# DESCRIPTION OF THE EDUCATIONAL ACTIVITY

Academic year: ***2010-2011***

Course title: ***Machine Design and Construction***

Course number: ***16527***

Type of educational activity: ***compulsory subject, characteristic of the class***

Subject Group: ***ING-IND/14***

Year of study: ***1st year "Laurea magistrale"***

Semester: ***2nd***

Total number of credits: ***9***

Global workload (n. of hours) : ***225***

Number of hours allocated to: lectures, tutorials, laboratory, individual study: ***86,0, 4, 135***

Name of lecturer: ***Roberto Citarella, Gabriele Cricrì***

Objectives of the course: ***To give to students the proper education and theoretical tools to approach the machine design.***

Prerequisites: ***Machine Design I***

Course contents:
***Anisotropic materials characterization. Linear elastic fracture mechanics. Elasto-plastic fracture mechanics. Fatigue crack propagation. Time-depending constitutive relations. Plasticity. Multiaxial Fatigue. Low cycle fatigue. Fatigue with variable amplitude loads. Finite Element Method: direct determination of stiffness matrices in truss structures; elements stiffness, structure stiffness and matrix assembly; boundary conditions; virtual work principle; beam elements; isoparametric plane elements; axisymmetric elements; solution of practical problems (truss structures, pressure vessels, stress concentration factors, fracture mechanics, etc.). Boundary Element Method.***

Recommended reading:
***Lecture notes***
***L. Vergani, Meccanica dei materiali, McGraw-Hill.***
***P. Davoli, A. Bernasconi, M. Filippini, S. Foletti, Comportamento meccanico dei materiali, McGraw-Hill.***
***G. Belloni, A. Lo Conte, Costruzione di Macchine (Resistenza dei materiali e sicurezza), Hoepli.***
***Hughes T. J. R., The finite element method: linear static and dynamic analysis.***
***Reddi J. N., Energy and variational methods in applied mechanics.***
***Bathe K. J., Finite element procedures in engineering analysis.***

Teaching methods: ***lectures, exercises***

Assessment methods: ***Oral examination***

Language of instruction: ***Italian***

Additional information: ***further information can be requested via e-mail: rcitarella@unisa.it, gcricri@.unisa.it .***