



Republic of the Philippines  
OFFICE OF THE PRESIDENT  
COMMISSION ON HIGHER EDUCATION

**CHED MEMORANDUM ORDER**

No. 14

Series of 2006

**SUBJECT: POLICIES, STANDARDS AND GUIDELINES FOR  
MEDICAL TECHNOLOGY EDUCATION**

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In accordance with the pertinent provisions of Republic Act (RA) No. 7722, otherwise known as the “Higher Education Act of 1994”, and for the purpose of rationalizing Medical Technology Education in the country with the end in view of keeping at pace with the demands of global competitiveness, the following Policies, Standards and Guidelines for Medical Technology Education are hereby adopted and promulgated by the Commission, thus:

**Article I  
INTRODUCTION**

Section 1. Medical Technology Education/Medical Laboratory Science Education aims to develop a foundation in the fundamentals of medical laboratory science and to make it responsive to the demands for manpower in the paramedical service utilizing the highly innovative technologies. It consists of clinical laboratory testing which plays a crucial role in the detection, diagnosis, prognosis, prevention and treatment of diseases such that medical technologists/medical laboratory scientists must have a combination of education, clinical laboratory internship and specialized training.

**Article II  
AUTHORITY TO OPERATE**

Section 2. All private higher education institutions (PHEIs) intending to offer the Bachelor of Science in Medical Technology/Bachelor in Medical Laboratory Science program must first secure proper authority from the Commission in accordance with the existing rules and regulations. State universities and colleges (SUCs), and local colleges and universities should likewise strictly adhere to the provisions in this policies and standards.

**Article III  
PROGRAM SPECIFICATIONS**

Section 3. Graduates of this program shall be conferred the degree - Bachelor of Science in Medical Technology/Bachelor in Medical Laboratory Science.

#### Section 4. Program Description

Bachelor of Science in Medical Technology/Bachelor in Medical Laboratory Science is a four year program consisting of general education subjects and professional subjects. The second semester of the fourth year level is the internship program of six (6) months in an accredited training laboratory with rotational duties in different sections such as Clinical Chemistry, Hematology, Microbiology, Immunohematology (Blood Banking), Immunology and Serology, Urinalysis and other Body Fluids (Clinical Microscopy), Parasitology, Histopathologic/Cytologic techniques and other emergent technologies.

- a. Objectives: The Medical Technology Education aims to:
  1. develop the knowledge, attitudes and skills in the performance of clinical laboratory procedures needed to help the physician in the proper diagnosis, treatment, prognosis and prevention of diseases;
  2. develop skills in critical and analytical thinking to advance knowledge in Medical Technology/Clinical Laboratory Science and contribute to the challenges of the profession;
  3. develop leadership skills and to promote competence and excellence and;
  4. uphold moral and ethical values in the service of society and in the practice of the profession.
  
- b. Specific professions, careers, occupations or trades that the graduates of this program may go into.
  - Clinical Laboratory Practice: Medical Technologists/Medical Laboratory Scientists in Hospital Laboratories, Clinics and Sanitarium.
  - Education: Medical Technologist/Medical Laboratory Scientists can be employed as faculty in colleges and universities offering Medical Technology/Medical Laboratory Science program to teach professional subjects.
  - Diagnostic Industry/Drug Companies
  - Specialized Fields:
    - Medico-Legal Laboratory
    - Drug Testing Laboratory
    - HIV/AIDS Testing Laboratory
    - Information System
    - Quality Management System
    - Research
  - Other Fields Employing the Knowledge and Skills of Medical Technologists/Medical Laboratory Scientists

**Article IV  
COMPETENCY STANDARDS**

- Section 5. Graduates of Bachelor of Science in Medical Technology/Bachelor in Medical Laboratory Science like any other Health Professions Education must be able to apply analytical and critical thinking in clinical laboratory. As such, graduates abovementioned must:
- a. collect samples, prepare specimen for analysis, determine the acceptability of samples within guidelines, perform the test according to standard methods/techniques;
  - b. demonstrate skills in judgment and decision making to analyze quality control and recognize implausible results and take appropriate actions to maintain accuracy and precision;
  - c. perform accurately data gathering, processing and encoding into the computer system;
  - d. observe the principles of data security or patient confidentiality, maintain ethical standards in working with other laboratory and hospital personnel;
  - e. possess good communication and human relation skills for effective and healthy interaction with health care professionals;
  - f. take responsibility for their own professional development or continuing education especially computer education in the application and management of data and computerized laboratory equipment; and,
  - g. acquire basic management, supervision, administrative skills to contribute to the resolution of conflicts pertaining to laboratory management, implementation of changes in response to technology and laboratory procedures, development of safety management procedures and improvement of standards of practice.

**Article V  
CURRICULUM**

Section 6. Curriculum – Higher Education Institutions offering Medical Technology/ Medical Laboratory Science education may exercise flexibility in their curricular offering. However, medical technology/medical laboratory science subjects as prescribed in the sample program of study shall be implemented.

Section 7. Curriculum Outline

a. *Outline of General Education Subjects*

- Language and Humanities ----- 21 units
- English ----- 6

Filipino -----	6
Humanities (Philosophy, Logic & Literature) -----	9
• Mathematics, Natural Science & Information Technology -----	18 units
Mathematics I -----	3
Basic Statistics-----	3
Natural Sc. ( Nat. Sc. Chem. & Physics)-----	9
Computer I ( Intro. to Info. Tech.) -----	3
• Social Sciences -----	6 units
Psychology -----	3
Socio Anthropology -----	3
• Introduction to Medical Technology with Science, Technology and Society (STS)-----	3
• Anatomy & Physiology -----	5
• Health Economics with TLR-----	3
• Community and Public Health-----	5
• Principles and Strategies of Teaching in Health Education-----	3
• Mandated subjects -----	6 units
Rizal's Life Works & Writings -----	3
Phil. History, Govt. & Constitution -----	3
	70 Units
P.E. -----	8 units
NSTP (2 Sems.) ----	6 units

**Total Units                                 84 Units**

**a. Outline and total units of Core courses ----- 16 Units**

**Core Subjects**

Biological Science -----	3 units
Chemistry-----	13 units
Chem. 2 (Qualitative and Quantitative Chemistry) -----	3 units
Chem. 3 (Organic Chemistry)-----	5 units
Chem. 4 (Biochemistry) -----	5 units

**Professional Courses -----50 units**

Microbiology -----	7 units
Bacteriology -----	5 units
Mycology/Virology -----	2 units
Clinical Chemistry -----	9 units
Clinical Chem. 1 (Routine Clinical	

Chemistry) -----	4
Clinical Chem. 2 (Special Chemistry)-----	3
Clinical Chem. 3 (Endocrinology, Toxicology And Drug Testing)-----	2
Histology -----	2 units
Analysis of Urine and Other Body Fluids (Clinical Microscopy) -----	3 units
Pharmacology -----	2 units
Cytogenetics -----	2 units
Med Tech Laws & Bioethics-----	3 units
Laboratory Management -----	2 units
Parasitology -----	3 units
Immunology & Serology -----	4 units
Immunoematology (Blood Banking)-----	3 units
Hematology 1 -----	4 units
Hematology 2 -----	3 units
Gen. Pathology,Histopathologic / Cytologic Techniques -----	3 units
Research -----	3 units
Research 1 (Introduction to Research)-----	1
Research 2 (Research Paper Writing) -----	2
Seminar (Special Topics)-----	6 units
<b>Total Units – General Education Courses -----</b>	<b>84 units</b>
<b>Core Courses -----</b>	<b>16 units</b>
<b>Professional Courses -----</b>	<b>50 units</b>
<b>Research -----</b>	<b>3 units</b>
<b>Seminar -----</b>	<b>6 units</b>
<b>Internship -----</b>	<b>18 units</b>
<b>Grand Total -----</b>	<b>177 units</b>

**At the end of the BS Medical Technology/Medical Laboratory Science program,  
the total number of exposure/contact hours in the laboratory is as follows:**

Clinical Chemistry	-	392 hrs.
Clinical Microscopy & Parasitology	-	338 hrs.
Microbiology	-	258 hrs.
Hematology	-	228 hrs.
Blood Banking	-	204 hrs.
Histopathologic Technique & Cytology	-	208 hrs.
Immunology & Serology	-	104 hrs.
Research	-	54 hrs.
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Total	=	1,786 hours

**BACHELOR OF SCIENCE IN MEDICAL TECHNOLOGY/  
BACHELOR IN MEDICAL LABORATORY SCIENCE  
MINIMUM CURRICULUM**

**FIRST YEAR**

<b>FIRST SEMESTER</b>					<b>SECOND SEMESTER</b>				
	<b>SUBJECTS</b>	<b>Lec</b>	<b>Lab</b>	<b>Units</b>		<b>SUBJECTS</b>	<b>Lec</b>	<b>Lab</b>	<b>Units</b>
English 1	Communication Skills I	3	0	3	English 2	Communication Skills II	3	0	3
Filipino 1	Sining ng Pakikipagtalastasan	3	0	3	Filipino 2	Panitikang Filipino	3	0	3
Math 1	College Algebra	3	0	3	Chem 2	Analytical Chemistry (Qualitative & Quantitative)	2	1	3
Chem 1	General/Inorganic Chem.	2	1	3	Comp 1	Introduction to Information Technology	3	0	3
Biological Sciences	Biological Science (Botany or Zoology or Human Biology)	2	1	3	Physics	Physics	2	1	3
	Introduction to Med. Tech. With STS	3	0	3	Logic	Logic	3	0	3
P.E. 1				2	P.E. 2				2
NSTP				3	NSTP				3
				<b>Total</b>	<b>23</b>				
						<b>Total</b>			<b>23</b>

**SECOND YEAR**

<b>FIRST SEMESTER</b>					<b>SECOND SEMESTER</b>				
	<b>SUBJECTS</b>	<b>Lec</b>	<b>Lab</b>	<b>Units</b>		<b>SUBJECTS</b>	<b>Lec</b>	<b>Lab</b>	<b>Units</b>
Lit. 1	Philippine Literature in English	3	0	3	PHGC	Phil. History /Govt and Cons.	3	0	3
Chem. 3	Organic Chemistry	3	2	5	Math 2	Basic Statistics	3	0	3
	Socio w/ Anthropology	3	0	3		Health Eco w/ TLR	3	0	3
	Integrated Human Anatomy & Physiology	3	2	5	Health Care	Community & Public Health	2	3	5
	General Psychology	3	0	3	Chem. 4	Biochemistry	3	2	5
P.E. 3		2	0	2	Philo	Philosophy of Human Person	3	0	3
					P.E. 4				2
				<b>Total</b>	<b>21</b>				
						<b>Total</b>			<b>24</b>

**THIRD YEAR**

**FIRST SEMESTER**

**SECOND SEMESTER**

	<b>SUBJECTS</b>	<b>Lec</b>	<b>Lab</b>	<b>Units</b>		<b>SUBJECTS</b>	<b>Lec</b>	<b>Lab</b>	<b>Units</b>
CC 1	Clinical Chemistry 1	3	1	4	CC 2	Clinical Chemistry 2	2	1	3
MICRO 1	Bacteriology	3	2	5	MICRO 2	Mycology & Virology	2	0	2
Histo	Histology	1	1	2	Pharma.	Pharmacology	2	0	2
PARA.	Parasitology	2	1	3	IS	Immunology/ Serology	3	1	4
Cyto	Cytogenetics	2	0	2	Hema. 1	Hematology	2	2	4
					AUBF	Analysis of urine & other body fluids	2	1	3
MTLBE	Med. Tech. Laws & Bioethics	3	0	3	Research 1	Introduction to Research	1	0	1
	Laboratory Management	2	0	2	RIZAL	Life & Works of Rizal	3	0	3
	<b>Total =</b>			<b>21</b>		<b>Total =</b>			<b>24</b>

#### FOURTH YEAR

##### FIRST SEMESTER

##### SECOND SEMESTER

	<b>SUBJECTS</b>	<b>Lec</b>	<b>Lab</b>	<b>Units</b>	<b>SUBJECTS</b>	<b>Lec</b>	<b>Lab</b>	<b>Units</b>
Clin. Chem 3	Endocrinology, Toxicology & Drug Testing	2	0	2	Internship			18
Hema 2	Hematology 2	2	1	3	Seminar II- Special Topics			3
Research 2	Research Paper Writing & Presentation	1	1	2	<b>Total =</b>			<b>21</b>
IH	Immunohematology (Blood Banking)	2	1	3	<b>Instrumentation and Quality Control shall be integrated in all Professional Laboratory Courses.</b>			
Gen. Path.	Histopathologic & Cytologic Techniques	2	1	3				
PSTHE	Principles & Strategies of Teaching in Health Education	3	0	3				
Seminar 1	Special Topics	3	0	3				
	<b>Total =</b>			<b>19</b>				

#### Article VI

#### COURSE SPECIFICATIONS

## Section 11.

Course Name	:	<b>INTRODUCTION TO MEDICAL TECHNOLOGY WITH SCIENCE, TECHNOLOGY AND SOCIETY (STS)</b>
Course Description	:	This course is designed to introduce students to the major disciplines (Hematology, Histopathology, Microbiology, Clinical Chemistry, Blood Banking etc.) in the Medical Technology profession. In addition, students are introduced to the structure of clinical laboratory and pathology services and an examination of the roles and functions of Medical Technologists. Students are acquainted with Professional Practice issues including ethical practices in medical technology and laboratory-based research and an introduction to environmental and occupational health and safety issues affecting laboratory practices. The course includes discussion on the historical foundations of the Profession, its impact to society and its contribution to other medical sciences.
Course Credit	:	3 units lecture only
Contact Hours	:	3 lecture hours per week (no laboratory)
Prerequisite	:	None
Placement	:	First year, First semester
Course Objectives	:	<p>At the end of the course, the students should be able to :</p> <ol style="list-style-type: none"> <li>1. identify the specific duties a Medical Technologist performs in a clinical laboratory as well as other fields</li> <li>2. describe the organization, function and nature of the working environment of Medical Technologists</li> <li>3. realize the role of Medical Technologists in the diagnosis, treatment and management of diseases and the impact of the profession to the society in general</li> <li>4. recognize the importance of the Medical Technology profession in the delivery of health care services</li> <li>5. integrate the scientific ethics and humanistic values when dealing with application of concept of the course in everyday life</li> <li>6. manifest the values of: honesty, critical thinking, empathy and value for Life.</li> </ol>
Course Outline	:	<ol style="list-style-type: none"> <li>1. What is Medical Technology?</li> <li>2. History of the Medical Technology Profession Here and Abroad             <ol style="list-style-type: none"> <li>1.0 Early Beginnings</li> <li>2.0 Modern Era</li> <li>3.0 Future Trends</li> </ol> </li> <li>3. Medical Technology in the Philippines: Problems, Resources and Needs             <ol style="list-style-type: none"> <li>1.0 Demands for health services in the Philippine setting</li> <li>2.0 Demands for laboratory and related services in the Philippines</li> <li>3.0 Profile of laboratories and related facilities (i.e. drug testing centers, blood collection units, etc.) in the Philippines</li> </ol> </li> </ol>



	<p>4.0 Future direction and predicted demands for laboratory services in the Philippine scenario</p> <p>4. Professionals Within the Clinical Laboratory</p> <p>    1.0 Clinical Laboratory Practitioners</p> <p>    2.0 Other Laboratory Practitioners</p> <p>        1.0.0 Phlebotomist</p> <p>        2.0.0 Cytotechnologists and histotechnologists</p> <p>        3.0.0 Others</p> <p>5. Employment Opportunities for Medical Technologists</p> <p>    1.0 Traditional Roles/Career Opportunities</p> <p>    2.0 Nontraditional Roles/Career Opportunities</p> <p>6. Licensure Examinations for Medical Technologists</p> <p>    1.0 Local Examinations</p> <p>    2.0 Foreign Examinations</p> <p>7. Professional Organizations</p> <p>    1.0 PAMET</p> <p>    2.0 PASMETH</p> <p>    3.0 Other related organizations</p> <p>8. Future Opportunities and Challenges of the Medical Technology Profession</p> <p>9. The Clinical Laboratory</p> <p>    1.0 Definition</p> <p>    2.0 Classifications</p> <p>    3.0 Overview of the Different Sections of the Laboratory</p> <p>        1.0.0 Clinical Chemistry</p> <p>        2.0.0 Hematology</p> <p>        3.0.0 Blood Bank and Transfusion services</p> <p>        4.0.0 Microbiology</p> <p>        5.0.0 Clinical Microscopy</p> <p>        6.0.0 Histopathology and Anatomic Pathology</p> <p>        7.0.0 Immunology and Serology</p> <p>        8.0.0 Others</p> <p>10. Laboratory Organization</p> <p>    1.0 The Head Pathologist</p> <p>    2.0 The Chief Medical Technologist</p> <p>    3.0 The Section Head</p> <p>    4.0 The Senior Medical Technologists</p> <p>    5.0 The Junior Medical Technologists</p> <p>    6.0 The Medical Technicians</p> <p>11. Laboratory Services</p> <p>    1.0 Clinical Chemistry services</p> <p>    2.0 Hematology services</p> <p>    3.0 Blood Bank and Transfusion Services</p> <p>    4.0 Microbiology services</p> <p>    5.0 Clinical Microscopy services</p> <p>    6.0 Histopathology and Anatomic Pathology services</p> <p>    7.0 Immunology and Serology services</p> <p>    8.0 Other services</p> <p>12. An Introduction to Laboratory Management</p>
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		<ul style="list-style-type: none"> <li>13. Laboratory Safety</li> <li>14. Professional Ethics of Medical Technologists</li> <li>15. Current Issues in the Medical Technology Profession <ul style="list-style-type: none"> <li>1.0 Medical Engineering <ul style="list-style-type: none"> <li>1.0.0 Clinical Laboratory Instrumentation</li> <li>2.0.0 Laboratory Information System</li> <li>3.0.0 Others</li> </ul> </li> <li>2.0 Genetic Engineering <ul style="list-style-type: none"> <li>1.0.0 Prenatal diagnosis</li> <li>2.0.0 Genetic screening</li> <li>3.0.0 In vitro fertilization</li> <li>4.0.0 Sperm and zygote banking</li> <li>5.0.0 Sex prediction and selection</li> <li>6.0.0 Organ transplantation</li> <li>7.0.0 Cloning</li> <li>8.0.0 Others</li> </ul> </li> <li>3.0 The Allied Health Professions and its Moral Implications <ul style="list-style-type: none"> <li>1.0.0 Contraception</li> <li>2.0.0 Euthanasia</li> <li>3.0.0 Cloning</li> <li>4.0.0 Stem cell research</li> <li>5.0.0 Others</li> </ul> </li> <li>4.0 Occupational Risks in the Medical Technology Profession <ul style="list-style-type: none"> <li>1.0.0 Blood Borne Diseases</li> <li>2.0.0 Needle stick and related injuries</li> <li>3.0.0 Others</li> </ul> </li> <li>5.0 Laboratories and the Environment <ul style="list-style-type: none"> <li>1.0.0 Characteristics of Laboratory Wastes</li> <li>2.0.0 Potential Hazards of Laboratory Wastes</li> <li>3.0.0 Proper Disposal of Laboratory Wastes</li> </ul> </li> <li>1.1 The Medical Technologist and the Diseases of the 21<sup>st</sup> Century <ul style="list-style-type: none"> <li>1.0.0 HIV and AIDS</li> <li>2.0.0 SARS</li> <li>3.0.0 Avian Flu</li> <li>4.0.0 Others</li> </ul> </li> </ul> </li> </ul>
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Textbook	:	1. Mahon, Connie et al., <b>AN INTRODUCTION TO CLINICAL LABORATORY SCIENCE</b> . W.B. Saunders Co., 1998
References	:	<ul style="list-style-type: none"> <li>1. Avelino, Maria D., <b>WORKTEXT IN SCIENCE, TECHNOLOGY AND SOCIETY</b>. 2003</li> <li>2. Rabor, Rodolfo R., <b>MEDICAL TECHNOLOGY LAWS AND ETHICS</b>. UST Printing Press, 2005</li> <li>3. Fallorin, Conrado, <b>MEDICAL TECHNOLOGY PROFESSION IN THE PHILIPPINES</b>. 1999</li> <li>4. Tiglao, Teodora V., <b>A CENTURY OF PUBLIC HEALTH IN THE PHILIPPINES</b>. UP-Manila Information, Publication and Public Affairs Office, 1998</li> </ul>

