Doc. 300.1.2

Higher Education Institution's Response

Date: 3.11.2025

- **Higher Education Institution:** European University Cyprus, School of Medicine-Frankfurt Branch
- **Town:** Frankfurt, Germany
- **Programme of study Name (Duration, ECTS, Cycle)**

  In Greek:
  "Βιολογία του Καρκίνου (18 Μήνες/90 ECTS, Master of Science)"

  In English:
  "Cancer Biology (18 Months/90 ECTS, Master of Science)"

- **Language(s) of instruction:** English
- **Programme's status:** New
- **Concentrations (if any):**

  In Greek: Concentrations
  In English: Concentrations

The present document has been prepared within the framework of the authority and competencies of the Cyprus Agency of Quality Assurance and Accreditation in Higher Education, according to the provisions of the "Quality Assurance and Accreditation of Higher Education and the Establishment and Operation of an Agency on Related Matters Laws" of 2015 to 2021 [L.136(I)/2015 – L.132(I)/2021].

A. Guidelines on content and structure of the report

- *The Higher Education Institution (HEI) based on the External Evaluation Committee's (EEC's) evaluation report (Doc.300.1.1 or 300.1.1/1 or 300.1.1/2 or 300.1.1/3 or 300.1.1/4) must justify whether actions have been taken in improving the quality of the programme of study in each assessment area. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

    - *the areas of improvement and recommendations of the EEC*
    - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

1. Study programme and study programme's design and development
(ESG 1.1, 1.2, 1.7, 1.8, 1.9)

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
While the study programme is aligned with contemporary developments in both society and biomedical research, EEC believes that it should pay attention to emerging topics closely related to biomedicine and cancer. Accordingly, continuous updating of the programme should be considered (e.g. with AI, omics, single-cell analysis, new forms of radiation therapy and immunotherapy as also highlighted in more detail elsewhere).	We greatly appreciate the Committee's insightful comments and fully share its view on the importance of keeping the M.Sc. Cancer Biology programme closely aligned with current and emerging developments in biomedical research. We continuously enrich core courses to reflect current advances in the field: Bioinformatics includes dedicated sessions on R-Studio, Python, and single-cell omics (RNA-seq, proteomics, multi-omics, spatial transcriptomics). Cancer Diagnostics and Therapeutics integrates AI applications in medical imaging (X-ray, CT, MRI, PET/CT) and AI-based prognostic tools; and Tumour Immunology and Immunotherapy covers CAR-T/NK therapies, bispecific antibodies, microbiome modulation, and neoantigen-agnostic vaccines (Appendix I). As outlined below in Response #2 (Student-centered learning) these updates are reinforced through M.Sc. thesis projects applying these technologies. Furthermore, the School of Medicine-Frankfurt Branch has an established, an operational AI Committee that ensures the systematic inclusion of AI and data-driven methodologies across relevant modules. It provides expert guidance on curriculum delivery, aligning educational content with evolving industry standards and clinical practices. The committee also fosters interdisciplinary collaboration, encouraging the inclusion of AI tools in diagnostics, treatment planning, and research. This continuous input helps prepare students for a rapidly changing medical landscape.	Choose level of compliance:

The programme currently includes practical placements, which are a valuable component of experiential learning. To further enrich the curriculum, the committee recommends reinforcing these placements by prioritizing laboratories that offer active research opportunities but also start-ups, industry and government institutions. This would allow students to engage in real-world scientific and other professional inquiries and contribute to ongoing biomedical endeavors.	We thank the External Evaluation Committee (EEC) for their constructive recommendations regarding the enhancement of on-site research facilities and the expansion of practical placements to include research laboratories, start-ups, industry, and government institutions. The EUC School of Medicine-Frankfurt Branch currently includes one dedicated research laboratory supporting faculty, postdoctoral researchers, and Ph.D. candidates, in addition to two fully equipped teaching laboratories. With the completion of the new campus building, an additional research laboratory and four additional teaching laboratories will be added, significantly increasing both research and teaching capacity. This expansion will bring the Frankfurt Campus to full parity with the Nicosia main campus within three years of operation. All laboratories are equipped with advanced instrumentation, including Real-Time PCR, Thermal Cycler, NanoDrop, Western Blot systems, and Fluorescence Microscopy. Further procurement is underway for specialized equipment such as a Flow Cytometer, HPLC, FTIR, NMR, and cryostat. As practiced at the Nicosia main campus, any specialized equipment needs arising from new faculty appointments are reviewed by the Department and School Council for inclusion in the Capital Expenditure (CapEx) budget. This ensures that research infrastructure evolves strategically in alignment with faculty expertise and emerging research priorities. Such ongoing investment reflects the School's commitment to supporting high-quality, research-driven education and scholarship across all EUC campuses.	Choose level of compliance:

	While certain specialized facilities (e.g., animal facilities) are not directly maintained on-site at the School of Medicine-Frankfurt Branch, the M.Sc. Cancer Biology programme has established active collaborations with leading research institutions in the Frankfurt and Mainz regions to ensure full access to advanced technologies and methodologies. These partnerships mirror the well-established collaborative model at the Nicosia main campus, where external research collaborations successfully sustain high-level experimental research and training. Specifically, the programme maintains a close collaboration with Prof. Dr. Ilse Hofmann, Scientific Coordinator of the Major Cancer Biology Programme and Group Leader at the German Cancer Research Center (DKFZ). Through this collaboration, students and faculty gain exposure to cutting-edge European research in single-cell and spatial omics, molecular profiling, and translational oncology—providing valuable access to advanced experimental methods and facilities. In addition, Dr. Adonis Yiannakas (Pharmacology) has established a collaboration with Prof. Aris Waisman, Director of the Institute of Molecular Biology (IMB) at the University Medical Center (UMC) Mainz, enabling access to neuroimmunology research facilities employing advanced rodent models and molecular techniques (in vitro, in vivo, and ex vivo). Furthermore, Prof. Panagiotis Politis has developed a growing research network within the Frankfurt and Mainz regions, collaborating with Prof. Benedikt Berninger (University Medical	

	Center Mainz) on projects investigating long non-coding RNAs and transcriptional regulation in adult and embryonic neurogenesis. Prof. Politis also maintains a long-standing collaboration with the Institute of Clinical Neuroanatomy, Goethe University Frankfurt, focusing on transcriptional mechanisms regulating neural differentiation in the spinal cord and peripheral nervous system. Through these partnerships, School of Medicine-Frankfurt Branch faculty and students actively participate in high-impact biomedical research and benefit from mentorship by internationally recognized investigators with strong publication records. These collaborations fully address the EEC's recommendation by ensuring that EUC students have direct access to advanced experimental resources and world-class research environments, thereby reinforcing the programme's commitment to research-led education and international engagement. Following the model successfully implemented by the School of Medicine both at the main campus and in Frankfurt, which places medical students annually in leading international laboratories—such as that of Nobel Laureate Prof. Aaron Ciechanover at the Technion – Israel Institute of Technology—the MSc Cancer Biology programme is adopting a similar strategy. This includes expanding international placements and strengthening its research training network to ensure that students gain both academic and translational research experience. Moreover, EUC is uniquely positioned to extend its research and placement activities beyond traditional academic	

	laboratories. As part of a university with a dedicated Start-Up Hub, the School is developing collaborative opportunities with start-ups, industry, and government institutions. These partnerships will facilitate joint innovation projects, translational research initiatives, and talent development and exchange, while also offering advisory and regulatory collaboration opportunities. Such collaborations will further enrich the M.Sc. Cancer Biology curriculum by providing students with direct exposure to real-world biomedical research, entrepreneurship, and professional practice—fully aligning with the EEC's recommendation to broaden experiential learning and strengthen links with the biotechnology and life sciences sectors. In summary, the M.Sc. Cancer Biology programme is fully committed to advancing research infrastructure, fostering strategic academic and industry partnerships, and providing students with immersive, research-oriented training experiences that reflect the highest international standards in biomedical science education.	
Moreover, the academic staff is encouraged to leverage future collaborations with both local and international institutions — particularly take advantage of the resources provided by the SUNRISE consortium — to identify and invite distinguished Visiting Professors specializing in Advanced Cancer Biology and Biomedical Sciences. Such engagements would not only elevate the academic profile of the programme but also provide students with exposure	We thank the External Evaluation Committee (EEC) for its valuable recommendation and fully endorse the importance of sustained international academic engagement and collaboration with leading experts in advanced cancer biology and biomedical sciences. This objective is already actively pursued across both the Nicosia and Frankfurt campuses through established mechanisms that promote scholarly exchange, interdisciplinary dialogue, and collaboration with international researchers. These include the Communities of Practice, the	Choose level of compliance:

to cutting-edge research and global perspectives.	Research Committee, and regular Journal Clubs, all of which serve as structured platforms for engaging with external academics and disseminating current scientific advances within the programme community. At the School of Medicine-Frankfurt Branch, the Research Committee convenes regularly to review ongoing projects, share methodological developments, and facilitate interdisciplinary collaboration. Recent academic events have included invited seminars by Prof. Vijay Tiwari (University of Southern Denmark) on gene regulatory mechanisms in brain development and Dr. Davide Poloni (Università Cattolica del Sacro Cuore, Rome) on neuroscience and research engagement. These sessions exemplify the programme's active integration of international expertise into its academic environment and contribute directly to the research culture of the M.Sc. in Cancer Biology. The Communities of Practice initiative further supports faculty in identifying and engaging with distinguished visiting scholars and researchers, particularly from leading biomedical institutions in the Frankfurt–Mainz region and beyond. Through this framework, the programme regularly hosts guest lectures and collaborative seminars with internationally recognized scientists. For example, recent invited lectures have included contributions from Prof. Aris Waisman, Director of the Institute for Molecular Medicine, University Medical Center Mainz, whose work in neuroimmunology and molecular biology provides valuable insights highly relevant to cancer and biomedical research.	

	Additionally, academic staff across both campuses actively moving to leverage institutional partnerships and networks, including those available through the SUNRISE Alliance, to facilitate collaboration, co-supervision, and exchange opportunities. These interactions and collaborative initiatives will enrich the programme's academic ecosystem and broaden students' exposure to international scientific perspectives. The office of the Vice Rector of Research has sent out an anonymous survey for training and professional development needs conducted within SUNRISE. The aim is to identify which further training and development opportunities are most relevant and beneficial for doctoral students, post-docs, staff members, and academics across partner universities in the SUNRISE Alliance. Through these sustained activities, the M.Sc. in Cancer Biology programme consistently integrates international expertise into teaching and research, ensuring that both faculty and students engage with the latest global developments in cancer biology and related biomedical disciplines. This ongoing engagement strengthens the academic profile of the programme and reinforces its commitment to maintaining an intellectually vibrant, internationally connected learning and research environment.	

