Università degli Studi della Basilicata
Scuola di Ingegneria

ACCADEMIC YEAR 2019-2020			
COURSE: **Structural Engineering**			
TYPE OF EDUCATIONAL ACTIVITY: Basic			
TEACHER: Angelo MASI			
e-mail: angelo.masi@unibas.it		website: www.angelomasi.it	
phone: 0971 205061		mobile (optional):	
Language: Italian			
ECTS: 9	n. of hours: 90	Campus: Potenza	Semester: I

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course provides basic knowledge of structural design in order to make safety verifications of simple structures made up of the materials mainly used in civil engineering (e.g. reinforced concrete, steel), complementing the theoretical notions of the Strength of Materials course. The methodologies for the design of reinforced structures are provided in the framework of national and international building codes.

Knowledge and understanding: the student must be able to know the main materials used for the construction and know the steps necessary for design and safety verifications of simple structures, in accordance with national and international building codes.

Ability to apply knowledge and understanding: the student must know the main materials used for construction; carry out stresses and deformation analysis on beams with one or more spans; principles of Limit States design in RC structures; Basic notions for safety verification of steel structures.

Autonomy of judgment: the student must be able to deepen his / her own knowledge as he / she learns, using the knowledge gained as a starting point for achieving increasing maturity and autonomy of judgment.

Communicative Skills: the student must be able to explain the notions acquired in the course, in a simple way, even to non-experienced people, using a correct scientific language.

Learning Skills: the student must be able to become self-sufficient in order to deepen his/her knowledge through books, scientific publications, and attendance at specialized seminars.

PRE-REQUIREMENTS

Students must have acquired and assimilated the basic knowledge provided by the courses of "Strength of Materials" and in particular:

- determination of stresses and deformations in simple beams;
- stress-strain constitutive laws.

SYLLABUS

1. Building materials. Technology and mechanical properties of concrete. Short accounts on fluage effect in concrete. Properties and characteristics of steel reinforcement for RC structures. Steel-concrete adherence.
2. Actions.
3. Stresses and deformation analysis on beams with one or more spans. Introduction to Sap 2000 software.
4. Notes on structural design. Analysis of structural safety. Probabilistic evaluation of safety: 1st, 2nd and 3rd level methods. Application examples. Stresses analysis of framed structures.
5. General notes on reinforced concrete (RC) structures. National and international building codes on RC structures. Definition and classification of Limit States. Characteristic and design values of actions and materials strength. Principles of Limit States design in RC structures. Ultimate Limit State (SLU) for bending with or without axial force. Bending-Axial force domains. SLU for shear stresses. SLU for torsion stresses. Serviceability Limit State (SLE): stress limitation, crack control, deflection control.
6. Basic notions for safety verification of steel structures: material, mechanical properties and tests, safety

verification of members under compression axial load, bending moment, shear. Simple bolted joints.
7. echnical-administrative and executive issues in the design and construction of RC structures.
8. Exercise: design of simple RC structures (slab and plane frame).

TEACHING METHODS
90 hours of: Theoretical lessons, Classroom tutorials, Laboratory tutorials.

EVALUATION METHODS
The exam consists of 2 parts:
- Written examination (1 hour);
- Oral examination. The exercise carried out during the course will also be discussed.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL
E. Cosenza, G. Manfredi, M. Pecce, Strutture in cemento armato. Basi della progettazione, ed. Hoepli.
National code: DM 17.1.2018
International code: Eurocodes 1 and 2
Lecture notes on web site: www.angelomasi.it

INTERACTION WITH STUDENTS
At the beginning of the course, after the description of the course program and main objectives, as well as of exam procedures, the teacher indicates the teaching material (available at www.angelomasi.it). He collects the list of the students who attend the course (name, surname, and e-mail address).
The teacher generally receives students on Thursday from 9:30 to 11:30 in his office (School of Engineering, third floor) but he can be also contacted by e-mail.

EXAMINATION SESSIONS (FORECAST)[1]
4.2.20, 28.2.20, 8.4.20, 26.6.20, 24.7.20, 8.9.20, 30.9.20, 11.11.20, 16.12.20

SEMINARS BY EXTERNAL EXPERTS YES x NO □

FURTHER INFORMATION

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.