**Graduate School 3MG**

Courses catalog for 2026-2027



# CORE ACTIVITIES

for PhD students

| Year | Activity | Participation | Hours recorded |
|---|---|---|---|
| **1** | **BOOTCAMP** | Mandatory | 20 |
| 1 | Open Science | Mandatory | 2 |
| 1 | Ethics & Integrity | Mandatory | 3 |
| 1 | Thesis management 1 | Mandatory | 2 |
| 1 | AI for research | Mandatory | 3 |
| 1 | State of the art | Mandatory | 10 |
| **3** | **3RD YEAR MEETING** | Mandatory | 11 |
| 3 | Thesis writing | Mandatory | 7 |
| 3 | Thesis management 2 | Mandatory | 2 |
| 3 | Alumni meetup | Mandatory | 2 |
| **Each year** | **DOCTORAL SCHOOL DAY** | 2 mandatory participations, with at least 1 presentation (poster or oral communication) | 0 |
| | | **TOTAL** | **31** |

## Basics for research

**Our mandatory and recommended courses** to acquire the essential skills of a young researcher.

Open science (2H) MASTER, PHD

*Marine Bernard*

Open science is profoundly transforming research practices and has become a requirement of funders, institutions, and the scientific community. This course will introduce students to the core principles of open science, open-access publishing, managing and sharing research data in accordance with the FAIR principles, and exploring citizen science.

Ethics & integrity (3H) MASTER, PHD

*Ewa Zlotek-Zlotkiewicz*

This course aims to develop students' informed and critical understanding of ethical issues in scientific research. It also prepares them to integrate research ethics and integrity requirements into their current and future work. Through group discussions, students will address key topics such as authorship, collaborations, data collection and conflicts of interest.

Thesis management (3H) PHD

*Ewa Zlotek-Zlotkiewicz*

Consisting of interactive workshops and peer exchanges, these courses will give to PhD students the basics for a successful thesis in physics, chemistry and geosciences.

AI for research (3H) MASTER, PHD
*Nicolas Hernandez*
This course on generative AI for research aims to share experiences with tools that can be easily used in daily research, demonstrating both their possibilities and potential limitations.

Scientific publishing & state of the art (10H) PHD
*Gabriele Hess-Fernandez*
Content to be confirmed

Write it right - Thesis writing (7H) PHD
*Gabriele Hess-Fernandez*
This interactive workshop dedicated to thesis writing combines practical guidance, peer exchange, and mentoring. Led by an experienced scientific writing trainer and with the participation of scientists from your lab, it will give you tools and techniques to help clarify your ideas, write more effectively, and overcome common roadblocks.

Write & publish your paper (18H) PHD
*Gabriele Hess-Fernandez*
With this course, PhD students will get practical advice and guidance on how to structure a research article, write it and get it published in international journals; explaining every step of the process, from choosing a suitable journal for your work, to presenting the results and citing references. We will work on your writing skills and discuss ethical issues important in scientific publishing.

General public communication (3H) PHD
*Ulysse Pedreira*
This course is an introduction that explores the basics of science communication to the general public (scicom). In addition to providing students with the basic concepts and theory of scicom, it will be an opportunity to explore the rich local scicom ecosystem and to participate in hands-on activities that are essential to the creation of any scicom project.

Research transfer & innovation (3H) PHD, POSTDOC
*Mallory Pain-Lardeux & Valérie Viranaiken*
This course dedicated to PhD students in physics, chemistry and geosciences will give you basic tools of intellectual property, research transfer and patents (brevets). The aim is to provide you with essential notions to protect your results, turn your current research into innovation and pursue a career in the academic or R&D sectors.

Intervenir en TP ou en TD (6H) PHD, POSTDOC
*Yasmine Filali*
Cette formation vise à travailler sur les points clés à avoir en tête avant de se lancer dans l'enseignement d'un module de TD ou de TP en chimie, physique ou géosciences. L'objectif est d'apprendre à s'approprier les caractéristiques d'un module, à organiser une séance et à participer aux modalités d'évaluation.

# ELECTIVE COURSES

We offer **optional courses** you can choose according to your needs. The regional Doctoral College, the University Library and the others doctoral/graduate schools also offer general and scientific courses **available on AMETHIS.**

## Computational tools

Introduction to Python for data analysis (7H) PHD, POSTDOC

*Damien Vintache*

This course is designed to introduce the Python programming language for scientific research and is aimed at those who are least at ease with developing and analyzing data with Python, to provide them with the knowledge they need to become autonomous.

