement, of bridge bearings and joints.

Topic n. 3:   In Part III are analyzed in detail how to design the superstructure and the substructure of girder bridges. In this part will be also developed a complete example of calculation of a simply supported girder bridge with prestressed concrete deck.

Content details: (i) types and construction methods; (ii) the transverse loading distribution, (simplified methods by Engesser, Courbon and Massonnet); (iii) the steel-concrete composite structures decks; (iv) segmental box-girder bridges erected in cantilever; (v) the piers and abutments of the girder bridge; (vi) the most common types of footing; (vi) a short account of the integral bridges; (vii) modeling techniques and the bases for the use of the most common tools for automatic calculation.

Topic n. 4:   Part 4 is devoted to bridges built in seismic zone.

Content details: (i) bridge seismic design conceptual principles; (ii) the ductility of concrete piers; (iii) the main properties of isolation and dissipation devices; (iv) the seismic vulnerability of the existing bridges.

Topic n. 5:   Part V is devoted to the analysis of principles that govern the arch bridges static.

Content details: (i) the centerline and thrust line; (ii) influence lines and the horizontal thrust reaction of the arches hyperstatic; (iii) deck arch bridges superstructure; (iv) 2nd order effects and instability in the plane and out-of-plane; (v) construction methods.

Topic n. 6:   In Part VI are provided, finally, brief remarks on the principles of static operation of the bridges supported by cables.

Content details: (i) cable balance and his stabilization; (ii) the main characteristics of cable-stayed bridges (arrangement of stays and systems of suspension, pylons, girders, cables and their protection, anchorages, criteria for pre-design, the non-linearity of the cable, the problems of fatigue in the stays); (iii) configuration suspension bridges and main characteristics.

Reference Texts

2580 - TEORIA E PROGETTO DI PONTI
ICAR/09 - Ingegneria civile

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM01 - INGEGNERIA CIVILE (D.M. 270/04)
Study plans/Curricula:	LM01-21 - STRUTTURE
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	RAFFAELE DOMENICO

Training objectives

The course includes basic aspects related to the analysis and design of bridge structures, with reference to the typologies of usual employment. Are also briefly presented issues concerning the long-span bridges, with particular reference to the arch bridges and cable-stayed bridges

The primary objectives of the course are designed to provide students with the fundamentals of the viaduct with precast prestressed concrete girders and steel-concrete composite decks, and mainly concern:

1) the acquisition of basic knowledge for the design (taking into account also the seismic aspects) with particular reference to the technological, construction, sizing and calculation problems;

2) learning criteria roadmap towards appropriate and rational design choices;

3) seismic assessment of existing bridges.

The student is led to the development of the structural design of a simple type road/railway bridge.

Prerequisites

Bases of structural mechanics and structural analysis and design

Didactic Methods

Course programme

The course is divided into 6 parts.

Topic n. 1: In Part I, after a brief historical introduction, are taken up and explored basic concepts of influence lines theory.

Content details: (i) historical evolution of the bridges; (ii) typological classifications and principles of construction; (iii) the theory of influence lines and surfaces.

Topic n. 2: Part II is entirely devoted to the analysis of the chapter n. 5 of the Italian Technical Codes relating to the design of the road and rail bridges; in this part is also analyzed the behavior and the dimensioning of bridge bearings and joints.

Content details: (i) loads on bridges (traffic loads, wind loads, thermal loadings,...); (ii) the principles of operation, selection, arrangement, of bridge bearings and joints.

Topic n. 3: In Part III are analyzed in detail how to design the superstructure and the substructure of girder bridges. In this part will be also developed a complete example of calculation of a simply supported girder bridge with prestressed concrete deck.

Content details: (i) types and construction methods; (ii) the transverse loading distribution, (simplified methods by Engesser, Courbon and Massonnet); (iii) the steel-concrete composite structures decks; (iv) segmental box-girder bridges erected in cantilever; (v) the piers and abutments of the girder bridge; (vi) the most common types of footing; (vi) a short account of the integral bridges; (vii) modeling techniques and the bases for the use of the most common tools for automatic calculation.

Topic n. 4: Part 4 is devoted to bridges built in seismic zone.

Content details: (i) bridge seismic design conceptual principles; (ii) the ductility of concrete piers; (iii) the main properties of isolation and dissipation devices; (iv) the seismic vulnerability of the existing bridges.

Topic n. 5: Part V is devoted to the analysis of principles that govern the arch bridges static.

Content details: (i) the centerline and thrust line; (ii) influence lines and the horizontal thrust reaction of the arches hyperstatic; (iii) deck arch bridges superstructure; (iv) 2nd order effects and instability in the plane and out-of-plane; (v) construction methods.

Topic n. 6: In Part VI are provided, finally, brief remarks on the principles of static operation of the bridges supported by cables.

Content details: (i) cable balance and his stabilization; (ii) the main characteristics of cable-stayed bridges (arrangement of stays and systems of suspension, pylons, girders, cables and their protection, anchorages, criteria for pre-design, the non-linearity of the cable, the problems of fatigue in the stays); (iii) configuration suspension bridges and main characteristics.

