

UNIVERSITA' DEGLI STUDI MEDITERRANEA DI REGGIO CALABRIA

Subject Code	56T034
Subject Name	Electrotechnics
Professor	Prof. Ing. Mario Versaci
Department:	DICEAM
Degree course:	Civil-Environmental Engineering
Class:	L7
Type of educational activity:	Mandatory
Disciplinary Area:	Electrotechnics
Scientific-Disciplinary Sector:	ING-IND/31
Compulsory preliminary exams:	Mathematics, Physics
Course Year:	III
Semester:	II
ECTS:	6
Hours:	48

Synthetic description:

Knowledge of the analysis and synthesis methodologies of electrical circuits under stationary, sinusoidal, permanent, single and three-phase rule with elements of conversion.

Acquisition of knowledge on:

Analysis of electrical circuits for civil and industrial applications.

Evaluation method:

Practical and Oral Examination

Student's independent work

Detailed course program

Resistive Circuits

Power and electric voltage. Definition of a circuit and laws of Kirchhoff. Power and power keeping. Resistors. Short circuit and open circuit. Independent generators. Dividers. Equivalence relations among resistors. Combination of generators. Transformation of generators and resistances.

Modal Analysis

Circuits with independent generators of voltage and power. Circuits with controller generators. Circuits analysis through MatLab®.

Linearity and Superimposition

Linearity, superimposition and Thevenin-Norton theorems. Equivalent generator and real generator.

Condensers and Inductors. Transitories.

Dynamic circuit elements and parallel-series combination. Applications. Circuits in free or forced evolution. Circuits of first and second order.

Analysis under Sinusoidal rule

Complex numbers. Sinusoids. Phasors. Response to a sinusoidal entrance. Symbolic Law of Ohm. Methods of the phasors. Analysis of the domain of the phasors.

Power under Sinusoidal Rule

Instant power and medium power. Effective value and complex power. Complex power keeping. Passive bipoles. Power factor correction. Maximum power transfer. Power superimposition.

Three-phase circuits

Three-phase circuits with balanced load. Power used up by a balanced load. Power factor correction of a three-phase load.

Power converters

Principles of electric conversion. AC/DC convertitors, chopper and inverters.

Resources and main references

Desoer, Khu, Fondamenti di Circuiti Elettrici, Franco Angeli Editore.

Perfetti, Circuiti Elettrici, Zanichelli Editore.

Alexander, Circuiti Elettrici, McGraw Hill.