Course Name	:	<b>COMMUNITY AND PUBLIC HEALTH</b>
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Course Description	:	It deals with the study of the foundations of community health that includes human ecology , demography and epidemiology. It emphasizes the promotion of community, public and environmental health
Course Credit		5 units (2 units lecture, 3 units laboratory)
Contact Hours		Total of 36 lecture hours and 54 hours laboratory per semester
Pre-Requisite		None
Placement		Second year second semester
Course Objectives		<ul style="list-style-type: none"> <li>0. discuss the concepts, principles and theories on community organizations, development and related demography issue</li> <li>0. promote community health</li> <li>0. appreciate the significance of health in the community</li> </ul>
Course Outline		<p>Part One</p> <p>I. Foundations</p> <ul style="list-style-type: none"> <li>1. History of Community Health</li> <li>2. The Community, Its Organization, and Its Health <ul style="list-style-type: none"> <li>2.1. The Health Field Concept</li> <li>2.2 A Model of Community Health <ul style="list-style-type: none"> <li>a. Consumer health, economics, and competition</li> <li>b. The organization of health services and technology</li> </ul> </li> <li>2.3 Concept of Community <ul style="list-style-type: none"> <li>a. Community environmental factors</li> <li>b. Social and cultural factors</li> <li>c. Organizational factors</li> </ul> </li> <li>2.4 Quality of Health</li> <li>2.5 Community Action and Innovation <ul style="list-style-type: none"> <li>a. Planning and implementing community programs</li> <li>b. Centralization Versus Decentralization</li> </ul> </li> </ul> </li> <li>3. Human Ecology, Demography, and Epidemiology <ul style="list-style-type: none"> <li>3.1 Human Ecology <ul style="list-style-type: none"> <li>a. Component of ecology</li> <li>b. Adaptation and conservation</li> <li>c. Climatic and seasonal effects on health</li> </ul> </li> <li>3.2 Demography <ul style="list-style-type: none"> <li>a. Population growth</li> <li>b. Biotic potential</li> <li>c. Government policy</li> <li>d. Food limits</li> <li>e. Fuel limits</li> </ul> </li> <li>3.3 Epidemiology <ul style="list-style-type: none"> <li>a. Epidemiological comparisons</li> <li>b. Host, agent and environment</li> <li>c. Epidemics and pandemics</li> </ul> </li> <li>3. 4 Agriculture, Technology and Health</li> <li>3.5 Life Span Versus Life Expectancy <ul style="list-style-type: none"> <li>a. Risk factors determining life expectancy</li> </ul> </li> <li>3.6 Community Applications</li> <li>3.7 Measuring Progress</li> </ul> </li> <li>4. Human Behavior and Community Health Education <ul style="list-style-type: none"> <li>4.1 Science and Application</li> </ul> </li> </ul>

- 4.2 Health Behavior and Life-Style
- 4.3 Community Health Education
  - a. Principles of Health education
  - b. Diagnostic stage of educational planning for community health

Part Two

II. Promoting Community Health

- 1. Communicable Disease Control
- 2. Nature of Communicable Disease
  - 2.1 Infection and disinfection
  - 2.2 Contamination and decontamination
- 3. Incidence of Communicable Diseases
- 4. Classification of Infectious Diseases
  - 4.1 Respiratory diseases
  - 4.2 Alvine discharge diseases
  - 4.3 Vector-borne diseases
  - 4.4 Open lesion diseases
- 5. Eradication of Smallpox
  - 5.1 The strategy
  - 5.2 The global victory
- 6. Sexually Transmitted Diseases
  - 6.1 Prevention-promoting measures
- 7. The Microbiology of Causative Agents
  - 7.1 Infecting organisms
  - 7.2 Reservoirs of infection
- 8. The Epidemiology of Infection
  - 8.1 Direct transmission
  - 8.2 Indirect transmission
  - 8.3 Vehicles of transfer
  - 8.4 Entry of organisms into new host
  - 8.5 Defenses of the host
  - 8.6 Agent-host-environment
- 9. Epidemiological Principles of Disease Control
  - 9.1 Legal Authority
  - 9.2 Segregation of reservoir
  - 9.3 Reservoir eradication
  - 9.4 Environmental measures
  - 9.5 Increasing resistance of new host
- 10. Disease Control Resources

Part Three

III. Environmental Health Protection

- 1. Community Water and Waste Management
- 2. Social Importance of water to the Community
- 3. Epidemiology of Infectious and Toxic Agents in Water
  - 3.1 Distribution and trends
  - 3.2 Mapping the future
  - 3.3 Water consumption
  - 3.4 Etiology and effects of toxic agents
  - 3.5 Waterborne infectious diseases
- 4. Sources of Water

- 4.1 Groundwater supplies
- 4.2 Surface water supplies
- 4.3 Addition of fluorides
- 5. Testing of water
  - 5.1 The coliform test
  - 5.2 The chlorine test
- 6. Regulation of water supplies
  - 6.1 Safe drinking water legislation
- 7. Drinking Water in Development Countries
- 8. Community Wastes
  - 8.1 Nitrogen cycle
- 9. Sewage Disposal
  - 9.1 Sewage treatment
  - 9.2 Lagoon treatment
  - 9.3 Financing sewage treatment
  - 9.4 Regulation of sewage disposal
  - 9.5 Septic tanks
  - 9.6 Pit latrines
  - 9.7 Cities without sewer systems
  - 9.8 Stream Pollution
    - a. Criteria of stream pollution
    - b. Control of stream pollution
  - 9.9 Solid wastes
    - a. Collection
    - b. Disposal
    - c. Reducing litter
  - 9.10 Residential, Occupational, and Recreational Environments
    - 9.10.1 Housing
      - a. Epidemiology of housing and health
      - b. Criteria of substandard housing
      - c. Principles of healthful housing
      - d. Building regulations and codes
      - e. Community responsibility
    - 9.10.2 Occupational Health
      - a. Epidemiology of occupational illness
      - b. Responsibility for occupational health
      - c. Hazard prevention and occupational health promotion
    - 9.10.3 Recreational and other Environments
      - a. Smoking in Public places
      - b. Swimming area
    - 9.10.4 Community Food Protection
    - 9.10.5 Epidemiology of Food-Borne Disease
      - a. Modes of transmission
      - b. Control of milk and milk product
      - c. Meat products
    - 9.10.6 Eating Establishment Regulations
      - a. Control measures
      - b. Inspections

		<ul style="list-style-type: none"> <li>c. Appraisal of Food control measures</li> <li>9.10.7 Food Protection Objectives <ul style="list-style-type: none"> <li>a. Outcome</li> <li>b. Process</li> </ul> </li> <li>9.10.8 Vector and Zoonoses control <ul style="list-style-type: none"> <li>a. Epidemiology of vectors</li> <li>b. Rodent and zoonoses control</li> </ul> </li> <li>9.10.9 Control of Air, Radiation and Noise Pollution <ul style="list-style-type: none"> <li>9.10.9.1 Air Pollution <ul style="list-style-type: none"> <li>a. Epidemiology of air pollution</li> <li>b. Air pollution control</li> <li>c. Air quality objectives</li> </ul> </li> <li>9.10.9.2 Radiation Pollution <ul style="list-style-type: none"> <li>1. Epidemiology of exposure to radioactivity</li> <li>2. Radiological health objectives</li> <li>3. Pressurized Gases <ul style="list-style-type: none"> <li>a. Aerosol spray</li> <li>b. Other pressurized gases</li> </ul> </li> <li>4. Noised Pollution <ul style="list-style-type: none"> <li>a. Epidemiology of noise</li> <li>b. Noise control objectives</li> </ul> </li> <li>5. Environmental Protection Agencies <ul style="list-style-type: none"> <li>a.State of provincial agencies</li> </ul> </li> </ul> </li> </ul> </li> </ul> <p>Part Four IV. Health Resources and Services 1. National and International Health Services</p>
Textbook	:	0. Guy, Howard, <b>Healthy Villages: A GUIDE FOR COMMUNITIES AND COMMUNITY HEALTH WORKERS</b> , 2000
References	:	<ul style="list-style-type: none"> <li>1. Arcaine, Arnold, <b>A LEARNING GUIDE FOR ALLIED HEALTH STUDENTS TOWARDS COMMUNITY HEALTH DEVELOPMENT</b>, 1999</li> <li>2. Kahssay, Haile, <b>COMMUNITY INVOLVEMENT IN HEALTH DEVELOPMENT, A REVIEW OF THE CONCEPTS AND PRACTICE</b>, 1999</li> </ul>
Course Name	:	<b>CYTOGENETICS</b>
Course Description	:	This course deals with the study of the concepts related to the study of heredity and inheritance: genetic phenomena, sex determinations, defects in relation to human inheritance. Nucleic acids( DNA and RNA) and their application to medical science are given emphasis.
Course Credit	:	2 units lecture only
Contact Hours	:	2 lecture hours per week (no laboratory) Total of 36 lecture hours per semester
Prerequisite	:	Anatomy and Physiology, Biochemistry
Placement	:	Third year, Second semester

Course Objectives	:	At the end of the course, the students should be able to : 1. identify the chemical and physical nature of the genetic materials present in parents that are transmitted to the offspring. 2. realize that gene is the basic unit of heredity that shares the properties of function, recombination and mutation 3. think critically and discuss the effect of changes in the environment and how these changes affect various living system. 4. apply principles and concepts of genetics in Medical Technology practice 5. integrate the scientific ethics and humanistic values when dealing with application of genetics in everyday life 6. manifest the values of : honesty, critical thinking, empathy and value for Life.
Course Outline	:	1. Origin and Importance of Genetics 2. Introduction to Cytology 2.1 Chromosomes 2.2 Review of mitosis 2.3 Meiosis 3. Inheritance 3.1 Basic Laws 3.2 Definition of Terms 3.3 Test cross 4. Genetic Material 4.1 Deoxyribonucleic acid (DNA) 4.2 Ribonucleic acid (RNA) 5. Chromosomes 6. Replication 7. Transcription 8. Translation 9. Variation and Mutation 9.1 Genetic Disorders 9.2 Genetic Engineering/Recombinant 9.3 DNA technology 9.4 Gene Therapy
Textbook	:	1. Hart, Daniel and Elizabeth W.Jones, <b>ESSENTIAL GENETICS 2<sup>nd</sup> ed.</b> Jones and Barth, Massachussets , 1999
Reference	:	1. Russel, Peter J. <b>GENETICS , 4<sup>th</sup> ed.</b> Harper Collins Publisher, 1996
Course Name	:	<b>BASIC PHARMACOLOGY</b>
Course Description	:	This course deals with the study of drugs: history and sources; physical and chemical properties; biochemical and physiologic effects; mechanism of action; distribution; metabolism; excretions, pharmacokinetics; indications; side and adverse reactions and drug interactions. Emphasis is on therapeutics and drugs of abuse.
Course Unit	:	2 units lecture only (no laboratory)

Contact Hours	:	2 hours lecture per week Total of 36 lecture hours per semester
Prerequisite	:	Biochemistry; Anatomy and Physiology
Placement	:	Third year, Second semester
Course Objectives	:	At the end of the course, the student should be able to : 1. acquire knowledge pertaining to the fate of drugs in the body from the point of entry up to the excretion process. 2. explain basic concepts of pharmacokinetics, pharmacodynamics 3. present a basic rationale in understanding drug therapy 4. manifest the following values: integrity critical thinking, honesty, empathy and value for life.
Course Outline	:	1.1 General Principles of Pharmacology 1.1 Introduction 1.2 Definition of Terms 1.3 Nature of Drugs 1.4 Physical and Chemical Properties 2.0 Principles of Pharmacodynamics 2.1 Mechanism of Drug Action 2.2 Pharmacologic Effects 2.3 Drug Receptors 3.0 Principles of Pharmacokinetics 1.0 Dynamics of Drug Absorption, Distribution and Elimination 3.2 Bioavailability 3.3 Routes of Administration 3.4 Drug distribution 3.5 Elimination and Drug Excretion 4.0 Biotransformation 5 0 Principles of Therapeutics 5.1 Enhancement of drug effects 5.2 Adverse drug reaction 5.3 Drug toxicity 6.0 Introduction to Toxicology and Treatment to Poison 7.0 Drug Safety 8.0 Chemotherapeutic Agents
Textbook	:	1. Katzung, Bertram (ed) <b>BASIC AND CLINICAL PHARMACOLOGY, 4<sup>th</sup> ed</b> , Prentice Hall
Reference	:	1. Hardman, Joel, Lee E. Limbird, (ed), <b>GOODMAN AND GILMAN'S THE PHARMACOLOGIC BASIS OF THERAPEUTICS , 9<sup>th</sup> ed.</b> Mc. Graw Hill , 1996
Course Name	:	<b>HISTOLOGY</b>
Course Description	:	This course deals with the study of the fundamentals of cells, tissues and organs with emphasis on microscopic structure, characteristics and



		functions.
Credit Units	:	2 units (1 unit lecture and 1 unit laboratory)
Contact Hours	:	1 hours lecture and 3 hours laboratory per week Total of 18 hours lecture and 54 hours laboratory per semester
Prerequisite	:	Human Anatomy and Human Physiology
Placement	:	Third year, First semester
Course Objectives	:	At the end of the course, the student should be able to: 3. explain the fundamentals of cells and tissues. 4. explain the different characteristics and functions of the microscopic structure of human cells, tissues and organs 5. recognize the morphologic/ microscopic features of different groups of cells . 6. explain the cellular functions of cellular organelles and their functional interrelationship. 7. manifest the following values: integrity, critical thinking, honesty, creativity, and concern for others.
Course Outline	:	<ol style="list-style-type: none"> <li>1. Introduction/Orientation <ol style="list-style-type: none"> <li>1.1 Definition of Terms</li> <li>1.2 Significance of Histology to the Med. Tech. profession</li> </ol> </li> <li>2. The Cell <ol style="list-style-type: none"> <li>2.1 Function and Structure</li> <li>2.2 Cell physiology</li> <li>2.3 Cell division</li> </ol> </li> <li>3. Epithelial cells <ol style="list-style-type: none"> <li>3.1 Forms and Characteristics</li> <li>3.2 Nomenclature and Specialization</li> <li>3.3 General biology</li> </ol> </li> <li>4. Connective Tissue <ol style="list-style-type: none"> <li>4.1 Composition</li> <li>4.2 Types</li> <li>4.3 Histophysiology</li> </ol> </li> <li>5. Adipose</li> <li>6. Cartilage</li> <li>7. Bone <ol style="list-style-type: none"> <li>7.1 Cells</li> <li>7.2 Types</li> <li>7.3 Histophysiology</li> </ol> </li> <li>8. Nervous tissue <ol style="list-style-type: none"> <li>8.1 CNS</li> <li>8.2 Cells</li> <li>8.3 Histophysiology</li> </ol> </li> <li>9. Muscular Tissue <ol style="list-style-type: none"> <li>9.1 Skeletal</li> <li>9.2 Smooth</li> <li>9.3 Cardiac</li> </ol> </li> <li>10. Circulatory Systems <ol style="list-style-type: none"> <li>10.1 Blood vessels: Morphology; Characteristics</li> </ol> </li> </ol>

		<ul style="list-style-type: none"> <li>10.2 Formed elements of blood</li> <li>11. Integumentary System <ul style="list-style-type: none"> <li>11.1 Skin : Structure; Functions</li> </ul> </li> <li>12. Lymphatic system <ul style="list-style-type: none"> <li>12.1 Structure and cells</li> </ul> </li> <li>13. Respiratory System <ul style="list-style-type: none"> <li>13.1 Upper</li> <li>13.2 Lower</li> </ul> </li> <li>14. Digestive System</li> <li>15. Excretory System</li> <li>16. Male Reproductive System</li> <li>17. Female Reproductive System</li> </ul>
References	:	<ul style="list-style-type: none"> <li>1. Di Fiore, <b>ATLAS IN HISTOLOGY</b></li> <li>2. Johnson, Kurt E., <b>HISTOLOGY AND CELL BIOLOGY, 2<sup>ND</sup> ED.</b>, NMS, 1991</li> <li>3. Cabral, <b>HISTOLOGY</b>. In 2 volumes of current editions</li> </ul>
Laboratory Exercises: Microscopic Examination of	:	<ul style="list-style-type: none"> <li>1. Epithelium <ul style="list-style-type: none"> <li>Simple</li> <li>Stratified</li> </ul> </li> <li>2. Connective Tissue</li> <li>3. Adipose tissue cells</li> <li>4. Cartilage</li> <li>5. Bone cells</li> <li>8. Nerve cells</li> <li>9. Muscle cells <ul style="list-style-type: none"> <li>7.1 Smooth</li> <li>7.2 Cardiac</li> <li>7.3 Skeletal</li> </ul> </li> <li>8. Circulatory System <ul style="list-style-type: none"> <li>8.1 Blood cells</li> <li>8.2 Arteries</li> <li>8.3 Veins</li> </ul> </li> <li>1. Skin</li> <li>2. Lymphatic System <ul style="list-style-type: none"> <li>1.0 Lymphocytes</li> <li>2.0 Peyer's patches</li> <li>3.0 Thymus</li> <li>4.0 Spleen</li> <li>5.0 Tonsils</li> </ul> </li> <li>3. Respiratory System <ul style="list-style-type: none"> <li>1.0 Upper Respiratory Tract</li> <li>2.0 Lower Respiratory Tract</li> </ul> </li> <li>12. Digestive Tract <ul style="list-style-type: none"> <li>12.1 Stomach</li> <li>12.2 Small Intestine</li> <li>12.3 Liver</li> </ul> </li> <li>13. Excretory System <ul style="list-style-type: none"> <li>13.1 Kidney</li> </ul> </li> <li>1. Reproductive System</li> </ul>

		14.1 Male : Testis 14.2 Female: Ovary, Uterus
Course Name	:	<b>GENERAL PATHOLOGY, HISTOPATHOLOGIC AND CYTOLOGIC TECHNIQUES</b>
Course Description	:	The course is divided into three. The first part deals with the study of basic disease processes, correlating the etiology of disease with the course of development of anatomic and clinical changes brought about by the disease. The second part is a study of the histologic techniques essential in the production of histologic slides for the diagnosis of diseases including special staining procedures. The third part is the study and identification of cells in the diagnosis of diseases using cytologic techniques.
Course Credit	:	3 units (2 units lecture and one unit laboratory)
Contact Hours	:	2 hours lecture and 3 hours laboratory Total of 36 hours lecture and 54 hours laboratory per semester
Prerequisite	:	Histology
Placement	:	Fourth Year, First semester
Course Objectives	:	At the end of the course, the student should be able to : 1. discuss the basic concept of disease formation. 2. explain the physiologic changes brought about by the various diseases. 3. discuss step-by-step procedure in tissue preparation. 4. recognize the concepts of quality assurance program in Histopathology laboratory. 5. acquire the necessary skills required in the preparation of slides for microscopic examination of tissues from fresh state to mounted state. 6. apply the knowledge acquired about diseases in daily living. 7. manifest the following values: honesty, critical thinking, empathy and value for life .
Course Outline	:	1. Review: Fundamentals of Normal Histology 2.0 Normal cell structure 3.0 Cell in tissues, types and sub-types of tissues and their location 4.0 Cellular adaptation: Terminologies (atrophy, hypertrophy, hyperplasia, dysplasia, hypoplasia, agenesis, etc.) 5. Introduction to Pathology 6.0 Definition of terms (pathology, pathogenesis, pathologist, medical technologist, autopsy, biopsy etc.) 7.0 Divisions of Pathology <ul style="list-style-type: none"> <li>• Gross and Microscopic Pathology</li> <li>• Anatomic Pathology</li> <li>• Clinical Pathology</li> </ul> 8. Nature of Disease 9.0 Definition of Terms (disease, health etiology etc.) 10.0 Describe manifestation of disease

