



## Course Specifications

<b>Course Title:</b>	<b>Clinical Immunology</b>
<b>Course Code:</b>	<b>373311-2</b>
<b>Program:</b>	<b>Bachelor in Clinical Laboratory Sciences; Level-6 (Program Code: 373000)</b>
<b>Department:</b>	<b>Clinical Laboratory Sciences Department</b>
<b>College:</b>	<b>College of Applied Medical Sciences</b>
<b>Institution:</b>	<b>Taif University</b>

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## A. Course Identification

<b>1. Credit hours:</b> 2 Hours Theory
<b>2. Course type</b>
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 7 <sup>th</sup> Level/ Third Year
<b>4. Pre-requisites for this course (if any):</b> Basic of Immunology/ 373239-3
<b>5. Co-requisites for this course (if any):</b> None

## 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3 hours /week= 30 hours/semester	100%
2	Blended	None	0%
3	E-learning	None	0%
4	Distance learning	None	0%
5	Other (Laboratory)	None	0%

## 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	N/A
3	Tutorial	N/A
4	Others (specify)	NA
	<b>Total</b>	<b>30 Hours</b>

## B. Course Objectives and Learning Outcomes

<p><b>1. Course Description</b></p> <p>This course describes the development, function and regulation of the cells of the immune system in relation to immunological disorders in the human body, and study the methods followed in the clinical laboratories to diagnose these diseases.</p>
<p><b>2. Course Main Objective</b></p> <p>To study the normal and abnormal process associated with immunological disorders and learn various diagnostics approaches applied to immunological clinical laboratories.</p>

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge and Understanding</b>	
1.1	Identify the clinical basis of the immune response in normal and abnormal conditions, and the modulation in the immune system components.	<b>K1</b>
1.2	Describe the significance of clinical immunological markers and the methods employed in the clinical laboratory.	<b>K2</b>
<b>2</b>	<b>Skills:</b>	
2.1	Assess proper immunological procedures in accurate and precise testing and data analysis.	<b>S2</b>
<b>3</b>	<b>Values:</b>	
<b>None</b>		

### C. Course Content (Theory)

No	List of Topics	Contact Hours
1	Tolerance of the immune system and Hygiene hypothesis ( <b>Presentation</b> )	<b>3</b>
2	Immunizations ( <b>Lecture Notes: Immunology/Chapter 12; Pages 353-377</b> )	<b>3</b>
3	Allergy and Hypersensitivity ( <b>Lecture Notes: Immunology/Chapter 14; Pages 405-434</b> )	<b>3</b>
4	Tumor Immunology ( <b>Lecture Notes: Immunology/Chapter 16; Pages 458-498</b> )	<b>3</b>
5	Immunodeficiency ( <b>Lecture Notes: Immunology/Chapter 13; Pages 378-404</b> )	<b>6</b>
6	Autoimmune disorders	<b>6</b>
7	Transplantation ( <b>Lecture Notes: Immunology/Chapter9; Pages 458-498</b> )	<b>3</b>
8	Immunotherapy ( <b>Presentation</b> )	<b>3</b>
<b>Total</b>		<b>30</b>

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	<b>Knowledge and Understanding</b>		
1.1	Identify the clinical basis of the immune response in normal and abnormal conditions, and the modulation in the immune system components.	<ul style="list-style-type: none"> <li>Lectures.</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> <li>Assignment</li> </ul>
1.2	Describe the significance of clinical immunological markers and the methods employed in the clinical laboratory.	<ul style="list-style-type: none"> <li>Lectures.</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> </ul>
2.0	<b>Skills</b>		
2.1	Evaluate proper immunological procedures in accurate and precise testing and data analysis.	<ul style="list-style-type: none"> <li>Lecture</li> <li>Problem-Based Learning</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> </ul>
3.0	<b>Values</b>		
None			

