

Department of Clinical Laboratory Science

► General Introduction

The department of Clinical Laboratory Science, which merges natural and medical science, is very practical. The objectives are to educate a variety of skills how to investigate disease what are related to train professional pathologists.

► Education objectives

The Clinical Laboratory Science, which integrates natural and medical science, is to improve human health. It is much applied knowledge not only to investigate and diagnose disease, but also to check effects of therapy and prognosis. Particularly, it is aiming to learn principle to be a professional clinical laboratory scientist. Further, the objectives of this department involve training professional knowledge and skills to bring up good pathologists.

► Course Descriptions

Category	Seme-ster	Years	Code	Courses	Credit	Hours		Note
						theory	practice	
Basic courses	1	Freshman	03058	General Biology & Lab	3	2	2	
			03059	General Chemistry & Lab	3	2	2	
			03060	General Physics & Lab	3	2	2	
			02325	Mathematics	3	3		
Basic courses	2	Freshman	01677	Human Anatomy	3	3		
Required courses	2	Freshman	01235	Introduction to Clinical Lab. Science	2	2		
Elective courses	2	Freshman	01233	Medical Terminology	2	2		
Basic courses	1	sophomore	01676	Human Physiology	3	3		
Required courses	1	sophomore	01849	Clinical Microbiology	3	3		
			02240	Clinical Hematology	2	2		
Elective courses	1	sophomore	01234	Parasitology & Lab	2	1	2	
			01236	Organic Chemistry	2	2		
			01237	Basic Clinical Chemistry	3	3		
			02570	Clinical Microbiology Lab I	2		4	
Required courses	2	sophomore	01238	Immunology	3	3		
			01240	Clinical Chemistry & Lab I	3	2	2	
Elective courses	2	sophomore	02571	Hematology Lab I	2		4	
			02572	Clinical Microbiology Lab II	3		6	
			01241	Histology	2	2		
			01658	Biochemistry	3	3		

			02112	Nuclear Medicine	2	2		
			02241	Hemostasis and Thrombosis	2	2		
			02108	Urinalysis Lab	1		2	
Required courses	1	junior	01247	Clinical Physiology	3	3		
Elective courses	1	junior	01245	Immunoserology & Lab	3	2	2	
			01246	Clinical Chemistry & Lab II	3	2	2	
			01251	Mycology& Lab	2	1	2	
			02574	Hematology Lab II	2		4	
			02575	Clinical instrumentation	2	2		
			02573	Clinical Molecular Biology	2	2		
			02242	Histochemistry	3	3		
Elective courses	2	junior	01260	Diagnostic Cytology & Lab	2	1	2	
			01261	Clinical Chemistry & Lab III	3	2	2	
			02576	Clinical Physiology Lab I	2		4	
			01433	Health Statistics	3	3		
			01256	Technology of Extracorporeal circulation	2	2		
			02577	Clinical Molecular Biology Lab	1		2	
			02243	Histochemistry Lab	1		2	
			02246	Immunohematology & lab	2	1	2	
02111	Diagnostic Molecular Genetics	2	2					
Required courses	1	senior	01255	Seminar	2	2		
Elective courses	1	senior	01269	Virology	2	2		
			01650	Pathology	2	2		
			02578	Forensic Medicine	2	2		
			02244	Cell Culture & Lab	2	1	2	
			02245	Public Health	2	2		
			02580	Analysis of Industrial and Biospecimen	2	2		
			01270	General Function	2	2		
			02579	Clinical Physiology Lab II	1		2	
Elective courses	2	senior	01253	Medical Laboratory Management	2	2		
			02581	Hospital Infection Control	2	2		
			02066	Public Health Law	2	2		
			02107	Toxicology	2	2		
			01264	Practice of Clinical Lab. Science I	3		9	
			01265	Practice of Clinical Lab. Science II	3		9	

► Course Descriptions (Special Course for Bachelor Degree)