		<ul style="list-style-type: none"> <li>• Signs</li> <li>• Symptoms</li> <li>• Course of Disease</li> </ul> <p>11.0 Factors predisposing an individual to disease</p> <p>12. Etiology of Disease</p> <p>13.0 Classification of diseases according to the basic etiologic mechanisms, their features and laboratory findings</p> <ul style="list-style-type: none"> <li>• Hereditary disorders and congenital anomalies</li> <li>• Circulatory disorders</li> <li>• Metabolic disorders and disturbance</li> <li>• Deficiency diseases</li> <li>• Disorders of the immune system</li> <li>• Neoplasms</li> <li>• Disorders caused by air pollution, chemical and physical injuries</li> </ul> <p>4.4.1 Extrinsic</p> <p>4.4.2 Intrinsic</p> <p>5. Routine Histotechniques</p> <p>5.1 Collection and handling of histological specimens</p> <p>5.2 Steps in tissue processing</p> <ul style="list-style-type: none"> <li>• Fixation, decalcification, dehydration and clearing</li> <li>• Impregnation and embedding</li> <li>• Trimming and cutting of tissue sections</li> <li>• Mounting of tissue section</li> <li>• Difficulties encountered during tissue processing and the corresponding remedies</li> </ul> <p>6. Special Processing Techniques</p> <p>6.1 Rapid processing techniques</p> <p>6.2 Preparation of bone marrow section</p> <p>6.3 Enzyme Histo or Cytochemistry</p> <p>7. Exfoliative Cytology</p> <ul style="list-style-type: none"> <li>• Definition of Terms</li> <li>• Collection of specimens</li> <li>• Preparation, fixation and staining of smears for exfoliative cytology</li> <li>• Vaginal cytology</li> </ul>
Textbook References	:	<p>9. Raphael, Stanley S. <b>LYNCH MEDICAL LABORATORY TECHNOLOGY</b>, latest edition</p> <p>10. Bruce-Gregorios, Jocelyn H. <b>HISTOPATHOLOGIC TECHNIQUES</b></p> <p>11. Smith, Alice Lorraine. <b>MICROBIOLOGY AND PATHOLOGY</b></p>
Laboratory Exercises	:	<p>0. <b>CYTOTECHNIQUE</b> Collection , Handling and Preservation of Specimen Smear Preparation Fixation Staining Mounting Reading and Interpretation</p> <p>1. <b>HISTOTECHNIQUES</b> Specimen Collection and Handling</p>

		<p>Fresh Tissue Examination: Teasing, Squash and Smear Preparation</p> <p>Processing of Tissues</p> <p>    Fixation/Decalcification</p> <p>    Dehydration</p> <p>    Clearing</p> <p>    Infiltration</p> <p>    Embedding</p> <p>    Trimming</p> <p>    Section Cutting</p> <p>    Mounting</p> <p>3. Special Procedures</p> <p>    3.1 Special Stains</p> <p>    3.2 Immunohistologic stains</p>
Course Title	:	<b>HEMATOLOGY 1</b>
Course Description	:	The course deals with the study of fundamentals of blood as a tissue. It includes blood cell disorders, special hematology evaluation, quality control and quality assurance.
Course Credit	:	4 units (3 units lecture and 1 unit laboratory)
Contact Hours	:	3 hours lecture and 3 hours laboratory per week Total of 54 hours lecture and 54 hours laboratory per semester
Prerequisite	:	Anatomy and Physiology
Placement		Third year, Second Semester
Course Objectives		<p>At the end of the course, the student should able to :</p> <ol style="list-style-type: none"> <li>1. explain the facts and principles of hematological determinations.</li> <li>2. identify microscopically the normal and abnormal cells.</li> <li>3. assume responsibility in handling blood specimens, including examination and interpretation of test results.</li> <li>4. appreciate the importance of hematological tests to pathologic conditions.</li> <li>5. perform hematological tests with precision, accuracy and reliability.</li> <li>6. manifest the following values: integrity, honesty, critical thinking, empathy and value for life.</li> </ol>
Course Outline	:	<ol style="list-style-type: none"> <li>1. Introduction <ol style="list-style-type: none"> <li>1.1 Definition of Terms</li> <li>2.0 Characteristics of Blood</li> <li>3.0 Functions of Blood</li> <li>4.0 Composition</li> </ol> </li> <li>5. Basic Hematological Methods of Examination <ol style="list-style-type: none"> <li>2.1 Collection, handling and preservation of blood for hematologic study</li> <li>2.2 Evacuated Tubes: Anticoagulants used in blood preservation.</li> </ol> </li> <li>6. Morphology of Blood Cells <ol style="list-style-type: none"> <li>1.0 Hematopoiesis</li> <li>2.0 Normal Morphology</li> <li>3.0 Abnormal Morphology/Variations</li> </ol> </li> </ol>

		<ol style="list-style-type: none"> <li>4. Routine Hematology Examinations <ol style="list-style-type: none"> <li>4.1 Hemoglobin</li> <li>4.2 Hematocrit</li> <li>4.3 RBC count</li> <li>4.4 Erythrocyte Sedimentation Rate</li> <li>4.5 WBC count</li> <li>4.6 WBC Differential Count</li> <li>4.7. Platelet count</li> </ol> </li> <li>5. Principle in Blood Cell Counting <ol style="list-style-type: none"> <li>5.1 Manual</li> <li>5.2 Automated</li> <li>5.3 New Terminologies</li> </ol> </li> <li>6. Blood Indices and Blood Constant <ol style="list-style-type: none"> <li>6.1 Computation</li> <li>6.2 Interpretation</li> </ol> </li> <li>7. Blood Smear, Routine and Special Stains <ol style="list-style-type: none"> <li>7.1 Cytochemical Stains</li> </ol> </li> <li>8. Erythrocyte, Leukocyte, and Platelet Pathology; and Diagnostic Laboratory Examinations <ol style="list-style-type: none"> <li>8.1 Erythrocyte Disorders</li> <li>8.2 Leukocyte Disorder</li> <li>8.3 Platelet Disorders</li> </ol> </li> </ol>
Textbook  References	:	<ol style="list-style-type: none"> <li>1. Henry, John Bernard. <b>CLINICAL DIAGNOSIS AND MANAGEMENT 20<sup>TH</sup> ED.</b> W.B. Saunders, Philadelphia c. 2001</li> <li>2. Brown, Barbara. <b>HEMATOLOGY 16<sup>TH</sup> ED.</b> Lea &amp; Febiger, Philadelphia. 1993</li> <li>3. Turgeon, Mary Louise. <b>CLINICAL HEMATOLOGY” 2<sup>ND</sup> ED.</b> Little Brown &amp; Co. Boston. 1993.</li> <li>4. Steininger, Cheryl et al. <b>CLINICAL HEMATOLOGY: PRINCIPLES, PROCEDURES, CORRELATIONS</b> J.B. Lippincott, Philadelphia, USA</li> <li>4. Lewis, Mitchell Bain Barbara, Bates, Imelda, <b>DACIE &amp; LEWIS PRACTICAL HAEMATOLOGY.</b> 2001, 9<sup>th</sup> edition</li> </ol>
Laboratory Exercises	:	<ol style="list-style-type: none"> <li>Blood Collection Techniques <ol style="list-style-type: none"> <li>1.1 Venipuncture</li> <li>1.2 Capillary Puncture</li> </ol> </li> <li>2.0 The Hemocytometer</li> <li>3.0 Hemoglobin Determination</li> <li>4.0 Hematocrit Detrmination</li> <li>5.0 Cell Count <ol style="list-style-type: none"> <li>4.1 Blood Dilution</li> <li>4.2 Reticulocyte Count</li> <li>4.3 Red Blood Cell Count</li> <li>4.4 White Blood Cell Count</li> <li>4.5 Eosinophil Count</li> <li>4.6 Basophil Count</li> <li>4.7 Platelet Count</li> </ol> </li> <li>6.0 Blood Smear Preparation</li> <li>7.0 Identification of blood cells seen in the peripheral smear</li> <li>1.0 Erythrocyte Sedimentation Rate</li> </ol>

		<p>9.0 Osmotic Fragility Test</p> <p>10.0 Erythrocyte Indices</p> <p>11.0 Special Hematology Tests</p> <ul style="list-style-type: none"> <li>. L.E. Slide Preparation</li> <li>. Bone Marrow Smear Study</li> <li>. Alkali Denaturation Test</li> <li>. Test for Paroxysmal Nocturnal Hemoglobinuria</li> <li>. Test for Paroxysmal Cold Hemoglobinuria</li> </ul>
Course Name		<b>HEMATOLOGY 2-CLINICAL HEMATOLOGY</b>
Course Description		The course deals with the study of fundamentals of the pathophysiology and the mechanism of coagulation and hemostasis, with emphasis on laboratory diagnostic procedures
Course Credit		3 units
Contact Hours	:	2 hours lecture and 3 hours laboratory per week Total of 36 lecture hours and 54 hours laboratory per semester
Prerequisite	:	Hematology 1
Placement		Fourth Year, First Semester
Course Objectives		<p>At the end of the course, the student should be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the principles of Hemostasis, Coagulation and Fibrinolysis</li> <li>2. Appreciate the importance of laboratory assays for the diagnosis of Hemostatic disorders</li> <li>3. Perform the laboratory assays on hemostatis/coagulation with precision, accuracy and reliability</li> <li>4. Manifest the following values: integrity, honesty, critical thinking, empathy and value for life</li> </ol>
Course Outline		<ol style="list-style-type: none"> <li>1. Megakaryopoiesis Stages of Development Platelet Structure Platelet Functions</li> <li>2. Basic Principles of Hemostasis</li> <li>3. Mechanism and Laboratory Evaluation of Primary Hemostasis</li> <li>4. Mechanism and Laboratory Evaluation of Secondary Hemostasis</li> <li>5. Mechanism of Fibrinolysis</li> <li>6. Hemostatic Disorders Qualitative and Quantitative Platelet Disorders Disorders of Primary Hemostatis Disorders of Secondary Hemostasis Disorders of Fibrinolysis Disorders due to pathologic and pharmacologic inhibitors of coagulation Disorders Leading to Thrombosis</li> <li>7. Specimen Collection and Processing for Hemostasis Testing</li> <li>8. Laboratory Evaluation of Platelets</li> <li>9. Routine Laboratory Evaluation of Coagulation</li> <li>10. Special Laboratory Evaluation of Fibrinolysis</li> <li>11. Laboratory Monitoring of Anticoagulant Therapy</li> <li>12. Quality Control and Quality Assurance in Hemostasis, Coagulation</li> </ol>

		and Fibrinolysis
Textbook References		Same references for Hema I
Lab. Exercises		<ol style="list-style-type: none"> <li>1. Bleeding time</li> <li>2. Clotting/coagulation time</li> <li>3. Capillary Fragility Test</li> <li>4. Clot Retraction Time</li> <li>5. Prothrombin Time Computation of INR)</li> <li>6. Activated Partial Thromboplastin Time</li> <li>7. Fibrin Stabilizing Factor</li> <li>8. Fibrinolysis</li> <li>9. Fibrinogen Test</li> </ol>
Course Name	:	<b>ANALYSIS OF URINE AND OTHER BODY FLUIDS (CLINICAL MICROSCOPY)</b>
Course Description	:	The course deals with the study of the gross, chemical, and microscopic analyses of the different body fluids other than blood. It includes the importance of these body fluids to body processes, the principles of the analytical procedures, interpretation of results and clinical significance of the physiologically important substances found in these body fluids.
Course Credit	:	3 units ( 2 units lecture, 1 unit laboratory)
Contact Hours	:	2 hours lecture and 3 hours laboratory per week Total of 36 lecture hours and 54 laboratory hours per semester
Prerequisite	:	Anatomy and Physiology Biochemistry
Placement	:	Third year, Second semester
Course Objectives	:	<p>At the end of the course, the student should be able to :</p> <ol style="list-style-type: none"> <li>1. understand the principles and mechanism involved in the formation, composition and general characteristics of all body fluids (except blood) and secretions.</li> <li>2. perform skillfully the routine and special laboratory methods employed in the proper handling, examination and disposal of different body fluids and secretions.</li> <li>3. recognize the importance of accurate and precise laboratory findings as aid to the diagnosis and treatment of diseases.</li> <li>4. manifest the following values: Integrity Honesty, Critical Thinking, Empathy and Value for Life .</li> </ol>
Course Outline	:	<ol style="list-style-type: none"> <li>1. The Examination of Urine</li> <li>2.0 Formation</li> <li>3.0 Patient Preparation</li> <li>4.0 Specimen Collection, Transport and Handling</li> <li>5.0 Laboratory Examinations</li> <li>6.0 Reference Values and Clinical Significance</li> <li>7.0 Pregnancy Tests</li> </ol>



		<p>8. The Examination of Feces</p> <p>9.0 Formation</p> <p>10.0 Patient Preparation</p> <p>11.0 Specimen Collection, Transport and Handling</p> <p>12.0 Laboratory Examinations</p> <p>13.0 Reference Values and Clinical Significance</p> <p>14. The Examination of Cerebrospinal Fluid</p> <p>15.0 Formation</p> <p>16.0 Patient Preparation</p> <p>17.0 Specimen Collection, Transport and Handling</p> <p>18.0 Laboratory Examinations</p> <p>19.0 Reference Values and Clinical Significance</p> <p>20. The Examination of Transudates and Exudates</p> <p>21.0 Formation</p> <p>22.0 Patient Preparation</p> <p>23.0 Specimen Collection, Transport and Handling</p> <p>24.0 Laboratory Examinations</p> <p>25.0 Reference Values and Clinical Significance</p> <p>26. The Examination of Seminal Fluid</p> <p>27.0 Formation</p> <p>28.0 Patient Preparation</p> <p>29.0 Specimen Collection, Transport and Handling</p> <p>30.0 Laboratory Examinations</p> <p>31.0 Reference Values and Clinical Significance</p> <p>32. The Examination of Sputum</p> <p>33.0 Formation</p> <p>34.0 Patient Preparation</p> <p>35.0 Specimen Collection, Transport and Handling</p> <p>36.0 Laboratory Examinations</p> <p>37.0 Reference Values and Clinical Significance</p> <p>38. The Examination of Gastric and Duodenal Contents</p> <p>39.0 Formation</p> <p>40.0 Patient Preparation</p> <p>41.0 Specimen Collection, Transport and Handling</p> <p>42.0 Laboratory Examinations</p> <p>43.0 Reference Values and Clinical Significance</p> <p>44. The Examination of Amniotic Fluid</p> <p>45.0 Formation</p> <p>46.0 Patient Preparation</p> <p>47.0 Specimen Collection, Transport and Handling</p> <p>48.0 Laboratory Examinations</p> <p>49.0 Reference Values and Clinical Significance</p> <p>9. Quality Assurance Program</p>
Textbooks	:	<p>1. Strasinger, Susan King. <b>URINALYSIS AND BODY FLUIDS 4<sup>TH</sup> ED.</b> F.A. Davis &amp; Co., Philadelphia. C2001</p> <p>2. Henry, John Bernard. <b>CLINICAL DIAGNOSIS AND MANAGEMENT. 20<sup>TH</sup> ED.</b> C.2002</p>
Laboratory Exercises	:	<p>2.0 Review/ study of Instruments used in the analysis of urine and other body fluids:</p> <ul style="list-style-type: none"> <li>. clinical and cytocentrifuge</li> <li>. microscope</li> </ul>

		<ul style="list-style-type: none"> <li>. refractometer</li> <li>. urinometer</li> </ul> <p>3.0 Routine Urinalysis</p> <p>3.1 Routine Urinalysis</p> <p>3.2 Chemical Examination</p> <p>3.2.1 Routine: Protein, Sugar</p> <p>3.2.2 Special Chemical Examination: Occult Blood, Ketones, Bile Pigments etc.</p> <p>3.2.3 Urine strip test</p> <p>3.2.4 Microscopic Examination</p> <p>4.0 Stool Examination</p> <p>4.1 Physical Examination</p> <p>4.2 Chemical Examination: Bile Pigments, Occult Blood, Fats</p> <p>4.3 Microscopic Examination</p> <p>4.3.1 Identification of Formed Elements</p> <p>5.0 Pregnancy Tests</p> <p>6.0 Examination of Cerebrospinal Fluid</p> <p>6.1 Macroscopic</p> <p>6.2 Cell Count and Differential Count</p> <p>6.3 Chemical Examination</p> <p>6.3.1 Glucose, Protein</p> <p>6.3.2 White Blood Cell Count</p> <p>7.0 Examination of Seminal Fluid</p> <p>7.1 Physical</p> <p>7.2 Cell Count and Morphology</p> <p>7.3 Motility / Viability Tests</p> <p>8.0 Examination of sputum and bronchial washings</p>
Course Name	:	<b>CLINICAL CHEMISTRY I</b>
Course Description	:	The course deals with the physiologically active soluble substances found in body fluids particularly blood. These involve the knowledge and the understanding of the basic concepts and principles of their metabolism, laboratory analyses and their diagnostic utility. The course also deals with instrumentation and evaluation of the accuracy and precision of the procedures using analytical techniques.
Course Credit	:	4 units (3 units lecture, 1 unit laboratory)
Contact Hours	:	3 hours lecture and 3 hours laboratory per week Total of 54 lecture hours and 54 laboratory hours per semester
Prerequisite	:	Anatomy and physiology Biochemistry
Placement	:	Third year, First semester
Course Objectives	:	At the end of the course, the student should be able to: 1. explain the different blood chemical constituents: their metabolism, functions, actions, laboratory techniques and principles, reference

