



N°	DMEM PhD courses list	hours	ECM	N° sists	Course description AA 2022-2023
1	Quantification and characterization of extracellular vesicles in biomedical research	10	2	No limits	<p>Extracellular vesicles (EVs) are increasingly recognized as masters of intercellular communication with a relevant role in human health and disease. The course is intended to provide students with basic knowledge about EVs, their nomenclature, biogenesis, release and uptake mechanisms, and cargo. The course will focus on emerging approaches for EV quantification and characterization, including procedures for collection and processing of samples prior to EV isolation, different isolation methods, as well as quantification and characterization techniques. The course will also exploit the potential of using artificial vesicles in biomedical research.</p> <p>The course will be organized <b>during January 2023 at LITA, Segrate</b>. At the end of the course, the student will have to take an assessment test.</p>
2	Improving your statistical skills in biomedical sciences	10	2	20	<p>The purpose of this course will provide a basic knowledge on the proper implementation of statistical methods to the analysis of biological data. After a theoretical overview of the main statistical approaches, some selected applications to real cases will be illustrated and discussed to help PhD students understand how to extract the correct information from biological experiments. The course will introduce the student to the use of R language.</p> <p>The course will be organized in two/three days <b>during January 2023 at LITA, Segrate</b>. At the end of the course, the student will have to take an assessment test.</p>
3	Advanced biomedical statistics	10	2	25	<p>The course aims to strengthen the use of statistical and technical tools for the analysis of biomedical data. The course will provide students with advanced knowledge in experimental design and statistical methodology beyond the introductory statistical course. Advanced statistical techniques will be examined and applied to a wide range of biomedical data, including binary and count data. During the practical sessions, students will work with R, thus basic knowledge of the R language is required.</p> <p>The course will be organized in two/three days <b>during February 2023 at LITA, Segrate</b>. At the end of the course, the student will have to take an assessment test.</p>
4	Preclinical models in oncology	10	2	No limits	<p>The course aims to provide a broad survey of cancer experimental models such as 2D and 3D culture systems, organoids and animal models including zebrafish embryos as well as syngeneic, transgenic and xenograft murine models.</p> <p>The purpose is to show the potential of different experimental tools to explore the mechanisms underlying tumor progression and the interplay between tumor and the microenvironment and study the efficacy of novel anti-cancer pharmacologic treatments.</p> <p>The course will be organized in two/three days <b>during February 2023</b>. At the end of the course, the student will have to take an assessment test</p>



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5	Supporting tools for drug–target prioritisation and protein-protein interaction	10	2	25	<p>The course will be aimed to strengthen the use of bioinformatics platforms for supporting processes of drug–target prioritisation using human genetics and genomics data for systematic drug target identification and prioritization. In addition, a second part of the course will be dedicated to methods in building and analysing biological networks.</p> <p>The course will be organized by lectures and practical sessions. The course will be organized in two sessions <b>in collaboration with EMBL-EBI experts during April 2023</b>. At the end of the course, the student will have to take an assessment test.</p>
6	Alternative splicing in health and disease	10	2	No Limit	<p>Alternative splicing (AS) is a mechanism that allows the formation of several functionally different transcripts starting from a single gene, enhancing proteome complexity without the need of an increased number of genes. Interestingly, the average number of splicing isoforms per gene is higher in vertebrates, implying that alternative splicing contributes increase evolutionary complexity. In particular, in the nervous system, AS represents a potent regulatory mechanism of protein functions, and is regulated by specific developmental programs affecting embryonic patterning, cell-fate determination, axon guidance and synaptogenesis. In mature neurons, specific alternative splicing pathways can be controlled by neuronal activity and modulate neuronal plasticity.</p> <p>The goal of the course is to provide an overview on remarkable example of alternative splicing events in physiology and pathology, with a particular emphasis on the nervous system.</p> <p>The course will describe methods to study mechanism and relevance of alternative splicing in vitro and in vivo. Moreover, the therapeutic relevance of antisense-mediated exon skipping will be discussed as successful therapeutic approach for genetic disease.</p> <p>The course will be organized in two sessions <b>in May 2023 at LITA, Segrate</b>. At the end of the course, the student will have to take an assessment test.</p>
7	Flow cytometry in biomedical research	21	4	25	<p>Flow cytometry is widely used in basic and translational research for investigating cellular phenotypes and functions at the level of single cells. The course is intended to provide students with notions in the terminology, concepts and approaches used in flow cytometry applications, needed for initiating flow cytometric studies, and allowing a critical interpretation of published flow cytometry results. The course will illustrate basic principles of flow cytometry, experimental design and quality control, critical issues in the pre-analytical and analytical phase, experimental design in polychromatic immunophenotype and functional cytometry. Examples of flow cytometric approaches applied to biomedical investigation will be presented through scientific seminars. Practical training on the analysis of flow data will be provided, in order to enable students to analyze flow data and present high quality data for publications. Wet lab practical training, illustrating instrumentation handling, cell preparation and staining, data acquisition and analysis, will be offered to students who are new to flow cytometry.</p>



					The course will be organized in two/three days <b>during May 2023</b> . At the end of the course, the student will have to take an assessment test.
8	Single Cell Sequencing: a deep dive into dissecting cell populations at single cell level	<b>10</b>	2	25	<p>The course comprises an overview of the Single Cell Sequencing workflow from the library preparation, the sequencing to the data analysis. The data analysis is made by lectures and practical sessions.</p> <p>The course will be organized in two/three days <b>during June 2023 in collaboration with IFOM</b>. At the end of the course, the student will have to take an assessment test.</p>

## How to enroll

The [University Catalogue](#) lists specialist courses to be included in your individual study plan. All students enrolled in the PhD programmes of the University of Milan can access the Catalogue. The course enrolment deadline is usually the **25th day of the month prior to the start date**.