PAOLETTI ALFONSO

Programme of "Tecnologie Speciali"

"Non Traditional Manufacturing Technologies"

Number of ECTS credits: 9 (workload of 90 hours of teaching + work at home)

CODE : I0639

TYPE OF COURSE UNIT : Compulsory for 2nd Cycle in MECHANICAL ENGINEERING, 1st year , 2nd semester;
Optional for 1st Cycle in INDUSTRIAL ENGINEERING, 3rd year , 2nd semester.

Teacher: **Alfonso Paoletti**

1	**Course objectives and Learning outcomes**	The goal of this course is to provide the motivations, definitions and techniques for the analysis of advanced and non conventional manufacturing processes applied to machining of traditional and innovative materials, such as composite materials. On successful completion of this module, the student should understand the fundamental concepts of non traditional manufacturing technologies and the differences with the conventional processes.
2	**Dublin descriptors**	Topics of the module include: **Plastic materials**: classification, characterization, forming techniques and machining processes. **Composite materials**: fibres and matrices, mechanical properties, manufacturing methods, machining processes. **Powders metallurgy**: powders production, compaction, sintering. **Non conventional welding processes**. **Non conventional machining processes**: electro-discharge machining, electrochemical machining, chemical machining, laser beam machining, electro-beam machining, plasma-arc machining, ultrasonic machining, water jet machining, abrasive water jet machining. **Surfaces technology**: surface treatments. Coating processes: vapour deposition, sputtering. On successful completion of this module, the student should - have profound **knowledge** of basic techniques in manufacturing processes, - have **knowledge and understand** arguments of manufacturing and materials machining, - **understand and explain** the meaning of conventional and non traditional manufacturing processes applied both to traditional and innovative materials; - **understand** the fundamental concepts concerning the choice of the best technology to manufacture a product and be aware of potential applications in other fields, - **demonstrate skill** reasoning in non traditional manufacturing processes and ability to conceive principles of non conventional machining of products. - demonstrate **capacity** for reading and understand other texts on related topics.
3	**Prerequisites and learning activities**	The student must know the basic notions of Materials Science and Technology and Manufacturing Technologies.
4	**Teaching methods and language**	Lectures and exercises. Language: Italian **Ref. Text books** - J.A. Mc Geough: **Advanced Methods of Machining**, Chapman and Hall. - G. F. Benedict , **Nontraditional Manufacturing Processes**, Marcel Dekker Inc., New York. - Metal Handbook, Vol. 16: **Non Traditional Machining Processes**.
5	**Assessment methods**	Written and oral exam.