		<p>values and clinical significance, and variables or factors that may affect their determination.</p> <ol style="list-style-type: none"> <li>2. analyze and interpret laboratory test results</li> <li>3. apply concepts and principles of the various instruments used in the clinical laboratory</li> <li>4. prepare solutions of various concentrations correctly.</li> <li>5. discuss basic concepts of quality control and assurance, laboratory safety and proper waste disposal</li> <li>6. manifest the following values: Integrity, Honesty., Critical Thinking, Empathy and Value for Life .</li> </ol>
Course Outline	:	<ol style="list-style-type: none"> <li>2. Fundamental Concepts in Analytical Procedure <ol style="list-style-type: none"> <li>2.0 Units of Measurement</li> <li>2.1 Preparation and Standardization of Solutions</li> <li>2.2 Chemical Reagents and Laboratory Supplies</li> <li>2.3 Laboratory Mathematics</li> </ol> </li> <li>3. Analytical Techniques and Instrumentation <ol style="list-style-type: none"> <li>3.0 Spectrophotometry <ol style="list-style-type: none"> <li>3.1 Electrochemistry</li> <li>3.2 Electrophoresis</li> <li>3.3 Chromatography</li> <li>3.4 Osmometry</li> <li>3.5 Refractometry</li> <li>3.6 Nephelometry</li> <li>3.7 Densitometry</li> <li>3.8 Scintillation Counting</li> <li>3.9 Automation</li> <li>3.10 Immunochemical Techniques</li> </ol> </li> </ol> </li> <li>4. Specimen Collection and Processing <ol style="list-style-type: none"> <li>4.0 Pre-Analytical Variables <ol style="list-style-type: none"> <li>4.1 Patient Preparation</li> <li>4.2 Blood Collection, Processing and Handling <ol style="list-style-type: none"> <li>3.3.1 Vacutainer Tubes and Anticoagulants</li> </ol> </li> </ol> </li> </ol> </li> <li>5. Quality Assurance <ol style="list-style-type: none"> <li>5.0 Definition of Terms</li> <li>5.1 Computation</li> <li>5.2 Preparation and Use of Quality Control Charts</li> <li>5.3 Evaluation of Methods</li> </ol> </li> <li>6. Carbohydrates <ol style="list-style-type: none"> <li>6.0 Classification</li> <li>6.1 Metabolism</li> <li>6.2 Laboratory Methods of Determination</li> <li>6.3 Reference Values</li> <li>6.4 Clinical Significance</li> </ol> </li> <li>7. Lipids <ol style="list-style-type: none"> <li>7.0 Classification</li> <li>7.1 Metabolism</li> <li>7.2 Laboratory Methods of Determination</li> <li>7.3 Reference Values</li> <li>7.4 Clinical Significance</li> </ol> </li> <li>8. Non-Protein Nitrogen</li> </ol>

		8.0 Classification 8.1 Metabolism 8.2 Laboratory Methods of Determination 8.3 Reference Values 8.4 Clinical Significance 9. Proteins 9.0 Classification 9.1 Metabolism 9.2 Laboratory Methods of Determination 9.3 Reference Values 9.4 Clinical Significance
Textbook References		1. Henry, John Bernard. <b>CLINICAL DIAGNOSIS AND MANAGEMENT BY LABORATORY METHODS 20<sup>TH</sup> ED</b> 2. Teitz, Norbert et.al. ed. <b>TEITZ TEXTBOOK OF CLINICAL CHEMISTRY</b> 3. Bishop, Michael et al. <b>CLINICAL CHEMISTRY: PRINCIPLES, PROCEDURES AND CORRELATIONS</b> 4. Craig Lehman A, <b>SAUNDERS' MANUAL OF CLINICAL LAB. SCIENCES</b> ,1998 5. Frankel, Sam, Reitman, Stanley, Sonnenwirt Alex, <b>GRADWOHL'S CLINICAL LABORATORY METHODS AND DIAGNOSIS</b> , 1970 6. Hubbard, Joel D. <b>A CONCISE REVIEW OF LABORATORY SCIENCE</b> 7. Kaplan, <b>.CLINICAL CHEMISTRY PRINCIPLES AND PROCEDURES</b>
Laboratory Exercises	:	1.0 Safety Precautions and Waste Disposal 2.0 Laboratory Calculations 3.0 Use of Volume Measurements: TD,TC, Micropipette 4.0 Blood Collection 4.1 Skin Puncture 4.2 Venipuncture 4.3 Labeling 5.0 Specimen Preparation 6.0 Instrumentation: Use of Spectrophotometer 7.0 Test for Blood Glucose 8.0 Tests for Lipids - Total cholesterol - LDL - HDL - VLDL - Triglycerides 9..0 Test for Non-Protein Nitrogen 10.1 Blood Urea Nitrogen 10.2 Uric Acid 10.3 Creatinine 10.0 Creatinine Clearance Test 11.0 Test for Total Protein, Albumin and Computation of A/G Ratio 12.0 Tests for Bilirubin
		<b>CLINICAL CHEMISTRY 2</b>

Course Description	Continuation of Clinical Chemistry 1.
Course Outline	<ol style="list-style-type: none"> <li>1. Liver Function Tests <ol style="list-style-type: none"> <li>1.0. Anatomy and Physiology of the Liver</li> <li>2.0. Laboratory Methods, Evaluation and Quality Assurance</li> <li>3.0. Reference Values</li> <li>4.0. Clinical Significance</li> </ol> </li> <li>2. Clinical Enzymology <ol style="list-style-type: none"> <li>1.0. Basic Concepts and Terminologies</li> <li>2.0. Factors affecting enzymatic reaction</li> <li>3.0. Individual enzymes <ul style="list-style-type: none"> <li>• Iso-enzymes</li> <li>• Reactions</li> <li>• Laboratory Determinations</li> <li>• Reference Value</li> <li>• Clinical Significance</li> </ul> </li> </ol> </li> <li>3. Electrolytes and Trace Minerals <ol style="list-style-type: none"> <li>3.1 Classification and Functions</li> <li>3.2 Laboratory Methods</li> <li>3.3 Reference Values</li> <li>3.4 Clinical Significance</li> </ol> </li> <li>4. Acid-Base Physiology and Blood Gases</li> <li>5. Tumor markers <ol style="list-style-type: none"> <li>5.1. Definition of terms</li> <li>5.2. Clinically useful markers</li> <li>5.3. Laboratory Analysis</li> <li>5.4. Disease correlation</li> </ol> </li> </ol>
Placement	Third Year, Second semester
Course Credit	3 units (2 units lecture; 1 unit laboratory)
Contact Hours	3 hours lecture and 3 hours laboratory Total of 36 lecture hours and 54 laboratory hours per semester
Pre-requisite	Clinical Chemistry 1
Course Objectives	<ol style="list-style-type: none"> <li>1. Explain the principles of liver function test, clinical enzymology, electrolytes and blood gases.</li> <li>2. Apply concepts and principles of the various instruments used in the performance of clinical enzymology, electrolyte determination and blood gases</li> <li>3. Discuss the basic concepts of quality control and assurance</li> <li>4. Manifest the following values: Integrity, Honesty., Critical Thinking, Empathy and Value for Life .</li> </ol>
Textbook References	<ol style="list-style-type: none"> <li>1. Henry, John Bernard. <b>CLINICAL DIAGNOSIS AND MANAGEMENT BY LABORATORY METHODS 20<sup>TH</sup> ED</b></li> <li>2. Teitz, Norbert et.al. ed. <b>TIETZ TEXTBOOK OF CLINICAL CHEMISTRY</b></li> <li>3. Bishop, Michael et al. <b>CLINICAL CHEMISTRY: PRINCIPLES, PROCEDURES AND CORRELATIONS</b></li> <li>4. Craig Lehman A, <b>SAUNDERS' MANUAL OF CLINICAL LAB. SCIENCES,1998</b></li> </ol>

		5. Frankel, Sam, Reitman, Stanley, Sonnenwirt Alex, <b>GRADWOHL'S CLINICAL LABORATORY METHODS AND DIAGNOSIS</b> , 1970 6. Hubbard, Joel D. <b>A CONCISE REVIEW OF LABORATORY SCIENCE</b>
Laboratory Exercises	:	1.0 Clinical Enzymology Aspartate Amino Transferase ( AST/SGOT) Alanine Amino Transferase ( ALT/SGPT) Amylase Lipase Lactate Dehydrogenase Creatine Kinase Acid Phosphatase Alkaline Phosphatase 2.0 Electrolytes Sodium Potassium Chloride
Course Title	:	<b>MICROBIOLOGY I- BACTERIOLOGY</b>
Course Description	:	A course which deals with the study of the morphology and physiology of bacteria and their role in infection and immunity. Emphasis is made on their isolation, identification and susceptibility testing as an aid in laboratory diagnosis.
Course Units	:	5 units (3 units lecture & 2 units laboratory)
Contact Hours	:	3 hours lecture and 6 hours laboratory per week Total of 54 lecture hours and 108 laboratory hours per semester
Prerequisites	:	Human Anatomy and Physiology, Biochemistry
Placement	:	Third year, First Semester
Course Objectives	:	At the end of the course, the student should be able to: 1. describe the morphology and physiology of bacteria, rickettsia and other significant organisms 2. perform methods and techniques of isolation, identification and susceptibility testing of bacteria 3. apply concepts in controlling the growth and spread of pathogenic bacteria 4. establish quality assurance program in Bacteriology 5. demonstrate critical thinking interpreting results of tests 6. manifest the following values: Honesty, Critical Thinking, Value for Life, and Concern for Others
Course Outline	:	1. Introduction  1.1 Brief History of Microbiology 1.2 Bacterial Morphology, Structure and Classification 1.3 Cell Physiology, Metabolism and Bacterial Genetics 1.4 Microbial Control 1.5 Different Laboratory apparatus

		<p>1.6 Methods of Studying Bacteria</p> <ul style="list-style-type: none"> <li>• Microscopic</li> <li>• Cultural</li> <li>• Serological</li> <li>• Animal Inoculation</li> <li>• Molecular Techniques</li> </ul> <p>2. Infection and Immunity</p> <p>2.1 Definition of Terms</p> <p>2.2 Infectious Process</p> <p>2.3 Specimen Collection, Transport and Processing</p> <p>3. The Pathogenic and Non-Pathogenic Bacteria</p> <p>3.1 <u>Micrococceae</u></p> <p>3.2 Streptococceae</p> <p>3.3 Neiseriaceae</p> <p>3.4 Enterobacteriaceae</p> <p>3.5 Non-Enteric Gastrointestinal Pathogens</p> <p>3.6 Non-Fermentative Gram Negative Bacilli</p> <p>3.7 Small Pleomorphic Gram Negative Bacilli</p> <p>3.8 Aerobic Bacteria</p> <p>3.9 Anaerobic Bacteria</p> <p>3.10 Spirochaetaceae</p> <p>3.11 Rickettsiaceae</p> <p>3.12 Chlamydiaceae</p> <p>3.13 Mycoplasmaceae</p> <p>3.14 Miscellaneous Pathogenic Bacteria</p> <p>4. Antimicrobial Susceptibility Testing</p> <p>4.1 Manual</p> <p>4.1.1 Dilution</p> <p>4.1.2 Diffusion</p> <p>4.1.2.1 disk</p> <p>4.1.2.2 cylinder</p> <p>4.1.2.3 antibiotic gradient strip</p> <p>4.2 Automated</p> <p>5. Applied Bacteriology</p> <p>5.1 Bacteriological Analysis of Food, Water and milk</p> <p>5.1.1 Methods</p> <p>5.1.2 Interpretation</p> <p>6. Quality Assurance</p> <p>6.1 Quality Control Measures</p> <p>7. Infection Control</p> <p>7.1 Precautionary Measures for Infection Control</p> <p>7.2 Waste Disposal Management</p>
Textbook References	:	<p>1. Forbes, <b>BAILEY AND SCOTT DIAGNOSTIC MICROBIOLOGY 11<sup>TH</sup> ED.</b> s 2002</p> <p>2. Delost, Maria D., <b>INTRODUCTION TO DIAGNOSTIC MICROBIOLOGY : A TEXT AND WORKBOOK</b> , 1997</p> <p>3. Alcamo, Edward, <b>MICROBIOLOGY ( SCHAUM'S OUTLINE )</b></p> <p>4. Harrigan. Mc Cance, Margarete, <b>LABORATORY METHODS IN</b></p>

		<p><b>MICROBIOLOGY, 1996</b>  <b>5. JAWETZ MEDICAL MICROBIOLOGY, latest edition</b></p>
Laboratory Exercises	:	<p>1.0 The Use and Care of the Microscope  2.0 Micrometry and Size of Bacteria  3.0 Preparation of Bacterial Smear  4.0 Staining Techniques      5.0 Simple      6.0 Gram Stain      7.0 Acid Fast Stain      8.0 Special Stains      9.0 Indirect Stain  10.0 Preparation of The Culture Media  11.0 Inoculation Techniques  12.0 The Effects of Temperature on Bacterial Growth  13.0 Thermal Death Time  14.0 Effects of Chemicals on Bacteria  15.0 Antimicrobial Susceptibility Testing  16.0 Biochemical Properties of Bacteria  17.0 Culture and Identification of:      18.0 Gram positive cocci      19.0 Gram negative cocci      20.0 Gram positive bacilli      21.0 Enterobacteriaceae      22.0 Aerobic Sporeformers      23.0 Non-fermentative gram negative bacilli      24.0 Small, pleomorphic, fastidious gram negative bacilli  25.0 Applied Bacteriology      26.0 Indigenous Flora (Normal Flora)      27.0 Blood Culture      28.0 Stool Culture      29.0 Urine Culture      30.0 Water Bacteriology      31.0 CSF Culture  14.0 Special Procedures      14.1 Serologic Identification of Bacteria      14.2 Anaerobic Bacteriology      14.3 Serum Bactericidal Level</p>
Course Name	:	<b>PARASITOLOGY</b>
Course Description	:	This course deals with the study of human parasites which are of medical importance especially those commonly found in the Philippines. Emphasis is given in the morphology; epidemiology; pathogenicity; laboratory diagnosis of their specific diseases; distribution and life cycle as well as control and preventive measures against infection.
Course Credit	:	3 units(2unit lecture & 1 unit laboratory)
Contact Hours	:	2 hours lecture and 3 hours laboratory per week Total of 36 lecture hours and 54 laboratory hours per semester



Prerequisite	:	Human Anatomy and Human Physiology
Placement	:	Third year; First semester
Course Description		<p>At the end of the course, the student should be able to:</p> <ol style="list-style-type: none"> <li>1. explain the characteristics and diagnostic features of parasites of medical importance</li> <li>2. perform routine and special laboratory tests used in the identification of parasites</li> <li>3. discuss the importance of prevention and control of parasitic infection</li> <li>4. manifest the following values: Honesty, Critical Thinking, Value for life; Concern for others</li> </ol>
Course Outline	:	<ol style="list-style-type: none"> <li>1. Introduction to Parasitology</li> <li>2. Host-Parasite Relationship</li> <li>3. Pathophysiology of Parasitic Infection/ Infestation</li> <li>4. Specimen collection; Transport, Preservation</li> <li>5. Laboratory Examination <ol style="list-style-type: none"> <li>5.0. General Concepts</li> <li>5.1. Routine Techniques</li> <li>5.2. Special Techniques</li> </ol> </li> <li>6. Nematodes <ol style="list-style-type: none"> <li>6.0. General Characteristics <ol style="list-style-type: none"> <li>1.1. <u>Ascaris lumbricoides</u></li> <li>1.2. <u>Trichuris trichura</u></li> </ol> </li> <li>6.1. Hookworms _and_Strongyloides stercoralis</li> <li>6.2. Enterobius vermicularis</li> <li>6.3. Trichinella spiralis</li> <li>6.4. Capillaria philippinensis <ul style="list-style-type: none"> <li>Filaria worm <ul style="list-style-type: none"> <li>• Morphology</li> <li>• Life cycle</li> <li>• Laboratory diagnosis</li> <li>• Epidemiology</li> <li>• Prevention and Control</li> <li>• Pathology</li> </ul> </li> </ul> </li> </ol> </li> <li>8. Cestodes <ol style="list-style-type: none"> <li>8.0. General characteristics</li> <li>8.1. Diphyllobotrium</li> <li>8.2. Taenia</li> <li>8.3. Hymenolepis</li> <li>8.4. Echinococcus <ul style="list-style-type: none"> <li>• morphology</li> <li>• Life cycle</li> <li>• Laboratory diagnosis</li> <li>• Epidemiology</li> <li>• Prevention and control</li> <li>• Pathology</li> </ul> </li> </ol> </li> <li>9. Trematodes <ol style="list-style-type: none"> <li>9.0. General characteristics</li> </ol> </li> </ol>

		<p>9.1. Fasciola  9.2. Fasciolopsis  9.3. Paragonimus  9.4. Schistosoma  9.5. Heterophyes  9.6. Opistorchis  9.7. Echinostoma</p> <ul style="list-style-type: none"> <li>• Morphology</li> <li>• Life cycle</li> <li>• Laboratory Diagnosis</li> <li>• Epidemiology</li> <li>• Prevention and control</li> <li>• Pathology</li> </ul> <p>10. Protozoa</p> <p>10.0. General Characteristics</p> <p>1.1. <u>Amoeba</u>  1.2. <u>Giardia</u>  1.3. <u>Trichomonas</u>  1.4. <u>Chilomastix</u>  1.5. <u>Balantidium</u>  1.6. <u>Trypanosomes</u>  1.7. <u>Leishmanias</u>  1.8. <u>Plasmodia</u></p> <ul style="list-style-type: none"> <li>• Morphology</li> <li>• Life cycle</li> <li>• Laboratory diagnosis</li> <li>• Epidemiology</li> <li>• Prevention and control</li> <li>• Pathology</li> </ul> <p>11.0 Parasites of immunocompromised patients</p>
Textbook References	:	<p>1. Brown Harold W, Neva, Franklin <b>BASIC CLINICAL PARASITOLOGY 6<sup>TH</sup> ED</b>, 1994  2. Belisario, Vicente (ed) <b>PHILIPPINE TEXTBOOK OF MEDICAL PARASITOLOGY UP-</b> Manila Publications, Manila ,2004  2. Beaver Paul C et.al., <b>CLINICAL PARASITOLOGY10<sup>TH</sup> ED</b>. Lea and Febiger, Philadelphia. 1990.</p>
Laboratory Exercises		<p>1. Direct Fecal Smear  2. Gross and Microscopic Examination</p> <p>2.1 <u>Ascaris lumbricoides</u>  2.2 <u>Trichiuris trichiura</u>  2.3 <u>Enterobius vermicularis</u>  2.4 Strongyloides stercoralis  2.5 Necator americanus  2.6 Ancylostoma species  2.7 Capillaria philippinensis</p> <p>3. Scotch Tape Method  4. Harada Mori Technique  5. Gross and Microscopic Examination of Filarial Worm</p>

		<ol style="list-style-type: none"> <li>6. Gross and Microscopic Examination <ol style="list-style-type: none"> <li>6.1 Liver flukes</li> <li>6.2 Lung fluke</li> <li>6.3 Intestinal Fluke</li> <li>6.4 Schistosomes</li> <li>6.5 Pseudophyllidea</li> <li>6.6 Taenia solium</li> <li>6.7 T. saginata</li> <li>6.8 Hemenolepis nana and H. diminuta</li> <li>6.9 Dipylidium caninum</li> <li>6.10 <u>Echinococcus granulosus</u></li> </ol> </li> <li>7. Microscopic Examination of Rhizopoda <ol style="list-style-type: none"> <li>Unstained/Iodidne stained</li> <li>7.1 Living Trophozoite</li> <li>7.2 Stained Trophozoites</li> <li>7.3. Stained Cysts</li> </ol> </li> <li>8. Microscopic Examination of Atrial Flagellates <ol style="list-style-type: none"> <li>Unstained/Stained</li> </ol> </li> <li>9. Microscopic Examination <ol style="list-style-type: none"> <li>9.1 Hemoflagellates</li> <li>9.2 Ciliates</li> <li>9.3 Eimerina</li> </ol> </li> <li>11. Preparation of Thick and Thin Blood Smear</li> <li>12. Microscopic Examination of Haemosporina (malarial parasites)</li> <li>13. Concentration Techniques <ol style="list-style-type: none"> <li>13.0. Formalin-Ether Sedimentation</li> <li>13.1. Formalin-Zinc Sulfate Flotation</li> </ol> </li> <li>14. Staining of Fecal Smears</li> </ol>
Course Title	:	<b>MEDICAL TECHNOLOGY LAWS AND BIOETHICS</b>
Course Description		<p>The course deals with the study of various laws related to the practice of Medical Technology in the Philippines primarily RA 005527. It also includes the study of professional ethics and Bioethics.</p> <p>Bioethics deals with the study of Ethics in relation to health particularly and to human life generally. Its emphasis is on basic ethical principles, major bioethical principles and its application in health. It also includes the discussion of philosophical principles and virtues of health care providers.</p>
Course Credit	:	3 unit lecture
Contact Hours	:	3 hours lecture per week Total of 54 lecture hours per semester
Prerequisite	:	Introduction to Medical Technology
Placement	:	Third Year, First Semester
Course Objectives	:	<p>At the end of the course, the student should be able to:</p> <ol style="list-style-type: none"> <li>1. Recognize the rights and privileges, duties and responsibilities of a</li> </ol>

