



## University of Nicosia, Cyprus

<b>Course Code</b> BISC-513	<b>Course Title</b> Laboratory Practice (Immunology)	<b>ECTS</b> 7
<b>Department</b> Life and Health Sciences	<b>Semester</b> Spring	<b>Prerequisites</b> To have finished all required courses
<b>Type of Course</b> Elective	<b>Field</b> Bioscience: Immunology	<b>Language of Instruction</b> English
<b>Level of Course</b> 2 <sup>st</sup> Cycle	<b>Year of Study</b> 1 <sup>th</sup>	<b>Lecturer</b> Nicolaidou Stella Chryso Pierides
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

### Objectives of the Course:

This course aims to provide the theory of immunology based techniques and give students the opportunity to find out how these are used for the diagnosis of immune diseases/disorders:

Specific aims of the course is to enable students to:

- Use antigen-antibody based interactions to identify proteins and study the function of cells of the immune system.
- Develop clinical laboratory skills by practice on immunology based techniques.
- Use standard and controls that apply to good laboratory practice.
- Gather and analyze data and develop communications skills in data reporting.
- Utilize quantitative methods and numerical data to evaluate and draw conclusions from experimental results.
- Work cooperatively and display leadership qualities through critical and creative thinking.

### Learning Outcomes:

At the end of the course students should be able to:

1. Describe antigen-antibody reactions and how they are used in clinical diagnosis
2. Explain the difference between polyclonal and monoclonal antibodies
3. Process and analyze immunology-serology specimens
4. Follow instructions and perform competently diagnostic tests using various techniques/methods based on immunology.

5. Evaluate factors that affect methods, test results, and take the appropriate actions following the guidelines established in the profession.
6. Apply scientific laboratory principles for safely when working in the lab,
7. Relate laboratory test results to disease processes
8. Work cooperatively and demonstrate professional conduct and interpersonal communication skills

### **Course Contents theory and practice:**

In this course, the following topics will be addressed using data results, illustrations and video or demonstrations:

- Assessment of proteins (identification and quantitative) of the immune system (antigens and antibodies).
  - a. Immunoprecipitation,
  - b. Immunodiffusion (Ouchterlony double; Radial),
  - c. Nephelometry
  - d. Agglutination (hemagglutination: Coombs test, Latex fixation test);
  - e. Electrophoresis (serum proteins; immunofixation);
  - f. Immunofluorescence: Direct and Indirect immunofluorescence
  - g. Immunometric methods: ELISA, ELISPOT, Enzyme Multiplied Immunoassay, RAST test
  - h. Multiplex methods; Aptamers, Antibody arrays
- Flow Cytometry; detection of lymphocyte population (data analysis, immunophenotyping, intracellular evaluations)
- Assessment of functional immune responses
  - a. Ontogenesis of B lymphocytes. B- cell surface markers.
  - b. Ontogenesis of T lymphocytes. T- cell surface markers
  - c. Assessment of neutrophil function
  - d. Assessment of human allergic diseases
    - a. IgE measurements; skin allergy test, patch test
- Molecular Techniques
- Laboratory automation

### **LABORATORY HANDS-ON PRACTICALS**

- Basic practical techniques in hematology
  - a. Safety in the laboratory
  - b. Complete blood count
  - c. Differential count for leukocytes
- agglutination,
- precipitation,
- complement,
- T cell enumeration,
- Flow Cytometry,
- Western blotting,
- ELISA/EIA
- Immunofluorescence.

**Learning Activities and Teaching Methods:**

Instructional lectures, Laboratory demonstrations and hands-on experiments, Analysis and discussions on diagnostic test results;
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**Assessment Methods:**

Laboratory report/data (60%) and Final exam (40%)
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**Required Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
By Robert R. Rich, Thomas A Fleisher, William T. Shearer, Harry Schroeder, Anthony J. Frew, and Cornelia M. Weyand,	Clinical Immunology: Principles and Practice (Expert Consult - Online and Print), 4e (Rich, Clinical Immunology)	Saunders;	4 edition (2012)	<b>ISBN-10:</b> 0723436916 <b>ISBN-13:</b> 978-0723436911
Ulrich Sack, Attila Tarnok, Gregor Rothe	Cellular Diagnostics: Basic Principles, Methods and Clinical Applications of Flow Cytometry	S. Karger	Publishing (2008)	<b>ISBN-10:</b> 3805585551 <b>ISBN-13:</b> 978-3805585552
Christine Dorresteyn Stevens	Clinical Immunology and Serology: A Laboratory Perspective	F.A. Davis Company;	3 edition (2009)	<b>ISBN-10:</b> 080361814X <b>ISBN-13:</b> 978-0803618145

**Recommended Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
<a href="#">Mary Louise Turgeon</a>	Immunology & Serology in Laboratory Medicine,	Mosby;	5 edition (2013)	<b>ISBN-10:</b> 0323085180 <b>ISBN-13:</b> 978-0323085182
Barbara Detrick	Manual of Molecular and Clinical Laboratory Immunology Hardcover	American Society for Microbiology;	7th Revised edition (2006)	<b>ISBN-10:</b> 155581364X <b>ISBN-13:</b> 978-1555813642
Kate Rittenhouse-Olson, Ernesto DeNardin	Contemporary Clinical Immunology and Serology	Prentice Hall;	(2012)	<b>ISBN-10:</b> 0135104246

				<b>ISBN-13:</b> 978-0135104248
Michael P. Marder Amitava Dasgupta, Amer Wahed	Clinical Chemistry, Immunology and Laboratory Quality Control: A Comprehensive Review for Board Preparation, Certification and Clinical Practice	Elsevier;	1 edition (2014)	<b>ISBN-10:</b> 0124078214  <b>ISBN-13:</b> 978-0124078215

