

## ROBERTO CARAPPELLUCCI

. PROGRAMME OF "MACCHINE" "MACHINES AND THERMAL POWER PLANTS"		
<ul style="list-style-type: none"> <li>• CODE: I0629</li> <li>• TYPE OF COURSE UNIT: COMPULSORY FOR THE INDUSTRIAL ENGINEERING SPECIALIZATION</li> <li>• LEVEL OF COURSE UNIT (E.G. FIRST, SECOND OR THIRD CYCLE; SUB-LEVEL IF APPLICABLE): FIRST CYCLE</li> <li>• YEAR OF STUDY (IF APPLICABLE); SEMESTER: THIRD YEAR, FIRST SEMESTER</li> </ul>		
NUMBER OF ECTS CREDITS: 9 (WORKLOAD OF 90 HOURS OF TEACHING + WORK AT HOME; 1 CREDIT = 25 HOURS OF TOTAL ACTIVITIES)		
<b>Teacher: Prof. Roberto Carapellucci</b>		
1	<b>Course objectives</b>	THE COURSE AIMS TO INITIATE STUDENTS TO THE STUDY OF FLUID MACHINERY AND ENERGY CONVERSION SYSTEMS FROM NATURAL SOURCES. AFTER A FEW CALLS AND EXTENSIONS OF THE MAIN CONCEPTS OF APPLIED THERMODYNAMICS, IT ADDRESSES THE THERMODYNAMIC ANALYSIS OF THERMAL POWER PLANTS FED BY FOSSIL FUELS. THEN, IT DEALS WITH THE STUDY OF THE OPERATING PRINCIPLES AND APPLICATION CRITERIA OF TURBOMACHINERY, ENGINES AND OPERATORS, VOLUMETRIC MACHINES, THERMAL POWER PLANTS AND THEIR COMPONENTS.
2	<b>Course content and Learning outcomes (Dublin descriptors)</b>	<p>TOPICS OF THE MODULE INCLUDE:</p> <p>THERMODYNAMICS APPLIED TO MACHINES AND THERMAL POWER PLANTS. CLASSIFICATION OF MACHINES AND ENGINES. TRANSFORMATIONS OF COMPRESSION AND EXPANSION AND THEIR EFFICIENCIES. TYPICAL EFFICIENCIES OF THERMAL POWER PLANTS. AXIAL AND RADIAL TURBOMACHINERY. NOZZLES AND DIFFUSERS. PRINCIPLE OF IMPULSE AND REACTION STAGES. STEAM POWER PLANTS. SCHEMES AND METHODS FOR IMPROVING PERFORMANCE OF STEAM PLANTS. FOSSIL-FUELLED STEAM GENERATORS. PUMPS AND COMPRESSORS. GAS TURBINE POWER PLANTS. COMBINED GAS-STEAM CYCLE POWER PLANTS.</p> <p>ON SUCCESSFUL COMPLETION OF THIS MODULE, THE STUDENT SHOULD</p> <ul style="list-style-type: none"> <li>- HAVE PROFOUND <b>KNOWLEDGE</b> OF BASIC TECHNIQUES IN ENERGY SYSTEMS ANALYSIS,</li> <li>- HAVE <b>KNOWLEDGE AND UNDERSTANDING</b> OF THE OPERATING PRINCIPLES OF MACHINES AND THERMAL COMPONENTS,</li> <li>- <b>UNDERSTAND AND EXPLAIN</b> THE MEANING OF THERMODYNAMIC EFFECTS AND PLANT LAYOUT ISSUES,</li> <li>- <b>UNDERSTAND</b> THE FUNDAMENTAL CONCEPTS FOR THE APPLICATION CRITERIA OF MACHINES AND THERMAL COMPONENTS,</li> <li>- <b>DEMONSTRATE SKILL</b> IN ANALYZING THE BEHAVIOR OF INDIVIDUAL MACHINES AND THERMAL COMPONENTS AND <b>ABILITY</b> TO EVALUATE THEIR PERFORMANCE IN INTEGRATED ENERGY SYSTEMS.</li> </ul>
3	<b>Prerequisites and learning activities</b>	THE STUDENT MUST KNOW THE BASIC NOTIONS OF CHEMISTRY, INCLUDING COMBUSTION PROCESSES AND FUEL HEATING VALUE, AND OF APPLIED PHYSICS, INCLUDING PRINCIPLE OF ENERGY CONSERVATION AND HEAT TRANSFER MECHANISMS.
4	<b>Teaching methods and language</b>	LECTURES AND EXERCISES. LANGUAGE: ITALIAN/ ENGLISH  <b>REF. TEXT BOOKS</b>  MORAN M.M., SHAPIRO H.N., <i>FUNDAMENTAL OF ENGINEERING THERMODYNAMICS</i> , JOHN WILEY & SONS, INC., 5 <sup>TH</sup> EDITION
5	<b>Assessment methods and criteria</b>	WRITTEN AND ORAL EXAM