



Universitat Autònoma de Barcelona

Master Program in Industrial Chemistry and Introduction to Chemical Research 2022-2023 edition

Programs, number of hours per theoretical module/section, teachers, and module coordinators

M1: Industry and Research in Chemistry: Specialized Topics in Theory and Practice. 60 h.
Coord. Fina Pons (Josefina.Pons@uab.cat)

- Introduction to photochemistry. 3 h. José Luis Bourdelande
- Regulations. 4 h. Cristina Palet
- Patents. 5 h. Núria Rivera.
- Experimental design. 7 h. Jordi Coello
- CV and presentations preparation. 4 h. Rosa M^a Sebastián
- Introduction to computational chemistry. 4 h. Agustí Lledós, Gregori Ujaque
- NMR (theory + problem resolution). 7 h. Roger Bofill, Ona Illa.
- Resource optimization and environmental assessment of chemical processes. 7 h. José Peral
- Risk and safety in chemical facilities. 4 h. Manel del Valle
- Laboratory instrumental techniques and chemical analysis. 14 h
 - o ICP-Mass. 4 h Montserrat Resina.
 - o X-Ray. 3 h. Francesc Piniella + Ángel Álvarez (Servei RX)
 - o Laboratory advanced techniques. 7h Jordi García-Antón, Josefina Pons

M2: Chemistry for Specific Materials of Interest in Industry and Research. 38 h.
Coord. Xavier Sala (Xavier.sala@uab.cat)

- Solids, Supramolecular materials, nanomaterials, biomaterials and liquid interphases.
- Molecular recognition: cationic or anionic species. Neutral molecules. Self-assembly. Molecular devices and molecular machines. Liquid interphases: Langmuir-Blodgett films, micelles, vesicles. (8 h) Jordi Hernando.
- Metal-Organic Frameworks: from molecules and metal ions to crystals and superstructures. Inhar Imaz (4 h).
- Metal nanoparticles, quantum dots, nanotubes, graphenes, fullerenes, liquid crystals. M^a José Esplandiú (7 h).
- Materials for Sustainable Energy: sustainable energy, solar fuels, water splitting, hydrogen, CO₂ reduction. 4 h. Xavier Sala (4h).
- Gels and biomaterials, and use of synchrotron radiation in their study. Roberto Boada (6 h)
- Materials and microfabrication technologies for miniaturized systems. (6 h). Mar Puyol
- Nanoparticles and applications in catalysis. Roser Pleixats, (3 h)

M3: Chemistry in Industry. 102 h.

Coord. José Peral (Jose.Peral@uab.cat)

- Project management and production cost assessment. 4 h. David del Moral
- Entrepreneurship. 3 h. Jordi Marquet
- Wastewater and residue treatment. 10 h. M. González (5 h), Sergi Ponsà (5 h)
- Biotechnology procedures. 4 h. Pau Ferrer
- Chemical and biochemical process control. 3 h. Joan Baeza
- Green Chemistry. 6 h. Gonzalo Guirado (3 h), José Peral (3 h)
- Micro- and nano-capsules for controlled delivery of functional molecules. (3 h). Claudio Roscini.
- Special topics in chemical products of industrial interest (66 h) :
 - o Bulk chemicals (*Top ten*). 10 h. Joan Carles Bayón (5 h), Jordi Marquet (5 h), Jesús Santamaria (3 h)
 - o Polymers. 12 h. Joan Carles Bayón (6 h) + Jesús Santamaria (3 h), Romina Marín (2 h) y Josep Gimeno (2 h).
 - o Pharmaceuticals. 16 h. Francesc Cabré (6 h) + Joan Guasch (4 h) + Marius Valls (4 h) + Montse Closa (2 h)
 - o Surfactants. (4 h). Miquel Osset
 - o Dyes. (4 h). Fernando Carrillo
 - o Flavours and fragrances. (4 h). Amadeo Triviño
 - o Food products. 8 h. Manuel Valiente (3 h), Jordi Saldó (5 h)
 - o Diagnostics. (4 h). X Ceto
 - o Asymmetric synthesis and catalysis in industrial processes. (4 h) Pau Bayón

M4: Advanced Chemistry. 56 h.