Python for data analysis: Numpy/Matplotlib (6H) PHD, POSTDOC

*Benoît Seignovert*

This course will focus on Numpy and Matplotlib libraries, which are at the core of Python ecosystem for scientific data analysis, and is intended for PhD students who already have some basic knowledge of Python and who wish to improve their skills with these two libraries.

Python pour le chimiste de synthèse (10H) MASTER, PHD, POSTDOC

*Thibaud Mabit*

Cette formation a pour objectif de présenter les bases de la programmation Python aux chimistes de synthèse. La formation alternera entre théorie et exercices pratiques.

Introduction to LaTeX (6H) MASTER, PHD, POSTDOC

*Boualem Merainani*

This introductory course offers students a hands-on approach to using LaTeX for academic and scientific writing. It introduces the core principles of LaTeX, highlights its advantages over traditional word processors, and shows how to create well-structured, professional documents. Participants will discover how to write mathematical formulas, insert figures and tables, manage bibliographies, and collaborate efficiently to produce research papers, theses, and presentations.

Introduction to OriginPro: scientific data analysis and visualization (9H) MASTER, PHD, POSTDOC

*Loubna Hadhoum*

The aim of this course is to provide participants with a solid introduction to using OriginPro for effective data analysis and scientific graphing. The course focuses on building practical skills to efficiently import, organize, explore, and present datasets using OriginPro's intuitive tools.

Introduction to High Performance Computing (8H) MASTER, PHD, POSTDOC

*Luisa da Silva*

This course covers fundamentals of parallel computing and GPU acceleration. Participants will learn how to connect to the GLiCID cluster, a regional support unit that provides shared resources for high performance computing and exploitation of computationally-related research data.

AI from scratch to material or molecular design (6H) MASTER, PHD, POSTDOC

*Isabelle Braems*

This session offers a gradual immersion into AI applied to molecular and material design, to provide participants with the conceptual tools they need to know how to represent matter, predict properties, and generate new structures. The goal is to provide an intuitive understanding of the issues at stake: what questions can AI solve in chemistry and materials science, and

which ones still elude current approaches?

Introduction to git and GitLab/GitHub (3H) MASTER, PHD, POSTDOC
*Valentin Piau*
Git is a very powerful version control system, that became a key tool for software developpers. It is also the backbone of many software forges like GitHub or GitLab used for collaborative development and open source projects. This course proposes an introduction to git, presenting its principles and introducing its main commands for version control and collaborative work with software forges.

Introduction to atomistic simulations (18H) PHD
*Nicolas Galland*
The aim of this course is to develop a critical view of modeling and its relevance in chemistry, solid state physics and structural biology: advantages and limitations of techniques commonly used at different scales to model molecules, nanomaterials, periodic solids and biological systems. PhD students will learn to apply the appropriate technique(s) to model and analyze elementary properties.

Introduction to R (10H) PHD
*Aymeric Stamm*
Content to be confirmed

## Initiation to...

Contributions of microscopy - towards nano characterization (6H) PHD
*Philippe Moreau*
This course introduces PhD students to the broad possibilities offered by modern microscopy. After placing microscopy in the context of research and industry, it covers the fundamentals of photonic, scanning probe and electron microscopy. Through concrete examples across multiple disciplines, students will better understand image resolution, contrast and potential applications relevant to their own research.

Photoscience (6H) MASTER, PHD
*Yann Pellegrin, Vincent Coëffard & Clémence Queffélec*
This course will introduce you photosciences and photochemistry. You will learn how to identify the key elements of a photochemical reaction, understand activation modes in photocatalyzed processes and recognize the potential of photosciences in synthesis, materials, and medicine.

Les médicaments de l'Antiquité à nos jours (6H) PHD
*Jacques Le Breton*
Cette formation retrace, depuis le néolithique, les grandes étapes de l'évolution des pratiques thérapeutiques. Elle montre comment les savoirs empiriques et les découvertes scientifiques ont conduit à la création des médicaments tels que nous les connaissons aujourd'hui.

Nuclear Energy, Environment and Medicine (3H) PHD
*Gilles Montavon*

Content to be confirmed

## Career development

You can take part in our meetings to **explore academic & non academic careers**: presentations, talks with alumni from your labs and company visits.

Find a PhD (1H) MASTER
During this session, master's students will learn how to identify PhD offers, understand admission criteria and use tools to find a position. They will also learn about PhD programs and career paths, particularly in Nantes.

Fundamentals of research in France (1H) MASTER, PHD, POSTDOC
The purpose of this presentation is to explain how research works in France, specifically by introducing you to the main institutions you'll have to deal with. You'll also learn more about research funding in France and Nantes Université's main projects.