		<p>medical technologist/medical laboratory scientist in the practice of the profession;</p> <ol style="list-style-type: none"> <li>2. Cite the different laws, presidential decrees, administrative orders affecting the practice of the medical technology profession</li> <li>3. Explain the ethical principles relative to health</li> <li>4. Discuss the major bioethical issues</li> <li>5. Clarify issues belonging to Ethics, Bioethics, Health Ethics and Professional Ethics</li> <li>6. Internalize the necessary virtues as health care professionals</li> <li>7. Apply the different principles in bioethical/health ethics</li> </ol>
Course Outline	:	<p>Part I – Laws Pertaining to Medical Technology Profession</p> <ol style="list-style-type: none"> <li>1. RA 005527</li> <li>2. Amendments to RA 005527 <ol style="list-style-type: none"> <li>1.0. RA 6138</li> <li>2.0. PD 498</li> <li>3.0. PD 1534</li> </ol> </li> <li>3. PRC Modernization Act of 2000/Republic Act No. 8981</li> <li>4. Republic Act 4688</li> <li>5. Republic Act 7719</li> <li>6. Republic Act 7722 “Higher Education Act”</li> <li>7. CHED , PRC, DOH Memos /Orders pertaining to Medical Technology Education and Laboratory Practice</li> <li>8. RA 9165-Comprehensive Dangerous Drug Act of 2002</li> </ol> <p>Part II. Bioethics</p> <ol style="list-style-type: none"> <li>I. I.0 .Introduction to Bioethics. <ol style="list-style-type: none"> <li>1.0. Definitions of Health</li> <li>2.0. Definitions of Disease/Illness</li> </ol> </li> <li>2.0. Concepts OF Disease <ol style="list-style-type: none"> <li>1.0. Ontological</li> <li>2.0. Physiological</li> </ol> </li> <li>3.0. Ethics <ol style="list-style-type: none"> <li>3.1. Etymology</li> <li>3.2. Ethos of Man <ol style="list-style-type: none"> <li>1.0. Meaning/Definition <ol style="list-style-type: none"> <li>1.0.0. Human Acts</li> <li>2.0.0. Morality</li> </ol> </li> <li>2.0. Ethics as a Practical Science.</li> <li>3.0. Bioethics, Health Ethics, Professional Ethics.</li> </ol> </li> </ol> </li> <li>II. Importance of Ethics and Health Ethics.</li> <li>III. The Human Person <ol style="list-style-type: none"> <li>1.0 The Notion of a Person <ol style="list-style-type: none"> <li>1.0 Needs and Values human persons. <ol style="list-style-type: none"> <li>1.0.0 Biological</li> <li>2.0.0 Psychological</li> <li>3.0.0 Social</li> <li>4.0.0 Spiritual</li> </ol> </li> <li>2.0 The Human Act <ol style="list-style-type: none"> <li>2.1 Characteristics of Human Act <ol style="list-style-type: none"> <li>2.1.1 Knowledge</li> <li>2.1.2 Freedom</li> <li>2.1.3 Willfulness</li> </ol> </li> </ol> </li> </ol> </li> </ol> </li> </ol>

- 3.0 Conscience
  - 3.1 Definition of Conscience
  - 3.2 Conscience as a “Practical Judgment”
  - 3.3 Kinds of Conscience
    - 3.3.1 Correct or True Conscience
    - 3.3.2 Erroneous or False Conscience
      - 3.3.2.1 Inculpable
      - 3.3.2.2 Culpable
    - 3.3.3 Certain Conscience
    - 3.3.4 Doubtful Conscience
    - 3.3.5 Scrupulous Conscience
    - 3.3.6 Lax Conscience
- IV. The Calling of Health Care Provider
  - 1.0 The Healthcare Profession
    - 1.0. Merton’s Values of a profession
    - 1.2 Merton’s knowing, doing and helping principles
    - 1.3 Differences between profession and occupation
    - 1.4 Characteristics of trust
    - 1.5 Relationship of healthcare provider and patient
  - 2.0 The Patient’s Duties and Rights
  - 3.0 Personalizing the Health Care Profession
    - 3.1 Factors needed in ethical decisions
  - 4.0 The Psychoanalytical model
  - 5.0 Duties/Rights of the Health Care Provider
    - 5.1 Characteristics of a good healthcare provider
    - 5.2 Commitment of a healthcare provider
- V. Basic Ethical Principles
  - 5.1 Stewardship
  - 5.2 Totality
    - 5.2.1 application in health care
    - 5.2.2 Relationship of totality to wholeness
  - 5.3 Double Effect Principle
  - 5.4 Principle of Cooperation
    - 5.4.1 Formal and Informal Cooperation
    - 5.4.2 Immediate and Mediate
- VI. Major Bioethical Principles
  - 6.1 Respect for a Person
    - Respect as a value
    - Principle of free and informed consent
    - Principle of Autonomy
  - 6.2 Importance of free and informed consent
    - 6.2.1 Patient’s Right to information
    - 6.2.2 . Proxy Consent
  - 6.3 Principles of Justice
    - 6.3.1 Neighborly Relations
    - 6.3.2 Types of Justice
  - 6.4 . Beneficence
    - 6.4.1 Application of principle of beneficence to healthcare
  - 6.5 The Inviolability of Life
    - 6.5.1 Crimes Against Human Life
      - Suicide
      - Mutilation

	<ul style="list-style-type: none"> <li>Sterilization</li> <li>Euthanasia</li> <li>Drug Addiction</li> <li>Alcoholism</li> <li>Abortion and others</li> <li>6.6 Non-Maleficence</li> <li>VII Applied Health Ethics</li> <li>7.1 Informed Consent <ul style="list-style-type: none"> <li>7.1.1 Functions</li> <li>7.1.2 Elements</li> </ul> </li> <li>7.2 The Beginning of Life <ul style="list-style-type: none"> <li>7.2.1 Principal values of human sexuality</li> <li>7.2.2 Rights of a person to sex and parenthood</li> <li>7.2.3 Maternal and Fetal Conflicts</li> <li>7.2.4 Double Effect principle to maternal and fetal conflicts</li> <li>7.2.5 Artificial Insemination and In Vitro Fertilization</li> </ul> </li> <li>7.3 The End of Life <ul style="list-style-type: none"> <li>7.3.1 Needs of a dying person</li> <li>7.3.2 Role of Healthcare provider in caring for the dying person</li> </ul> </li> <li>7.4 Suffering <ul style="list-style-type: none"> <li>7.4.1 Role of suffering in man's</li> <li>7.4.2 Role of the healthcare provider in a suffering patient</li> </ul> </li> <li>7.5 Death <ul style="list-style-type: none"> <li>7.5.1 Karl Rahner's view on death</li> <li>7.5.2 Dying with Christ</li> </ul> </li> <li>7.6 Health Professional Relationships <ul style="list-style-type: none"> <li>7.6.1 The health care professionals and the professional organization and society <ul style="list-style-type: none"> <li>7.6.1.1 Mutual responsibility</li> <li>7.6.1.2 Mutual support</li> <li>7.6.1.3 Mutual respect</li> </ul> </li> </ul> </li> <li>VIII Analyses of Bioethical Issues</li> <li>8.1 Introduction</li> <li>8.2 Ethical Method</li> <li>8.3 Deontological Methods <ul style="list-style-type: none"> <li>- legalism</li> <li>- deontologism</li> <li>- legal positivism</li> <li>- teleological methods</li> <li>- utilitarianism</li> <li>- proportionalism</li> <li>- emotivism</li> <li>- Prudential Personalism</li> </ul> </li> <li>9.0 Virtues of Healthcare Providers</li> <li>9.1 Definition of virtues/role of virtues in healthcare <ul style="list-style-type: none"> <li>- Fidelity</li> <li>- Honesty</li> <li>- Integrity</li> <li>- Humility</li> <li>- Respect</li> <li>- Compassion</li> </ul> </li> </ul>
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		<ul style="list-style-type: none"> <li>- Prudence</li> <li>- Courage</li> <li>- Truth</li> <li>- Love</li> <li>- Faith</li> <li>- Hard work</li> <li>- Social Justice Etc.</li> </ul> <p>9.2 Vices</p> <ul style="list-style-type: none"> <li>- Authority and Power</li> <li>- Pride</li> <li>- Greed</li> </ul>
Textbooks/ References	:	<p>Fallorin, Conrado. <b>THE PHILIPPINE MEDICAL TECHNOLOGY PROFESSION, 3<sup>RD</sup> EDITION</b>, 2003.</p> <p>Moraleta, Nardito D. <b>MEDICAL TECHNOLOGY LAWS AND RELATED LAWS</b> latest edition</p> <p>Rabor, Rodolfo R. <b>MEDICAL TECHNOLOGY LAWS AND ETHICS</b>. Latest edition</p> <p>Tan, Alora. <b>BIOETHICS. FIRST EDITION</b>, 1996</p> <p>Ciabal, Laura Evelyn P. <b>HEALTH ETHICS, 2<sup>ND</sup> ED.</b> 2003 A Guide for Health Allied Professions</p> <p>Reyes, Ramon C. <b>GROUND AND NORM OF MORALITY</b>. Ateneo de Manila University. C. 1989 Ateneo de Manila</p> <p>Ashley, Benedict M. OP. Rourke, Kevin D.O.P., <b>ETHICS OF HEALTH CARE</b>, c. 1986 c. 1992 and 1994. The Catholic Health Association of the United States</p> <p>Edge, Raymund S. Groves. John Randall. <b>ETHICS OF HEALTH CARE. A GUIDE FOR CLINICAL PRACTICE</b> c. 1999. Delmar Publishers.</p>
Course Title	:	<b>LABORATORY MANAGEMENT</b>
Course Description		This course deals with the study of basic concepts of management, planning, organizing, leading, staffing, controlling as applied to a clinical laboratory set-up like quality assurance/quality control; policy and procedure manuals; infection controls, etc.
Course Credit	:	2 unit lecture
Contact hours	:	2 hours lecture per week Total of 36 lecture hours per semester
Placement	:	Third Year, First Semester
Course Objectives	:	<ol style="list-style-type: none"> <li>1. Explain the different processes of management</li> <li>2. Prepare and critique: organizational chart; procedure and policy manual; general physical plan and layout; and job description;</li> <li>3. Manifest a desire to develop the medical technologist's personal, social and professional responsibilities in helping, restoring or maintaining the health of men of high moral and ethical standards that are required of the medical technology profession</li> </ol>
Textbook/References		1. Henry, John Bernard, <b>CLINICAL DIAGNOSIS AND MANAGEMENT BY LABORATORY METHODS, 20TH</b>

		<p><b>EDITION, 2001</b></p> <p>2.Varnadoe, Lionel A., <b>MEDICAL LABORATORY MANAGEMENT AND SUPERVISION OPERATIONS, REVIEW AND STUDY GUIDE</b>, latest edition.</p>
Course Outline	:	<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Leadership</li> <li>3. Management Processes <ol style="list-style-type: none"> <li>3.1. Planning</li> <li>3.2. Organizing</li> <li>3.3. Leading</li> <li>3.4. Staffing</li> <li>3.5. Control</li> </ol> </li> <li>4. Licensing</li> <li>5. Job description/specification</li> <li>6. Policy and procedure manual</li> <li>7. Laboratory Budget</li> <li>8. Communication</li> <li>9. Principles of Marketing</li> <li>10. Quality Assurance</li> <li>11. Laboratory Safety</li> </ol>
Course Title	:	<b>MYCOLOGY AND VIROLOGY (MICROBIOLOGY II)</b>
Course Description	:	The course deals with the study of morphologic and biologic characteristics of fungal and viral agents of diseases. It also includes the study of laboratory diagnostic method; modes of transmission, epidemiology; pathology; prevention and control of diseases caused by viruses and fungi.
Course Credit	:	2 units lecture only
Contact Hours	:	2 hours lecture per week Total of 36 lecture hours per semester
Prerequisite	:	Bacteriology (Microbiology I)
Placement	:	Third year, second semester
Course Objectives	:	<p>At the end of the course, the student should be able to:</p> <ol style="list-style-type: none"> <li>1. define common terms</li> <li>2. describe the morphology and physiology of virus and fungi</li> <li>3. discuss laboratory tests used for identification including specimen collection, processing and handling; isolation</li> <li>4. manifest the following values: Integrity, honesty, critical thinking, empathy and value for life.</li> </ol>
Course Outline		<p>A. MYCOLOGY</p> <ol style="list-style-type: none"> <li>1. Basic Concepts <ol style="list-style-type: none"> <li>1.0.General Features and Physiology <ol style="list-style-type: none"> <li>1.1.Mode of Transfusion</li> </ol> </li> </ol> </li> </ol>



	<p>1.2. Specimen Collection Transport and handling  1.3. laboratory Tests for Identification  1.4. Prevention and Control</p> <p>2. Dermatophytes  1.1. <u>Microsporum</u>  1.2. <u>Epidermophyton</u>  1.3. <u>Trichophyton</u></p> <ul style="list-style-type: none"> <li>• Morphology</li> <li>• Identification Techniques</li> <li>• Prevention and Control</li> <li>• Pathology</li> </ul> <p>3. Subcutaneous Fungi  1.4. <u>Sporothrix</u>  1.5. <u>Basidiobolus and Conidiobolus</u></p> <ul style="list-style-type: none"> <li>• Morphology</li> <li>• Identification Techniques</li> <li>• Modes of Transmission</li> <li>• Prevention and Control</li> <li>• Pathology</li> </ul> <p>3.3</p>
	<p>4. Opportunistic Fungi  4.0. Candida  4.1. Aspergillus</p> <ul style="list-style-type: none"> <li>• Morphology</li> <li>• Identification Techniques</li> <li>• Mode of Transmission</li> <li>• Prevention and Control</li> <li>• Pathology</li> </ul> <p>5. Systemic Fungi  5.0. Histoplasma  1.6. <u>Coccidioides</u>  1.7. <u>Paracoccidioides</u>  1.8. <u>Blastomyces</u></p> <ul style="list-style-type: none"> <li>• Morphology</li> <li>• Identification Techniques</li> <li>• Modes of Transmission</li> <li>• Prevention and Control</li> <li>• Pathology</li> </ul> <p><b>B. VIROLOGY</b></p> <p>1. Basic Concepts  1.0. General Features and Physiology  1.1. Mode of Transmission  1.2. Specimen Collection, Processing and Handling  1.3. Laboratory Tests for identification: Cell Culture and Serology, Molecular Methods  1.4. Prevention and Control</p> <p>2. Respiratory Viruses  2.0. Respiratory Syncytial virus  2.1. Rhinovirus</p>

- 2.2. Coronavirus
- 2.3. Ortho and Paramyxoviridae
  - Characteristics
  - Laboratory Tests
  - Epidemiology
  - Prevention and Control
- 3. Gastrointestinal viruses
  - 1.1 Rotavirus
  - 1.2 Norwalk
  - 1.3 Adeno virus
  - 1.4 Astro virus
  - 1.5 Polio virus
    - Characteristics
    - Laboratory Tests
    - Epidemiology
    - Prevention and Control
- 4. Hepatitis viruses
  - Characteristics
  - Laboratory Tests
  - Epidemiology
  - Prevention and Control
- 5. Herpes viridae
  - Characteristics
  - Laboratory Tests
  - Epidemiology
  - Prevention and Control
- 6. Arthropod-borne virus and Zoonotic virus
  - 6.0. Dengue
  - 6.1. Rabies
  - 6.2. Marburg
  - 6.3. Ebola
    - Characteristics
    - Laboratory Tests
    - Epidemiology
    - Prevention and Control
- 7. Childhood fever viruses
  - 7.0. Mumps virus
  - 7.1. Measles virus
  - 7.2. Rubella virus
  - 7.3. Pox virus
    - Characteristics
    - Laboratory Tests
    - Epidemiology
    - Prevention and Control
- 8. Sexually Transmitted viruses
  - 8.0. Human papilloma virus
  - 8.1. Human Immunodeficiency virus
- 9. Prions
- 10. Miscellaneous Viruses

Textbooks and References		Same as Bacteriology Bulmer, Glenn, <b>FUNGAL DISEASES IN THE ORIENT</b>
Course Name	:	<b>CLINICAL CHEMISTRY 3 (ENDOCRINOLOGY, TOXICOLOGY AND DRUG TESTING)</b>
Course Description	:	This course deals with the study of the nature of endocrine glands with emphasis on the properties, functions and laboratory analyses of the various internal secretions. It also deals with the principles of drug disposition, specific drug groups and their classification, action, therapeutic drug monitoring and laboratory analyses of toxic substances and substances of abuse.
Course Credit	:	3 units ( 2 units lecture and 1 unit laboratory)
Contact Hours	:	2 hours lecture and 3 hours laboratory per week Total of 36 lecture hours and 54 laboratory hours per semester
Prerequisites	:	Clinical Chemistry I and II
Placement	:	Fourth year, First semester
Course Objectives	:	At the end of the course, the student should be able to: 1. discuss the synthesis, functions, interactions of the various hormones 2. appreciate the significance of the various hormones and their relation to the metabolism of the human body 3. discuss the different toxic substances that may affect the human body 4. appreciate importance of the application of toxicology in forensic medicine 5. discuss the laboratory analyses of hormone and toxic substances and therapeutic drug monitoring 6. manifest the following values: Integrity honesty, critical thinking, empathy and value for life.
Course Outline	:	1. Endocrinology 1.1. General Concepts 1.2. Laboratory Analyses: Routine and Special 1.3. Endocrine glands 1.3.1. hypothalamus 1.3.2. pituitary gland 1.3.3. Thyroid 1.3.4. Parathyroid 1.3.5. Adrenal gland 1.3.6. Pancreas 1.3.7. Reproductive Organs <ul style="list-style-type: none"> <li>• actions and functions of hormone produced</li> <li>• Specimen collection, transport and handling</li> <li>• Laboratory analyses</li> <li>• Pathology</li> </ul> 2. Toxicology

		<p>2.1. General Concepts</p> <p>2.2. Laboratory Analyses</p> <p>2.3. Therapeutic Drugs</p> <p>2.3.1. Salicylates</p> <p>2.3.2. Acetaminophen</p> <p>2.3.3. Non-steroidal anti-inflammatory drugs</p> <p>2.3.4. Muscle relaxants</p> <p>2.3.5. Antibiotics</p> <p>2.3.6. Anticonvulsants</p> <p>&gt;Therapeutic drug monitoring</p> <p>2.4. Specific Agents</p> <p>2.4.1. Alcohol</p> <p>2.4.2. Carbon Monoxide</p> <p>2.4.3. Mercury</p> <p>4.5.4. Lead and Arsenic</p> <p>3. Drug Testing</p> <p>3.1 Review of RA 9165</p> <p>3.2 Substance of Abuse: Mechanisms of Action</p> <p>3.2.1 Amphetamines</p> <p>3.2.2 Cocaine</p> <p>3.2.3 Marijuana</p> <p>3.2.4 Hallucinogens</p> <p>3.2.5. Opiates</p> <p>3.2.6 Designer drugs(e.g. ecstasy)</p> <p>3.2.7 Synthetic Drugs</p> <ul style="list-style-type: none"> <li>• Action</li> <li>• Specimen Collection, Processing and Handling</li> </ul> <p>Laboratory Analyses: Screening and Confirmatory Tests</p>
References		Same as in Clinical Chemistry I
Course Title	:	<b>IMMUNOHEMATOLOGY (BLOOD BANKING)</b>
Course Description	:	The course deals with the concepts and principles of different red cell antigen systems and the application of specific blood group antigens and antibodies to compatibility testing. It also deals with the entire blood donation process or transfusion medicine.
Course Credit		3 units (2 units lecture and 1 unit laboratory)
Contact Hours	:	2 hours lecture and 3 hours laboratory per week Total of 36 lecture hours and 54 laboratory hours per semester
Prerequisite	:	Immunology, Cytogenetics
Placement	:	Fourth year; First semester
Course Objectives	:	<p>At the end of the course, the student should be able to:</p> <ol style="list-style-type: none"> <li>1. explain the principles and procedures in immunohematology, blood banking collection, processing, preservation, storage and distribution of blood and its components and derivatives</li> <li>2. perform accurately the techniques of blood grouping, compatibility testing, Coombs test and other special tests in immunohematology</li> </ol>

