GENERAL INFORMATION					
Course name	RO1. Fundamentals of robotics				
Semester	2	Character	Compulsory	Type of module	Specialisation
ECTS	5		Modality	Face-to-face	
Higher Education Institution(s)			ESTIA		
Lecturer(s)			Maylis Uhart, Joseph Canou, Vincent Magimel, Olivier Patrouix		

LEARNING AND TEACHING	
ESCO Occupation(s)	Manufacturing engineer Calculation engineer
ESCO Skill & Competences (*no ESCO)	Computational mechanics Apply numeracy skills Modelling methods* Monitor technology trends Apply advanced manufacturing Create a product's virtual model Use CAD / CAE software
Learning outcomes (Please refer to Appendix 4 for the interpretation of the acronym)	KU1, KU3, EA1, EP2, EP3
Teaching methods	Lectures Tutorials Case Studies Simulation-Based Learning
Assessment methods	Technical reports Oral presentation & defence Examinations Case studies

CONTENTS

Previous requirements (if necessary)

TR3 Advanced Simulation & Modelling

Content index

Modelling of robots

- Introduction to industrial robotics: robot families, operating principles, applications, safety, control modes...
- Joint space / operational space
- Forward kinematics; inverse kinematics
- Control in joint space; control in Cartesian space
- Modelling tools, Denavit Hartenberg modelisation

Kinematics and geometric models

Robot dynamics modelling

- Time domain, frequency domain
- Fourier transforms (FFT)
- Frequency response function (FRF)
- Vibration modes
- Active damping

SUPPORTING BIBLIOGRAPHIC REFERENCES

SOFTWARE

3DExperience, Grasshoper, HAL