### 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-Term Exam	5 <sup>th</sup> week	30%
2	Activity	8 <sup>th</sup> week	10%
3	Final Exam	12 <sup>th</sup> /13 <sup>th</sup> week	60%
	<b>Total</b>		<b>100%</b>

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

### Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- Course instructors are available for individual consultation in their free time. They are usually full-time permanent members present on-campus from 8:00 am to 2:30 pm on all working days. Appointments can be made in person with the instructor through email etc. Days and time availability of each instructor are posted on their doors. Course instructors provide a range of academic and course management advice including course planning and its progression.
- Each student at the department of Clinical Laboratory Sciences has an academic adviser who is available for individual consultation and guidance. Appointments can be made in person with the instructor through email etc. Days and time availability of each adviser are posted on their doors. The academic adviser can provide support with time management, exam preparation, clarification of subject requirements, feedback on performance and dealing with personal issues as well.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ul style="list-style-type: none"> <li>• Todd, I., Spickett, G., &amp; Fairclough, L. (2015). Immunology (7th ed.). Wiley-Blackwell Publishers. ISBN: 978-1-118-45164-9</li> </ul>
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>Electronic Materials</b>	<ul style="list-style-type: none"> <li>• Saudi Digital Library, PubMed, Google Scholar</li> </ul>
<b>Other Learning Materials</b>	<ul style="list-style-type: none"> <li>▪ Journals and Articles.</li> </ul>

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Data show, Blackboard and A/V
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student's feedback on effectiveness of teaching.	<ul style="list-style-type: none"> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester.</li> </ul>
Quality of learning resources (laboratory and library) related to each course.	<ul style="list-style-type: none"> <li>Students</li> <li>Staff members</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester related to learning resources.</li> </ul>
Evaluation of teaching	<ul style="list-style-type: none"> <li>Peer evaluators</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Peer evaluation</li> </ul>
Evaluation of exam quality and assessment.	<ul style="list-style-type: none"> <li>Exam committee</li> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li><b>Direct:</b> Exam paper/ exam blueprint review</li> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester.</li> </ul>
Achievement of course learning outcomes	<ul style="list-style-type: none"> <li>Course Coordinators</li> <li>Development and accreditation committee</li> </ul>	<ul style="list-style-type: none"> <li><b>Direct:</b> Student's Performance assessed through item analysis and rubrics.</li> </ul>

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

<b>Council / Committee</b>	Department Council
<b>Reference No.</b>	Meeting Number 11
<b>Date</b>	19/05/2022





## Course Specifications

<b>Course Title:</b>	<b>Diagnostic Parasitology</b>
<b>Course Code:</b>	<b>373321-3</b>
<b>Program:</b>	<b>Bachelor in Clinical Laboratory Sciences; Level-6 (Program Code: 373000)</b>
<b>Department:</b>	<b>Clinical Laboratory Sciences Department</b>
<b>College:</b>	<b>College of Applied Medical Sciences</b>
<b>Institution:</b>	<b>Taif University</b>



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<b>H. Specification Approval Data</b> .....	<b>8</b>

## A. Course Identification

<b>1. Credit hours:</b> 3 Hours (2 T + 1 P)
<b>2. Course type</b> a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 7 <sup>th</sup> Level/ Third Year
<b>4. Pre-requisites for this course</b> (if any): Basic of Medical Microbiology/ 373228-3
<b>5. Co-requisites for this course</b> (if any): None

## 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3 hours /week= 30 hours/semester	50%
2	Blended	None	0%
3	E-learning	None	0%
4	Distance learning	None	0%
5	Other (Laboratory)	3 hours /week= 30 hours/semester	50%