Reference Texts

1. M.P. Petrangeli, Progettazione e Costruzione di Ponti, Ed. Masson 1997
2. Leonhardt F., "I ponti: dimensionamento – tipologia - costruzione", Vol. VI, Ed. Tecniche, Milano.
3. Raithel, Costruzione di Ponti, Ed. Liguori, Napoli
4. Raithel, Ponti a Travata, Ed. Liguori, Napoli
5. F. De Miranda, Ponti a Struttura Mista di Acciaio, Vol. VII, Collana Italsider
6. F. De Miranda, I Ponti Strallati di Grande Luce, Ed Cremonese - Roma
7. E. Siviero, Il Ponte e l' Architettura, Ed Città Studi - Torino
8. M.J. Ryall, G.A.R. Parke, J.E. Harding, Manual of Bridge Engineering, Ed Thomas Telford, 2002, Londra
9. Appunti delle Lezioni

2533 - TERMODINAMICA APPLICATA AI SISTEMI ENERGETICI
ING-IND/08 - Ingegneria meccanica

Academic year: 2015
Faculty: Dipartimento di Ingegneria Elettrica e dell'Informazione
Study courses: LT05 - INGEGNERIA ELETTRICA (D.M.270/04)
Study plans/Curricula: PDS0-2013 - comune
Type: Caratterizzante
Total Credits: 6
Didactic Methods: Lezione
Didactic Period: Primo Ciclo Semestrale
Exam type: Orale
Professor in charge: DAMBROSIO LORENZO

Training objectives

This course aims at endowing industrial engineers with a basic knowledge heat exchangers for industrial applications and electric power production. At the end of the course, students will be able to understand and evaluate the performance of most important energy systems.

Prerequisites

Calculus, General Physics.

Didactic Methods

Course programme

General characteristics of Energy Systems: Classification of turbomachinery. Turbomachinery efficiency. Forms of Energy. First law of thermodynamics for mass and energy analysis of control volumes and Steady flow systems. Real transformations and irreversible processes. Polytropic and isoentropic efficiencies. Velocity triangles in turbomachinery. Eulerian work in turbomachinery. Power plant energy conversion efficiensies. Non-dimensional law and Buckingam's theorem. Fundamental and derived units. Dimensional homogeneity.

Second law of thermodynamics: Heat engine. Thermal efficiency. Second law of thermodynamics: Kelvin–Planck Statement. Heat pumps and refrigerators. Coefficient of Performance. 2nd law: Clausius statement. Equivalence of the two statements. Reversible and irreversible processes. The Carnot cycle. First and second Carnot principles. The thermodynamic temperature scale.

Direct and inverse thermodynamic cycles: Ideal gas power cycles. Overview of reciprocating engines. The Otto and Diesel cycles. Steady flow power plants. Overview of open and closed cycle gas turbines. Joule-Brayton cycle. Vapor power cycles. The Rankine cycle. Refrigeration cycles. Refrigerators and heat pumps. The inverse Carnot Cycle. Gas refrigeration cycles: the inverse Joule cycle. The vapor compression refrigeration cycle.

Heat transfer: Heat conduction. The Fourier's law. Boundary layer. Laminar and turbulent flow. Natural convection. Radiation heat transfer. The Kirchoff.' s law. View factors. Steady heat transmission across plane and cylindrical walls. Thermal resistance. Electrical and thermal analogy. Contact resistance. Series and parallels of resistances. Overall heat transfer coefficient. Heat exchangers. Parallel flow and counterflow heat exchangers. Log-mean temperature difference. Heat exchanger effectiveness. Types of heat exchangers.

Steam power plants: Thermodynamic cycles and layouts. The Rankine cycle. Methods to increase the efficiency of the Rankine cycle. Regenerative cycles. Condensers. Boilers.

Gas-turbine power plants: Layouts and working principles. Classification: aeroengines and industrial gas turbines. Gas turbine evolution and applications. Simple and regenerative ideal cycles: efficiency and power. Thermically perfect gas. Simple and regenerative cycle: efficiency and power. Combined gas-steam power plants and cogeneration: Classification. Layouts. Efficiency and power. Unfired cycle and Exhaust fired cycle. Pinch-point. Principles of heat and power cogeneration. Applications: efficiency, shaft and thermal power.

Reference Texts

2107 - TIPOLOGIE E TECNOLOGIE EDILIZIE
ICAR/10 - Architettura e urbanistica

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Secondo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	SCIOTI ALBINA

Training objectives

The course aims at:

Providing with the concepts, methods and tools for the architectural and technological design of building systems, with specific focus on residential buildings. The building typologies are developed, in terms of components, typological, formal and spatial features, as well as arrangement and technical-constructional models, within the emerging debate on technological, environmental and architectural issues and their relative correlation and integration.

Providing with methods and procedures to analyze the relationship among architectural design, construction phases and industrial manufacturing of construction materials and components.

Providing with awareness on design of pre-cast buildings, taking into account the critical issues of the industrial pre-casting for the building sector and process.

Prerequisites

Fundamentals about environmental and technological systems . Building technology.

Didactic Methods

Course programme

1) Typology of construction elements and systems within the development of building and architectural organisms.

