UNIVERSITÀ DEGLI STUDI DI PALERMO

SCHOOL	POLYTECHNIC SCHOOL
ACADEMIC YEAR	2016/2017
FIRST CYCLE COURSE	BIOMEDICAL ENGINEERING
SUBJECT	BIOFLUID MECHANICS
TYPE OF EDUCATIONAL ACTIVITY	D
AMBIT	10437-A scelta dello studente
CODE	18421
SCIENTIFIC SECTOR(S)	ICAR/01
HEAD PROFESSOR(S)	NAPOLI ENRICO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	96
COURSE ACTIVITY (Hrs)	54
PROPAEDEUTICAL SUBJECTS	
YEAR	3
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**NAPOLI ENRICO** Thursday 12:00 13:30 Ufficio Enrico Napoli - Secondo piano Friday 12:00 13:30 Ufficio Enrico Napoli - Secondo piano

DOCENTE: Prof. ENRICO NAPOLI

TEACHING METHODS	Lectures and exercises
ASSESSMENT METHODS	Written and oral test. The written test consists of some exercises, to be solved on the computer on the course topics. The oral examination consists of the discussion of the written test and of the basic principles of biofluid mechanics. The final assessment takes into account equally the result of the written and oral tests and is based on the following requisites: a) knowledge and presentation skills of the fundamental principles; b) ability to apply the principles to practical problems ; c) skills in solving new problems. The examination is passed if the student meets the requirement a) and, at least for simple problems, the requirement b). The requirement c) is a necessary condition to obtain an excellent rating (28 and up). The score is given in thirtieths.
LEARNING OUTCOMES	Knowledge and understanding skills. The student will obtain the basic skills to understand and analyze the more relevant hydrodynamic phenomena in the biofluid mechanics. Skills to apply knowledge and understanding Main objective of the course is to provide the students with the necessary tools for solving basic problems in biofluid mechanics and, specifically, those related to the blood circulation and respiratory flows. Making judgments The variety of the problems discussed during the course requires that the student, rather than the mere ability to apply methodologies, achieves the ability to combine the solution of specific methodologies independently of each addressed problem. Communication skills During the exercises in the classroom and in the lab, the student will be invited to discuss the used procedures and methodologies, thus acquiring the ability to explain the meaning of their work. Such capacity will be directly evaluated in the final exam. Learning skills The provided knowledge will allow the students to analyze and study complex biofluid mechanics problems (other than those covered in the course), thus acquiring the ability to further deepen their expertise throughout their subsequent professional or university experience.
EDUCATIONAL OBJECTIVES	As in the Academic Regulation of the Course
PREREQUISITES	Integral and differential calcolus - Kinematics and dynamics
SUGGESTED BIBLIOGRAPHY	L. Waite & J. Fine, Applied Biofluid Mechanics, McGraw-Hill, 2007.

SYLLABUS

Hrs	Frontal teaching
2	Physical properties of Newtonian and non-.Newtonian fluids
10	Momentum and continuity equations
6	Laminar and turbulent flows
4	Navier-Stokes and Reynolds-Averaged-Navier-Stokes equations
10	Blood flow in the cardiovascular system
8	Respiratory system gas exchanges

Hrs	Practice
6	Basic problems in incompressible flows
6	Pulsatile pipe flows
4	Stress and deformation in deformable pipes
6	Applications of blood circulation in the cardiovascular system