## 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	N/A
4	Others (specify)	NA
	<b>Total</b>	<b>60 Hours</b>

## B. Course Objectives and Learning Outcomes

<p><b>1. Course Description</b></p> <p>The course is intended to give students concepts about types of parasites that infect humans, their pathogenicity together with a brief clinical description and determining suitable clinical specimens for laboratory diagnosis using microscopy, immunoassays as well as molecular diagnosis.</p>
<p><b>2. Course Main Objective</b></p> <p>By the end of this course, students will gain adequate knowledge regarding human parasites in terms of distinct classes, pathology, pathogenicity, transmission and laboratory diagnosis and will be able to select proper diagnostic tests and interpret the results. They will also be able to do different parasitological diagnostic techniques both independently and in groups.</p>

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge and Understanding</b>	
1.1	Describe pathogenesis of underlying infections with different parasites of medical importance to human in terms of their classification, morphology and pathology.	K1
1.2	Identify the most appropriate clinical specimen(s) and laboratory test(s) used for diagnosis of different parasitic infections.	K2
2	<b>Skills:</b>	
2.1	Perform different parasitological laboratory tests in safe and effective way.	S1
2.2	Interpret laboratory test finding(s) and correlate it (them) with the patient's clinical picture(s).	S2
3	<b>Values:</b>	
3.1	Demonstrate self-learning ability during research in library, and internet as a source of knowledge to prepare assignments and perform tasks.	V1
3.2	Exhibit responsibility by creating awareness among community in areas related to the course.	V2

### C. Course Content

No	List of Theory Topics	Contact Hours
1	Introduction to Diagnostic Parasitology ( <b>Presentation</b> ) <ul style="list-style-type: none"> <li>• Terms</li> <li>• Type of parasites</li> <li>• Type of hosts</li> <li>• pathology,pathogenesis</li> </ul>	3
2	Protozoa: ( <b>Presentation</b> ) <ul style="list-style-type: none"> <li>• General Characters</li> <li>• Classification</li> <li>• Ameobiasis</li> <li>• Giardiasis</li> <li>• Coccidian parasites</li> <li>• Trichomoniasis</li> </ul>	3
3	Extra-intestinal protozoa: ( <b>Presentation</b> ) <ul style="list-style-type: none"> <li>• Leishmania</li> <li>• Toxoplasma</li> </ul>	3
4	Plasmodium ( <b>Book Chapter 4; Page 79</b> ) <ul style="list-style-type: none"> <li>• Epidemiology</li> <li>• Life cycle</li> </ul>	3

	<ul style="list-style-type: none"> <li>• Clinical picture</li> <li>• Pathogenesis</li> <li>• Laboratory diagnosis</li> </ul>	
5	<b>Trematodes: (Book Chapter 6; Pages 166 and 181)</b> <ul style="list-style-type: none"> <li>• General Characteristics of flat worms</li> <li>• Schistosomes</li> </ul>	3
6	<b>Trematodes: (Presentation)</b> <ul style="list-style-type: none"> <li>• liver flukes</li> <li>• Intestinal flukes</li> </ul>	3
7	<b>Cestodes: (Presentation)</b> <ul style="list-style-type: none"> <li>• General Characteristics</li> <li>• Fish Tapeworm,</li> <li>• Taeniasis</li> <li>• Cysticercosis</li> </ul>	3
8	<b>Cestodes: (Book Chapter 7; Page 207)</b> <ul style="list-style-type: none"> <li>• Hydatid cyst</li> <li>• Hymenolepsiasis</li> </ul>	3
9	<b>Nematodes: (Book Chapter 8; Page 239)</b> <ul style="list-style-type: none"> <li>• General Characters</li> <li>• Classification</li> <li>• Ascaris Lumbricoides</li> <li>• Hookworm</li> <li>• Whipworm</li> </ul>	3
10	<b>Nematodes: (Presentation)</b> <ul style="list-style-type: none"> <li>• pinworm infections</li> <li>• Threadworm</li> <li>• Lymphatic filariasis</li> </ul>	3
<b>Total</b>		<b>30</b>

