

Name of course: CLINICAL DIAGNOSTIC TESTS AND INSTRUMENTATION

Number of credit: 4 (3,1)

Prerequisites: Human Anatomy and Physiology

Course Description:

The laboratory plays a crucial role in healthcare because it provides physicians and other health professionals with information to: (1) detect disease or predisposition to disease; (2) confirm or reject a diagnosis; (3) establish prognosis; (4) guide patient management; and (5) monitor efficacy of therapy. Therefore, a fundamental understanding of the principles of laboratory tests and instrumentation used in clinical laboratories is essential. This course will provide students an overview of medical laboratory, principle of a wide range of analytical tests and instrumentations ranging from hematology, immune biochemistry to molecular pathology lab tests.

Course Objectives:

To understand how the knowledge of BME is applied in clinical lab diagnostic test.

Get familiar with clinical laboratory instrumentation as related to Biomedical engineering and future career needs.

Student responsibility:

Student is expected that you will spend at least **8 hours** per week studying this course. This time should be made up of reading, working on exercises and problem, group assignment and attending class lectures and tutorials. University regulations indicate that if students attend less than 80% of scheduled classes they may be refused final assessment. Regular attendance is essential for successful performance and learning in this course, particular in view of the interactive teaching and learning approach adopted.

1. Course Assessment Policy:

- One midterm exam: 20% - 40%
- One comprehensive final exam: 40% - 60%
- In-class quizzes, class participation and learning attitude: 20% - 40%

2. Textbooks and Other Required Materials:

- PowerPoint files
- Class Notes

3. Grade scale: 100

4. Course Outline:

Chapter	Title	Descriptions
1	Clinical laboratory	Overview of medical laboratory Clinical laboratory tests: which, why and what do the results mean?
2	Pre-analysis: sample collection, transport, and	Preanalysis variables Blood collection Urine and other body

	processing	fluids collection Specimen transport, Specimen processing
3	Principle of instrumentation	Spectrophotometry Molecular Luminescence
4	Principle of instrumentation	Flow cytometry Electrophoresis and Densitometry Chromatography Mass Spectrometry
5	Clinical laboratory automation, point-of-care and physician office laboratories	
6	Haematology	Haematology Transfusion
7	Haemostasis and Thrombosis	Coagulation and fibrinolysis Platelet and vWF diseases
8	Clinical chemistry	Renal, liver function Water, electrolytes, acid-based balance
9	Immunology, Immunopathology	
10	Molecular pathology	

Lab outline

	Week	Subject
	1	Overview of medical laboratory
	2	Visit of medical laboratory in hospital
	3	Visit of physician office laboratory
	4	Blood collection, fractionation
	5	Microscopic observation of blood cells
	6	Case study
	7	Report
	8	Exam