

Study Plan Master's Degree Program MECHATRONICS AND SMART TECHNOLOGY ENGINEERING (a.y. 2021-2022)

Curriculum: SMART TECHNOLOGY ENGINEERING

FIRST YEAR

Number	Credits	Year	Semester	Course	Code	SSD	Taught	Professor	
1,1	9	X	1	1	C.I. Sustainable Energy + Thermal Physics for advanced technology (module SE)	161003	ING-IND/09	ENG	Silvia Ravelli Giuseppe Franchini
1,2	6	X	1	1	C.I. Sustainable Energy + Thermal Physics for advanced technology (module TP)	161003	ING-IND/10	ENG	Simona Tonini
2,1	6	X	1	1	C.I. Virtual and Physical Prototyping + Advanced Machine Design (module VPP)	161001	ING-IND/15	ENG	Daniele Regazzoni
3	9	X	1	1	Smart sensors and electronic systems	39168-ENG	ING-INF/01	ENG	Valerio Re Gianluca Traversi
2,2	6	X	1	2	C.I. Virtual and Physical Prototyping + Advanced Machine Design (module AMD)	161001	ING-IND/14	ENG	Sergio Baragetti
4	6	X	1	2	Industrial plant design and simulation	161005	ING-IND/17	ENG	Sergio Cavalieri
5	6	X	1	2	Materials for advanced engineering applications	39171-ENG	ING-IND/22	ENG	Sergio Lorenzi
6	6	X	1	2	Data science and automation	39170-ENG	ING-INF/04	ENG	Mirko Mazzoleni
7	6	X	1	2	Mechanical vibrations	39074-ENG	ING-IND/13	ENG	Paolo Righettini

SECOND YEAR (*)

Number	Credits	Year	Semester	Course	Code	SSD	Taught	Professor	
8	6	X	2	1	Advanced manufacturing technologies	161007	ING-IND/16	ENG	to be defined
9	6		2	1-2	Course in Group A	/	/		
10	6		2	1-2	Course in Group A	/	/		
11	17		2	2	Lab 1 or Lab 2	/	/		
12	12		2	1-2	Elective courses	/	/		

Group A

Number	Credits	Year	Semester	Course	Code	SSD	Taught	Professor	
				1	Combustione e trattamento degli effluenti gassosi	39045	ING-IND/08	ITA	Marco Savini
				2	Progettazione degli impianti termotecnici	39096	ING-IND/10	ITA	to be defined
				2	IT architecture in production	39187-ENG	ING-IND/13	ENG	to be defined
				2	Progettazione FEM	39056	ING-IND/14	ITA	Sergio Baragetti
				1	Innovazione di prodotto e di processo	39075	ING-IND/15	ITA	Davide Russo
				1	Quality management systems	22027-ENG	ING-IND/16	ENG	Claudio Giardini
				2	Lean manufacturing	39122-ENG	ING-IND/17	ENG	Paolo Gaiardelli
				1	Elettronica industriale	21031	ING-INF/01	ITA	Massimo Manghisoni
				1	Automazione industriale	21029	ING-INF/04	ITA	Fabio Previdi
				1	Embedded and Real Time systems	21038-ENG	ING-INF/05	ENG	Davide Brugali

LAB 1: SMART LIVING TECHNOLOGIES

Number	Credits	Year	Semester	Course	Code	SSD	Taught	Professor	
	3		2	2	Structural monitoring	161009-1	ICAR/08	ENG	to be defined
	3		2	2	Structural safety and risk assessment	161009-2	ICAR/09	ENG	to be defined
	4		2	2	Energy systems design	161009-3	ING-IND/09	ENG	to be defined
	4		2	2	Smart grids	161009-4	ING-IND/33	ENG	to be defined
	3		2	2	Sensors	161009-5	ING-INF/01	ENG	to be defined

LAB 2: SMART MANUFACTURING

Number	Credits	Year	Semester	Course	Code	SSD	Taught	Professor	
	4		2	2	Robots and automatic machinery for industrial applications	161010-1	ING-IND/13	ENG	to be defined
	3		2	2	Human-machine interaction	161010-2	ING-IND/15	ENG	to be defined
	3		2	2	Smart manufacturing technologies	161010-3	ING-IND/16	ENG	to be defined
	4		2	2	Advanced production systems	161010-4	ING-IND/17	ENG	to be defined
	3		2	2	Collaborative robotics	161010-5	ING-INF/04	ENG	to be defined

	1	X			Other skills (*)	39077			
	12	X			Thesis work and final defence	161000			

(*) included in thesis preparation

(*) 2nd year courses will be activated in the academic year 2022-23

Elective courses (taught in English)