No	List of Practical Topics	Contact Hours
1	<ul style="list-style-type: none"> <li>Laboratory safety</li> <li>Samples</li> <li>Sampling and microscopy.</li> </ul> <b>(Lab Manual)</b>	3
2	Demonstration slides of: <ul style="list-style-type: none"> <li>Ameobiasis</li> <li>Giardiasis</li> <li>Coccidian parasites</li> <li>Trichomoniasis.</li> </ul> <b>(Lab Manual)</b>	3
3	Demonstration slides of : <ul style="list-style-type: none"> <li>Leishmania</li> <li>Toxoplasma.</li> </ul> <b>(Lab Manual)</b>	3
4	Demonstration slides of : <ul style="list-style-type: none"> <li>Plasmodium</li> </ul> <b>(Lab Manual)</b>	3
5	<ul style="list-style-type: none"> <li>Stool concentration</li> <li>Staining techniques</li> <li>Demonstration slides(Schistosomes)</li> </ul> <b>(Lab Manual)</b>	3
6	Trematodes: <ul style="list-style-type: none"> <li>liver flukes</li> <li>Intestinal flukes</li> </ul> <b>(Lab Manual)</b>	3
7	Demonstration slides of: <ul style="list-style-type: none"> <li>Fish Tapeworm</li> <li>Taeniasis</li> <li>Cysticercosis</li> </ul> <b>(Lab Manual)</b>	3
8	Demonstration slides of: <ul style="list-style-type: none"> <li>Hydatid cyst</li> <li>Hymenolepsiasis</li> </ul> <b>(Lab Manual)</b>	3
9	Demonstration slides of: <ul style="list-style-type: none"> <li>Ascaris Lumbricoides</li> <li>Hookworm</li> <li>Whipworm</li> </ul> <b>(Lab Manual)</b>	3
10	Demonstration slides of: <ul style="list-style-type: none"> <li>Pinworm infections</li> <li>Threadworm</li> <li>Lymphatic filariasis</li> </ul> <b>(Lab Manual)</b>	3
<b>Total</b>		<b>30</b>

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	<b>Knowledge and Understanding</b>		
1.1	Describe pathogenesis of underlying infections with different parasites of medical importance to human in terms of their classification, morphology and pathology.	<ul style="list-style-type: none"> <li>Lecture</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> </ul>
1.2	Identify the most appropriate clinical specimen(s) and laboratory test(s) used for diagnosis of different parasitic infections.	<ul style="list-style-type: none"> <li>Lecture</li> <li>Practical Session</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> <li>Practical Exam</li> <li>Lab Report</li> </ul>
2.0	<b>Skills</b>		
2.1	Perform different parasitological laboratory tests in safe and effective way.	<ul style="list-style-type: none"> <li>Practical Session</li> </ul>	<ul style="list-style-type: none"> <li>Practical Exam</li> <li>Lab Report</li> </ul>
2.2	Interpret laboratory test finding(s) and correlate it (them) with the patient's clinical picture(s).	<ul style="list-style-type: none"> <li>Lectures</li> <li>Practical Session</li> <li>Problem based learning.</li> </ul>	<ul style="list-style-type: none"> <li>Written Exams</li> <li>OSPE</li> </ul>
3.0	<b>Values</b>		
3.1	Demonstrate self-learning ability during research in library, and internet as a source of knowledge to prepare assignments and perform tasks.	<ul style="list-style-type: none"> <li>Group Discussion</li> </ul>	<ul style="list-style-type: none"> <li>Activity</li> </ul>
3.2	Exhibit responsibility by creating awareness among community in areas related to the course.	<ul style="list-style-type: none"> <li>Service Learning</li> </ul>	<ul style="list-style-type: none"> <li>Activity</li> </ul>

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-Term Exam	5 <sup>th</sup> week	15%
2	Activity	Throughout	5%
3	Practical Report	Throughout	10%
4	Final Practical Exam	11 <sup>th</sup> week	20%
5	Final Exam	12 <sup>th</sup> /13 <sup>th</sup> week	50%
<b>Total</b>			<b>100%</b>