Category	Seme-ster	Years	Code	Courses	Credit	Hours		Note
						theory	practice	
Cultural Core	1	junior	01992	Living English I	3	3		
Cultural Elective	1	junior	01841	Introduction to Information Science	3	3		
			02247	Psychology of Relationship and Adjustment	3	3		
			02248	Introduction to First Aids	3	3		
Elective courses	1	junior	01238	Immunology	3	3		
			01847	Clinical Biochemistry I	3	3		
			01854	Cell Biology	3	3		
			01859	Quality Control	3	3		
			01433	Health Statistics	3	3		
Cultural Core	2	junior	01836	Christian Thought	3	3		
Cultural Elective	2	junior	01837	Introduction to Biomedical Engineering	3	3		
			01839	Legal Medicine	3	3		
			01840	Basic Oriental Medicine	3	3		
Elective courses	2	junior	01649	Pathology	3	3		
			01848	Clinical Biochemistry II	3	3		
			01849	Clinical Microbiology	3	3		
			01851	Hemostasis and Thrombosis	3	3		
			01862	Introduction to Nuclear Medicine	3	3		
Elective courses	1	senior	01247	Clinical Physiology	3	3		
			01460	Seminar	3	3		
			01853	Virology	3	3		
			01855	Medical Genetics	3	3		
			01857	Medical Biochemistry	3	3		
			01863	Histodiagnosis	3	3		
Elective courses	2	senior	01250	Clinical Molecular Biology	3	3		
			02853	Diagnostic Molecular Genetics	3	3		
			01860	Technology of Extracorporeal circulation	3	3		
			01861	Research	6	6		
			01994	Hospital Infection Control	3	3		

▶ **03058 General Biology & Lab**

General biology and Lab is to educate science of living things such as molecular structure, cell structure and functions, metabolism, and cellular basis of reproduction and inheritance. In addition, it will try to make students understand about life processes by examined primarily at the molecular and cellular level.

▶ **03059 General Chemistry & Lab**

General Chemistry and Lab is to learn to basic concepts of chemistry associated with composition, structure, and properties of matter. Moreover students will be educated what they need to carry out experiments such as making reagents and treating tools.

▶ **03060 General Physics & Lab**

General Physics and Lab is to learn to basic principal and concepts of physics which is related to the study of material and energy, particularly as related to motion, force, heat, and light. Furthermore it will train how to investigate basic examination to understand about processing of Clinical Laboratory Science.

▶ **02325 Mathematics**

Mathematics is to teach Calculus and linear algebra which will be required to learn other majors.

▶ **01677 Human Anatomy**

Human Anatomy is to educate primarily the scientific study of the morphology of the adult human body by comparing human body structures and functions.

▶ **01235 Introduction to Clinical Lab. Science**

Introduction to Clinical Lab. Science is basic to learn Clinical Lab. Science which is related to changing by diseases in the human. Students will train to conduct complex medical tests and to manage clinical labs.

▶ **01233 Medical Terminology**

Medical Terminology is to learn to accurately describing the human body and associated with components, conditions, processes and process in a science-based manner which are related to clinic chemistry, anatomy, physiology and pathology etc.

▶ **01676 Human Physiology**

Human Physiology is to learn to human body function in molecular biologic side from physiology, subset organs and the organ systems to teach their associations.

▶ **01849 Clinical Microbiology**

Clinical Microbiology is the study of microorganisms, which are unicellular or cell-cluster microscopic organisms including bacteria, viruses, algae, fungi, and protozoa. Students will learn to fundamental theory of microbiology, morphological and biochemical characteristics of microorganisms.

▶ **02240 Clinical Hematology**

Clinical Hematology is to learn to study of blood diseases such as hematopoiesis, morphology and function of cellular components of blood.

▶ **01234 Parasitology & Lab**

Parasitology and Lab is to inform about divisions of parasites, relations between hosts and parasites, paths of contamination, characters of figures of parasites. Furthermore it will train how to treat and describe clinic views and how to figure out parasites eggs and characters of lavas.

