

**Programme of “BIOMATERIALI”
BIOMATERIALS**

• Code: B2F020
 • type of course unit OPTIONAL
 • level of course unit 2nd Cycle in Chemical Engineering, 2nd year , 2nd semester
 Number of ECTS credits: 6 (workload is 150 hours; 1 credit = 25 hours)
 Teacher: Leonardo Pajewski (leonardo.pajewski@univaq.it)

1	Course objectives	<p>The course of Biomaterials has the objective of presenting the materials application in medicine. These particular materials used in contact with biological systems, are named biomaterials.</p> <p>On successful completion of this module, the student should understand the fundamental concepts of biofunctionality, biocompatibility and sterility of a medical device.</p>
2	Course content and Learning outcomes (Dublin descriptors)	<p>Topics of the module include: Biocompatible materials for biotechnological applications. Use of materials in medicine in the past centuries. Concepts of biomaterial and biocompatibility. Regulations and Ethics. Biofunctionality and sterility requirements. Classes of biomaterials: metallic, ceramic and polymeric. Surface properties of materials. Surface interactions with the water and with the proteins at the interface material-tissue. Modifying the surface properties of materials. Biomaterials control specified by ISO 10933. Registration of medical devices and requirement of the CE marking in conformity with the Directive EC 93/42. Evolution of biomaterials and tissue engineering applications.</p> <p>On successful completion of this module, the student should</p> <ul style="list-style-type: none"> - understand biofunctional and biocompatibility requirements of a material used to carry out a medical device - understand surface interactions of a biomaterial with biological environment and the way to surface properties improvement - understand the quality control requirements defined by the Directive EC 93/42.
3	Prerequisites and learning activities	The student must know the basic concepts of Chemistry and Material Science.
4	Teaching methods and language	<p>Lectures, team work, home work. Language: Italian Ref. B.D. Ratner, A.S. Hoffman, F.J. Schoen, J.E. Lemons, “Biomaterials Science. An Introduction to Materials in Medicine”. Academic Press 2004. ISBN 0-12-582463-7. R. Pietrabissa, “Biomateriali per Protesi e Organi Artificiali”, Patron Editore, Bologna 1996.</p>
5	Assessment methods and criteria	SEMINAR PRESENTATION AND DISCUSSION OF A MEDICAL DEVICE.