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:**

- Course instructors are available for individual consultation in their free time. They are usually full-time permanent members present on-campus from 8:00 am to 2:30 pm on all working days. Appointments can be made in person with the instructor through email etc. Days and time availability of each instructor are posted on their doors. Course instructors provide a range of academic and course management advice including course planning and its progression.
- Each student at the department of Clinical Laboratory Sciences has an academic adviser who is available for individual consultation and guidance. Appointments can be made in person with the instructor through email etc. Days and time availability of each adviser are posted on their doors. The academic adviser can provide support with time management, exam preparation, clarification of subject requirements, feedback on performance and dealing with personal issues as well.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ul style="list-style-type: none"> <li>David T. John, William A. Petri. Markell and Voge's Medical Parasitology (2006), 9<sup>th</sup> Edition, Elsevier Inc., Saunders Imprint. ISBN-13: 978-0-721-64793-7; ISBN-10: 0-7216-4793-6.</li> </ul>
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>Julia Walochnik and Michael Duchene, Molecular Parasitology (2016), 1<sup>st</sup> Edition, Springer Publishers, ISBN: 978-3-7091-1416-2.</li> <li>Elizabeth A. Zeibig. Clinical Parasitology: A Practical Approach (2013), 2<sup>nd</sup> Edition. Elsevier Saunders, ISBN: 978-1-4160-6044-4</li> </ul>
<b>Electronic Materials</b>	None
<b>Other Learning Materials</b>	Websites, Search engines (Saudi Digital Library, PubMed, Google Scholar)

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and Laboratories
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Data show, Blackboard and A/V
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	N/A



## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student's feedback on effectiveness of teaching.	<ul style="list-style-type: none"> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester.</li> </ul>
Quality of learning resources (laboratory and library) related to each course.	<ul style="list-style-type: none"> <li>Students</li> <li>Staff members</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester related to learning resources.</li> </ul>
Evaluation of teaching	<ul style="list-style-type: none"> <li>Peer evaluators</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Peer evaluation</li> </ul>
Evaluation of exam quality and assessment.	<ul style="list-style-type: none"> <li>Exam committee</li> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li><b>Direct:</b> Exam paper/ exam blueprint review</li> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester.</li> </ul>
Achievement of course learning outcomes	<ul style="list-style-type: none"> <li>Course Coordinators</li> <li>Development and accreditation committee</li> </ul>	<ul style="list-style-type: none"> <li><b>Direct:</b> Student's Performance assessed through item analysis and rubrics.</li> </ul>

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

<b>Council / Committee</b>	Department Council
<b>Reference No.</b>	Meeting Number 11
<b>Date</b>	19/05/2022





## Course Specifications

<b>Course Title:</b>	<b>Hematology 1</b>
<b>Course Code:</b>	<b>373313-3</b>
<b>Program:</b>	<b>Bachelor in Clinical Laboratory Sciences; Level-6 (Program Code: 373000)</b>
<b>Department:</b>	<b>Clinical Laboratory Sciences Department</b>
<b>College:</b>	<b>College of Applied Medical Sciences</b>
<b>Institution:</b>	<b>Taif University</b>

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1. Learning Resources .....	7
2. Facilities Required.....	7
<b>G. Course Quality Evaluation</b> .....	<b>7</b>
<b>H. Specification Approval Data</b> .....	<b>8</b>

## A. Course Identification

<b>1. Credit hours:</b> 3 Hours (2 T + 1 P)
<b>2. Course type</b>
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 7 <sup>th</sup> Level/ Third Year
<b>4. Pre-requisites for this course (if any):</b> Human Physiology/ 373220-2
<b>5. Co-requisites for this course (if any):</b> None