▶ **01236 Organic Chemistry**

Organic Chemistry is to get knowledge about chemistry of the structure, properties, composition, reactions, and preparation of carbon-based compounds, hydrocarbons, and their derivatives.

▶ **01237 Basic Clinical Chemistry**

This course provides student with the information and principles of new method and instruments in the field of clinical chemistry.

▶ **02570 Clinical Microbiology Lab I**

Clinical Microbiology Lab I is to educate fundamental theory of microbiology, morphological and biochemical characteristics of microorganisms. Furthermore it will train how to separate microbiology which is related to disease in human by samples collection, isolation, stain and culture methods.

▶ **01238 Immunology**

Immunology will educate learns about the structure and function of the immune system, innate and acquired immunity, the bodily distinction of self from nonself, and laboratory techniques involving the interaction of antigens with specific antibodies.

▶ **01240 Clinical Chemistry & Lab I**

Clinical Chemistry and Lab I is generally concerned with analysis of body fluids, including blood. Students will learn to use and measurement of enzyme activities, spectrophotometry, electrophoresis and immunoassay.

▶ **02571 Hematology Lab I**

Hematology Lab I is to learn to a variety of skills and knowledge such as drawing blood, the number of RBC and WBC and how to divide blood cells properly. In addition, students will learn diagnosis skills which are very peculiar and have various characters to find out diseases.

▶ **02572 Clinical Microbiology Lab II**

Clinical Microbiology Lab II is to encourage learners to cultivate microorganism by training biochemical experiment, dying cells and how to treat samples to isolate and identify cells with making them understand about biological and biochemical characters.

▶ **01241 Histology**

Histology is the study of the microscopic anatomy of cells and tissues of plants and animals. Students will learn to differentially identify microscopic structures in histologic stains.

▶ **01658 Biochemistry**

Biochemistry is to educate the chemical processes in living organisms associated with the structure and function of cellular components, such as proteins, carbohydrates, lipids, nucleic acids, and other

biomolecules.

▶ **02112 Nuclear Medicine**

Nuclear Medicine is to explain about how to treating patients using radioactivity an isotope and radioactive immune system and medicine.

▶ **02241 Hemostasis and Thrombosis**

Students will consider solidifying of blood and causes, characters, diseases and process of it inside of artery. Furthermore, they will learn to exam with blood.

▶ **02108 Urinalysis Lab**

Urinalysis Lab is to learn an array of tests performed on urine and medical diagnosis by using urine dipsticks, in which the test results can be read as color changes.

▶ **01247 Clinical Physiology**

Students will learn about skills, divisions, cell and tissue characteristics, organs and internal organ functions and control to investigate and diagnosis disease and find out remedies as it will be helpful for treatments.

▶ **01245 Immunoserology & Lab**

Immunoserology and Lab is to make students understand about immune system which is related to methods of detecting antigen to antibody reactions. Furthermore students will learn to performs a large number of infectious and autoimmune disease tests.

▶ **01246 Clinical Chemistry & Lab II**

Clinical Chemistry and Lab II is to explain the relationship between disease and metabolism that is close to blood and substances such as fat, an electrolyte, a mineral acid, a base. In addition, it will train a various technique of experiments.

▶ **01251 Mycology & Lab**

Mycology and Lab is to educate fundamental theory of mycology, morphological and biochemical characteristics of fungus. Furthermore it will train how to separate fungus which is related to disease in human through education for sample collection and transportation, stain and culture methods.

▶ **02574 Hematology Lab II**

Hematology Lab II is to learn to a variety of skills to count a number of platelet associated with hemostasis, to elucidate a function of platelet and its related disease, and to examine blood coagulation, fibrin lysis and their related disease.

▶ **02575 Clinical instrumentation**

Students will learn to principle of Clinical instrumentation and how to use a photoelectric photometer, a flamephotometer, a atomic absorption spectrophotometer, pH meter, an electron investigation machine.