	<ol style="list-style-type: none"> <li>3. explain the basic concepts in the organization of Blood Bank</li> <li>4. establish quality assurance program in Blood Bank</li> <li>5. manifest the following values: Integrity, honesty, critical thinking, empathy and value for life</li> </ol>
Course Outline	<p>:</p> <ol style="list-style-type: none"> <li>1. Introduction       <ol style="list-style-type: none"> <li>1.1. Review of Genetics</li> <li>1.2. Historical background</li> <li>1.3. Blood Group Antigens, Antibodies and Complement</li> </ol> </li> <li>2. Major Blood Group System: ABO and Rh       <ol style="list-style-type: none"> <li>2.1. Inheritance</li> <li>2.2. Characteristics of Antigen Antibodies</li> <li>2.3. Laboratory methodology</li> <li>2.4. Interpretation of test Result</li> <li>2.5. Resolving discrepancies</li> <li>2.6. Rare phenotypes</li> </ol> </li> <li>3. Minor Blood Group       <ol style="list-style-type: none"> <li>3.1. Inheritance</li> <li>3.2. Characteristics of Antigen Antibodies</li> <li>3.3. Laboratory identification</li> <li>3.4. Interpretation of test Result</li> <li>3.5. Resolving discrepancies</li> <li>3.6. Rare phenotypes and variant antigens</li> </ol> </li> <li>4. Leukocyte Antigens</li> <li>5. Platelet Antigens</li> <li>6. Blood Donation       <ol style="list-style-type: none"> <li>6.1. General Concepts</li> <li>6.2. Review of Technical Standards</li> <li>6.3. Recruitment and Classification of Donors</li> <li>6.4. Screening of Donors and Collected Blood</li> <li>6.5. Blood Collection, Processing, Handling and Storage</li> <li>6.6. Blood Bank Inventory (refer to Technical Standards)</li> <li>6.7. Special Blood Donation           <ul style="list-style-type: none"> <li>• Autologous</li> <li>• Apheresis</li> <li>• Therapeutic</li> </ul> </li> </ol> </li> <li>7. Transfusion Medicine       <ol style="list-style-type: none"> <li>7.1. Component Preparation</li> <li>7.2. Methods of Transfusion           <ol style="list-style-type: none"> <li>7.2.1 Indirect Transfusion</li> <li>7.2.2 Exchange Transfusion</li> </ol> </li> </ol> </li> <li>8. Transfusion Reactions       <ol style="list-style-type: none"> <li>8.1. General Concepts: Classification</li> <li>8.2. Reaction Work-up</li> </ol> </li> <li>9. Laboratory Tests       <ol style="list-style-type: none"> <li>9.1. Compatibility Testing           <ol style="list-style-type: none"> <li>9.1.1 Type and Screen</li> <li>9.1.2 Cross-matching</li> </ol> </li> <li>9.2. Coombs Test</li> <li>9.3. Elution Techniques</li> <li>9.4. Antibody Titration Test</li> <li>9.5. Panel Cell Testing</li> </ol> </li> </ol>

		10. Hemolytic Disease of the Newborn (Isoimmune Hemolytic Anemia) 11. Medico-Legal Application of Blood Group Systems
Textbooks/References	:	Harmening Denise <b>MODERN BLOOD BANKING AND TRANSFUSION PRACTICES, 3<sup>RD</sup> EDITION</b> Henry, John Bernard- <b>CLINICAL DIAGNOSIS AND LABORATORY MANAGEMENT 20<sup>TH</sup> ED.</b> W.B. Saunders Co, Philadelphia PA 2000 Widmann, Sally V- <b>TEXTBOOK OF BLOOD BANK AND TRANSFUSION MEDICINE</b> W.B. Saunders Co. Philadelphia 2001 Vengelen, Virginia Tyler, <b>TECHNICAL MANUAL</b> , American Association of Blood Banks, 12 <sup>th</sup> edition <b>MANUAL OF STANDARDS FOR BLOOD BANKS AND BLOOD CENTERS IN THE PHILIPPINES</b> , BRL-DOH, Manila Phils., First Edition, 1996
Laboratory Exercises	:	1.0 Preparation of RBC Suspension, Dilution and Concentration 2.0 Test for Hemolysis 3.0 Test for Agglutination 4.0 ABO Blood Grouping 5.0 Rh Typing 6.0 Test for Rho Variant 7.0 Blood Donation 8.0 Preparation of Donor's Questionnaire 9.0 Screening of Donors: Preliminary Blood Examinations, Medical History etc. 10.0 Compatibility Testing ( Crossmatching) 11.0 Using BSA 12.0 Using LISS 13.0 Coombs Test: Direct and Indirect 14.0 Preparation of Serum Dilution/Determination of Antibody Titer 15.0 Heat Elution Technique 16.0 Preparation of IgG-Sensitized Red Cells 13.0 Quality Assurance/Quality Control in Blood Banking
Course Name	:	<b>IMMUNOLOGY AND SEROLOGY</b>
Course Description	:	This course deals with the basic concepts of immunology and principles of serological procedures, reading, interpretation of results and their clinical significance.
Course Credit	:	4 units ( 3 units lecture and 1 unit laboratory)
Contact Hours	:	3 hours lecture; 3 hours laboratory Total of 54 lecture hours and 54 laboratory hours per semester
Prerequisite	:	Biochemistry and Bacteriology
Placement	:	Third year, second semester
Course Objectives	:	At the end of the course, the student should be able to: 1. explain the immune system of the body 2. apply the principles of immunology in serology and laboratory diagnosis of specific disease through the use of serological reactions 3. appreciate the importance of the course in the diagnosis and

		<p>treatment of diseases</p> <p>4. manifest the following values: Integrity. honesty, critical thinking, empathy and value for life</p>
Course Outline	:	<p>Part 1: IMMUNOLOGY</p> <p>UNIT 1: INTRODUCTION</p> <ol style="list-style-type: none"> <li>1. Historical Development</li> <li>2. Definition of Terms</li> </ol> <p>UNIT II: IMMUNITY</p> <ol style="list-style-type: none"> <li>1. Natural/Innate Immunity <ul style="list-style-type: none"> <li>o First line of Defense <ul style="list-style-type: none"> <li>- Anatomical/ Physical Barriers of Infections</li> </ul> </li> <li>o Second Line of Defense <ul style="list-style-type: none"> <li>- Physiological Barriers</li> <li>- Biochemical Factors</li> <li>- Cellular Factors</li> <li>- Phagocytosis</li> </ul> </li> <li>o Third Line of Defense <ul style="list-style-type: none"> <li>- Immune response</li> </ul> </li> </ul> </li> <li>2. Acquired/Adaptive Immunity <ol style="list-style-type: none"> <li>2.1. Active Acquired Immunity</li> <li>2.2. Passive Acquired Immunity</li> <li>2.3. Humoral Immunity</li> <li>2.4. Cell-Mediated Immunity <ol style="list-style-type: none"> <li>2.4.1. Cytokines</li> </ol> </li> </ol> </li> </ol> <p>UNIT III: THE IMMUNE SYSTEM</p> <ol style="list-style-type: none"> <li>1. Phylogeny of the Immune System</li> <li>2. Anatomy Compartments of the Immune System</li> <li>3. Anatomy and Physiology of the Lymphoid Organs</li> <li>4. Cells of the Immune System <ul style="list-style-type: none"> <li>Ontogeny of the Lymphoid Cells</li> <li>Characteristics and Functions of the Lymphoid Cells and other cells involved in the Immune response</li> </ul> </li> </ol> <p>UNIT IV. ANTIGENS</p> <ol style="list-style-type: none"> <li>1. Structure and Biologic Properties of an Antigen</li> <li>3. Factors Affecting Immunogenicity</li> </ol> <p>UNIT V. ANTIBODIES</p> <ol style="list-style-type: none"> <li>1. Biologic Structure and Functional Properties of Antibodies</li> <li>2. Classification of Antibodies</li> <li>3. Enzymatic Fragmentation and Reduction of An Antibody Molecule</li> <li>4. Theories of Antibody Synthesis</li> <li>5. Immunoglobulin Genetics</li> <li>6. Antibody Diversity</li> <li>7. Monoclonal Antibody Production</li> </ol> <p>UNIT VI. MAJOR HISTOCOMPATIBILITY COMPLEX</p> <ol style="list-style-type: none"> <li>1. MHC Cluster of Genes: Characteristics and Importance</li> <li>2. MHC Genetic Regions</li> </ol>

H2 Complex Map

HLA Complex Map

5. HLA Classes of Molecules

6. HLA Testing and Their Application

**UNIT VII: COMPLEMENT SYSTEM**

1. Major Proteins of the Complement System

2. Pathways of Activation

3. Biologic Consequences of Activation

4. Measurement of its Biologically Active Components

**UNIT VIII: BIOLOGY OF THE IMMUNE RESPONSE**

1. Fate of the Antigen

2. Phases of Immune response

3. Structure and Functions of the T cell Receptor (TCR)

4. T and B cell Activation Process

**UNIT IX: IMMUNOMODULATION**

1. Immunopotentiality

2. Immunosuppression

3. Immune Tolerance

**UNIT X: ASSAYS OF IMMUNE COMPETENCE**

1. Enumeration and Functional Assays of T cells

2. Enumeration and Functional Assays of B Cells

3. Assays on the Functions of Phagocytes

**UNIT XI: HYPERSENSITIVITY REACTIONS**

1. Types of Hypersensitivity

2. Laboratory Methods

**UNIT XII: TRANSPLANTATION**

1. Terminologies used in Transplantation

1.1. Types of Graft

2. Host response to Transplantation

2.1. Host-versus-Graft reaction

2.2. Graft-versus-Host reaction

2.3. Types of Graft Rejection

**UNIT XIII: TUMOR IMMUNOLOGY**

1. Cancer – its Clinical Features and Biology

2. Tumor markers

3. Laboratory Detection

**UNIT XIV: AUTOIMMUNITY**

1. Autoimmune Diseases

○ Etiologies

○ General Clinical Features

○ Classification

**PART II: SEROLOGY**

**UNIT XV: ANTIGEN – ANTIBODY REACTIONS**

1. Intermolecular Forces Involved in Antigen – Antibody reaction

1.2. strength of Attraction Between Antigens - Antibodies



2. Levels of Antigen –Antibody Interaction-Principles and Application

Primary Reactions

- 2.1.1 Immunofluorescence
- 2.1.2 Radioimmunoassay
- 2.1.3 Enzyme Immunoassay
- 2.1.4 Chemiluminescence

2.2 Secondary Reactions

- 2.2.1 Precipitation
  - 2.2.1.1 Immunodiffusion
  - 2.2.1.2 Immunoelectrophoresis
- 2.2.2 Agglutination
  - 2.2.2.1. Hemagglutination
- 2.2.3 Flocculation
- 2.2.4 Neutralization
  - 2.2.4.1 Toxin Neutralization
  - 2.2.4.2 Viral Neutralization
- 2.2.5 Complement Fixation

UNIT XVI: SEROLOGICAL APPLICATION

1. Collection, Processing and Preservation of Specimen for Serologic Examination

2. Serologic Tests for Diagnosis of Different Diseases

2.1 Bacterial, Rickettsial, Mycoplasmal Diseases

- 2.1.1 Syphilis
- 2.1.2 Typhoid Fever
- 2.1.3 Streptococcal Infection
- 2.1.4 Brucellosis
- 2.1.5 Tularemia
- 2.1.6 Leptospirosis
- 2.1.7 Bacterial Meningitis
- 2.1.8 Typhus
- 2.1.9 Primary Atypical Pneumonia

2.2 Viral Diseases

- 2.2.1 Hepatitis
- 2.2.2 HIV
- 2.2.3 infectious Mono-nucleosis
- 2.2.4 Influenza
- 2.2.5 Dengue Fever
- 2.2.6 Rubella Infection
- 2.2.7 Cytomegalovirus Infection
- 2.2.8 Herpes Simplex Infection

2.3 Parasitic diseases

- 2.3.1 Toxoplasmosis
- 2.3.2 Amoebiasis

2.4 Antifungal Diseases

- 2.4.1. Collagen Vascular Diseases (e.g. SLE, RA)

2.5 Collagen Myeloma

2.6 Multiple Myeloma

2.7 Thyroid Disorders

		<b>XVII: QUALITY ASSURANCE</b>
Laboratory Exercises	:	<ol style="list-style-type: none"> <li>1. Anatomical body defense- skin</li> <li>2. Chemical body defense- effect of normal human serum on certain Species of bacteria</li> <li>3. Phagocytosis</li> <li>4. Organs and Cells of the immune system</li> <li>5. Preparation of Antibodies- Antiserum in rabbits</li> <li>6. Preparation of Serial Dilution</li> <li>7. Flocculation-VDRL, RPR</li> <li>8. Precipitation by Ring method</li> <li>9. Immunodiffusion</li> <li>10. Febrile Agglutination Tests-Widal Test, Weil Felix test</li> <li>11. CRP Latex Agglutination test</li> <li>12. RF Latex Agglutination test</li> <li>13. ASO Latex Agglutination test</li> <li>14. HBs One Step Serum test (w/emphasis on the mechanism of reaction)</li> <li>15. Particle Agglutination Test for Anti-HIV</li> </ol>
Textbooks/References		<ol style="list-style-type: none"> <li>1. Turgeon, Mary Louise, <b>IMMUNOLOGY AND SEROLOGY IN LABORATORY MEDICINE, 2<sup>nd</sup> edition</b>, Mosby-Year Book, Inc., St. Louis, Missouri, 1996</li> <li>2. Abbas, Abul K., Lictman, Andrew H., Pober, Jordan D., <b>CELLULAR AND MOLECULAR IMMUNOLOGY, 4<sup>th</sup> edition</b>, W.B. Saunders Co., Philadelphia, USA, 2000.</li> <li>1. Bryant, Neville J., <b>LABORATORY IMMUNOLOGY AND SEROLOGY, 3<sup>rd</sup> edition</b>, W.B. Saunders Company Harcourt 4. Brace Jovanovich, Inc., Philadelphia, London, Montreal, Sydney, Tokyo.</li> <li>4. Stites, Danielle., <b>MEDICAL IMMUNOLOGY</b>, latest edition</li> <li>5. Roitt, Ivan., <b>IMMUNOLOGY</b> (latest edition)</li> </ol>
Course Title	:	<b>RESEARCH 1 - INTRODUCTION TO RESEARCH</b>
Course Description	:	The course deals with the study of the general concepts of a research process. It also includes the study of the rudiments in the preparation of a research including problem identification, literature search, limitations and scope of the study, sampling, statistical analysis, budget preparation and GANTT chart preparation
Credit Units	:	1 unit lecture
Contact Hours	:	1 hour lecture per week (no laboratory) Total of 18 lecture hours per semester
Prerequisite	:	None
Placement	:	Third year, Second semester

<p>Course Objectives</p>	<p>:</p>	<p>At the end of the course, the student should be able to:</p> <ol style="list-style-type: none"> <li>1. discuss the basic concepts of research and the process of making a research proposal.</li> <li>2. recognize the importance of research to the medical technology profession</li> <li>3. formulate a research problem, choose the appropriate method, literature source, statistical tools and presentation of data.</li> <li>4. prepare a research proposal</li> <li>5. understand the ethical considerations in research.</li> <li>6. manifest a desire to develop the medical technologist's personal, social and professional responsibilities in the conduct of research.</li> </ol>
<p>Course Outline</p>		<ol style="list-style-type: none"> <li>1. Introduction to Research <ul style="list-style-type: none"> <li>Definition of Research</li> <li>Importance of Research</li> <li>General types of Research</li> <li>Research process</li> <li>Ethical considerations in doing research.</li> </ul> </li> <li>2. Problem Identification <ul style="list-style-type: none"> <li>Sources of Problem</li> <li>Characteristics of a Good Problem</li> <li>Selection Process</li> </ul> </li> <li>3. Theoretical, Conceptual and Operational Frameworks</li> <li>4. Hypothesis</li> <li>5. Review of Related Literature</li> <li>6. Types of Research <ul style="list-style-type: none"> <li>Basic</li> <li>Applied</li> <li>Action</li> </ul> </li> <li>7. Descriptive Research <ul style="list-style-type: none"> <li>Definition</li> <li>Types/Classification</li> <li>Uses</li> <li>Advantages; Disadvantages; Limitations</li> </ul> </li> <li>8. Historical Research <ul style="list-style-type: none"> <li>8.1 Definition</li> <li>8.2 Types/Classification</li> <li>8.3 Uses</li> <li>8.4 Advantages; Disadvantages, Limitations</li> </ul> </li> <li>9. Experimental Research <ul style="list-style-type: none"> <li>9.1 Definitions</li> <li>9.2 Designs</li> <li>9.3 Uses</li> <li>9.4 Advantages, Disadvantages, Limitations</li> <li>9.5 Variables</li> <li>9.6 Ethical considerations</li> </ul> </li> <li>10. Sample <ul style="list-style-type: none"> <li>10.1 Sampling Strategies</li> <li>10.2 Sample size</li> <li>10.3 Sample Collection</li> </ul> </li> <li>11. Making of Questionnaire</li> </ol>

		12. Budget Preparation 13. Gantt Chart Preparation
		<b>NOTE: OUTPUT REQUIREMENT IS SUBMISSION OF COMPLETED RESEARCH PROPOSAL (CHAPTERS 1-3)</b>
Textbook	:	1. Adanza, Estela . Martinez, Fe N., <b>METHODS OF RESEARCH FOR THE HEALTH PROFESSIONS</b> , Manila Rex Bookstore Inc. 2002
References	:	1. Andres, Thomas. <b>PREPARING A RESEARCH PROPOSAL: A DETAILED ANALYSIS</b> . Quezon City: New Day Publishers, 1999. 2. Arboleda, Cora, <b>WRITING A THESIS PROPOSAL</b> 3. <b>Calmorin and Calmorin METHODS OF RESEARCH AND THESIS WRITING</b>
Course Title	:	<b>RESEARCH 2 ( RESEARCH PAPER WRITING AND PRESENTATION)</b>
Course Description	:	This course deals with the completion of the research process started in Research 1.Emphasis is on the presentation, analysis and interpretation of data and summary of findings and recommendations.
Course Credit	:	2 units ( 1 unit lecture and 1 unit laboratory/field work)
Contact Hours	:	1 hour lecture and 3 hours laboratory/field work Total of 18 lecture hours and 54 laboratory/field work hours per semester
Prerequisite	:	Research 1
Placement	:	Fourth year, First semester
Course Objectives	:	At the end of the course, the student should be able to : 1. Appreciate the correct procedure in undertaking research activities 2. Write chapters 4 and 5 3. Present the completed research paper.
Course Outline	:	1. Review of the past lessons particularly on the preparation of the research proposals 2. Statistical Analysis: A Review Descriptive Comparative Parametric Non-parametric 3. Use of tables and graphs 4. Computer-Aided Statistical Analysis 5. Presentation, Analysis and Interpretation of Data 6. Summary of Findings, Conclusions and Recommendations 7. Bibliography: Books, Articles and Journals, Theses and Abstractions 8. Research Abstract 9. Final Presentation  <b>NOTE: FINAL REQUIREMENT IS A COMPLETED</b>

