



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2021/2022
MASTER'S DEGREE (MSC)	MANAGEMENT ENGINEERING
SUBJECT	SMART FACTORY RESEARCH AND INNOVATION
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50368-Ingegneria gestionale
CODE	21682
SCIENTIFIC SECTOR(S)	ING-IND/16
HEAD PROFESSOR(S)	LA COMMARE Professore Ordinario Univ. di PALERMO UMBERTO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	LA COMMARE UMBERTO Monday 10:00 12:00 Stanza Docentel° piano edificio 8 - Padiglione Tecnologie Meccaniche

DOCENTE: Prof. UMBERTO LA COMMARE

PREREQUISITES	Basic knowledge of economy for engineers and management of innovation
LEARNING OUTCOMES	Knowledge and comprehension capability The student, at the end of the course, will have acquired knowledges and methodologies to evaluate the critical aspects of an actual manufacturing routing and he will have the tools to design and to structure a research and development project aimed to improve the competitive positioning of the company (i.e. to reduce the critical aspect of the manufacturing routing). Capability to use the acquired knowledges The student will be able to set up research and development proposals in a manufacturing environment. Judgement capability The student will have acquired a methodology to examine a manufacturing routing and to evaluate actions and innovations. Communication capability The student will be able to properly communicate (present) in an effective way and language with reference to the aspects of the proposed research and development actions. He will be eventually able to manage an interview with an evaluator of the research and development proposal. Learning capability The student will be autonomously able to carry out and structure a research and development project for the considered company.
ASSESSMENT METHODS	Oral exam and discussion of the project work. Project work weight 70%; oral exam weight 30% The selection of the topic of the project work, i.e. of an actual manufacturing routing, is aimed to evaluate the abilities of the capacity of the student to analyse in actual industrial contexts the possible activities of research and development. The project work is a document (and power point presentation) focused on the analysis of a manufacturing production cycle (routing) highlighting the most relevant critical aspects, determining the most suitable research and development activities aimed to reduce the highlighted critical aspects. The proposed activities have to be structured in a research and development project. The final document must contain both the scientific and technological basis together with the economic and market ones related to the considered production cycle. The presentation of the project works made in the classroom during the second module of the semester both for the evaluation and for the whole class. The evaluation of the project work is made on the basis of the analysis of the literature, on the proposed technological solutions aimed to the reduction of the critical aspects and of the presentation quality. The oral exam is made of the discussion on the presentation of the project work and on questions on the related arguments of the course. The score of the oral exam (maximum 30) evaluates the level of knowledge and the capability to apply to the topic of the project work the topics of the course. The following levels of evaluation will be used: excellent 30 - 30 cum laude, very good 26-29, good 22-25, sufficient 18-21, insufficient.
EDUCATIONAL OBJECTIVES	The course is aimed to give to the student the knowledges and methodologies to set up an eventual action of research and development in a manufacturing company, highlighting the existing critical aspects in the actual routing. Furthermore the course is aimed to give the instruments and methodologies to structure and develop a research and development proposal aimed to the improvement of the position of the company in the arena of the competitors.
TEACHING METHODS	Case studies analysis (analysis of process plans in manufacturing smes). Preparation of a business plan of research and development (project work). Discussion of the project work.
SUGGESTED BIBLIOGRAPHY	Appunti e slide del corso.

SYLLABUS

Hrs	Frontal teaching
2	The concept of innovation in a modern factory. From industry 4.0 to industry 5.0.
2	Research and innovation in Italy and in the world. The steps of innovation: research-development-industrialisation.
4	Machine learning and industrial production through advanced technologies.
6	Analysis of a production routing in a manufacturing environment. The product cost accounting. The analysis of the wastes and other critical aspects.
6	The set up of a research and development project. Objectives and activities. The determination of the work packages.
4	The fundamental tools financing industrial research and development activities at the regional, national and European level.
4	The evaluation of a research and development proposal.

Hrs	Practice
10	The analysis of manufacturing routings.
10	The set up of a research and development proposal.