▶ **02573 Clinical Molecular Biology**

Clinical Molecular Biology is the study of biology at a molecular level such as genetics and biochemistry. It will learn to understanding the interactions between the various systems of a cell, including the interactions between DNA, RNA and protein biosynthesis as well as learning how these interactions are regulated.

▶ **02242 Histochemistry**

Histochemistry is to educate microscopic study of diseased tissue, diagnosis of cancer and other diseases. Furthermore students will learn to histopathological examination of tissue samples.

▶ **01260 Diagnostic Cytology & Lab**

Diagnostic Cytology and Lab will account for characters of structures and arrangements of cells in a human body. Furthermore it will train skills to detection of malignant, premalignant lesion, inflammation and normal condition from cytologic sample as cervical-vaginal smear, urine, sputum etc.

▶ **01261 Clinical Chemistry & Lab III**

Clinical Chemistry and Lab III is to educate association between disease and metabolism which are related to enzyme and hormone. Furthermore it is to train skills to use and measurement of enzyme activities, spectrophotometry, electrophoresis and immunoassay.

▶ **02576 Clinical Physiology Lab I**

Clinical Physiology Lab I is to learn techniques how to investigate by using physiology function tests such as an electrocardiogram, brain waves and function of the lungs investigation and machines.

▶ **01433 Health Statistics**

Health Statistics is to account for the definition of statistic, percentages and variables, a distribution chart, expectation figures. Furthermore, students will study process and identification of disaster and death statistics, alongside, and to learn analysis those statistics.

▶ **01256 Technology of Extracorporeal circulation**

Technology of Extracorporeal circulation is study to diversion of blood flow through a circuit located outside the body but continuous with the bodily circulation

▶ **02577 Clinical Molecular Biology Lab**

Clinical Molecular Biology is the study of biology at a molecular level associated with genetics and biochemistry. Students will train how to examinations such as division and refining DNA, electrophoresis, restricted enzyme and PCR which are related to a gene reassociation.

▶ **02243 Histochemistry Lab**

Histochemistry Lab is to learn a variety of skills to preparation of tissue slides which is related to diagnosis of tissue for sample fixation, microtome cutting and stain.

▶ **02246 Immunohematology & lab**

Immunohematology and lab will teach drawing blood, saving, delivery, medicine manufacturing and managing of elements of blood, isolating and identifying of irregular antibody and crossing tests.

▶ **02111 Diagnostic Molecular Genetics**

Diagnostic Molecular Genetics will explain basic principle and applying of investigations of molecular biology which are based on human genes and to use for finding out tumors, heredity and infection diseases.

▶ **01255 Seminar**

Seminar is to improve presentation and discussions on the current trends of clinical laboratory science.

▶ **01269 Virology**

Virology is to educate basic principle which is related to structure, classification and evolution, their ways to infect and exploit cells for virus reproduction. Furthermore students will learn how to isolate and culture viruses and use in research and therapy.

▶ **01650 Pathology**

Pathology is to educate diagnosis of disease through examination of organs, tissues, cells and body fluids. Students will learn to understand the mechanisms of injury to cells and tissues which is related to injury, necrosis, inflammation, wound healing, and neoplasia.

▶ **02578 Forensic Medicine**

Forensic Medicine concerned with the resolution of legal issues by the application of scientific medical knowledge that interprets or establishes the issues in civil or criminal law cases.

▶ **02244 Cell Culture & Lab**

Cell Culture and Lab is living cells that are maintained in vitro in artificial media of serum and nutrients for the study and growth of certain strains, experiments in controlling diseases, or study of the reaction to certain drugs or agents.

▶ **02245 Public Health**

Public Health is to learn to practice of protecting and improving the health of a community, as by preventive medicine, health education, control of communicable diseases, application of sanitary measures, and monitoring of environmental hazards.

▶ **02580 Analysis of Industrial and Biospecimen**

Analysis of industrial and Biospecimen is to make sure whether the work place is safe or not by conducting examinations which is about finding out heavy metals and a variety of contaminated substances by environmental causes or by jobs in human bodies.