		<b>RESEARCH PAPER</b>
Textbooks	:	Same as in Research 1
Course Title	:	<b>PRINCIPLES AND STRATEGIES OF TEACHING IN HEALTH EDUCATION</b>
Course Description	:	This course deals with the principles and teaching/learning strategies in health education including adult learning, the roles of a teacher/medical technologist in different settings. It also includes strategies that enhance critical thinking, clinical laboratory teaching, assessing and evaluating learning.
Course Credit	:	3 units lecture (no laboratory)
Contact Hours	:	3 hours per week Total of 54 lecture hours per semester
Prerequisite	:	None
Placement	:	Fourth year, First semester
Course Objectives	:	At the end of the course, the students must be able to: <ol style="list-style-type: none"> <li>1. Explain teaching/learning process</li> <li>2. Relate the learning experiences in the practice of the profession</li> <li>3. Internalize the values in different roles</li> <li>4. Apply the principles, methods and strategies in different settings</li> <li>5. Prepare a sample course syllabus</li> <li>6. Recognize the values of Traditional Teaching, Activity-based Teaching, Distance Learning and Teaching Psychomotor Skills</li> <li>7. Assess critical thinking and clinical laboratory teaching</li> <li>8. Evaluate learning</li> </ol>
Course Outline	:	<ol style="list-style-type: none"> <li>1. Introduction to Teaching <ol style="list-style-type: none"> <li>1.0. Teaching and Learning Process <ol style="list-style-type: none"> <li>1.0.0. Teaching</li> <li>2.0.0. Learning <ol style="list-style-type: none"> <li>1.0.0.0. Learning Theories <ul style="list-style-type: none"> <li>▪ Classical Conditioning</li> <li>▪ Operant Conditioning</li> <li>▪ Social Conditioning</li> </ul> </li> </ol> </li> </ol> </li> <li>2.0. The “How of Teaching” <ol style="list-style-type: none"> <li>1.0.0. Strategies</li> <li>2.0.0. Approach</li> <li>3.0.0. Technique</li> <li>4.0.0. Method</li> </ol> </li> <li>3.0. Teaching Approaches <ol style="list-style-type: none"> <li>1.0.0. Discovery</li> <li>2.0.0. Conceptual</li> <li>3.0.0. Process</li> <li>4.0.0. Unified</li> </ol> </li> <li>4.0. Instructional Media</li> <li>5.0. Health Education</li> </ol> </li> <li>2. Roles, Functions and Characteristics of a Health Professional in Education <ol style="list-style-type: none"> <li>1.0. The Teacher <ol style="list-style-type: none"> <li>1.0.0. Characteristics of a Good Teacher</li> </ol> </li> </ol> </li> </ol>

- 2.0.0. Professional Competence
- 3.0.0. Interpersonal Relationship
- 4.0.0. Teaching/Evaluation Practices
- 5.0.0. The Teacher/Medical Technologist and his/her roles in guidance
- 6.0.0. As a Motivator
  - 1.0.0.0. Ways to Motivate the Learners
  - 2.0.0.0. Medical Technologists in the Community
- 3. Principles of Teaching and Learning
  - 1.0. Teaching as a Process
    - 1.0.0. As a process or as a “giving off process”
    - 2.0.0. as involving more of the learner than a teacher
    - 3.0.0. as a system of actions and interactions
    - 4.0.0. as an adjustive act
    - 5.0.0. as providing the learner with basic tools of learning
    - 6.0.0. as inherently a humane activity
    - 7.0.0. as structuring the learning environment
    - 8.0.0. as an inquiry process
    - 9.0.0. as a complex
    - 10.0.0. as a science and as an art
    - 11.0.0. teaching applying the principles of other significantly related disciplines
  - 4. Learning theories and styles
    - 1.0. Behavioral Theories
    - 2.0. Cognitive Learning Theories
    - 3.0. Social Cognitive Theory
    - 4.0. Types of Learning
      - 1.0.0. Signal Learning
      - 2.0.0. Stimulus Response Learning
      - 3.0.0. Chaining
      - 4.0.0. Verbal Association
      - 5.0.0. Discrimination Learning
      - 6.0.0. Concept Learning
      - 7.0.0. Rule Learning
      - 8.0.0. Problem Solving
    - 5.0. Learning Styles
      - 1.0.0. Learning Style Models
        - 1.0.0.0. Kolb’s Theory of Experimental Learning
        - 2.0.0.0. Gregore Cognitive Styles Models
        - 3.0.0.0. Field Independence
        - 4.0.0.0. Dependence Model
      - 2.0.0. Matching Learning Styles to Instruction
  - 5. Adult Learning
    - 1.0. A model of Adult Learning
    - 2.0. Comparison of Pedagogy from Andragogy
    - 3.0. Propositions of Learning
    - 4.0. Gagne’s Condition of Learning
  - 6. Planning and Conducting Classes
    - 1.0. Planning Sequence
    - 2.0. Course Syllabus
      - 1.0.0. Primary purpose

- 2.0.0. Functions
- 3.0.0. Developing a Course Outline/Syllabus
- 4.0.0. Formulation of Objectives
  - 1.0.0.0.Types of Objectives
  - 2.0.0.0.Characteristics of Objectives
- 5.0.0. Determination of Strategies/Methods to be used
- 6.0.0. Selection of Appropriate Instructional Materials
- 7.0.0. Determination of Time Allotment
- 8.0.0. Evaluation of Student Performance
- 9.0.0. Taxonomy of Objectives
  - 1.0.0.0. Cognitive Domain
  - 2.0.0.0.Affective Domain
  - 3.0.0.0.Psychomotor Domain
- 10.0.0. Selecting and Organizing Content
- 11.0.0. Planning Assignments
- 12.0.0. Conducting a Class
- 7. Teaching Strategies
  - 1.0. Traditional Teaching Strategies
    - 1.0.0. Lecture Method
    - 2.0.0. Integrated Method
      - 1.0.0.0.Lecture/Discussion
      - 2.0.0.0.Lecture/Demonstration
      - 3.0.0.0.Demonstration/Return Demonstration
    - 3.0.0. Questioning Method
    - 4.0.0. Use of Audio-Visuals
    - 5.0.0. Interactive Lecture (Class Discussion)
    - 6.0.0. Film Showing Method
    - 7.0.0. Reporting Method/Discussion/Report Back Session
  - 2.0. Other Common Teaching Methods
    - 1.0.0. Case Study Method
    - 2.0.0. Role Playing Method
    - 3.0.0. Buzz Session
    - 4.0.0. Debate Forum
    - 5.0.0. Panel Forum/Round Table Conference
    - 6.0.0. Symposium/Seminar/Workshop
    - 7.0.0. Deductive/Inductive Method
  - 3.0. Activity-Based Teaching Strategies
    - 1.0.0. Cooperative Learning
    - 2.0.0. Simulations
    - 3.0.0. Problem Based Learning
    - 4.0.0. Self-Learning Modules
  - 4.0. Computer Teaching Strategies
    - 1.0.0. Computer Technology and Learning
    - 2.0.0. Computer Assisted Instruction
    - 3.0.0. Computer Managed Instruction
    - 4.0.0. The Internet
- 8. Distance Learning
  - 1.0. Advantages and Disadvantages of Distance Learning
  - 2.0. Clinical Education in Distance Learning
  - 3.0. Interactive Television Classes
  - 4.0. Distance Learning via the Internet

	<ol style="list-style-type: none"> <li>9. Teaching Psychomotor and Promoting/Assessing Critical Thinking       <ol style="list-style-type: none"> <li>1.0. History of Teaching Psychomotor Skills</li> <li>2.0. Psychomotor Skills           <ol style="list-style-type: none"> <li>1.0.0. Phases of Skill Learning</li> <li>2.0.0. Attention Feedback Practice, Mental Practice</li> </ol> </li> <li>3.0. Learning Psychomotor Skills</li> <li>4.0. Teaching Skills</li> <li>5.0. Assessment of Psychomotor Skill Learning</li> <li>6.0. Promoting and Assessing Critical Thinking           <ol style="list-style-type: none"> <li>1.0.0. Aspects of Critical Thinking</li> <li>2.0.0. Distinguishing Critical Thinking from Other Technology Concepts</li> <li>3.0.0. Ways we inhibit the Critical Thinking of Medical Technology Students</li> <li>4.0.0. Strategies that Enhance Critical Thinking               <ol style="list-style-type: none"> <li>1.0.0.0. Discussion</li> <li>2.0.0.0. Asking Effective Questions</li> <li>3.0.0.0. Test Interaction</li> <li>4.0.0.0. Problem-Based Learning</li> <li>5.0.0.0. Concept Mapping</li> <li>6.0.0.0. Positive Learning Environment</li> </ol> </li> <li>5.0.0. Assessing Critical Thinking</li> </ol> </li> </ol> </li> <li>10. Clinical Teaching       <ol style="list-style-type: none"> <li>1.0. Purposes of Clinical Laboratory</li> <li>2.0. Models of Clinical Teaching</li> <li>3.0. Preparation for Clinical Instruction</li> <li>4.0. Conducting a Clinical Laboratory Session</li> <li>5.0. Evaluating Learner Progress</li> <li>6.0. Clinical Laboratory Evaluation Tools</li> </ol> </li> <li>11. Assessing and Evaluating Learning       <ol style="list-style-type: none"> <li>1.0. Test Blueprint</li> <li>2.0. Multiple-Choice Questions</li> <li>3.0. True-False Questions</li> <li>4.0. Essay-Type Questions</li> <li>5.0. Test Item Analysis</li> <li>6.0. Item Discrimination</li> </ol> </li> </ol>
References	<ol style="list-style-type: none"> <li>1. Beck, Susan J. &amp; Legrys, Vicky. <b>CLINICAL LABORATORY EDUCATION RESEARCH</b>. Appleton and Lange Publishing.</li> <li>2. Abbatt, Fredd, McMahon, Rosemary, <b>TEACHING HEALTH-CARE WORKERS. A PRACTICAL GUIDE</b>. Macmillian Education LTD.</li> <li>3. Gregorio, Herman C. , <b>PRINCIPLES AND METHODS OF TEACHING</b>. Garotech Publishing, Revised Edition, 1976.</li> <li>4. Lardizabal, Amparo S., Campos, Milgaros A., <b>THEORY AND PRACTICE IN STUDENT TEACHING</b>, Katha Publishing Co., Inc. 1999</li> <li>5. De Young, Sandra, <b>TEACHING STRATEGIES FOR NURSE EDUCATORS</b>, Pearson, South Asia PTE., LTD c. 2002. New Jersey 07458.</li> </ol>



**Article VIII**  
**OTHER REQUIREMENTS**

**Section 12. Program Administration**

The higher education institution offering BS Medical Technology/Bachelor in Medical Laboratory Science program shall be administered by a full-time dean/head with the following qualifications:

- A Filipino citizen of good moral character;
- Must be a registered Medical Technologist in the Philippines with at least master 's degree in Medical Technology or other health related courses, Biological Science, Education and Administration;
- Have at least five (5) years of very satisfactory teaching experience (Medical Technology professional subjects) and must have adequate managerial competence and technical expertise in school management.

The general functions and responsibilities of the Dean of Medical Technology:

- administers general policies of the college/university;
- exercises educational leadership among Medical Technology faculty members, as stated , in the Manual of Regulations for Private Schools Eight Edition 1992, Art. VIII, Sec. 41 on the Qualifications and Functions of the Dean.

The dean shall have a maximum of twelve (12) units of teaching load and shall render at least twenty (20) hours of administrative services per week, distributed proportionately in the days of the week.

**Section 13. Faculty**

A faculty member teaching licensure and non-licensure Medical Laboratory Science subjects shall have academic preparation appropriate to teaching assignment:

2. For those teaching subjects included in the licensure examination, the following qualifications are required:
  - a registered Medical Technologist with current and valid PRC license:
  - holder of a Master's degree in Medical Technology and other health related fields;
  - with a minimum of one (1) year experience in training of Medical Technology interns in an accredited laboratory; or in lieu thereof, one (1) year experience in a licensed clinical laboratory
2. For those teaching non-licensure Medical Technology subjects:
  - a faculty member who has appropriate Master's/Doctoral degree in related fields with at least two (2) years teaching experience shall be allowed to teach subjects not included in the licensure examination.
3. In case of vacancy in the teaching force of the college during the school year, a substitute or a replacement with similar or higher qualifications shall be employed.
4. The conditions of employment shall be in accordance with the institutional policy.
  - The probationary period shall be in accordance with the Provision of the Labor Law Code.
  - Every college/university shall have a faculty manual containing information and policies on all matters pertaining to faculty.
5. The faculty member shall actively pursue continuing professional development.
6. The faculty member shall be actively involved in research activities.
7. The faculty member shall obtain faculty evaluation rating of “ highly satisfactory .”
8. At least fifty percent (50%) of every college/university faculty handling professional subjects shall be in full time status.

Section 14. **Library-** Every college/ university offering the Medical Laboratory Science Program shall have adequate library resources relevant to Medical Technology/Medical Laboratory Science adequate in quantity, which shall serve the needs of the students and shall be in accordance with the college's /university 's development and expansion plans. A

well developed Medical Laboratory Science library whether established separately or as a section in a general library shall be clearly defined as Medical Technology/Medical Laboratory Science collection. It shall be managed by a full-time licensed librarian.

### **Book Collections**

- The library shall be open at least eight (8) hours a day on school days.
- The institution offering the Medical Laboratory Science program shall assure the availability of at least two (2) titles of each current edition of Medical Laboratory Science books, pamphlets, monographs and serials specifically used as basic reference reading materials for each Medical Technology subject.
- To update the students and faculty members with the latest developments in the profession, a subscription to a minimum of one (1) international journal and two (2) local journals as well as Health Science periodicals shall be maintained.
- The institution offering the Medical Technology course has the freedom to select the basic textbooks to be used by the students in all the subjects specified in the curriculum. However, the library facility of the institution shall have at least one (1) copy of each of these textbooks for every fifteen (15) students enrolled in the class.
- All income from the students' library fee shall be spent strictly for the acquisition of books, journals, publications and other expenses toward the improvement of the library.
- There shall be appropriate materials and equipment such as :
  - Computer with internet access
  - CD-ROMs, etc.

### **Section 15. Facilities and Equipment**

#### **Classroom requirements**

- The institution shall provide a fully-equipped laboratory facilities for adequate instruction.
- A laboratory room shall have two (2) exits and a minimum floor space of one square meter for every 1-2 students, and a locker for every 1-5 students. Rooms shall be well lighted and well ventilated.

#### **Laboratory Requirements**

- Each laboratory room shall have:
  - A continuous and adequate supply of water, gas and electricity
  - 1. Readily accessible safety devices/first aid facilities
    - Fire extinguishers
    - Emergency shower
    - First aid kit/cabinet

- Safety posters
  - Exhaust system and/or fume hoods
  - Acid resistant laboratory table tops
- The institution shall provide the requirements for the following laboratories:
    1. Chemistry (General, Analytical, Organic, Biochemistry)
    2. Biological Sciences (Botany, Zoology, Anatomy and Physiology)
    3. Physics
    4. Clinical Chemistry
    5. Immunology and Serology
    6. Blood Banking
    7. Hematology
    8. Microbiology (Bacteriology, Mycology, Virology)
    9. Clinical Microscopy
    9. Parasitology
    9. Histopathology
    9. Toxicology
  - The institution shall provide appropriate and safe waste disposal system.

**List of Laboratory Facilities - See Appendix B**

**Section 16. Admission Requirements**

The applicant for admission to a degree course in Medical Technology/Medical Laboratory Science must have :

- graduated from a general secondary course from a school authorized by the government;
- satisfactorily complied with the admission requirements of the school;
- never been convicted or found guilty of any criminal offense and/or any misconduct involving moral turpitude.

As a general rule, no applicant shall be enrolled in the Medical Technology course unless he/she presents the required pertinent school documents before the end of the enrolment period.

**Section 17. Instructional Standards**

The institution shall maintain a high standard of quality of instruction.

1. The institution shall have attained recognition status.
2. The professional licensure performance rating shall be 50% of NPR (National Passing Rate) for the last 5 years
3. The institution shall provide a systematic and continuing plan of evaluation of students' progress through a grading system that is consistent and congruent to the objectives set by the college/university.

4. The Medical Technology education program shall adopt the prescribed textbooks which are of recent edition and which reflect current trends in the Medical Technology profession and which do not violate Philippine laws.
5. The Dean shall make arrangements with the administration to ensure that textbooks adopted for use are sufficiently available in the institution's library for students to use or refer.

Article X  
**REPEALING CLAUSE**

Section 18. This Order supersedes all previous issuances concerning medical technology education which may be inconsistent or contradictory with any of the provisions hereof.

Article XI  
**EFFECTIVITY**

Section 19 This set of Policies, Standards and Guidelines for Medical Technology Education shall take effect beginning school year 2006 -2007.

Pasig City, Philippines, March 15, 2006.

Original Signed  
**CARLITO S. PUNO**  
Chairman

## **APPENDIX A**

### **GENERAL GUIDELINES FOR THE MEDICAL TECHNOLOGY INTERNSHIP PROGRAM**

#### **ARTICLE I VISION**

The Medical Technology/Medical Laboratory Science Internship Training Program will be a global academic enterprise, recognized not only in the Philippines, but throughout the world as demonstrated by the students, patients, employers, professionals and the public. It will be the standard by which schools measure their performance in terms of Medical Technology/Medical Laboratory Science internship training of students. Its hallmarks will be competence, teamwork, and initiative of the students and their ability to respond to patient care in a health care delivery system.

#### **MISSION STATEMENT**

The mission of the Medical Technology/Medical Laboratory Science Internship Training Program is to provide quality training of Medical Technology/Medical Laboratory Science students; and help them become humane and competent Medical Technologists/Laboratory Scientists who are globally competitive and committed to serve the health needs of the community.

#### **ARTICLE II DESCRIPTION**

The Medical Technology/Medical Laboratory Science Internship Training Program is in the fourth year level of Bachelor of Science in Medical Technology/Medical Laboratory Science course. It is an intensive practical and theoretical training in the different sections in the clinical laboratory namely, Clinical Chemistry, Hematology, Immunohematology (Blood Banking), Immunology, Serology, Microbiology, Urinalysis and Other Body Fluids (Clinical Microscopy), Parasitology, Histopathology/Cytology and other emergent technologies. It also emphasizes the development of proper value system.

#### **ARTICLE III OBJECTIVES**

The program aims to:

1. Enhance the knowledge, skills and attitudes needed for a member of the health care delivery team who with precision and accuracy performs the clinical laboratory procedures needed to help the physician in the proper diagnosis, treatment and prevention of diseases.
2. Develop among students a well-rounded personality with a healthy outlook and oriented towards intelligent, ethical and active participation in professional as well as community welfare activities.
3. Develop critical thinking skills that will enable them to participate in research endeavors/activities and respond to challenges of the profession.
4. Develop humane and competent Medical Technologists/Laboratory Scientists who are globally competitive, and committed to serve the health needs in both local and international communities.