2. Student – centred learning, teaching and assessment
(ESG 1.3)

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
2.1 Process of teaching and learning and student-centred teaching methodology The programme is a direct 1:1 implementation of the Cancer Biology M.Sc. programme in Nicosia. It is well designed, and the committee has only a few recommendations. A minor comment is the suggestion to strengthen the inclusion of artificial intelligence (AI) components across various courses.	We appreciate the committee's positive evaluation and constructive suggestion. As noted above (Response #1, under Study programme and study programme's design and development) we recognize the growing importance of AI in cancer research and biomedical sciences. We continue to ensure its systematic integration by embedding relevant examples, case studies, and data analysis exercises into courses such as Bioinformatics, Molecular and Cellular Biology of Cancer, Precision and Personalized Medicine, Cancer Diagnostics and Therapeutics, and Research Methodology and Biostatistics (Appendix I). The AI Committee regularly reviews course content to maintain consistency and relevance. The programme's student-centred approach—through case-based learning, interactive seminars, and research-driven assignments—continues to foster independent and critical thinking.	Choose level of compliance:
2.2 Practical training A key element of the training programme is the placement of the students at external laboratories for the M.Sc. theses. However, this relies on the commitment of these external stakeholders to host these interns in their laboratories. Therefore, the EEC strongly recommends establishing binding, long-term agreements with these stakeholders. These agreements should outline the	The Cancer Biology M.Sc. Program operates within the framework of the School of Medicine-Frankfurt Branch, thereby benefiting from the collaborative networks of its faculty. This affiliation inherently provides students with access to a broad spectrum of research and practical learning opportunities. Our strategic faculty recruitment process further strengthens this ecosystem. New faculty appointments are selected not only for their academic excellence, but also for their active engagement in externally funded research projects and	Choose level of compliance:

allocation of students, specify the number of students involved, and detail arrangements for training and supervision.	established collaborations with national and international institutions. This approach ensures that as student numbers grow, placement opportunities within high-quality research environments will continue to expand. As described in detail in Response 2.1 (under Study programme and study programme's design and development) the program currently maintains active collaborations with internationally recognized researchers and institutions, offering students exposure to cutting-edge biomedical research. Notably, the program collaborates with Prof. Dr. Ilse Hofmann, Scientific Coordinator of the Major Cancer Biology Programme and Group Leader at the German Cancer Research Center (DKFZ), providing students insight into leading European research in single-cell and spatial omics, molecular profiling, and translational oncology. In addition, Dr. Adonis Yiannakas, Pharmacology, has already established a collaboration with the University Medical Center Mainz and the Institute of Molecular Biology (IMB) offer valuable collaboration opportunities through Prof. Aris Waisman's (Director of Institute for Molecular Medicine, UMC), which investigates neuroimmunological mechanisms of stress resilience using advanced rodent models and molecular techniques (in vitro, in vivo, and ex vivo). Furthermore, Prof. Panagiotis Politis has established a growing research network within the Frankfurt and Mainz regions, collaborating with Professor Benedikt Berninger (University Medical Center Mainz) with projects investigating the role of long non-coding RNAs and transcriptional regulation in adult and embryonic neurogenesis.	

	Dr. Politis also maintains a long-standing collaboration with the Institute of Clinical Neuroanatomy, Goethe University Frankfurt, focusing on transcriptional mechanisms regulating neural differentiation in the spinal cord and peripheral nervous system. Through these partnerships, students gain direct exposure to internationally competitive biomedical research and benefit from mentorship by distinguished investigators with strong publication records. Beyond research laboratories, the program also offers placement opportunities in clinical and diagnostic settings. Partner hospitals and clinics—such as St. Elisabethen Hospital, Red Cross Hospital, Mangau Hospital of Red Cross, Center for Kidney and Hypertension Diseases (CfNH), Offenbach IVF Clinic (Kinderwunsch und Endometriose Zeentrum), and Sana Hospital—provide students with the ability to do clinical research. EUC has already established MoUs with these placements. It should be noted that the formalization of collaborations with research laboratories is a continuous, ongoing process. The aim is to further deepen partnerships with laboratories and organizations that offer active research engagement. As the Frankfurt region hosts a high concentration of biotechnology and pharmaceutical companies, as well as prominent research institutions, the program's growing network within this dynamic environment will facilitate student placements, support the exchange of scientific expertise, and enhance access to competitive research opportunities.	
A risk is that the number of students that will enrol in the new Cancer Biology M.Sc.	We recognize that the precise student intake for the new Cancer Biology M.Sc. programme in at the School of Medicine -	Choose level of compliance:

programme is uncertain. It is aimed for 10 students in the first year. In case of an unexpectedly low or high number of students, the programme needs to be adjusted accordingly, which will pose risks for scheduling and resource allocation, especially for the practical training. Of course, this is a risk with any new educational programme.	Frankfurt Branch cannot yet be fully projected. However, based on current in house dedicated research laboratory capacity and partnerships as well as the additional partnerships under development (please see previous section 2.2 Physical Facilities) – placement needs will be adequately covered.	
Another risk is the challenge of securing research funding, particularly since faculty at the EUC Frankfurt branch are not eligible for DFG funding. It is essential to connect the M.Sc. teaching programme with state-of-the-art research to ensure high-quality training. In addition, having dedicated Ph.D. students and postdoctoral researchers engaged full-time in research will support teaching by assisting with the supervision of M.Sc. theses. **2.3 Student assessment** The committee has no specific recommendation concerning student assessment.	Faculty members of School of Medicine - Frankfurt Branch maintain active and externally funded research profiles in cancer biology, immunology, and neuroimmunology, and are engaged in sustained collaborations with leading European research institutions such as the German Cancer Research Center (DKFZ) and the University Medical Center Mainz. Importantly, the faculty's research activity is not dependent on access to national DFG funding mechanisms. Instead, EUC faculty participate successfully in large-scale European and international research consortia funded through programmes, such as Horizon Europe, the Innovative Health Initiative (IHI), EU4Health, and Horizon 2020 (H2020). These competitive programmes provide substantial research support and ensure that the M.Sc. in Cancer Biology remains closely connected to state-of-the-art European biomedical research. Faculty members have demonstrated the capacity to obtain and manage multimillion-euro research projects, integrating their research outcomes into teaching, supervision, and mentorship of MSc students.	

	For example, EUC is a partner and Cyprus pilot lead in the IHI READI project (Research in Europe on Representativeness and Diversity Inclusion, 2025–2030), a €66.8 million public–private consortium coordinated by ECRIN-ERIC and industry partners including Sanofi, Novartis, Pfizer, AstraZeneca, and GSK. EUC leads two work packages (WP1 and WP5.3) with direct funding of €1.23 million. This consortium connects major European academic and clinical partners such as UMC Utrecht, the University Hospital of Cologne, Aarhus University, and NICE (UK), advancing inclusive and representative health research across Europe. EUC also participates as a partner in the Horizon Europe VERDI project (SARS-CoV-2 Variants in Pregnancy and Paediatrics), coordinated by INSERM and the PENTA network, which studies epidemiological preparedness and emerging infectious diseases. Collaborating institutions include Imperial College London, the University of Cape Town, and the University of Basel. Under the EU4Health framework, EUC serves as the Cyprus hub lead in the ImmuHubs project, coordinated by University College London, which aims to improve vaccination uptake among underserved populations through community-based interventions. EUC also participates as a partner and School of Medicine site lead in H-PASS (Health Professionals' and the "Digital Team" Skills Advancement), coordinated by the Medical University of Warsaw. This €3.58 million initiative enhances digital competencies and teamwork among European health professionals through collaboration among more than a dozen partner universities.	

	In addition, EUC is a national partner in VACCELERATE, a €26.5 million H2020 consortium coordinated by the University of Cologne, which brings together leading European institutions such as the University of Oxford, INSERM, and Erasmus MC to enhance vaccine trial capacity and clinical research awareness across Europe. Participation in these high-value, multidisciplinary research consortia demonstrates that EUC faculty are fully integrated into the European research ecosystem and have the institutional and administrative capacity to secure and manage competitive international grants. These activities ensure that teaching in the MSc in Cancer Biology is informed by current scientific advances and that students benefit from direct exposure to ongoing international research through seminars, project-based learning, and supervision. In summary, the School of Medicine-Frankfurt Branch faculty are not constrained by national funding eligibility but are active participants in European and global research programmes. Their engagement in large, externally funded projects provides a sustainable and diverse foundation for research-led teaching and for the integration of M.Sc. students and postdoctoral researchers into dynamic, internationally networked scientific environments.	

3. Teaching staff
(ESG 1.5)

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
At the Nicosia branch, the teachers/researchers have the advantage of having nearby the Basic and Translational Cancer Research Center (BTCRC), which provides access to modern and diverse equipment and collaborations, as well as promotes the training of M.Sc. and Ph.D. students. At the Frankfurt Branch, however, a network of collaborators and a track record of successful thesis placements have not yet been established, since the programme is just starting. The advantage of the Frankfurt branch is the close location to one of the largest in Europe cancer research centers - DKFZ. The EEC recommends the faculty to put effort into developing a partnership with DKFZ, not only for research collaborations, but also for training M.Sc. and Ph.D. students, as well post-docs in the future. Based on the positive experiences in Nicosia and the School of Medicine in Frankfurt, the committee is confident that the university will successfully establish this and other, national and international, partnerships but it needs to be done urgently to ensure a state-of-the-art, future-proofed M.Sc. focused on cancer biology.	As noted above, the M.Sc. in Cancer Biology operates within the framework of the School of Medicine-Frankfurt Branch, which provides the programme with access to the School's established collaborative research networks and infrastructure. This affiliation ensures that both faculty and students benefit from an extensive ecosystem of academic, clinical, and research partnerships that support high-quality scientific training and mentorship (please also refer to Response 2.2: Practical Training under Student-Centred Learning, Teaching, and Assessment). At the School of Medicine-Frankfurt Branch, the programme has already developed strong links with leading biomedical research institutions in the region, ensuring that M.Sc. students engage with active research environments comparable to those at the Nicosia campus. In direct response to the EEC's recommendation, collaboration with the German Cancer Research Center (DKFZ) is already underway. Specifically, the programme collaborates with Professor Dr. Ilse Hofmann, Scientific Coordinator of the Major Cancer Biology Programme and Group Leader at DKFZ, who contributes expertise in single-cell and spatial omics, molecular profiling, and translational oncology. Through this collaboration, faculty and students are integrated into advanced European cancer research, gaining practical exposure	Choose level of compliance:

	to state-of-the-art experimental techniques and contemporary research methodologies. In addition, the programme maintains active partnerships with the University Medical Center Mainz and the Institute of Molecular Biology (IMB) under Professor Aris Waisman, Director of the Institute for Molecular Medicine. This collaboration provides access to specialized research in neuroimmunology and stress resilience using in vitro, in vivo, and ex vivo models. Further collaborations include projects with Professor Benedikt Berninger (University Medical Center Mainz) on long non-coding RNAs and transcriptional regulation in neurogenesis, and with the Institute of Clinical Neuroanatomy, Goethe University Frankfurt, focusing on transcriptional mechanisms controlling neural differentiation in the spinal cord and peripheral nervous system (see also Responses 1.2 and 2.2). These partnerships collectively ensure that students engage in internationally competitive biomedical research and receive mentorship from leading investigators with strong publication records. Such collaborations strengthen the scientific foundation of the programme and support M.Sc. thesis supervision, research placments, and joint training activities involving doctoral and postdoctoral researchers. Beyond the research setting, the M.Sc. in Cancer Biology programme also incorporates clinical and diagnostic training opportunities. As detailed in Response 2.2,	