▶ **01270 General Function**

General Function is lecturing which accounts for find out relationship between diseases of biochemical elements from samples such as fluid, chorion intestinal juice, gastric juice, intestinal juices, synovial, semen, a calculus. Furthermore, by investigating those samples, it is possible to get exact results.

▶ **02579 Clinical Physiology Lab II**

Clinical Physiology Lab II is to learn to knowledge, practical applying and ways to use machines considering an electromyogram, inducing electronic potential investigate, brain doppler, blood flowing investigation by

practical tests.

▶ **01253 Medical Laboratory Management**

Medical Laboratory Management is to learn how to manage medical laboratory and recognise functions. After that it will train learners to improve managing skills and environments in laboratory.

▶ **02581 Hospital Infection Control**

Hospital Infection Control is aiming to teach effects of hospital infection not patients and their family, but our society, as this lecture is to encourage pathologist knowing importance of infection and work practically.

▶ **02066 Public Health Law**

Public Health Law will promote effective regulatory, legal and policy solutions to improve public health.

▶ **02107 Toxicology**

Toxicology is the study of the adverse effects of chemicals on living organisms. It is to educate the study of symptoms, mechanisms, treatments and detection of poisoning, especially the poisoning of people.

▶ **01264 / 01265 Practice of Clinical Lab. Science I, II**

Practice of Clinical Lab. Science I, II is to encourage learners to practice with high technology machines by practicing in hospitals to apply knowledge and to improve understanding from this university.

Special Course for Bachelor Degree

▶ **01992 Living English I**

This subject is designed to help students better understand cultures whose first language is English and raise skills of communication in the foreign language by making them memorizing English words, idioms and sentences.

▶ **01841 Introduction to Information Science**

In this rapidly changing society, a variety of computation devices are being used to effectively process and manage a great deal of information. Thus this subject is designed to make students raise skills of information processing using computers and other devices and learn programming languages and tools for making the processing more systematic and effective.

▶ **02247 Psychology of Relationship and Adjustment**

An introductory course to the study of human behavior, scanning briefly the stage of human development and focusing on perception, learning, thinking, motivation, individuality and personality. It also touches at each stage in life ; differential effects of wholesome and inadequate development to personality adjustment.

▶ **02248 Introduction to First Aids**

The goal of first aid is to save life, to prevent an injury or illness from worsening, or to help speed recovery. First aid for cardiac arrest, choking, bleeding, minor wounds, and minor soft tissue injuries are

discussed in the lecture and practice.

▶ **01238 Immunology**

Immunology will educate learns about the structure and function of the immune system, innate and acquired immunity, the bodily distinction of self from nonself, and laboratory techniques involving the interaction of antigens with specific antibodies.

▶ **01847 Clinical Biochemistry I**

Clinical Biochemistry I is generally concerned with analysis of body fluids, including blood. Students will learn to use and measurement of enzyme activities, spectrophotometry, electrophoresis and immunoassay.

▶ **01854 Cell Biology**

Cell Biology is the study of the molecular or chemical interactions of biological phenomena which is related to study of the activities, functions, properties, and structures of cells.

▶ **01859 Quality Control**

Quality Control is to study basic quality control by practical test to improve experiments' accuracy.

▶ **01433 Health Statistics**

Health Statistics is to account for the definition of statistic, percentages and variables, a distribution chart, expectation figures. Furthermore, students will study process and identification of disaster and death statistics, alongside, and to learn analysis those statistics.

▶ **01836 Christian Thought**

This subject is designed to find the way to coexistence between human and God, clarify the true meaning of human existence and help understand major religions of the world. With the overview of key Christian factors, <Truth, Love, Service>, which are also ideas of this university's foundation, the study describes that such ideas could contribute to establishing better ways of thinking and values of the present generation who will lead the future world.