Academic careers (1H) MASTER, PHD, POSTDOC
The purpose is to help you think through the key steps of an academic career. We will discuss the post-doctoral phase, but more importantly the various types of permanent academic positions in France or abroad, the application processes, and some advice and tips to help you prepare your applications.

Postdoc funding (1H) PHD, POSTDOC
This presentation will enable you to discover the range of funding opportunities available for post-doctoral positions (Horizon Europe, French National Research Agency, foreign governments, etc.) and tools to find offers. In particular, you will learn how to identify calls for applications (e.g. Marie Skłodowska Curie Actions - Postdoctoral Fellowships & COFUND) and monitor current and future projects to target your job research.

Alumni meeting (2H) PHD, POSTDOC
Once a year, you'll have the opportunity to meet alumni from your lab who are currently working in France or abroad and to learn about employment data in your field of research.

Company visits (2H) PHD
These company visits in Nantes area are designed to provide insight into the corporate world - particularly in R&D - including its structure, activities, and HR policies regarding the recruitment of PhDs.

# TRAINING SCHOOLS

**Organized by our Graduate Programmes**, these schools are interdisciplinary and open to students in physics, chemistry or geosciences interested in these topics.

Winter School LUMOMAT (10H) MASTER, PHD
During this school, students and researchers will discuss recent advances and future directions in research fields dedicated to

light-matter interactions. The program will combine invited talks and workshops aimed at developing innovative solutions to address challenges in the fields of health, environment and energy.

Winter School E-Mat (10H) MASTER, PHD
The aim of this school is to enable students - particularly those working in the field of materials science - to discover new methods and deepen their understanding of issues at the intersection of science, society and industry.

Winter School EPS (10H) MASTER, PHD
This school provide students with an overview of the latest discoveries related to various solar system objects, resulting from recent explorations and analysis, and to open up perspectives for future exploration.

# TRAINING EQUIVALENCES

If you take courses outside AMETHIS or carry out **specific activities** during your PhD, **you can benefit from equivalence hours which will be included in the calculation of the minimum 100 hours required.** The maximum hourly rate indicated is valid for the entire duration of the thesis.

| Code | Type of activity | Hours recorded | Documents to provide |
|---|---|---|---|
| **EQ-3MG-TAKE ONLINE COURSES (MOOC)** | MOOC, tutorials and keynotes in the scientific field of the thesis | max 20 | Certificate of achievement from the organizing institution with the number of hours completed |
| **EQ-3MG-MASTER COURSE** | Master's level courses | max 30 | Certificate of attendance from the organizing institution with the number of hours completed |
| **EQ-3MG-CERTIFYING TRAINING** | Training outside AMETHIS in the scientific field of the thesis | max 15 per course | Certificate of attendance from the organizing institution with the number of hours completed |
| **EQ-3MG-THEMATIC SCHOOL** | Participation in a winter/summer school | max 15 | Certificate of attendance from the organizing institution with the number of hours completed |
| **EQ-3MG-SCIENTIFIC ACHIEVEMENT** | Participation in a national or international conference with poster presentation or oral communication | max 20 (max 10 per conference) | Certificate of attendance from the organizing institution and link to the program to identify your presentation |
| **EQ-3MG-SCIENTIFIC CULTURE** | Actions of communication to the general public: Fête de la Science, Petits débrouillards, Nuit blanche des chercheurs… | max 15 | Certificate of participation from the organizing institution and description of the actions carried out specifying the number of hours |

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|---|---|---|---|
| **EQ-3MG-ORGANIZATION EVENT** | Participation in the organization of an event: seminar, congress, conference, Doctoral School Day… | max 12 | Certificate of participation from the organizing committee and description of the activities carried out specifying the number of hours |
| **EQ-3MG-INVOLVEMENT BODIES** | Participation in bodies related to the PhD: PhD students associations, student committee, laboratory council, doctoral school steering committee… | max 15 | Certificate of participation with the list of meetings attended during the PhD |
| **EQ-3MG-READING** | Participation in a review committee | max 5 | Certificate of participation and description of the activities carried out |
| **EQ-3MG-TUTORING** | Bachelor or Master students project tutoring | max 15 | Certificate of participation from the organizing institution and description of the activities carried out specifying the number of hours |
| **EQ-3MG-QUOTA-CIFRE/COTUTELLE** | Exemption for professional experience:<br>- CIFRE or cotutelle agreement<br>- Main job not related to the thesis | max 50 | Work contract or agreement |