

Syllabus MSc FLUIDS ENGINEERING FOR INDUSTRIAL PROCESSES

Semester	MODULES	Number of ECTS credits	Format of the course (in hours of class lecture L, tutored work TW, Lab work LW, project P)
First year M1 Semester 1 (Sept – Dec) 30 ECTS credits	A. COMMUNICATION & RESEARCH A1. French as a Foreign Language – Exams – 4 ECTS A2. Research Project – Project – 4 ECTS A3. Physics for Industrial Processes – 1 ECTS	9	60 L + 10 TW + 60 P
	B. UNIT OPERATIONS FOR INDUSTRIAL PROCESSES B1. Chemical engineering introduction – 1 ECTS B2. Chemical balance –1 ECTS B3. Sedimentation and Filtration + Lab – 2 ECTS B4. Chemical reactor engineering – 1 ECTS + Lab – 2 ECTS B5. Physico-chemistry – 1 ECTS	8	20 L + 20 TW + 10 LW
	C. MASS TRANSFER PHENOMENON C1. Mass transfer – 3 ECTS C2. Mass transfer lab – 2 ECTS	5	15 L + 15 LW
	D. FLUID MECHANICS FOR INDUSTRIAL PROCESSES D1. Basics of Fluid Mechanics – Project – 3 ECTS D2. Turbulence – Attendance – 2 ECTS D3. Fluid Mechanics Labs – Report – 3 ECTS	8	30 L + 30 LW + 10 P
First year M1 Semester 2 (Jan – June) 30 ECTS credits	E. PROCESS AND THERMODYNAMICS E1. Chemical Engineering - 3 ECTS E2. Chemical Engineering Lab - 1 ECTS E3. Machine thermodynamics 3 ECTS E4. Gas Turbomachine 3 ECTS	10	16L + 4TW + 4P 4LW 16L + 4TW + 8PW 16L + 4TW + 8PW
	F. PROJECT & RESEARCH F1. Experimental project – 5 ECTS F2. Numerical project – 5 ECTS	10	20TW + 20PW 20TW + 20PW
	G. CULTURE G1. English – 4 ECTS G2. French language or communication – 2 ECTS G3. Projet Professionnel – 2 ECTS G4. Sport – 2 ECTS	10	20TW + 10PW 20TW + 10PW 10L + 4PW 20TW

Second year M2 Semester 3 (Sept – Mar) 30 ECTS credits	H. LANGUAGE French & English Language - 3 ECTS	3	20TW + 10PW
	I. FLUID MECHANICS I.1 Fluid mechanics basics - 1 ECTS I.2 Turbulent flows - 2 ECTS I.3 Intensification & micro-processes - 1 ECTS I.4 Rheology 1 ECTS I.5 Mixing - 1 ECTS I.6 Transfer in porous media 2 ECTS	8	6L + 4TW + 4PW 16L + 4TW + 8PW 6L + 4TW + 4PW 6L + 4TW + 4PW 6L + 4TW + 4PW 16L + 4TW + 8PW
	J. MULTIPHASES FLOW J.1 Drops, Bubbles & Particles 2 ECTS J.2 Multiphase flows - 2 ECTS J.3 Multiphysics - 1 ECTS J.4 Two-phase flow with change of state - 2 ECTS J.5 Two-phase flow hydrodynamic - 1 ECTS J.6 Coalescence-break-up and agregation - 1 ECTS	9	6L + 4TW + 4PW 16L + 4TW + 8PW 16L + 4TW + 8PW 16L + 4TW + 8PW 6L + 4TW + 4PW 6L + 4TW + 4PW
	K. NUMERICAL SIMULATION K1. turbulence models - 2 ECTS K2. Computational fluid dynamics - 2 ECTS K3. Two phase flow in tube - 2 ECTS K4. Project on industrial applications - 4 ECTS	10	16L + 4TW + 8PW 6L + 4TW + 4PW 6L + 4TW + 4PW 4L + 10TW + 12PW
Second year M2 Semester 4 (Mar – Sept) 30 ECTS credits	L. INTERNSHIP L.1 2-month internship in enterprise or research lab. Oral defense last week of September. 4 ECTS L.2 5-month internship in enterprise or research lab. Oral defense first week of September. 26 ECTS	30	