**ARTICLE IV  
REQUIREMENTS**

1. Only those who completed all the course requirements for the first three and one half years shall be qualified for internship.
2. Applicants shall undergo physical and laboratory examinations which will include complete blood count (CBC), urinalysis, fecalysis, drug tests (metamphetamines and canabinoids), HbsAg, anti-HBs and chest X-ray and/or Sputum Microscopy. They are also required to present proof of vaccination against hepatitis B. Any applicant found positive for infectious diseases (like hepatitis, tuberculosis, etc.) shall be temporarily suspended to undergo training unless proof of adequate/complete treatment is submitted.
3. Other requirements of colleges and universities prior to internship shall be observed.

**ARTICLE V  
GENERAL RULES**

1. The school, in coordination with the accredited training laboratory shall provide a training program in line with the approved CHED updated rules on Medical Technology Internship Program (MTIP).
2. The school and the training center shall enter into a contract of affiliation.
3. The school shall assign interns only to accredited training centers.
4. The school shall pay the required affiliation fee to the training center.
5. As part of the CHED Memorandum on Medical Technology internship, colleges and universities shall conduct seminars relevant to Medical Technology education.
6. The interns shall be required to have a total of forty (40) hours per week of duty to complete a total of 1,080 hours in twenty-seven weeks. The interns must render the following number of hours in each discipline:

6.1. Clinical Chemistry	-	230 hrs.
6.2. Clinical Microscopy & Parasitology	-	230 hrs.
6.3. Microbiology	-	150 hrs.
6.4. Hematology	-	120 hrs.
6.5. Blood Banking	-	150 hrs.
6.6. Histopathologic Technique & Cytology	-	100 hrs.
6.7. Immunology & Serology	-	100 hrs.
- The contact hours for Phlebotomy (Specimen Collection, Handling and Transport) shall be integrated in all sections mentioned above.
7. The affiliation fee should be distributed as follows:
  - 8.1 hospital - 50%
  - 8.2 laboratory staff involved in the training program - 50%

**ARTICLE VI**  
**DUTIES / RESPONSIBILITIES OF CLINICAL INSTRUCTORS/INTERNS’**  
**COORDINATOR/CLINICAL COORDINATORS**

1. There shall be one (1) clinical instructor/interns’ coordinator/clinical coordinator for every 25 students/interns;
2. The Clinical Instructor/Intern Coordinator/Clinical Coordinator shall have the following duties/ responsibilities:
  - 1.0. acts as a liaison officer between the Higher Education Institution (HEI) and the accredited affiliating hospital-based or free-standing clinical laboratory;
  - 2.0. coordinates with the training officer and/or the chief medical technologist in the proper implementation of the internship training programs of both the HEI and the accredited training clinical laboratory in terms of:
    - 1.0.0. progressive evaluation of interns’ attendance, behavior and performance on an official visit at least once a month;
    - 2.0.0. preparation and submission of monthly report on matters related to the proper implementation of the internship training program
    - 3.0.0. participation in the review, revision and updating of the internship training program.
3. performs other related functions as maybe assigned by the Dean/Head of the HEI.

**ARTICLE VII**  
**DUTIES AND RESPONSIBILITIES OF INTERNS**

Section 1. Proper Decorum

The intern shall:

- 1.0 Behave as professional at all times
- 2.0 Treat the patients with compassion.
- 3.0 Avoid undue familiarity and intimacy
- 4.0 Treat results with utmost confidentiality.
- 5.0 Work harmoniously with fellow interns and other personnel of the institution
- 6.0 Follow the provision in the code of ethics of a medical technologist

Section 2. Attendance and Punctuality

The intern shall:

- 2.1 Adhere strictly to the policies of the institution and training center on absences and tardiness

Section 3. Laboratory Breakages

The interns shall be solely responsible for the payment, replacement or repair of laboratory equipment and supplies incurred by them.

Section 4. Uniform

The intern shall wear the complete uniform prescribed by the school.



**ARTICLE VIII  
OFFENSES AND SANCTIONS**

Section 1. Absences/tardiness incurred during internship shall be given the following sanctions:

- 1.0. for every excused absence, eight (8) hours make-up
- 2.0. for every unexcused absence, twenty-four (24) hours make-up
- 3.0. for every accumulated tardiness of sixty minutes, 8 hours make-up
- 4.0. for accumulated absences exceeding twenty percent (20%) of the total number of internship hours per hospital rotation, repeat internship.
- 5.0. for unauthorized out-of-post, eight (8) hours make-up

Section 2. Sanctions shall be determined by the training center and the institution on the following:

- 3.0 cheating in any form (forgery, falsification of documents, etc.)
  - 2.2 alcohol intoxication
  - 2.3. inflicting injuries
  - 2.4 carrying deadly weapon
  - 2.5 use of prohibited drugs
  - 2.6 sexual harassment
  - 2.7 vandalism
  - 2.8 willful destruction of hospital property
  - 2.9 gambling
  - 3.10 stealing
  - 3.11 immorality

**ARTICLE IX  
RESPONSIBILITIES OF THE ACCREDITED MEDICAL TECHNOLOGY TRAINING  
LABORATORIES**

Section 1. Responsibilities of the Institution

The institution shall:

- 1.0. meet the following requirements before applying for affiliation to any clinical laboratory:
  - 1.1.1. approval from the CHED in conjunction with the Board of Medical Technology, PRC
  - 1.1.2. compliance with the provisions of R.A 5527, Medical Technology Law
- 1.0 provide a clinical instructor experienced in actual laboratory work to monitor individual attendance, behavior and performance of the students, in coordination with the training laboratory and to assist the affiliating laboratory in implementing the Medical Technology training program.
- 2.0 ensure that the interns pay or replace damages, breakages and losses incurred by the interns on laboratory property, equipment and supplies.
- 3.0 ensure that the clinical instructors and students observe and abide with the policies, rules and regulations of the hospitals and that discipline is maintained at all times.

Section 2. Responsibilities of the Medical Technology Training Laboratories

- 2.1 The training center shall be a duly accredited and licensed clinical laboratory as specified by the law on clinical laboratories, R.A. 4688
- 2.2 There shall be an adequate number of registered medical technologists for each of the sections of clinical laboratory

- 2.3 The clinical laboratory shall have adequate space to accommodate both staff and interns
- 2.4 The clinical laboratory shall have sufficient equipment and supplies based on the volume and types of examinations and number of interns to be trained.
- 1.0 The Medical Technology/Medical Training Laboratory shall provide adequate supervision in the daily activities of the interns.
  - 1.0.0 The person responsible for the training program shall be a registered medical technologist
  - 2.0.0 The program shall provide for an objective measure of evaluation of the baseline skills and knowledge
  - 3.0.0 The program shall include the following:
    - 1.0.0.0 Objectives of the training
    - 2.0.0.0 Principles, methods and procedures to be taught
    - 3.0.0.0 Right work attitude and ethical values
    - 4.0.0.0 Required quota of tests to be performed to develop accuracy and precision
    - 5.0.0.0 Objective evaluation of performance in each section
- 2.0 The Medical Technology Training Laboratory shall be responsible for the orientation of interns on policies and procedures of the laboratory.
- 3.0 The Medical Technology Training Laboratory shall inform the school, through the clinical coordinator, of violations and misconduct committed by the interns.

**Section 3. Joint Responsibilities of the Institution and the Training Center**

The institution and the training center shall:

- 3.1 properly and effectively implement the training program
- 3.2 hold monthly conference to evaluate the implementation of the program and institute changes
- 3.3 maintain cooperation and harmonious relationships among the interns and staff of the training center at all times.

**ARTICLE IX  
PERFORMANCE EVALUATION**

- 1. To evaluate the performance of the interns the following shall be applied:
  - 1.0 Examinations
    - 1.0.0 Theoretical
    - 2.0.0 Practical
  - 2.0 Clinical Performance
    - 1.0.0 Competency Skills
    - 2.0.0 Attitude and Behavior
    - 3.0.0 Attendance and Punctuality

**PROPOSED LIST OF MINIMUM EQUIPMENT/  
INSTRUMENTS/CHEMICAL/ SUPPLIES REQUIREMENTS  
FOR MEDICAL TECHNOLOGY/MEDICAL LABORATORY SCIENCE  
EDUCATION**

Medical Technology Laboratory

A. Chemistry Laboratories

- |  |   |  |
|--|---|--|
| 1. analytical balance                        | - | 1 for every 15-25 students             |
| 2. rough balance                             | - | 1 for every 5-10 students              |
| 3. centrifuge machine                        | - | 1 for every 15-25 students             |
| 4. waterbath with thermometer                |   |  |
| 5. burner/hotplate                           |   |  |
| 6. timer                                     |   |  |
| 7. test tubes (different sizes)              | - | 10 pcs per group of max. of 5 students |
| 8. test tube holder                          | - | 1 pc per group of max. of 5 students   |
| 9. test tube rack                            | - | 1 pc per group of max. of 5 students   |
| 10. flask (Erlenmeyer, Florence, Volumetric) | - | 1 per group of students                |
| 11. beaker                                   | - | 1 pc per group of max. of 5 students   |
| 12. glass funnel                             | - | 1 pc per group of max of 5 students    |
| 13. graduated cylinder                       | - | 1 pc per group of max. of 5 students   |
| 14. aspirator bulb                           | - | 1 pc per group of max of students      |
| 15. serological and volumetric pipettes      | - | 2 pcs per group of max. of 5 students  |
| • 1 ml                                       |   |  |
| • 5 ml                                       |   |  |
| • 10 ml                                      |   |  |
| 16. reagents and supplies                    |   |  |

Biological Sciences

- |   |   |                          |
|---|---|--------------------------|
| 1. Microscopes (Binocular)                      | - | 1 for every 1-2 students |
| 2. Skeleton (Human and animal)                  |   |                          |
| 3. Models (Different systems of the human body) | - | 1 set each               |
| 4. Prepared slides of specimen                  | - | 1 for every 5 students   |
| 5. Dissecting pan                               | - | 1 for every 5 students   |
| 6. Dissecting set                               | - | 1 for every 5 students   |
| 7. Kymograph set                                | - | 1 per class              |
| 8. Glass slides                                 | - | 1 box per group          |
| 9. Cover slips                                  | - | 2 boxes per group        |
| 10. Reagents and supplies                       |   |                          |
| 11. Charts, CD-ROM, transparencies              |   |                          |
| 12. Fresh and Preserved specimen                |   |                          |

## Physics Laboratory

1. Vernier Caliper	-	5 pcs
2. Micrometer Caliper	-	5 pcs
3. Meterstick (with knife-edge support)	-	6 pcs
4. Metal Sphere	-	5 pcs
5. Cylinder vessel (metal or plastic)	-	5 pcs
2 to 3 cm diameter		
2 to 3 cm height		
6. Double Pan Balance	-	4 pcs
7. Graduated Cylinder		
10 ml	-	5 pcs
25 ml	-	5 pcs
50 ml	-	5 pcs
250 ml	-	5 pcs
500 ml	-	5 pcs
8. Metal Force table – round	-	5 pcs
9. Weights	-	5 sets
10. Sonometer	-	3 pcs
11. Tuning Forks	-	5 pcs
C – 256		
C – 384		
C – 512		
12. Bulb ( with socket)	-	5 pcs
Metal Block		
Lead	-	6 pcs
Copper	-	6 pcs
Aluminum	-	6 pcs
Brass	-	6 pcs
13. Thermometer	-	6 pcs
14. Bunsen Burner	-	6 pcs
15. Serological pipettes (10 ml)	-	12 pcs
16. Rubber Aspirator	-	12 pcs
17. Metal bob of different mass	-	12 pcs
18. Glass tubes	-	3 pcs
2.5 to 4 cm – diameter		
at least 40 cm in length		
19. Rubber mallet	-	6 pcs
20. Stirring Rod	-	6 pcs
21. Tripod	-	6 pcs
22. Steam boiler	-	6 pcs
23. Pycnometer – ordinary for solids	-	5 pcs
24. Mohr- Westphal Balance	-	3 pcs
25. Baumehydrometer (universal)	-	3 pcs
26. Leach Pycnometer	-	5 pcs
27. J-tube apparatus	-	3 pcs
28. Mercury	-	100 ml
29. Calorimeter	-	6 pcs
30. Magnifier	-	3 pcs

31. Droppers	-	24 pcs
32. Voltmeter	-	3 pcs
33. Ammeter	-	3 pcs
34. Alligator Clips	-	12 pcs
35. Multi-tester	-	3 pcs
1.5 V Battery		
Resistors (Assorted)		

## B. Clinical Chemistry

1. Spectrophotometer	-	1 unit per class
2. Centrifuge (12 tubes)	-	2 per class
3. Water Bath w/ thermostat control	-	1 unit per class
4. Refrigerator (8 cu. ft.)	-	1 unit per class
5. Burner/Stove (single)	-	2 units per class
6. Drying Oven	-	1 unit per class
7. Timer	-	1 unit per group
8. Test tubes	-	20 pcs per group
9. Test tube Rack	-	1 per group
10. Test tube holder	-	1 per group
11. Serological & Volumetric Pipetes	-	2 pcs per group

15.0ml

1 ml

2 ml

5 ml

19 ml

12. Pipettor with tips	-	1 per 10 students
13. Erlenmeyer and volumetric Flask		
14. Graduated Cylinder		
15. Glass Funnel		
16. Beaker		
17. Aspirator Bulb		
18. Nescofilm/Parafilm		
2. Reagents and supplies		

## C. Immunology and Serology/Blood Banking

1. Microscope	-	1 for every 1-2 students
2. Serofuge	-	2 per class
3. Rotator	-	1 per class
4. Incubator	-	1 for a class of 50
5. Waterbath with thermostat control	-	1 for a class of 50
6. Centrifuge (12 tubes)	-	2 per class
7. Spectrophotometer	-	1 per class
1. Rh viewer	-	1 per class
2. Refrigerator		
3. Test tubes of different sizes		
4. Test tube rack	-	1 per group
5. Slides	-	1 box per group

- |                           |   |                      |
|---------------------------|---|----------------------|
| 6. Serological Pipettes   | - | 2 pcs per group      |
| 1.0 ml                    |   |                      |
| 2.0 ml                    |   |                      |
| 1 ml                      |   |                      |
| 7. Pipettor               | - | 1 pc per 10 students |
| 8. Pipette washer         |   |                      |
| 9. Drying oven            |   |                      |
| 10. Nescofilm/Parafilm    |   |                      |
| 11. Pasteur Pipet         |   |                      |
| 12. Reagents and supplies |   |                      |

#### D. Hematology

- |  |   |                          |
|--|---|--------------------------|
| 1. microscope (binocular)                    | - | 1 for every 1-2 students |
| 2. Spectrophotometer                         |   |                          |
| 1. RBC Pipettes                              | - | requirement for students |
| 2. WBC Pipettes                              | - | requirement for students |
| 3. Hemoglobin Pipettes                       | - | requirement for students |
| 4. Serological and volumetric pipettes       | - | 2 pcs per group          |
| • 1 ml                                       |   |                          |
| • 2 ml                                       |   |                          |
| • 5 ml                                       |   |                          |
| 5. Pipette washer                            |   |                          |
| 6. Drying oven                               |   |                          |
| 7. Hemacytometer                             | - | 1 per 2 students         |
| 8. Hemoglobinometer                          |   |                          |
| 9. Differential Counter                      | - | 1 per group              |
| 10. Tally Counter                            | - | 1 per 2 students         |
| 11. Microhematocrit Centrifuge<br>And Reader | - | 1 set per class          |
| 12. Capillary Tube and Sealer                | - | 1 box per class          |
| 13. Westergren/Wintrobe Tube and Rack-       |   | 2 sets per class         |
| 14. Test Tubes                               |   |                          |
| 15. Test tube rack                           | - | 1 per group              |
| 16. glass slides                             | - | 1 box per group          |
| 17. Cover slips                              | - | 2 boxes per group        |
| 18. Nescofilm/Parafilm                       |   |                          |
| 19. Reagents and Supplies                    |   |                          |
| 20. Timer                                    | - | 1 per group              |

#### E. Microbiology

- |                           |   |                          |
|---------------------------|---|--------------------------|
| 1. Microscope (Binocular) | - | 1 for every 1-2 students |
| 1. Incubator              | - | 1 per class              |
| 2. Autoclave              | - | 1 per class              |
| 3. Inoculating Hood       | - | 1 per class              |
| 4. Gas Pak unit           | - | 1 per class              |
| 5. Refrigerator           |   |                          |
| 6. Colony Counter         | - | 1 per class              |
| 7. Drying oven            | - | 1 per class              |

8. pH meter	-	1 per class
9. Candle jar	-	1 per class
10. Petri dishes	-	5 per student
11. Inoculating Loop	-	1 per student
12. Inoculating needle	-	1 per student
13. Bent needle		
14. Burner/Alcohol lamp	-	1 per group
15. Set of Prepared slides	-	for demonstration
16. Erlenmeyer Flask	-	1 per 5 students
17. Graduated Cylinder		
18. Rough Balance	-	2 per class
19. Test tubes of different sizes	-	20 pcs per group
20. Test tube rack	-	1 per group
21. Stove (single)	-	2 per class
22. Stop watch	-	1 per group
23. Slide	-	1 box per group
24. Cover slips	-	1 box per group
25. Stock cultures		
26. Nescofilm/parafilm		
27. Culture media and other Reagents and supplies		

#### F. Histopathology

1. Microscope (Binocular)	-	1 per 1- 2 students
2. Rotary microtome	-	1 per class
3. Microtome Knife	-	1 per class
4. Sharpening Stone	-	1 per class
5. Leather Strop	-	1 per class
6. Paraffin oven	-	1 per class
7. Flotation bath	-	1 per class
8. Koplins jars/Staining dish	-	2 sets per class
9. Beakers	-	1 per group of 5
10. Graduated Cylinder		
11. Funnel	-	1 per group of 5
12. Tissue cassettes	-	1 per student
13. Embedding molds	-	1 per student
14. Slides and cover slips	-	1 box per group
1. Nescofilm/Parafilm		
2. Reagents, Supplies and Stains		

#### A. Clinical Microscopy/Parasitology

1. Microscope (Binocular)	-	1 for every 1-2 students
2. Centrifuge	-	2 per class
3. Serological & volumetric pipettes	-	2 pcs per group
• 1 ml		
• 5 ml		
• 10 ml		
4. Hemacytometer		

- |   |   |                  |
|---|---|------------------|
| 5. WBC and RBC Pipettes                                     |   |                  |
| 6. Urinometer/Refractometer                                 | - | 1 per group      |
| 7. Erlenmeyer & volumetric flask                            |   |                  |
| 8. Graduated cylinder                                       |   |                  |
| 9. Glass funnel   |   |                  |
| 10. Aspirator bulb  |   |                  |
| 11. Beaker  |   |                  |
| 12. Burner  |   |                  |
| 13. Test tubes  | - | 20 pcs per group |
| 14. Test tube rack  | - | 1 per group      |
| 15. Test tube holder  | - | 1 per group      |
| 16. Glass slides  | - | 1 box per group  |
| 17. Cover slips   | - | 1 box per group  |
| 18. Nescofilm/Parafilm                                      | - | 1                |
| 19. Tally counter   |   |                  |
| 20. Reagents/Supplies for<br>Routine Urinalysis/Fecalalysis |   |                  |

## B. Phlebotomy

1. Venipuncture demo set composed of
  - a. Tourniquet
  - b. Sterile Needle and Syringe
  - c. Evacuated Tubes, needles, disposable syringes
  - d. Containers for wet and dry cotton balls
  - e. Antiseptic solutions (70% alcohol, betadine)
  - f. Sterile lancets
  - g. Waste disposal container

## C. Universal Precautionary Requirements for all laboratories

- a. laboratory gowns with long sleeves
- b. gloves
- c. masks