2) Design methods and procedure. Relationship between design and building process. Relationship between design and construction.

3) Functional and constructional features of basic building types (terrace house, multi-storey building, tower house, aggregation and transformation rules); the spatial framework and the formal structure

4) Construction systems (timber, masonry, steel, reinforced concrete)

5) Pre-cast of building systems and components; specific features of the industrial sector; issues in the building sector

6) Sustainable design: principles and terms.

7)   Materials for the design (traditional. sustainable, innovative) with specific focus on their formal and functional potentialities and on their perspective for technological innovation and environmental sustainability;

8) Sustainability in the building process. Morphology and orientation. Solar gain systems. Shading solutions.

Reference Texts

AA. VV., Quaderni del manuale di progettazione edilizia, ed. Hoepli,2000

Enciclopedia pratica per progettare e costruire – Neufert, A. Baglioni, A. Gottfried (a cura di) – Hoepli, Milano 2005

Tipologie residenziali a schiera, Cambi, Di Sivo, Steiner – BE-MA Editrice

Marocco – Progettazione e costruzione bioclimatica dell' architettura – Edizioni Kappa – 2000 Trevisi, Laforgia, Ruggiero - EFFIECIENZA ENERGETICA IN EDILIZIA – Maggioli

Dassori E., La prefabbricazione in calcestruzzo, BE-MA Editrice, Milano, 2001

2595 - TOPOGRAFIA E TECN. DI RILEVAMENTO + INFRASTRUTTURE VIARIE
ICAR/06 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	TARANTINO EUFEMIA

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts
Dispense fornite dal docente
Carlucci R., Riggio A. Topografia di base. EPC Editore. 2015
Cina, A.: "Trattamento delle osservazioni topografiche" . Celid, Torino. 2003.
Barzaghi R., Pinto L. " Elementi di topografia e trattamento delle osservazioni" , Città Studi Edizioni, 2014.

2595 - TOPOGRAFIA E TECN. DI RILEVAMENTO + INFRASTRUTTURE VIARIE
ICAR/04 - Attività formative affini o integrative

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LT02 - INGEGNERIA EDILE (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Affine/Integrativa
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	TARANTINO EUFEMIA

Training objectives

Prerequisites

Didactic Methods

Course programme

Reference Texts
Dispense fornite dal docente
Carlucci R., Riggio A. Topografia di base. EPC Editore. 2015
Cina, A.: "Trattamento delle osservazioni topografiche" . Celid, Torino. 2003.
Barzaghi R., Pinto L. "Elementi di topografia e trattamento delle osservazioni", Città Studi Edizioni, 2014.

2079 - VALUTAZIONE IMMOBILIARE
ICAR/22 - Edilizia e ambiente

Academic year:	2015
Faculty:	Dipartimento di Ing. Civile, Ambientale, del Territorio, Edile e di Chimica
Study courses:	LM02 - INGEGNERIA DEI SISTEMI EDILIZI (D.M.270/04)
Study plans/Curricula:	PDS0-2013 - comune
Type:	Caratterizzante
Total Credits:	6
Didactic Methods:	Lezione
Didactic Period:	Primo Ciclo Semestrale
Exam type:	Orale
Professor in charge:	D'AMATO MAURIZIO

Training objectives

The aims of the course consist in providing the necessary knowledge to deliver an appraisal report or appraisal counselling. The students will investigate the basics of real estate investment and finance. Finally the fundamental of automated valuation modelling will be provided.

Prerequisites

Good Knowledge of Economics, Financial Math and Statistic, Urbanistic, Building Technology

Didactic Methods

Course programme

Syllabus – Lesson Topics
Topic n. 1:Property Valuation Methods
Lesson hours: 10
Content details: Market Approach: il Sistema di Stima, il Sistema di Ripartizione, Sistema delle Differenze ed i Sistemi Misti. Income Approach: Direct Capitalization with growth factor, Yield capitalization with and without growth factor, DCF Models. Models for Overall Capitalization Rate Determination :Band of Investment Analysis Land and Building and Band of Investment Analysis Mortgage Equity. Cost Approach and non linear depreciation
Topic n. 2: Investment Value
Lesson hours:10
Content details: Assessment of Worth, Net Present Value, Internal Rate of Return, Modified Internal Rate of Return, Payback period, Profitability Index, Break Even Analysis, Real Estate Ratios, Real Options
Topic n. 3: Real Estate Investment and Leverage
Lesson hours: 10
Content details: Real Estate Finance, Arrangement of Real Estate Investment, French and Italian amortization schedule.
Topic n. 4: Mass Appraisal
Lesson hours: 6
Content details: Introduction to Mass Appraisal and Automated Valuation Modeling, International Standard of Automated Valuation Modeling, Italian Mass Appraisal Methods, Automated valuation Modeling and Financial Stability
Syllabus
Topic n. 1: Property Valuation
Workshop hours: 12
Content details: Practical Applications of Valuation Methods for Property Valuation
Workshop hours: 12
Content details: Practical Application of Methods for Assessment of Worth and financial arrangement of real estate investment

Reference Texts