UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
IMMU-544	Immunotechnology	7.5
Prerequisites	**Department**	**Semester**
IMMU-541	Life Sciences	Spring
Type of Course	**Field**	**Language of Instruction**
Concentration-Immunology	Biomedical Sciences	English
Level of Course	**Lecturer**	**Year of Study**
2nd Cycle	Dr. Vicky Nicolaidou	1st
Mode of Delivery	**Work Placement**	**Corequisites**
Face to Face	N/A	N/A

Course Objectives:

The main objectives of the course are to inform students on the immunobiotechnology-based developments for use in medicine for research, therapeutics, and diagnostics purposes. The main objectives of the course are to:

- Provide a solid understanding of the pure and applied science underlying the biotechnology industry.
- Introduce the techniques and processes involved in the development of therapeutics, vaccines, research, and diagnostics.
- Introduce antibody-based technologies.
- Introduce targeted immunotherapies for cancer treatment.
- Introduce students to critical thinking and when the application of a specific technique is suitable.

Learning Outcomes:

After completion of the course, students are expected to be able to:

1. Appraise the methods for monoclonal and polyclonal antibody production, purification, characterization, and use in research and diagnosis.
2. Understand the use of monoclonal and polyclonal antibodies in the clinic and the bench.
3. Discuss the methods of measuring antibody affinities
4. Understand and apply flow cytometry in both research and diagnostic settings

5. Discuss the methods for antibody engineering and their application for therapeutics
6. Discuss the current methods of immunotherapies for cancer treatment (CAR, vaccines, cytokines, viruses, antibodies)
7. Understand and apply cell death and cell cycle analysis assays
8. Distinguish and assess the immune technology-based industrial products that are commercially available

Course Content:

1. Animal models and transgenic animals and their use in immunology.
2. Monoclonal and polyclonal antibody production and applications in research, diagnostics and immunotherapies.
3. Antibody engineering for Immunotherapy (Chimeric, humanized, human and bispecific antibodies)
4. ELISA and ELISPOT - principle and applications.
5. Immunocytochemistry, immunofluorescence microscopy - principle and applications.
6. Flow cytometry - principle and applications.
7. Western blot, Immunoprecipitation and agglutination - principle and applications.
8. Surface plasmon resonance to determine the affinity of antigen-antibody interactions.
9. Assays of cell death and cell cycle analysis.
10. The tumour microenvironment and immunotherapies (antibody immunotherapy, adoptive transfer immunotherapy, vaccine immunotherapy, oncolytic virus therapy, CAR cells)
11. Vaccine development: Recombinant vaccines, combined vaccines, polyvalent vaccines, RNA vaccines.

Learning Activities and Teaching Methods:

Lectures; problem-based learning (hybrid-PBL), videos. The lecturer will be introducing each topic through lectures and problem-based learning sections with individual tasks related to data analysis and students will be given research papers to read and then discuss in the class

Assessment Methods:

Assignments, Presentations, Mid-term Exam, Final Exam

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Immunotechnology: Principles, Concepts and Applications Paperback	Anthony Moran, James Gosling	John Wiley & Sons	2003	**ISBN-10:** 0471899119 **ISBN-13:** 9780471899112

Research papers and reviews will be given to students by the lecturer.

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Immunoassays: A Practical Approach	James P. Gosling	Oxford University Press, USA	2000	**ISBN-10:** 0199637105 **ISBN-13:** 9780199637102
The Immunoassay Handbook Theory and Applications of Ligand Binding, ELISA and Related Techniques	David Wild	ELSEVIER	2013	**ISBN-13:** 9780080970370 **ISBN-10:** 0080970370
Antibody Engineering: Methods and Protocols, 2nd Edition	Patrick Chames	Humana Press;	2012	**ISBN-10:** 1617799734 **ISBN-13:** 978-1617799730
Antibody-Drug Conjugates and Immunotoxins: From Pre-Clinical Development to Therapeutic Applications	Gail Lewis Phillips	Springer;	2013	**ASIN:** B00BLQCGIG
Handbook of Biological Confocal Microscopy	James B. Pawley	Springer; 3rd edition	2006	**ISBN-10:** 038725921X **ISBN-13:** 978-0387259215