ENSI CAEN
ÉCOLE PUBLIQUE D'INGÉNIEURS
CENTRE DE RECHERCHE

Material Science & Chemistry

Fall semester (Sept - Feb)
2nd year of Master

Teaching Units	Teaching modules	Code	Hours			ECTS
			Course	Practical Work	Total	
Languages	French as a foreign language		20		**20**	**5**
Research Project	Writing Report Oral Defense					**10**
Industrial Project	Writing Report Oral Defense					**5**

Energy & Materials						
Materials Science	Luminescent materials	3MAH4	15		**15**	**1.5**
	Transmission electron microscopy	3MAD2	15		**15**	**1.5**
	Criteria for materials selection	3MAD7	3	12 TP	**15**	**2**
	Application of finite elements to thermo-mechanical coupling	3M1CA		12 TP	**12**	**2**
	Amorphous materials	3MAH2	14		**14**	**1.5**
	Materials and Nuclear applications	*3MAD1*	14		**14**	**1.5**
	Non equilibrium thermodynamics	3MAI3	14	3 TD	**17**	**2**
	Corrosion of materials	*3MAI6*	21	7TD-4TP	**32**	**3**
Choice 1 (Materials for Energy)	Photovoltaics		15		**15**	**2,5**
	Thermoelectricity	3MAG3	15		**15**	**2,5**
Choice 2 (Materials for structures)	*Fatigue and materials failure*	3MAK9	14	7 TD	**21**	**3**
	Composite materials	*3MAK1*	14		**14**	**2**
Total					***164/169***	**20**

Courses in italics are taught in French with slides, handouts and examinations in English

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Chemistry - Petrochemistry & refinery

Catalysis for Energy & Environment	Life cycle analysis: Application to processes		15		**15**	**2**
	Biofuels & refining	3MR15	15		**15**	**2**
	Capture, recovery and hydrogenation of CO2		15		**15**	**2**
	Remedial Catalysis		15		**15**	**2**
	Hydrogen and SynGas		15		**15**	**2**
Chemical Engineering	Applied Fluid Mechanics	-	10	5TD+16TP	**31**	**3**
	Engineering of separation process	3CAGC6	15	12 TP	**27**	**3**
	Engineering of catalytic process	3CAGC8	15		**15**	**1,5**
	Safety of industrial processes		15		**15**	**1,5**
	Treatment of industrial effluents		10		**10**	**1**
Total					**173**	**20**

Chemistry - Organic Synthesis

Analytical Chemistry and Chemical engineering	Scale up process	3CABA1	8		**8**	**1**
	Engineering of separation process	3CAGC6	15	12 TP	**27**	**3**
	Safety of industrial processes		15		**15**	**1,5**
	Advanced Chromatography	3CAHC1	15		**15**	**1.5**
	Treatment of industrial effluents	3CACA2	10		**10**	**1**
Organic Synthesis 1	Retrosynthetic analysis & Total synthesis	3MR17	20		**20**	**2**
	Asymmetric synthesis & organometallics	3MR19	20		**20**	**2**
Organic Synthesis 2	Heterocyclic compounds	3CADA1	20		**20**	**2**
	Catalysis and industry	3CADC3	10		**10**	**1**
	Heteroelements	3CAEA2	20		**20**	**2**
	Energy Transition	3CAFC2	15		**15**	**1.5**
	New methods for polymer synthesis	3CADA4	15		**15**	**1.5**
Total					**195**	**20**

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