Curriculum UPES Industrial Computing Engineering specialty (i.e. Master Industrial Computing Engineering)

Semester	Subject	Coefficient	ECTS	Total Workload	Lecture / Tutorials	Lab	Project / Self-directed Study	Private Study
1	**Methods / Skills Modules (8 ECTS)**							
	Engineering Mathematics	2	4	120	45	-	-	75
	Probability and Stochastic Processes	2	4	120	45	-	-	75
	Technical CORE Modules (16 ECTS)							
	Algorithms and Programming	2	4	120	30	30	-	60
	Computer Networks	2	4	120	40	20	-	60
	Operating Systems	2	4	120	30	15	-	75
	Electronic System Design	2	4	120	30	30	20	40
	Management, Leadership, and Academic Skills Modules (6 ECTS)							
	Engineering Professional Practice	1,5	3	90	30	-	-	60
	Advanced English for the University 1	1,5	3	90	30	-	-	60

Semester	Subject	Coefficient	ECTS	Total Workload	Lecture / Tutorials	Lab	Project / Self-directed Study	Private Study
2	**Methods / Skills Modules (8 ECTS)**							
	Advanced Mathematics for Engineers	2	4	120	25	20	15	60
	Students must complete 1 course by 3 of 4 ECTS from those listed below							
	Numerical Methods	2	4	120	40	20	-	60
	Optimization Techniques	2	4	120	25	20	-	75
	Discrete Mathematics	2	4	120	45	-	-	75
	Technical CORE Modules (16 ECTS)							
	Automata, Computability, and Complexity	2	4	120	45	-	-	75
	Databases and Web Services	1,5	3	90	20	25	20	25
	Students must complete 3 courses by 6 of 3 ECTS from those listed below							
	Secure and Dependable Systems	1,5	3	90	30	-	-	60
	Computer Systems Architecture	1,5	3	90	20	25	-	45

Web Systems Engineering	1,5	3	90	15	30	-	45
Object Oriented Design and Patterns	1,5	3	90	45	-	-	45
Paradigms of Programming	1,5	3	90	25	20	-	45
Linear Systems, Signals & Control	1,5	3	90	30	15	-	45
Management, Leadership, and Academic Skills Modules (6 ECTS)							
Entrepreneurship and Intrapreneurship	1,5	3	90	30	-	20	40
Advanced English for the University 2	1,5	3	90	30	-	-	60

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	Technical CORE Modules (20 ECTS)							
	Mandatory Modules (16 ECTS)							
	Real Time Systems	2,25	4	120	40	20	20	40
	Embedded System Design	2,25	4	120	15	30	35	40
	Control Engineering	2,25	4	120	40	20	-	60
	Advanced Automation System	2,25	4	120	30	30	-	60
3	***Elective Modules (4 ECTS)*** *Students must complete 1 course by 5 of 4 ECTS from those listed below*							
	Advanced Computing Systems	2	4	120	30	30	-	60
	Measurements and Instrumentation	2	4	120	15	30	-	75
	Software Architecture	2	4	120	30	15	-	75
	Artificial Intelligence Techniques	2	4	120	45	-	-	75
	Mobile Applications Development	2	4	120	15	30	-	75

Management, Leadership, and Academic Skills Modules (8 ECTS)							
Developing, Funding and Commercialising Technology	2	4	120	60	-	-	60
Academic English for Postgraduates (Engineering)	2	4	120	45	-	-	75
Projects and Internships (2 ECTS)							
Junior Internship	-	2	-	-	-	60	-

Semester	Subject	Coefficient	ECTS	Total Workload	Lecture / Tutorials	Lab	Project / Self-directed Study	Private Study
4	**Technical CORE Modules (24 ECTS)**							
	Mandatory Modules (16 ECTS)							
	Embedded Electronics and Communications	2	4	120	15	30	15	60
	Modeling and Simulation of Complex Systems	2	4	120	30	30	-	60
	Soft Computing	2	4	120	45	15	-	60
	Reconfigurable Computing Design	2	4	120	30	30	-	60
	Mandatory Elective Modules (4 ECTS)							
	Students must complete 1 course by 5 of 4 ECTS from those listed below							
	Data Acquisition and Sensor Networks	2	4	120	15	30	-	75
	Machine Sensing	2	4	120	30	30	-	60
	Fault Diagnosis and Fault Tolerant Control	2	4	120	45	-	-	75
	Networked & Distributed Control Systems	2	4	120	45	-	-	75
	Power Electronics and Electrical Machines Control	2	4	120	30	30	-	60