Coord. Montse López Mesas (Montserrat.Lopez.Mesas@uab.cat)

- Chemical speciation, non destructive analysis, miniaturization. 6 h. M^a Jesús Sánchez (3 h), Mar Puyol (3 h)
- Chemometrics. 6 h. Manel Alcalà
- Surface chemistry (heterogeneous catalysis, self-assembled monolayers). 3 h. José Peral
- Conventional and non-conventional solvents. 2 h. Gonzalo Guirado.
- Applications of computational techniques in chemistry. 4 h. Agustí Lledós/ Gregori Ujaque
- Structure determination in chemistry. 13 h
 - o NMR: 1D, 2D, multinuclear, solid state. Miriam Pérez (6 h). Roger Bofill (2 h).
 - o EPR. 2 h. José Vidal (ICMAB)
 - o Microscopy: TEM, SEM, AFM, STSM. 3 h. M^a José Esplandiú
- Synthesis and catalysis. 20 h.
 - Homogeneous catalysis. 6 h. J.C. Bayón
 - Basic principles and strategies in the design of organic synthesis. 1 h. Marta Figueredo
 - Non-aromatic and aromatic heterocycles. 6 h. Marta Figueredo
 - Chirality: general concepts, molecular and supramolecular structures. 3 h. Pau Bayón
 - Stereoselective synthesis. 4 h. Ona Illa

M5: Biomolecular Chemistry. 38 h. Coord. Adelina Vallribera

(Adelina.Vallribera@uab.cat)

- Biomolecules & Biomimetics. Structure, function and biorecognition. 6 h. María Isabel Pividori (3 h), Manel del Valle (3 h)
- Structure and function of biomolecules and mimetics. 6 h. Oscar Palacios
- Modeling of biomolecular processes: recognition mechanisms and dockings, dynamical behaviours. 3 h. Jean Didier Maréchal

- Chemistry and biomedicine: Radiopharmaceuticals, contrast agents for magnetic resonance imaging. 3 h. Joan Suades
- Natural products: biosynthesis and properties. 8 h. Adelina Vallribera (4 h), Ramon Alibés (4 h)
- Biomolecule production, separation, modification and determination. 9 h. María Isabel Pividori (6 h), Manel del Valle (3 h)
- Nanomaterials in biosciences. 3 h. María Isabel Pividori

M6: From Small Molecules to Nanomaterials. 38 h.

Coord. Mar Puyol (MaríaDelMar.Puyol@uab.cat)

- Small molecules: synthesis and applications in molecular biology and medicine. 13 h. Ramon Alibés (7 h), Félix Busqué (6 h).
- Dendrimers and hyperbranched molecules: preparation and applications. (5 h). Rosi Sebastián.
- Computational chemistry in small molecules. Jean Didier Maréchal (4h)
- Soft materials: polymeric coatings and gelators, Supramolecular structures. (5 h). Carlos Jaime
- Organofluorinated compounds: synthesis and applications. (3 h) Adelina Vallribera
- Nanoparticle and applications in catalysis. (3 h) Mar Puyol
- Applications of small molecules, soft materials and nanoparticles in drug and biomolecule delivery. (5 h). Rosa Ortuño.

Internship. 300 h / student (15 ECTS) + Thesis Master. 300 h / student (15 ECTS). Coord. Félix Busqué (felix.busque@uab.es)

Evaluation

- Every professor decides the number and typology of evaluation activities: oral presentations, written exams, delivery of discussed articles and small written tests. All these activities will be accorded with the module coordinator.
- The final mark of the module will be the sum of the mark of every professor multiplied by the percentage of his classes in the total teaching of the module.
- The marks of the written exams must be above 3.5 in order to average with other marks of the professor and/or the module.
- There will be a period in January to repeat written exams with marks under 5. In the case of exams under 3.5 will be mandatory to the student, in case of exams between 3.5 and 5 would be optional to the student. Only students that have attended to 2/3 of the evaluation activities can retake these exams in January.
- In the case that a student will not arrive to a 3.5 mark after the retaking exam in January, the coordinator of the module could proceed to average this mark with the rest of the module. However, this option can only be considered for two written exams in the whole master.
- The marks of other evaluations activities (i. e. oral presentations) will average with the rest of the marks of the professor/module independently of the value. There will not be option of repeating these other evaluation activities.
- An average mark of 5.0 is mandatory in order to pass a module.

Tutorial of students

1. First semester

1.1. Students in Advanced Chemical Research

During the period of enrollment the tutor will be Isabel Pividori, main coordinator of the master (Isabel.Pividori@uab.cat).

Once enrolled one academic tutor will be assigned among the module coordinators of the master.

1.2. Students in Industrial Chemistry specialization

During the period of enrollment the tutor will be Félix Busqué, coordinator of the second semester modules (Felix.Busque@uab.cat).

Once enrolled, one academic tutor will be assigned between the professors of the department of chemistry of UAB.

2. Second semester (secondments and internships)

2.1. Students in Advanced Chemical Research

Every student will have two tutors: i) the same academic tutor that in the first semester and ii) a technical tutor selected by the student, usually the master thesis supervisor in the research group where the student is developing the experimental modules.

2.2. Students in Industrial Chemistry specialization

Every student will have two tutors: i) the same academic tutor that in the first semester and ii) a technical tutor selected by the company where the student is developing the experimental modules. In this case the academic tutor will help the student in the revision of the master thesis document and in the preparation of its public defense.