	Memoranda of Understanding (MoUs) have been established with several partner institutions. These collaborations provide students with valuable opportunities to participate in clinical and translational research projects, linking molecular findings with patient-oriented applications. In summary, the M.Sc. in Cancer Biology at EUC Frankfurt is building a strong network of regional and international collaborations, including with DKFZ and other leading research centres. These partnerships ensure the integration of teaching and research, offering students direct access to advanced scientific training and a research-driven academic environment equivalent in quality and scope to that of the Nicosia campus.	
Otherwise, the most important area of clarification is that the School can show CYQAA conclusively what they have not yet been able to convince this EEC, namely that the M.Sc. programme fulfils the requirements about permanently employed teachers. In an excel file received from the Vice Rector via Emily Mouskou as a response to our specific question, it appears as if the number for the existing Department of Medicine is 14 of 25 teachers with permanent full-time positions. This corresponds to 56%. But what's important is the figure for the M.Sc. programme, potentially facilitated after additional recruitments so we are hopeful that this is just a matter of gathering the details and showing the CYQAA.	We thank the EEC for the opportunity to clarify the composition of permanent, full-time faculty for the M.Sc. in Cancer Biology programme. We recognize that this information may not have been fully clear during previous correspondence following the site visit. The current teaching team for the programme, as listed in the Site Visit Agenda, includes nine academic staff members, of whom only one (Prof. Panagiotis Politis) is a Visiting Professor and one serves as an external collaborator. The faculty members are: • Christina Karantanou, Lecturer, Programme Co-Coordinator, Cancer Biology (MSc), School of Medicine–Frankfurt Branch, Immunology / Cell Biology • Efterpi Kostareli, Associate Professor, Chairperson, Department of Medicine, School	Choose level of compliance:

	of Medicine–Frankfurt Branch, Biochemistry / Genetics • Karim Dib, Professor, Immunology / Microbiolog • Yasemin Tanyildizi, Associate Professor, Imaging • Adonis Yiannakas, Lecturer, Neuroscience, Pharmacology • Dimitris Georgiou, Scientific Collaborator, Pharmacology • Ioannis Alatsathianos, Lecturer, Epidemiology / Biostatistics • Vasiliki Papadopoulou, Assistant Professor, Physiology, Hematology • Panagiotis Politis, Visiting Professor, Genetics / Biochemistry / Cell Biology Of these nine faculty members, seven are permanent, full-time academic staff of the School of Medicine-Frankfurt Branch, representing over 78% of the programme's teaching team. Please also note that Dr. Ahmed Elsanhoury will be joining the full-time faculty as an Assistant Professor starting the beginning of next semester (Spring 2026), making eight full time academic staff. This composition meets the Cyprus Agency of Quality Assurance and Accreditation in Higher Education (CY.Q.A.A.) requirements for permanently employed teaching personnel. As correctly noted by the EEC, additional faculty positions are currently included in our ongoing recruitment process. These appointments, to be finalized upon approval and accreditation of the programme by CY.Q.A.A., will further strengthen the teaching and research base of the M.Sc. in Cancer Biology, ensuring continued compliance with	

	all accreditation standards and supporting the programme's sustainable development. While still pending approval of the Program, the process of recruitment has already been initiated, with an open call which closed on 5.9.2025; ratification of Faculty Selection Committees (School Council 18.9.2025) and interviews and faculty selection which will commence November 2025.	
When it comes to research synergy for the teachers, they appear to have the time and a good incentives system but not really the on-site research facilities required to perform competitive experimental cancer research. We therefore recommend that the School seriously considers planning for proper and up-to-date cancer research laboratories for a few principal investigators with the right kind of questions, grants and ambitions (e.g. 1-3 labs) where competitive experimental cancer research can be performed, if nothing else to fulfil the School's very ambitious mission statement.	The EUC School of Medicine-Frankfurt Branch currently includes one dedicated research laboratory supporting faculty, postdoctoral researchers, and Ph.D. candidates, in addition to two fully equipped teaching laboratories. With the completion of the new campus building, an additional research laboratory and four additional teaching laboratories will be added, significantly enhancing both research and teaching capacity. This expansion will bring the Frankfurt Campus to full parity with the Nicosia main campus within three years of operation. All laboratories are equipped with advanced instrumentation, including Real-Time PCR, Thermal Cycler, NanoDrop, Western Blot systems, and Fluorescence Microscopy. Further procurement is underway for specialized equipment such as a Flow Cytometer, HPLC, FTIR, NMR, and cryostat. As practiced at the Nicosia campus, specialized equipment needs arising from new faculty appointments are reviewed by the Department and School Council for inclusion in the Capital Expenditure (CapEx) budget, ensuring that research infrastructure develops strategically in alignment	Choose level of compliance:

	with faculty expertise and emerging priorities. While certain specialized facilities (e.g., animal facilities) are not maintained on-site at the Frankfurt Campus, the M.Sc. Cancer Biology programme benefits from active collaborations with leading research institutions in the Frankfurt and Mainz regions. These partnerships provide full access to advanced technologies and methodologies, supporting high-level experimental research. The programme operates within the framework of the School of Medicine, leveraging its collaborative networks to provide students with a broad spectrum of research and practical learning opportunities. Key collaborations include the German Cancer Research Center (DKFZ) with Prof. Dr. Ilse Hofmann, University Medical Center Mainz and the Institute of Molecular Biology (IMB) with Prof. Aris Waisman, as well as projects with Prof. Benedikt Berninger (UMC Mainz) and the Goethe University Frankfurt. These partnerships ensure that students are exposed to internationally competitive biomedical research and receive mentorship from leading investigators. Beyond laboratory research, students also undertake clinical and diagnostic placements at partner hospitals and clinics, including St. Elisabethen Hospital, Red Cross Hospital, Mangau Hospital, Center for Kidney and Hypertension Diseases, Offenbach IVF Clinic, and Sana Hospital, where EUC has established formal MoUs.	

4. Student admission, progression, recognition and certification *(ESG 1.4)*

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
The EEC expressed concerns regarding the challenges of balancing teaching and research activities within the current infrastructure. It was noted that the existing facilities must be shared not only with students from other degree programmes offered by the School, but also with the experimental research conducted by the teaching staff. To address this issue proactively, it is strongly recommended that the University develops a comprehensive and forward-looking plan to ensure the availability of additional research laboratories in the projected new facilities. Such planning will be essential to support the programme's growth and maintain high standards in both education and research.	As outlined previously in *Response #2: Study Programme Design and Development*, the EUC School of Medicine-Frankfurt Branch currently operates one dedicated research laboratory supporting faculty, postdoctoral researchers, and Ph.D. candidates, in addition to two fully equipped teaching laboratories. Upon completion of the new campus building, one additional research laboratory and four new teaching laboratories will be established, substantially increasing both research and teaching capacity. This expansion will bring the Frankfurt Campus to full parity with the Nicosia main campus within three years of operation. While certain specialized facilities (e.g., animal facilities) are not directly maintained on-site at the School of Medicine-Frankfurt Branch, the M.Sc. in Cancer Biology programme has established formal collaborations with leading research institutions in the Frankfurt and Mainz regions. These partnerships ensure full access to advanced technologies and methodologies, mirroring the successful collaborative model at the Nicosia main campus. Through these partnerships, the programme sustains high-level experimental research and comprehensive training opportunities for students.	Choose level of compliance:
Furthermore, the EEC emphasizes that hands-on laboratory experience is a	We thank the EEC for highlighting the importance of hands-on laboratory experience, which we fully recognize as a cornerstone of high-quality	Choose level of compliance:

critical component of a programme focused on Cancer Biology. While this aspect is already recognized as a key strength of the current curriculum, the Committee recommends that it be further reinforced and expanded across both graduate and postgraduate levels. Enhancing laboratory training will not only deepen students' practical competencies but also strengthen their readiness for careers in research and other professional practice.	education in Cancer Biology. Based on the total number of contact hours across compulsory and elective laboratory courses, as well as the M.Sc. Thesis component, approximately 75% of the programme is dedicated to laboratory-based teaching and research activities. With the recent launch of the Ph.D. Programme in Medical Sciences, M.Sc. students now have the opportunity to collaborate closely with doctoral researchers. This interaction is integral to fostering an advanced research culture: Ph.D. candidates bring substantial expertise, methodological rigor, and mentorship to the M.Sc. learning environment. Their involvement promotes critical thinking, problem-solving, and innovation among MSc students while cultivating a dynamic, collaborative academic community. This synergy enhances the research outcomes and overall learning experience for both M.Sc. and Ph.D. cohorts.	
Students who graduated from the equivalent programme in Nicosia believe that more time in the laboratory is needed to the programme curriculum because it helped them the most in their career.	We acknowledge and appreciate the graduates' feedback and fully agree that extended laboratory experience is vital for professional and research preparedness. Accordingly, laboratory components of the existing courses will be reinforced and expanded through the incorporation of advanced methodologies such as single-cell omics, spatial transcriptomics, artificial intelligence and machine learning applications, and spectral flow cytometry (see **Appendix I**). Immediate measures taken include Increasing the number of practical exercises within existing courses (see **Appendix I**), incorporating	Choose level of compliance:

	advanced methodologies such as single-cell omics, spatial transcriptomics, artificial intelligence and machine learning applications, and spectral flow cytometry. The inclusion of these topics are highlighted in the revised syllabi for MCB605 Research Methodology and Biostatistics (page 2) (MCB610 Molecular and Cellular Biology of Cancer (page 4), MCB620 Laboratory Techniques & Scientific Communication (page 7), MCB630 Diagnostics and Therapeutics (Pg 9) BCB645 Bioinformatics (page15), MCB660 Cancer Systems Biology, MCB670 Precision and Personalized Medicine (page 18) in **Appendix I.** This exposure, in addition to the growing network in Frankfurt have expanded opportunities for students to engage in M.Sc. Thesis projects and laboratory rotations under direct mentorship from faculty and research staff. These enhancements aim to deepen students' practical competencies, improve research readiness, and ensure continued alignment of the programme with international standards in Cancer Biology education and training.	