▶ **01837 Introduction to Biomedical Engineering**

The aim is to educate intellection and scientific Biomedical engineering research by overall understanding Biomedical engineering conception and Biomedical engineering area.

▶ **01839 Legal Medicine**

This subject is introduction to forensic science and forensic medicine.

▶ **01840 Basic Oriental Medicine**

The object of this course is to provide students with the foundations in Oriental medical treatment and the concept of oriental medical thought about the treatment of diseases fundamentally handled only by western medicine.

▶ **01649 Pathology**

Pathology is to educate treating of the essential nature of disease, especially of the changes in body

tissues and organs which is related to causes, processes, development, and consequences.

▶ **01848 Clinical Biochemistry II**

Clinical Biochemistry II is to diagnose and cure disease exactly, in addition to decide prognosis properly, association between electrolytes, metabolism of inorganic matters and disease, between enzyme changes and diseases, between kidney and liver functional tests will be lectured to help diagnosis diseases.

▶ **01849 Clinical Microbiology**

Clinical Microbiology is to educate classification of microbiology, biology and biochemical characteristics. Furthermore it will train how to separate microbiology which is related to disease in human body by treating samples, dying cell, biochemical examinations to isolate and identify cells.

▶ **01851 Hemostasis and Thrombosis**

Students will consider solidifying of blood and causes, characters, diseases and process of it inside of artery. Furthermore they will learn to exam with blood.

▶ **01862 Introduction to Nuclear Medicine**

Introduction to Nuclear Medicine is to explain about how to treating patients using radioactivity an isotope and radioactive immune system and medicine. After that, professors will lecture about ways of investigating disease by outside of body methods.

▶ **01247 Clinical Physiology**

Learners will learn about skills, divisions, cell and tissue' s characteristic, organs and internal organs' functions and control to investigate and diagnosis disease and find out remedies as it will be helpful for treatments.

▶ **01460 Seminar**

Seminar is to improve presentation and discussions on the current trends of clinical laboratory science.

▶ **01853 Virology**

Virology is to educate basic principle which is related to structure, classification and evolution, their ways to infect and exploit cells for virus reproduction. Furthermore students will learn how to isolate and culture viruses and use in research and therapy.

▶ **01855 Medical Genetics**

Medical Genetics is considering making students learn to genetics by investigating structures and functions of genes. Moreover, students will get knowledge of diagnosis of diseases associated with special symptom and prescription of diseases of genes. Furthermore students will learn to prevent from occurring genetic disease.

▶ **01857 Medical Biochemistry**

Medical Biochemistry will teach the basic area of biochemistry such as a character and metabolism of carbohydrate, protein, fat. Especially learners will study sorts and characters of diseases when metabolism does not work properly and how to find out causes and metabolism of matters' problem.

▶ **01863 Histodiagnosis**

Histodiagnosis to educate microscopic study of diseased tissue, diagnosis of cancer and other diseases. Furthermore students will learn to histopathological examination of tissue samples.

▶ **01250 Clinical Molecular Biology**

Clinical Molecular Biology is the study of biology at a molecular level such as genetics and biochemistry. It will learn to understanding the interactions between the various systems of a cell, including the interactions between DNA, RNA and protein biosynthesis as well as learning how these interactions are regulated.

▶ **02853 Diagnostic Molecular Genetics**

Diagnostic Molecular Genetics will explain basic principle and applying of investigations of molecular biology which are based on human genes and to use for finding out tumors, heredity and infection diseases.

▶ **01860 Technology of Extracorporeal circulation**

Technology of Extracorporeal circulation is study to diversion of blood flow through a circuit located outside the body but continuous with the bodily circulation

▶ **01861 Research**

Research is to educate discussion with the recently published research papers and techniques, and their approach methods to solve the hypothesis in research.

▶ **01994 Hospital Infection Control**

Hospital Infection Control is aiming to teach effects of hospital infection not patients and their family, but our society, as this lecture is to encourage pathologist knowing importance of infection and work practically.