	Elective Modules (4 ECTS)						
	Students must complete 1 course by 5 of 4 ECTS from those listed below						
Machine Learning	2	4	120	45	-	-	75
Clouds, Grids and Virtualisation	2	4	120	30	15	15	60
Distributed Systems	2	4	120	30	15	-	75
Wireless Sensor Networks	2	4	120	25	20	-	75
Wireless IoT and Local Area Networks	2	4	120	30	15	-	75
Management, Leadership, and Academic Skills Modules (6 ECTS)							
IT Project Management	1,5	3	90	30	15	15	30
Research, Planning and Communication	1,5	3	90	30	-	-	60

Semester	Subject	Coefficient	ECTS	Total Workload	Lecture / Tutorials	Lab	Project / Self-directed Study	Private Study
	Technical CORE Modules (16 ECTS)							
	Mandatory Modules 1 (4 ECTS)							
	Robotics Engineering	2,5	4	120	30	15	25	50
	Mandatory Elective Modules 1 (4 ECTS) *Students must complete 1 course by 5 of 4 ECTS from those listed below*							
	Control of Complex Systems	2,5	4	120	40	20	-	60
	Intelligent Control Systems	2,5	4	120	40	20	-	60
5	Dynamic Programming & Stochastic Control	2,5	4	120	45	-	-	75
	Modeling and Control of Hybrid Systems	2,5	4	120	30	15	-	75
	Model Predictive Control	2,5	4	120	30	15	-	75
	Mandatory Elective Modules 2 (4 ECTS) *Students must complete 1 course by 5 of 4 ECTS from those listed below*							
	Quality Management	2,5	4	120	45	15	20	40
	Lean Management	2,5	4	120	45	15	20	40
	Production Planning and Control	2,5	4	120	45	-	15	60

Logistics and Supply Chain	2,5	4	120	45	-	15	60
Reliability and Maintenance Engineering	2,5	4	120	45	15	20	40
Elective Modules (4 ECTS) *Students must complete 1 course by 5 of 4 ECTS from those listed below*							
Neural Networks and Deep Learning	2	4	120	30	15	-	75
Computer Vision and Pattern Recognition	2	4	120	30	15	30	45
Multi-Agent Systems	2	4	120	45	-	-	75
Intelligent Architectures	2	4	120	20	10	30	60
Quantum Informatics	2	4	120	25	20	-	75
Management, Leadership, and Academic Skills Modules (6 ECTS)							
Mandatory Modules 2 (3 ECTS)							
Legal and Ethical Aspects of Computer Science	1,5	3	90	45	-	-	45
Mandatory Elective Modules 3 (3 ECTS) *Students must complete 1 course by 4 of 3 ECTS from those listed below*							
Agile Leadership and Strategic Management	1,5	3	90	30	-	20	40
Strategic Management of Technology and Innovation	1,5	3	90	30	-	20	40
Transformational Change Management	1,5	3	90	30	-	20	40

Organizational Behavior	1,5	3	90	30	-	20	40
Projects and Internships (8 ECTS)							
Mandatory Modules 3 (3 ECTS)							
Senior Internship	-	3	90	-	-	90	-
Mandatory Elective Modules 4 (5 ECTS) *Students must complete 1 course by 4 of 5 ECTS from those listed below*							
Literature Survey	2,5	5	150	-	-	150	-
Research Project Computer Science	2,5	5	150	-	-	150	-
Joint Interdisciplinary Project (JIP)	2,5	5	150	-	-	150	-
Interdisciplinary Advanced AI Project	2,5	5	150	-	-	150	-

Semester	Subject	Coefficient	ECTS	Total Workload	Lecture / Tutorials	Lab	Project / Self-directed Study	Private Study
6	**Projects and Internships (30 ECTS)**							
	Final Graduate Project	-	30	900	-	-	900	-