5. Learning resources and student support
(ESG 1.6)

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
5.1 Teaching and Learning resources An important strength is the ease with which students can contact and interact with the teaching staff. The good accessibility and interaction between students and teaching staff was highlighted in interviews with current and former students of the Medicine programme of the Frankfurt Branch and Cancer Biology M.Sc. and Biomedical Sciences B.Sc. programmes of the Nicosia main campus. This should be cherished and maintained when student numbers are increasing.	We thank the EEC for recognizing the strength of student accessibility and interaction with teaching staff. We fully agree that maintaining close engagement between students and faculty is essential for high-quality education and will be carefully preserved as the programme grows. We thank the EEC for recognizing the strong accessibility and positive interaction between students and teaching staff across both the Frankfurt and Nicosia campuses. We remain fully committed to maintaining this high level of engagement as student numbers grow, ensuring that every student receives individualized guidance, academic support, and close mentoring throughout their studies.	Choose level of compliance:
While sufficient teaching resources appear to be available, there is a potential risk due to uncertainty about the number of students expected. This necessitates a high degree of flexibility from both teaching staff and administration, posing potential challenges. If a larger-than-anticipated number of students enrol, there may be constraints in space and an insufficient number of teaching staff. However, the EEC acknowledges that such risks are inherent in launching a new programme. The EUC recognizes this risk and has implemented sufficient	We recognize that precise student intake projections for the new M.Sc. in Cancer Biology at the School of Medicine-Frankfurt Branch cannot yet be fully determined. However, based on the current dedicated research laboratory capacity, existing collaborations, and new partnerships under development, we are confident that the programme can adequately accommodate placement and training needs for all enrolled students. We also acknowledge the EEC's observation that uncertainty in enrolment numbers poses inherent risks when launching a new programme. In anticipation of this, the European University Cyprus (EUC) has established robust mechanisms to ensure operational flexibility. These include adaptive staffing strategies and	Choose level of compliance:

flexibility to adjust the programme as needed.	scalable use of facilities, allowing the programme to adjust dynamically to actual enrolment levels. This approach minimizes potential challenges related to scheduling, space allocation, and resource distribution. The Schools of Medicine, Sciences, Dentistry, and Veterinary Medicine at the Nicosia main campus have successfully managed the shared use of teaching and research laboratories across programmes. Initially, the Nicosia campus operated with one dedicated research laboratory and four teaching laboratories. Following programme expansion and increased student numbers, this capacity has grown to two research laboratories and six teaching laboratories, effectively supporting both teaching and research excellence. The School of Medicine-Frankfurt Branch, currently serves a smaller programme portfolio and student body, presently has one dedicated research laboratory and two teaching laboratories. The following expansion plan has been approved to ensure full capacity and future readiness: Summer 2026 (old building): Addition of two new teaching laboratories and by 2028 (new building): Addition of one dedicated research laboratory and two more teaching laboratories. Upon completion, the Frankfurt Campus will have two research laboratories and six teaching laboratories, achieving full parity with the Nicosia main campus—on a significantly shorter development timeline and for a smaller programme portfolio. As previously noted, hands-on laboratory experience is a cornerstone of the M.Sc. in Cancer Biology curriculum. Graduate feedback from the	

	Nicosia campus consistently identifies extensive laboratory exposure as one of the most valuable and career-enhancing aspects of their education. The planned expansion in Frankfurt will ensure the same standard of immersive, high-quality, and research-informed laboratory learning at both undergraduate and postgraduate levels. We also appreciate the EEC's emphasis on maintaining structured and sustainable partnerships for student placements. We have already established collaborations with several prominent research institutions, including: 1- German Cancer Research Center (DKFZ) – Prof. Hofmann; 2. Institute of Molecular Medicine, UMC – Prof. Waisman, 3. University Medical Center Mainz – Prof. Berninger and 4. Institute of Clinical Neuroanatomy, Goethe University Frankfurt. Additionally, we have agreements with four hospitals and two specialty clinics providing clinical and diagnostic laboratory placement opportunities. While the precise number of incoming students cannot yet be projected, the combination of existing and forthcoming research partnerships ensures sufficient placement capacity and research support. EUC has in place a robust system of academic accessibility, adaptive resource planning, and strategic partnerships that will ensure: • Continued close interaction between students and faculty • Adequate teaching and research facilities for current and future needs • Strong external collaborations providing comprehensive placement opportunities • A sustainable, high-quality learning environment that supports the	

	School's mission and the Biomedical Sciences programme's growth trajectory.	
5.2 Physical resources The EEC identified two main concerns: 1-Currently, the same laboratories are used both for student education and for staff scientific research. While the existing equipment is sufficient for most B.Sc. and M.Sc. teaching purposes, access to high-end devices is limited, and research activities must be scheduled around teaching, creating planning constraints. The Dean of the School of Medicine has proposed expanding laboratory capacity with the new building. As this building will feature significantly larger laboratories, this can be expected to alleviate part of this issue. The EEC strongly recommends allocating designated laboratories specifically for faculty research, as well as for Ph.D. students and postdoctoral researchers. However, since this solution may take several years to implement, the EEC advises ensuring in the interim that staff retain adequate time and access to laboratory facilities for their research. Maintaining active faculty engagement in scientific research is essential, as it enriches teaching by bringing cutting-edge developments into the classroom, inspiring students, and fostering a culture of inquiry and innovation. The	We thank the EEC for its constructive comments and recommendations regarding the enhancement of the physical and research infrastructure at the EUC Frankfurt Campus. We fully share the Committee's view that maintaining robust research capacity is essential to sustaining high-quality teaching and advancing a culture of inquiry and innovation within the M.Sc. in Cancer Biology programme. The EUC School of Medicine-Frankfurt Branch currently houses one dedicated research laboratory supporting faculty, postdoctoral researchers, and Ph.D. candidates, along with two fully equipped teaching laboratories. With the completion of the new campus building, an additional research laboratory and four further teaching laboratories will be established. This expansion will substantially enhance both research and teaching capacity, bringing the Frankfurt Campus to full parity with the Nicosia main campus within three years of operation. The existing laboratories are equipped with advanced instrumentation, including Real-Time PCR, Thermal Cycler, NanoDrop, Western Blot apparatus, and Fluorescence Microscope. Procurement of additional high-end equipment is underway, such as a Flow Cytometer, HPLC, FTIR, NMR, and cryostat, further expanding the facility's analytical capabilities. As practiced at the Nicosia main campus, specialized equipment needs arising from new faculty recruitment or evolving research priorities are reviewed	Choose level of compliance:

student representative of the EEC agrees that the premises can't support competitive lab work and big experiments because of limited space and lack of equipment regarding newer techniques and analyses.	by the Department and School Council for inclusion in the Capital Expenditure (CapEx) budget, ensuring that infrastructure investments are strategically aligned with research development and academic growth. This continuous investment underscores EUC's commitment to providing a research-driven and resource-rich educational environment across all campuses. While certain specialized facilities (e.g., animal research units) are not currently maintained directly on-site at the Frankfurt Campus, the MSc in Cancer Biology programme has established active collaborations with leading research institutions in the Frankfurt and Mainz regions to ensure access to advanced experimental methodologies and technologies. This model replicates the successful collaborative framework at the Nicosia main campus, where partnerships with external research centers effectively complement on-campus infrastructure. Specifically, the Frankfurt programme maintains close collaborations with: 1. Prof. Dr. Ilse Hofmann, Scientific Coordinator of the Major Cancer Biology Programme and Group Leader at the German Cancer Research Center (DKFZ) – providing access to cutting-edge research in single-cell and spatial omics, molecular profiling, and translational oncology. 2. Prof. Aris Waisman, Director of the Institute of Molecular Medicine, University Medical Center Mainz, offering access to advanced neuroimmunology research facilities utilizing rodent animal models and diverse in vitro, in vivo, and ex vivo approaches.	

	3. University Medical Center Mainz, collaborating with Prof. Panagiotis Politis on transcriptional regulation and long non-coding RNA mechanisms in adult and embryonic neurogenesis. 4. Institute of Clinical Neuroanatomy, Goethe University Frankfurt, a long-standing collaborator with Prof. Politis in the study of transcriptional mechanisms underlying neural differentiation in the spinal cord and peripheral nervous system (PNS). Through these strategic partnerships, EUC School of Medicine-Frankfurt Branch faculty and students actively participate in high-impact biomedical research and benefit from mentorship by internationally recognized investigators. These collaborations ensure that EUC students gain direct exposure to state-of-the-art research environments and technologies, fully addressing the EEC's recommendations and strengthening the programme's mission to deliver a research-intensive, globally connected educational experience. In summary, EUC has in place a comprehensive and forward-looking plan to expand and enhance the physical resources of the Frankfurt Campus while simultaneously leveraging strong regional collaborations. This dual approach ensures: • Designated laboratory spaces for both teaching and faculty research • Continuous modernization of scientific equipment and facilities • Sustained faculty engagement in active research • Access for students and staff to world-class experimental platforms through institutional collaborations	

	Together, these measures guarantee that the M.Sc. in Cancer Biology programme will maintain a competitive, research-driven learning environment aligned with international standards in biomedical education and scientific excellence.	
2-Certain resource-intensive facilities, such as those required for FACS, mass spectrometry, (single-cell) sequencing, animal experiments, are not available on campus and must instead be accessed through external organizations. While this arrangement is already well established at the main campus in Nicosia, it has not yet been developed at the Frankfurt Branch. The EEC considers it a priority for the Department to build concrete partnerships in the Frankfurt area to ensure access to these facilities. Based on the successful experiences of the Medicine B.Sc. programme, the committee is confident that this can be achieved. 5.3 Human support resources The human support resources seem excellent, and the EEC has no specific recommendations. 5.4 Student support The student support seems excellent, and the EEC has no specific recommendations.	We thank the EEC for this valuable recommendation and fully acknowledge the importance of ensuring access to advanced, resource-intensive facilities such as FACS, mass spectrometry, single-cell sequencing, and animal experimentation units. While such highly specialized infrastructures are not maintained directly on-site at the EUC School of Medicine-Frankfurt Branch, the M.Sc. in Cancer Biology programme has proactively established formal collaborations with leading research institutions in the Frankfurt and Mainz regions to secure full access to these technologies. These partnerships are modeled after the successful and well-established framework at the Nicosia main campus, where external collaborations have long supported advanced experimental research and comprehensive student training. The same model is now being actively implemented and expanded at the Frankfurt Campus to ensure students and faculty benefit from equivalent opportunities for high-level research engagement. Specifically, the programme has developed and formalized collaborations with the following institutions and investigators: 1. Prof. Dr. Ilse Hofmann, Scientific Coordinator of the Major Cancer Biology Programme and Group Leader at the German Cancer Research Center (DKFZ) – providing	