Semester	Course	Code	SSD	Credits	Taught	Professor
2	Computational mechanics of solids and structures	60039-ENG	ICAR/08	6	ENG	Rosalba Ferrari
1	Computational fluid dynamics	39070-ENG	ING-IND/06	6	ENG	Alessandro Colombo
2	Internal combustion engines and vehicle aerodynamics	39046-ENG	ING-IND/08	6	ENG	to be defined
2	Experimental techniques and performance test methods for power plants and fluid machinery	39047-ENG	ING-IND/09 ING-IND/12	7	ENG	Hamed Abdeh
2	IT architecture in production	39187-ENG	ING-IND/13	6	ENG	to be defined
1	Quality management systems	22027-ENG	ING-IND/16	6	ENG	Claudio Giardini
2	Lean manufacturing	39122-ENG	ING-IND/17	6	ENG	Paolo Gaiardelli
2	Science and technology of light alloys	39109-ENG	ING-IND/22	6	ENG	Sergio Lorenzi
1	Embedded and Real Time systems	21038-ENG	ING-INF/05	6	ENG	Davide Brugali
2	Statistics for digital and organisational innovation	37195-E2	SECS-S/02	6	ENG	to be defined

Other elective courses (taught in Italian)

Semester	Course	Code	SSD	Credits	Taught	Professor
1	Complementi di scienza delle costruzioni	60077-2	ICAR/08	6	ITA	Egidio Rizzi
2	Combustione e trattamento degli effluenti gassosi	39045	ING-IND/08	6	ITA	Marco Savini
1	Motori aeronautici	39120	ING-IND/08	6	ITA	Marco Savini
2	Tecnologie delle energie rinnovabili	39071	ING-IND/09	6	ITA	Giuseppe Franchini
1	Termofluidodinamica	39020	ING-IND/10	6	ITA	Gianpietro Cossali Lorenzo Botti
2	Progettazione di impianti termotecnici	39096	ING-IND/10	6	ITA	to be defined
2	Misure dimensionali e collaudi di produzione	39015	ING-IND/12	6	ITA	to be defined
2	Azionamenti dei sistemi meccanici	39038	ING-IND/13	6	ITA	Bruno Zappa
1	Meccanica dei robot (not activated in 2021-22)	39051	ING-IND/13	6	ITA	Bruno Zappa
1	Modellistica e simulazione dei sistemi meccanici	39052	ING-IND/13	6	ITA	Vittorio Lorenzi
1	Sistemi mecatronici	39162	ING-IND/13	6	ITA	Paolo Righettini
1	Progettazione funzionale di sistemi meccanici	39073	ING-IND/13	6	ITA	Paolo Righettini
2	Progetto di macchine	39055	ING-IND/14	6	ITA	Sergio Baragetti
2	Progettazione FEM	39056	ING-IND/14	6	ITA	Sergio Baragetti
2	Metodi e strumenti per il ciclo di vita del prodotto	37008	ING-IND/15	6	ITA	Caterina Rizzi
1	Innovazione di prodotto e di processo	39075	ING-IND/15	6	ITA	Davide Russo
2	Studi di fabbricazione	39057	ING-IND/16	6	ITA	Chiara Ravasio
1	Tecnologie di formatura (plasticità)	39105	ING-IND/16	6	ITA	Giancarlo Maccarini
1	Tecnologie di formatura (fonderia)	39106	ING-IND/16	6	ITA	Giancarlo Maccarini
2	Gestione della produzione industriale	39062	ING-IND/17	6	ITA	Fabiana Pirola
1	Corrosione e protezione dei materiali	39010	ING-IND/22	6	ITA	Tommaso Pastore
1	Materiali polimerici, compositi e ceramici	39013	ING-IND/22	6	ITA	Marina Cabrini
2	Gestione aziendale e dei sistemi logistici	39076	ING-IND/35	6	ITA	Matteo Kalchschmidt
1	Elettronica industriale	39066	ING-INF/01	6	ITA	Massimo Manghisoni
1	Automazione industriale	21029	ING-INF/04	6	ITA	to be defined
1	Controlli automatici	39067	ING-INF/04	6	ITA	Fabio Previdi
2	Intelligenza artificiale	38089-MOD1	ING-INF/05	6	ITA	Mario Verdicchio
1	Robotica	39068	ING-INF/05	6	ITA	Davide Brugali
1	Calcolo numerico	39064	MAT/08	6	ITA	to be defined

The selection of other courses provided by the School of Engineering must be verified and approved by the Degree Program Board

A **curricular internship** or a **Summer / Winter School** (max 6 credits) can be included among the 12 credits for elective courses after evaluation by the Degree Program Board