	EUC students and faculty access to cutting-edge European research in single-cell and spatial omics, molecular profiling, and translational oncology, including exposure to advanced experimental platforms and instrumentation. 2. Prof. Aris Waisman, Director of the Institute of Molecular Medicine, University Medical Center Mainz – offering access to facilities supporting neuroimmunology research, including in vivo, in vitro, and ex vivo approaches, as well as the use of rodent animal models for studying neuroimmune mechanisms of stress resilience. 3. University Medical Center (UMC) Mainz, in collaboration with Prof. Panagiotis Politis, jointly exploring the role of long non-coding RNAs and transcriptional regulation mechanisms in adult and embryonic neurogenesis. 4. Institute of Clinical Neuroanatomy, Goethe University Frankfurt, a long-standing collaborator of Prof. Politis, focusing on transcriptional mechanisms regulating neural differentiation in the spinal cord and peripheral nervous system (PNS). Through these collaborations, EUC Frankfurt faculty and students are directly engaged in internationally competitive biomedical research, gaining hands-on experience with advanced technologies and methodologies—including flow cytometry, molecular profiling, and genomic analyses—that would otherwise require significant on-campus infrastructure investment. In addition to access to cutting-edge facilities, these collaborations provide students with exposure to high-level	

	interdisciplinary research environments, mentorship from internationally recognized scientists, and opportunities to participate in joint research projects that align closely with the curriculum's emphasis on translational cancer biology. In summary, EUC has already taken concrete steps to implement the EEC's recommendation by: • Establishing and expanding strategic research partnerships in the Frankfurt and Mainz regions; • Providing faculty and students with access to specialized, high-end equipment and experimental platforms; • Ensuring equivalent research opportunities to those available at the Nicosia main campus; and • Embedding these collaborations into the long-term strategic development of the programme. These measures collectively ensure that M.Sc. Cancer Biology students at the Frankfurt Campus enjoy a research-rich, internationally networked educational experience, fully aligned with the highest standards of biomedical training and scientific excellence.	

B. Conclusions and final remarks

Conclusions and final remarks **by EEC**	Actions Taken by the Institution	For Official Use ONLY
In general, the EEC conclude that the M.Sc. programme in cancer biology appears to be of high quality, fulfilling most, if not all, criteria set up by CYQAA. In the following, recommendations to consider are listed with the aim to further improve the programme, which is already running since several years in Nicosia and should therefore be improved compared to the originally given programme, given several years of chances to revise and improve based on student and other stakeholder input.	EUC remains committed to maintaining academic excellence through curriculum renewal, enhanced laboratory infrastructure, and strong faculty-student engagement, ensuring that graduates possess advanced research competencies and transferable skills aligned with European qualification benchmarks. The M.Sc. in Cancer Biology fully meets CY.Q.A.A. and EQF standards, offering a robust, research-driven curriculum continuously updated to reflect emerging trends in oncology and biomedical science.	Choose level of compliance:
A sticking point that the EEC needs to emphasize when it comes to the teacher staff for the programme is that the School needs to show definitive proof to CYQAA that the M.Sc. programme meets the criteria regarding 70% permanent staff. This has been difficult to assess, given the information available but should hopefully be facilitated by the ongoing recruitment drive to the new department and new programmes to be started.	EUC confirms that over 70% of the M.Sc. Cancer Biology teaching team consists of permanent, full-time faculty at the EUC School of Medicine-Frankfurt Branch, meeting CY.Q.A.A. requirements. In addition, at the beginning of the Spring Semester 2026, the composition will be 75% full-time faculty. Additional academic appointments are currently underway to further strengthen the teaching and research base. This ensures staffing sustainability, faculty development, and compliance with EQF quality assurance principles emphasizing stability and institutional accountability in programme delivery.	Choose level of compliance:
The content of the M.Sc. programme is adequate and timely but could be even more tweaked with the future in mind. Cancer treatment is changing fast and the precision	The programme integrates the latest advances in cancer biology and precision medicine, including single-cell omics, AI and machine learning, gene and cell therapies, and novel immunotherapeutic approaches. The	Choose level of compliance:

medicine aspects of diagnosis and thereby choice of therapy are moving very fast. The EEC therefore wants to emphasize that at this level, the focus should very much be on what the students will encounter when they graduate. Thus, we recommend to include increasing focus on the new, cutting-edge technologies and concepts in understanding of the pathogenesis of cancer, diagnostics and treatment. The latter includes the large numbers of immunotherapies based on gene and cell therapy concepts (CAR-T of course but also much beyond that), gene editing, single-cell analysis and generative AI components, just to mention a few.	active AI Committee ensures systematic inclusion of digital and data-driven tools across relevant modules. These ongoing enhancements align with EQF outcomes by fostering innovation, analytical competence, and readiness for evolving biomedical careers.	
EEC sees a need to develop local networks and contacts for both the upcoming B.Sc. and M.Sc. programmes alike. Whilst there is a good collaboration with the main actors in Cyprus (e.g. the Karaiskakio Foundation), similar networks need to be built also in the Frankfurt environment. This is both to ensure chances of student placements for external M.Sc. thesis projects and supervision, but also to improve the research carried out by the teachers on the programme.	Building on the established Nicosia model, the School of Medicine-Frankfurt Branch has developed an extensive network of partnerships with leading research institutions such as the DKFZ, University Medical Center Mainz, and Goethe University Frankfurt. These collaborations provide M.Sc. students with access to advanced technologies, high-level research training, and international mentorship, reinforcing the programme's alignment with EQF descriptors of applied research experience and cross-sector engagement.	Choose level of compliance:
EEC recommends the School to plan for higher-end research laboratories that support in-house competitive experimental research in	The university has approved an ambitious laboratory expansion plan that includes additional research and teaching laboratories by 2028. Concurrently, the procurement of	Choose level of compliance:

cancer biology by a (initially probably) small number of principal investigators. In this way, the synergy between this programme and research of even higher quality can be achieved, in line with the School's very ambitious mission statement. If there is any field of research where the School has a chance to come close to this, it may be in the field of cancer. Despite this, we have recommended elsewhere that the mission statement is softened to a slightly more humble level.	advanced equipment and integration of faculty research partnerships ensure immediate access to high-end technologies. These investments strengthen the programme's research capacity and ensure that experimental and analytical training meet EQF level 7 standards for advanced scientific inquiry.	
Thanks to a dedicated teacher collegium with good credentials in both education and research on this topic, together with experienced programme (co-)coordinators, the EEC expects this programme to reach the same student numbers and quality of graduates as has previously been shown in Nicosia. We very much recommend that the School establishes a working relationship with local actors, most importantly the DKFZ to reach the next level.	Supported by a highly qualified faculty and a dynamic research environment, the M.Sc. in Cancer Biology is positioned to achieve the same academic excellence and graduate quality as demonstrated in Nicosia. Through sustained partnerships—particularly with DKFZ and other key institutions—the programme fosters interdisciplinary research and innovation, ensuring continuous enhancement of quality and full correspondence with EQF criteria for advanced, research-oriented master's education. We sincerely thank the EEC for their thorough and insightful review. We greatly appreciate the recognition of our efforts to foster an environment where students, staff and faculty can thrive. We remain committed to continuously improving our educational program and research initiatives, and we are grateful for the EEC's guidance in ensuring our ongoing compliance and excellence.	

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Prof. Elizabeth Johnson	Dean School of Medicine, EUC Main Campus & School of Medicine–Frankfurt Branch	Elizabeth Johnson Elizabeth Johnson (Nov 4, 2025 11:50:33 GMT+2)
Dr. Irene Polycarpou	• Chairperson, Department of Health Sciences, EUC Main Campus • Interim Co-Chairperson of the Department of Life and Health Sciences, School of Medicine–Frankfurt Branch	Irene Polycarpou Irene Polycarpou (Nov 4, 2025 10:56:24 GMT+2)
Dr. Maria Ioanna Chrystodoulou	• Chairperson, Department of Life Sciences, EUC Main Campus • Interim Co-Chairperson of the Department of Life and Health Sciences, School of Medicine–Frankfurt Branch • Programme Coordinator, EUC Main Campus & School of Medicine–Frankfurt Branch	
Dr. Christina Karantanou	Programme Co-Coordinator, School of Medicine–Frankfurt Branch	Christina Karantanou (Nov 4, 2025 10:01:36 GMT+1)

Date: 3/11/2025

5 Lemesou Avenue, 2112, Nicosia
T: + 357 22 504 340
F: + 357 22 504 392
e-mail: info@dipae.ac.cy

European University Cyprus

APPENDIX I – COURSE SYLLABI

Course title	**Research Methodology and Biostatistics**				
Course code	**MCB605**				
Course type	**Compulsory**				
Level	Master's (2nd cycle)				
Year / Semester	1st Year / 1st Semester				
Teacher's name	Dr. Ioannis Alatsathianos				
ECTS	10	**Lectures / week**	3 Hours	**Laboratories / week**	None
Course purpose and objectives	The main objectives of the Research Methodology and Biostatistics course are to provide students the required skills to search the scientific literature, critically read and evaluate research articles and acquire knowledge on the basic principles of designing and conducting research in the field of cancer-related sciences. Part of the course will be devoted to planning and organization the Master Thesis proposal / protocol as well as to the description, analysis, documentation and presentation of its content. The ultimate goal of this course is the preparation, completion and successful presentation of the Master Thesis proposal which will serve as a foundation for the implementation of the Master Thesis course (MCB690).				
Learning outcomes	Upon completion of the course, students will be able to: • List the sequential steps required to organize references in a literature review and perform experimental work. • Describe and explain the structure of scientific articles, summarize their content and consolidate it into a single text. • Define, explain and apply basic principles of biomedical research both in quantitative and qualitative studies, such as in DNA technology, protein analyses and Bioinformatics • Create research questions, formulate hypotheses and design research strategies for pertinent data acquisition. • Propose long term research goals and specific aims and apply rules for basic biomedical research projects. • Describe, distinguish and select the appropriate steps of a research protocol and acquire data both in quantitative and qualitative type of study. • Demonstrate abilities for literature search and analysis of personal reference databases. • Explain the results of systematic reviews in the field of				

	biomedical sciences (PICOS, Search Techniques, Quality: Critical appraisal, Impact Factor, Staying up to date) • Evaluate statistical issues in biomedical research, such as effect measure, hypothesis testing and confidence interval. • Utilize the SPSS program as an indispensable research tool in biomedical research. • Understand major ethical issues in human and animal studies and research ethics. • Plan, organize, create and implement a descriptive research proposal on a cancer-related topic in accordance with international standards and using reputable bibliographic systems. • Present, discuss and clearly analyze the problem, purpose, methodology of their research proposal. • Organize and carry out the presentation of their research proposal in written and in the form of oral presentation. • Comprehend and Use Core Machine Learning Methods for Biostatistics • Evaluate and interpret models		
Prerequisites	None	**Required**	None
Course content	**Description:** • Description of the main concepts and types of scientific research, learning the value of ethics in research, as well as defining the scientific approaches related to problem solving in the field of biomedical sciences • Training in searching scientific information using advanced techniques and search strategies in a variety of databases • Clarification of the concept of research hypotheses formulation, research protocol design, and pilot studies conduction • Learning various sampling procedures as well as the concepts of reliability and validity in research • Analysis of problems related to the internal and external validity of an experiment, and provision of ways to address them • Means of data collection and management depending on certain variables and scales • Critical reading and evaluation of the quality of published research work • Methods for writing and presenting research results • Analysis of research data and presentation in the form of tables and charts using the SPSS statistical program • Methods for calculation and evaluation of statistically significant differences between compared experimental groups. • Supervised and unsupervised learning methods • Deep Learning in Biostatistics • Regularization and Model Selection • Model Validation, Calibration, and Uncertainty Estimation (Cross-validation, ROC curves, AUC, confusion matrices, and confidence intervals for AI models)		

	• Explainable and Interpretable AI in Biostatistics (SHAP, LIME) • Detailed description of the course content and requirements as listed in the pertinent Master Thesis Guide. • Selected lectures on the subject of the dissertation in which specific issues related to the different types of scientific work, the design as well as the implementation of the literature review and/or biomedical research project are being discussed. **Preparation and presentation of the research proposal:** • Students should select a Master Thesis topic by week 2, from a list of topics offered by program faculty. Students should prepare and write a research proposal on the topic undertaken under the guidance of their supervisor. The research topic and proposal outline is finalized after the successful defense of their research proposal / protocol both in written form as well as through an oral presentation to the proposal committee members.
Teaching methodology	Face-to-face
Bibliography	Michael P. Marder, *Research Methods for Science.* Cambridge University, Latest edition. Laake P., Benestad H.B. and Olsen B.R. *Research methodology in the medical and biological sciences*. Amsterdam; Boston; London: Academic, Latest edition D. Madsen, SUCCESSFUL DISSERTATIONS AND THESES., A GUIDE TO GRADUATE STUDENT RESEARCH FROM PROPOSAL TO COMPLETION, John Wiley, Latest edition Master Thesis Guide, 1st edition, 2018, Department of Life Sciences, European University Cyprus Selected scientific articles in pdf format pertinent to the proposed project EUC Library
Assessment	Mid-Term Examination 20% Final Examination 30% Written proposal 30% Oral presentation 10% Class participation 10% **Total** **100%** *It should be noted that completion of this course requires successful completion of every one of its evaluation components*
Language	English

Course title	**Molecular and Cellular Biology of Cancer**				
Course code	**MCB610**				
Course type	**Compulsory**				
Level	Master's (2nd cycle)				
Year / Semester	1st Year / 1st Semester				
Teacher's name	Dr. Christina Karantanou, Prof. Panagiotis Politis				
ECTS	10	**Lectures / week**	3 Hours	**Laboratories / week**	None
Course purpose and objectives	The main objective of the Molecular and Cellular Biology of Cancer course is to provide a deep understanding and insights into the principles governing biology of cancer, while highlighting different molecular and cellular mechanisms of this profoundly complex disease.				
Learning outcomes	Upon completion of the course, students will be able to: • Describe the hallmarks of cancer • Develop an in depth understanding of the molecular and cellular mechanisms that lead to carcinogenesis, including oncogenes and tumor suppressor genes • Distinguish the role of cancer stem-like cells as tumor initiating cells • Differentiate between hereditary and sporadic forms of various cancer types • Describe different mechanisms of cellular communication as well as the commonly observed pathway alterations during cancer progression • Correlate the activity of each pathway to specific cellular functions and properties (e.g. apoptosis, proliferation, migration) • Describe the multistep process of cancer metastasis • Understand and evaluate the role of tumor microenvironment in cancer progression • Develop hypotheses to answer cancer-related questions and design the appropriate experimental strategies to address them. • Connect artificial intelligence (AI) and machine learning (ML) methods with molecular and cellular aspects of cancer biology.				
Prerequisites	None		**Required**	None	
Course content	**Description:** • Definition and hallmarks of cancer. Multi-step tumorigenesis and the evolution of cancer. Cancer stem cells as tumor initiating				

	cells. • Mutagens and mutations. Tumor viruses. DNA repair defects and carcinogenesis • Cellular senescence, telomeres and immortalization in tumorigenesis. • Cancer genetics and hereditary cancer types • Tumor suppressor genes: Cell cycle regulation and apoptosis • Oncogenes and mechanisms of oncogenic activation • Mechanisms of cellular communication: Gap junctions, autocrine, paracrine, endocrine signaling and implications for cancer. • Integrin signaling in cancer and cell signaling cross-talk in the tumor microenvironment. • Types of cell receptors and signaling pathways. G-protein coupled receptor signaling, second messengers, receptor tyrosine kinase and Serine/Threonine receptor pathways: EGF, FGF, PDGF, IGF, TGFβ, Wnt/β-catenin signaling. • Angiogenesis and hypoxic adaptation • Tumor microenvironment and cancer progression • Dormancy and mechanisms of cancer metastasis • AI and ML concepts; relevance to cancer biology and translational research. • Supervised vs. unsupervised learning; algorithms used in cancer data (SVMs, random forests, neural networks).
Teaching methodology	Face-to-face
Bibliography	Biology of Cancer, Latest Edition, by R. Weinberg, Garland Science Molecular Biology of Cancer: Mechanisms, Targets and Therapeutics Latest Edition, by Lauren Pecorino. Oxford Press Molecular Biology of the Cell, Latest Edition, by B. Alerts, Garland Science. Molecular Cell Biology, Latest Edition, by H. Lodish, W.H. Freeman publisher Selected scientific articles in pdf format that will be provided in advance by the lecturer
Assessment	Mid-Term Examination 30% Final Examination 40% Assignments 20% Class participation 10% **Total** **100%** *It should be noted that completion of this course requires successful completion of every one of its evaluation components*
Language	English

Course title	**Laboratory techniques and Scientific Communication**				
Course code	**MCB620**				
Course type	**Compulsory**				
Level	Master's (2nd cycle)				
Year / Semester	1st Year / 1st Semester				
Teacher's name	Dr. Christina Karantanou, Dr Adonis Yiannakas, Dr. Tanyildizi Yasemin				
ECTS	10	**Lectures / week**	1.5 Hours	**Laboratories / week**	1.5 Hours
Course purpose and objectives	This course has two main objectives: a) the acquisition of knowledge and experimental hands-on skills to independently perform basic laboratory techniques on laboratory techniques which have direct applications in cancer-related sciences and b) the development of critical thinking, public presentation skills and comprehension of cutting-edge articles in the field of cancer, through the active participation in bi-monthly colloquium series, which are necessary to effectively communicate scientific ideas..				
Learning outcomes	Upon completion of the course, students will be able to: • Identify potential biological hazards and be able to work safely in a biomedical lab • Recall basic terminology and experimental procedures related to biomedical laboratory techniques. • Practice hands-on skills to perform experimental assays commonly used in cancer biosciences. • Develop abilities to efficiently work both independently as well as in a team • Design experimental procedures and protocols to answer specific biological and cancer-related questions. • Deliver reports on results from experiments they performed • Develop critical thinking skills to interpret and discuss experimental data. • Diagnose potential technical issues during experimental procedures and develop abilities to troubleshoot • Study and comprehend cutting-edge research articles in the field of cancer biology and therapy • Prepare slide presentations and orally present research papers with the focus on proper communication skills as well as scientific content. • Critically evaluate and actively discuss the presented scientific results while highlighting major strengths and weaknesses in the research methodologies used. • Generate new hypotheses based on the experimental findings of an article and suggest appropriate experimental strategies to address the proposed hypotheses				

Prerequisites	None	**Required**	None
Course content	**Description:** **The laboratory techniques will include**: • Theoretical background on major laboratory techniques used in cancer biosciences. • Recombinant DNA technology techniques (bacterial transformation, plasmid isolation and digestion, agarose gel electrophoresis of nucleic acid) • Molecular methods for the regulation of gene expression including siRNA-, shRNA-, CRISPR-mediated gene targeting • Polymerase-chain reaction (PCR), RNA isolation, cDNA synthesis and real-time PCR gene expression analysis • Western blotting analysis using SDS-PAGE • Cell and tissue staining techniques (immunofluorescent staining, Hematoxylin & eosin staining, immunohistochemistry) on cells and tissues, respectively. • Flow-cytometry, spectral-flow cytometry and related data analysis • Single-cell RNA sequencing and related data analysis • Spatial transcriptomics and related data analysis • Small animal handling (mice) and basic principles for conducting in vivo experiments • All laboratory classes will be accompanied with practical assignments where students need to perform their own experiments, measurements, software or statistical analysis and deliver reports **Bi-monthly colloquium series will include:** **Description:** • Reading and critical evaluation of research articles in the field of cancer biology and therapy: Strengths, weaknesses of research methodologies and data interpretation • Proposal of future hypotheses and experimental design to address them • Development of oral presentation skills. Delivering in front of audience: moving, standing, talking, pointing, observing, listening. This includes facing the questions: preparing the Q&A session, listening to, evaluating the relevance, and answering common kinds of scientific questions. • Public presentations of research articles from the students which will be accompanied by peer-assessment of presentations and discussion regarding the scientific content		
Teaching methodology	Face-to-face		
Bibliography	A Guide to Methods in the Biomedical Sciences, by Ronald B. Corley, Springer, Latest edition, ISBN: 978-0-387-22845-7		

	When the Scientist Presents: An Audio and Video Guide to Science Talks, by Jean-luc Lebrun, World Scientific, Latest edition Selected scientific articles in pdf format that will be provided in advance by the lecturer
Assessment	Mid-Term Examination 20% Final Examination 40% Oral presentations/Assignments 30% Class participation 10% **Total** **100%**
Language	English

Course title	**Cancer Diagnostics and Therapeutics**				
Course code	**MCB630**				
Course type	**Compulsory**				
Level	Master's (2nd cycle)				
Year / Semester	1st Year / 2nd Semester				
Teacher's name	Prof. Karim Dip, Dr. Elsanhoury Ahmed				
ECTS	10	**Lectures / week**	3 Hours	**Laboratories / week**	None
Course purpose and objectives	The main objective of the Cancer Diagnostics and Therapeutics course is to introduce the latest advances in cancer diagnostic methodologies as well as provide a comprehensive overview of the different types of cancer treatment currently available in the clinic, emphasizing the connection between basic and translational knowledge in tumor biology.				
Learning outcomes	Upon completion of the course, students will be able to: • Describe and determine the appropriate the diagnostic methods in different cancer types • Recognize the advantages of using non-invasive or minimally invasive approaches in cancer diagnostics • Appraise the usefulness of different molecular markers for cancer diagnosis and prognosis • Describe different ionizing and non-ionizing imaging methodologies for cancer diagnosis • Describe new forms of radiation therapy • Describe the objectives and functions of Artificial Intelligence (AI) in medical imaging for cancer management • Describe the objectives and functions of Artificial Intelligence (AI) in drug discovery and prediction of drug resistance • Understand of the challenges behind AI techniques for cancer management • Describe application of AI for different medical tasks and scenarios • Describe the different types of cancer treatment strategies • Differentiate and compare the use of chemotherapy, nanotherapy and current targeted cancer therapies • Discuss the role of the tumor microenvironment in the efficacy of cancer treatment • Develop hypotheses to address the development of resistance to selected therapies				
Prerequisites	None			**Required**	None

Course content	**Description:** • Diagnostic methodologies using biopsies from biological tissues or fluids • Molecular diagnostic and prognostic markers for different cancer types • Ionizing radiation imaging methodologies for cancer diagnosis • Practical training with PET/CT images in order to extract quantitative information and compare it with biopsy results for non-Hodgkin lymphoma patients (use of a freely available software installed in the Radiology lab). • Non-ionizing radiation imaging methodologies for cancer diagnosis • Artificial Intelligence (AI) in medical imaging for cancer management • AI techniques in x-rays, CT, MRI, PET/CT imaging for cancer management • Histological classification, grading and staging of tumors • Chemotherapy: Different types and mechanisms of action in frequently diagnosed tumors, such as breast, colon, lung, prostate, pancreas, melanoma, leukemias. • Nanotherapy: Latest technologies and advantages over traditional chemotherapy. • Radiation therapy: including CyberKnife, proton therapy and theranostics • Applications of radiation oncology in cancer treatment • Personalized medicine: cancer treatment using targeted therapies • Anti-hormone therapies • Mechanisms of drug resistance • Novel technologies for drug development • AI Microscopy and Pathology Imaging • Virtual screening, molecular docking prediction, and identification of new therapeutic targets, using AI • Machine learning for treatment response and recurrence prediction.
Teaching methodology	Face-to-face
Bibliography	Anticancer Therapeutics, Latest Edition, by S. Missalidis, Wiley Breast Cancer: Translational Therapeutic Strategies, Latest Edition, by Gary H. Lyman, Harold J. Burstein, CRC Press Cancer Biomarkers: Minimal and Noninvasive Early Diagnosis and Prognosis, Latest Edition, by D. Barh, A. Carpi, M. Verma, M. Gunduz, CRC Press Cancer Nanotechnology: Principles and Applications in Radiation Oncology (Imaging in Medical Diagnosis and Therapy), Latest Edition, by S.H. Cho and S. Krishnan, CRC Press Selected scientific articles in pdf format that will be provided in advance by the lecturer

Assessment	Mid-Term Examination 30% Final Examination 40% Oral presentations/Assignments 20% Class participation 10% **Total** **100%**
Language	English

Course title	**Tumor Immunology and Immunotherapy**				
Course code	**MCB635**				
Course type	**Elective**				
Level	Master's (2nd cycle)				
Year / Semester	1st Year / 2nd Semester				
Teacher's name	Dr. Christina Karantanou, Prof. Ourania Tsitsilonis				
ECTS	10	**Lectures / week**	2 Hours	**Laboratories / week**	1 Hours
Course purpose and objectives	The main objective of the Tumor Immunology and Immunotherapy course is to provide a detailed understanding of the role of different immune system components in controlling tumor growth, describe how immune functions are compromised during cancer progression as well as discuss the latest advances in immune-based anticancer therapies.				
Learning outcomes	Upon completion of the course, students will be able to: • Classify the different components of the innate and adaptive immune system • Recognize different mechanisms by which the immune system controls cancer • Discuss why the immune system components can both inhibit or promote tumor growth. • Categorize different types of immune cells and compare their roles in cancer. • Locate the principles for different immunotherapies such as use of immune checkpoint inhibitor antibodies, adoptive T cell transfer, vaccinations, dendritic cell (DC) therapy etc. • Explain various methodologies to measure immune responses in patients and in experimental systems. • Validate immunoscore on human tumors, immunophenotype human peripheral blood samples and assess minimal-residual disease (MRD) on human samples				
Prerequisites	None		**Required**	None	
Course content	**Description:** **Theory:** • Innate immune system and its role in controlling tumorigenesis • The potential of natural killer cells in cancer immunotherapy • The role of tumor associated macrophages in cancer progression and response to therapy • Dendritic cells (DC) and dendritic cell tumor immunotherapies • Adaptive immune system components and regulation of cancer progression • Adaptive T cell immunity and tumor antigen recognition • Modulation of the adaptive immune system by inflammation and				

	T- regulatory cell responses • Escape from immune surveillance and ageing in compromising anti- tumor immune responses • Antibody-based cancer therapies: bispecific and multispecific antibodies, antibody engineering • Vaccination as a tool for cancer prevention and therapy (cell-based, DNA/RNA-based, peptides-based vaccines, viral vector vaccines) • Immune-checkpoint blockade in cancer immunotherapy • Adoptive anti-cancer therapies: CAR-T and CAR-NK cell immunotherapies • Combination anti-cancer therapies • Experimental methods for measuring immune system responses in animal models or patients **Practicals**: • Immune classification of solid tumor samples using Immunoscore • Immunophenotyping of human samples using flow-cytometry • Assessment of minimum-residual disease in patients with cancer upon treatment, using flow-cytometry • Enzyme-linked immunosorbent assay (ELISA)
Teaching methodology	Face-to-face
Bibliography	Cancer Immunology and Immunotherapy, by G. Dranoff, Latest edition, Springer Tumor Immunology and Immunotherapy, by R. C. Rees, Latest edition, Oxford University Press Biology of Cancer, Latest Edition, Chapter 15, by R. Weinberg, Garland Science Selected scientific articles in pdf format that will be provided in advance by the lecturer
Assessment	Mid-Term Examination 30% Final Examination 40% Oral presentations/Assignments 20% Class participation 10% **Total** **100%**
Language	English

Course title	**Bioinformatics**				
Course code	**MCB645**				
Course type	**Elective**				
Level	Master's (2nd cycle)				
Year / Semester	1st Year / 2nd Semester				
Teacher's name	Dr. Ioannis Alatsathianos, Dr. Efterpi Kostareli				
ECTS	10	**Lectures / week**	2 Hours	**Laboratories / week**	1 Hours
Course purpose and objectives	The main objective of the Bioinformatics course is for students to learn various bioinformatics tools and analysis methods and be able to apply them in the analysis of various cancer genomes. Upon completion of the course, students should be able to work with the vast amounts of genomic, transcriptomic and/or proteomic data and tools and apply this knowledge to their research or professional career.				
Learning outcomes	Upon completion of the course, students will be able to: • Apply computational tools to biological data with a focus on cancer genomes • Collect and interpret biological and cancer-related data from public databases • Apply statistical and non-statistical tools for multiple sequence alignment and alignment of reads from high-throughput sequencing technologies • Apply computational methods to analyze high-throughput DNA/RNA sequencing data • Utilize contemporary bioinformatics tools to address biological questions related to cancer and metastasis • Apply AI tools for molecular mechanisms and pathway analysis				
Prerequisites	None	**Required**	None		
Course content	**Description:** • Mining of Cancer-related Data from Online Repositories (GEO, SRA, TCGA, ICGC, etc.) • Introduction to omics • High-throughput sequencing technologies - basics of NGS chemistries • Introduction to the Galaxy platform • Hands-on practical courses on the analysis of NGS data (e.g., From peaks to genes, finding SNPs on a human chromosome, quality control of NGS data, mapping, etc.) • Gene expression analysis using RNA-sequencing (RNA-seq) • Variant analysis & Identification of somatic and germline variants • Chromatin immunoprecipitation sequencing (ChIP-seq): protein-DNA interactions				

	• Epigenetic data analysis: histone modifications, chromatin accessibility, DNA methylation • Single-cell RNA sequencing analysis • Single-cell multi-omics data analysis • Singel-cell proteomics data analysis • Spatial transcriptomics data analysis • Immunogenomics • Enrichment analysis • AI in Cancer Genomics • Deep Learning for Transcriptomics and Proteomics • AI for Epigenetic and Regulatory Network Analysis
Teaching methodology	Face-to-face
Bibliography	Bioinformatics: Sequence and Genome Analysis, David Mount, Latest Edition, ISBN 978-087969712-9 Bioinformatics and functional genomics, Jonathan Pevsner, Latest Edition, ISBN: 978-1-118-58178-0 Structural Bioinformatics. P. E. Bourne, H. Weissig, Latest Edition, Wiley- Liss ISBN 0471 20199 5 Selected scientific articles in pdf format that will be provided in advance by the lecturer
Assessment	Mid-Term Examination 30% Final Examination 40% Oral presentations/Assignments 20% Class participation 10% **Total** **100%**
Language	English

Course title	**Cancer Systems Biology**				
Course code	**MCB660**				
Course type	**Elective**				
Level	Master's (2nd cycle)				
Year / Semester	1st Year / 2nd Semester				
Teacher's name	Dr. Efterpi Kostareli, Prof. Antonia Vlahou				
ECTS	10	**Lectures / week**	3 Hours	**Laboratories / week**	None
Course purpose and objectives	The main objective of Cancer Systems Biology course is to provide students with a detailed understanding of the study of cancer biology at a systems level. Cancer systems biology approaches are based on the use of computational and mathematical methods to unravel the complexity involved in tumorigenesis as well as tumor heterogeneity.				
Learning outcomes	Upon completion of the course, students will be able to: • Demonstrate integrative knowledge and critical understanding of the concepts underlying mathematical and statistical approaches used in modelling tumorigenesis and cancer progression from a systems perspective. • Build networks from large –omics cancer data sets • Demonstrate general cognitive skills that they can, in a creative and critical way, use computer programs to apply a range of key algorithms in the analysis of demonstration datasets in order to learn and extract patterns from cancer-related biological data. • Critically evaluate a range of modelling paradigms and apply them correctly in different situations to verify or refute scientific hypotheses. • Interpret model predictions, formulate hypotheses and design appropriate experiments to address them. • Connecting Pathways for Network Building & Visualization - Analysis and Data Organization • Combining Annotation of Nodes with Network Topology • Deterministic vs. Stochastic Systems • Analysis of Directed Graphs, Regulatory Motifs in Cancer Cell Signaling Networks • Integrated Reasoning: Merging Bottom Up and Top Down Reasoning • From Model Predictions to Laboratory Experiments				
Prerequisites	None		**Required**	None	
Course content	**Description:** • Introduction to –omics technologies • Data mining: Gathering and Analyzing Large Data Sets (genomics, epigenomics, transcriptomics, proteomics, metabolomics)				

	• Genomics and cancer: mutations, copy number variation, epigenomics • Introduction to networks and graphs • Protein-protein interaction networks • Connecting Pathways for Network Building & Visualization - Analysis and Data Organization • Combining Annotation of Nodes with Network Topology • Deterministic vs. Stochastic Systems • Analysis of Directed Graphs, Regulatory Motifs in Cancer Cell Signaling Networks • Integrated Reasoning: Merging Bottom Up and Top Down Reasoning • From Model Predictions to Laboratory Experiments
Teaching methodology	Face-to-face
Bibliography	An Introduction to Systems Biology: Design Principles of Biological Circuits (Chapman & Hall/CRC Mathematical and Computational Biology) Latest Edition. Uri Alon Systems Biology - A Textbook (Second Edition). Edda Klipp, Wolfram Liebermeiste, Christoph Wierling and Axel Kowald. Wiley-VCH. A First Course in Systems Biology. Eberhard Voit, Latest Edition. Fundamentals of Systems Biology: From Synthetic Circuits to Whole-cell models. Markus W. Covert, Latest Edition. Systems Biology of Cancer, by S. Thiagalingam, Cambridge University Press, Latest Edition.
Assessment	Mid-Term Examination 30% Final Examination 40% Oral presentations/Assignments 20% Class participation 10% **Total** **100%**
Language	English

Course title	**Precision and Personalized Medicine**				
Course code	**MCB670**				
Course type	**Elective**				
Level	Master's (2nd cycle)				
Year / Semester	1st Year / 2nd Semester				
Teacher's name	Prof. Antonia Vlahou, Dr. Christina Karantanou				
ECTS	10	**Lectures / week**	3 Hours	**Laboratories / week**	None
Course purpose and objectives	The main objective of the Precision and Personalized Medicine course is to introduce the next generation approaches of cancer medicine, based on the individual's genetic profile, which aim to provide significant benefits to patients over traditional therapeutic strategies.				
Learning outcomes	Upon completion of the course, students will be able to: • Recognize the basic principles for applying data from human genome to cancer medicine • Describe the major -omics technologies currently used in personalized cancer medicine • Discuss the use of next-generation sequencing for developing personalized anti-cancer therapeutic approaches • Describe how transcriptomics (i.e RNA-sequencing, gene expression microarrays) and proteomics (i.e. mass spectrometry) can be applied for precision medicine. • Differentiate and compare the use of biological information from genomic, transcriptomic and proteomic datasets for personalized therapy in cancer. • Interpret big data information to evaluate the efficacy of targeted anti-cancer therapies • Evaluate big data results from omics studies as for their potential in cancer biomarker and therapeutic target discovery • Discuss the use of cancer biomarkers in diagnosis and therapy. • Discuss applications of pharmacogenetics and pharmacogenomics in novel personalized drug development in cancer research • Discuss the principles and advantages of drug repurposing • Discuss ethical issues related to personalized cancer medicine Applications of whole-genome sequencing for personalized cancer medicine • Transcriptomics and precision cancer medicine • Epigenomics in personalized cancer medicine • Quantitative proteomics in personalized cancer therapy • Translating genome information into clinical practice during cancer therapy • Big Data and translational bioinformatics in				

<table>
<tr><td></td><td colspan="3">precision and personalized cancer medicine
• Current targeted therapies for major types of human cancer
• Pharmacogenetics/Pharmacogenomics and precision anti-cancer drug development
• Drug Repurposing and repositioning in cancer therapy
• Clinical Use of biomarkers as diagnostic tools for cancer
• Ethical social, regulatory and financial considerations for personalized cancer medicine
• Future of personalized cancer medicine
• Translational and Predictive Applications of AI
• AI: Advanced topics and Ethics</td></tr>
<tr><td>Prerequisites</td><td>None</td><td>Required</td><td>None</td></tr>
<tr><td>Course content</td><td colspan="3">Description:
Theory:
• Principles for applying human genome information to clinical practice
• Basic technologies for developing personalized cancer medicine
• Analysis and Data Organization
• Combining Annotation of Nodes with Network Topology
• Deterministic vs. Stochastic Systems
• Analysis of Directed Graphs, Regulatory Motifs in Cancer Cell Signaling Networks
• Integrated Reasoning: Merging Bottom Up and Top Down Reasoning
• From Model Predictions to Laboratory Experiments
• Explainable AI in Cancer Research
• Ethical, Legal, and Reproducibility Issues in AI-driven Cancer Research
• Future Perspectives: Integrating AI with Systems Biology and Synthetic Biology
Practicals:
• Analysis of omics studies and their results, recently published, and their value in the discovery of cancer prognostic/predictive</td></tr>
<tr><td>Teaching methodology</td><td colspan="3">Face-to-face</td></tr>
<tr><td>Bibliography</td><td colspan="3">An Introduction to Systems Biology: Design Principles of Biological Circuits (Chapman & Hall/CRC Mathematical and Computational Biology) Latest Edition. Uri Alon

Systems Biology - A Textbook (Second Edition). Edda Klipp, Wolfram Liebermeiste, Christoph Wierling and Axel Kowald. Wiley-VCH.

A First Course in Systems Biology. Eberhard Voit, Latest Edition.

Fundamentals of Systems Biology: From Synthetic Circuits to Whole-cell models. Markus W. Covert, Latest Edition.

Systems Biology of Cancer, by S. Thiagalingam, Cambridge</td></tr>
</table>

	University Press, Latest Edition.
Assessment	Mid-Term Examination 30% Final Examination 40% Oral presentations/Assignments 20% Class participation 10% **Total** **100%**
Language	English

Course title	**Master Thesis**				
Course code	**MCB690**				
Course type	**Compulsory**				
Level	Master's (2nd cycle)				
Year / Semester	1st Year / 3rd Semester				
Teacher's name	Program Coordinator				
ECTS	10	**Lectures / week**	None	**Laboratories / week**	As required
Course purpose and objectives	The main objective of the Master Thesis course is to provide students with all the necessary skills required to independently design, organize and implement an experimental research project or in silico research project or literature review in the field of Cancer Biology and related disciplines. This cancer-related research project can be wet lab-based, in silico or literature review, depending on the topic. The ultimate goal is the submission to the thesis committee a scientific manuscript/essay describing the theoretical background, the experimental methodology, data analysis and interpretation in a cutting-edge in the field of Cancer Biology. Finally, the student will present and defend his/her work in an oral public presentation under the guidance of the three-member advisory committee and the supervisor of thesis project.				
Learning outcomes	Upon successful completion of the Master Thesis course, students should be able to: • Recognize and describe a specialized area in the field of cancer biology and/or therapy. • Compose a summary of the literature on the selected topic in the field of cancer biology by selecting, reading and understanding the appropriate research articles through database searching. • Plan, organize, and implement an experimental wet lab-based or in silico-based research project in the field of cancer-related sciences according to international standards. • Clearly present the problem, formulate hypotheses as well as the aims of their study • Select, design and organize the appropriate methodology to be used during the implementation of the study. • Demonstrate expertise in independently performing fundamental wet-lab experimental techniques in the field of molecular and cellular cancer biology. • Propose troubleshooting approaches to overcome experimental issues that may arise. Analyze the results obtained and calculate potential statistically significant associations between compared groups. • Interpret, evaluate and discuss the findings of the study.				

	• Draw biologically meaningful conclusions related to the current literature. • Produce original research work • Prepare the final thesis dissertation in written form as well as defend it during a public oral presentation.		
Prerequisites	Completed all courses of 1st and 2nd semester	**Required**	None
Course content	**Description:** • **Supervision and guidance** • Regular weekly meetings will take place between the student and the supervisor throughout the implementation period in order to provide guidance, organize the experimental methodology, data analysis and activities to be performed to complete the project. • The student will regularly obtain feedback from his/her advisor on the status of the work in progress. • **Implementation of the experimental research project** • Initially, the student will read and thoroughly comprehend the literature pertinent to the Master Thesis research project topic. • The student will work with his/her advisor in order to select and explicitly outline the detailed experimental methodology to be performed. • The student will work independently in the lab in order to implement the research project by applying fundamental molecular and cellular biology techniques, such as cell culture, genetic manipulation of model systems, nucleic acid and protein purification, gene expression and protein analysis. • The student will analyze the data obtained by applying basic statistical methodologies and therefore interpret, evaluate and discuss the findings of the study. • The student will compose the Master Thesis in written format, according to the instructions given and explained in the pertinent Master Thesis Guide. • **Thesis Presentation:** • Upon submission of the Master Thesis to the three-member advisory committee, the student will be informed regarding the date of the oral presentation of his/her work. • Following the oral presentation, evaluation and successful defense of the Master Thesis by the three-member advisory committee, the student will submit the final version of his/her Master Thesis to the Department secretary in order to obtain a grade. • Detailed description of the content and course requirements are listed in the pertinent Master Thesis Guide.		
Teaching methodology	Face-to-face		
Bibliography	D. Madsen, SUCCESSFUL DISSERTATIONS AND THESES., A GUIDE TO GRADUATE STUDENT RESEARCH FROM PROPOSAL TO		

	COMPLETION, John Wiley, Latest Edition. Master Thesis Guide, 1st edition, 2018, Department of Life Sciences, European University Cyprus Selected scientific articles in pdf format pertinent to the proposed project
Assessment	Written presentation 60% Oral presentation 40% **Total** **100%**
Language	English