## 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3 hours /week= 30 hours/semester	50%
2	Blended	None	0%
3	E-learning	None	0%
4	Distance learning	None	0%
5	Other (Laboratory)	3 hours /week= 30 hours/semester	50%

## 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	N/A
4	Others (specify)	NA
	<b>Total</b>	<b>60 Hours</b>

## B. Course Objectives and Learning Outcomes

<p><b>1. Course Description</b></p> <p>This course is intended to provide the students with the basic concepts of the generation, structure, function and metabolism of red blood cells. Moreover, it is a combined lecture and laboratory course covering methods for analysis of blood cells, the classification and laboratory investigation of anemias and other common disorders involving red blood cells.</p>
<p><b>2. Course Main Objective</b></p> <p>The main purpose of this course is directed towards the learning and understanding of pathological disorders of red blood cells, including anemias and other common disorders involving red blood cells.</p>

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge and Understanding</b>	
1.1	Explain red blood cell disorders by relating the etiology, pathophysiology and laboratory diagnosis of various hematological disorders.	K1
1.2	Recognize principles applied for hematology laboratory settings including specimen collection and suitability, instrumentation, testing and reporting	K2
<b>2</b>	<b>Skills</b>	
2.1	Perform basic red blood cells hematological techniques used in a diagnostic laboratory in a safe and effective manner	S1
2.2	Analyze clinical cases and interpret the red blood cells hematological results to determine a final diagnosis.	S2
2.3	Apply effective communication of scientific and hematological concepts clearly, concisely and logically.	S4
<b>3</b>	<b>Values</b>	
3.1	Display professional and responsible attitude while performing tasks related to the course.	V1

### C. Course Content (Theory)

No	List of Topics	Contact Hours
1	Introduction to hematology ( <b>Presentation</b> )	3
2	Hematopoiesis ( <b>Presentation</b> )	3
3	Erythrocytes structure and metabolism ( <b>Presentation</b> )	3
4	Hemoglobin Function and structure ( <b>Presentation</b> )	3
5	Introduction to Anemia ( <b>Presentation</b> )	3
6	Anemias of Disordered Iron Metabolism and Heme Synthesis ( <b>Presentation</b> )	3
7	Hemoglobinopathies ( <b>Presentation</b> )	3
8	Megaloblastic and Nonmegaloblastic Macrocytic Anemias ( <b>Presentation</b> )	3
9	Hemolytic Anemia: Membrane Defects and Enzyme Deficiencies ( <b>Presentation</b> )	3
10	Hemolytic Anemia: Immune Anemias and Nonimmune Defects ( <b>Presentation</b> )	3
<b>Total</b>		<b>30</b>

### C. Course Content (Practical)

No	List of Topics	Contact Hours
1	Introduction & Universal precautions (Lab Manual)	3
2	Hemoglobin Estimation Sahali method + HICN method. (Lab Manual)	6
3	Hemocytometry & Total erythrocyte count (Lab Manual)	3
4	Determination of Haematocrit (packed cell volume (Lab Manual)	3
5	Absolute values (red cell indices) MCV, MCH, MCHC (Lab Manual) (Lab Manual)	3
6	Preparation, staining and examination of blood film 1 (Lab Manual)	3
7	Preparation, staining and examination of blood film 2 (Lab Manual)	3
8	Reticulocyte count (Lab Manual)	3
9	Introduction & Universal precautions (Lab Manual)	3
10	Normal & abnormal morphology of red blood cells (Lab Manual)	3
<b>Total</b>		<b>30</b>

### D. Teaching and Assessment

#### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Explain red blood cell disorders by relating the etiology, pathophysiology and laboratory diagnosis of various hematological disorders.	<ul style="list-style-type: none"> <li>Lecture</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> </ul>
1.2	Recognize principles applied for hematology laboratory settings including specimen collection and suitability, instrumentation, testing and reporting.	<ul style="list-style-type: none"> <li>Lecture</li> <li>Practical Session</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> <li>Practical Exam</li> <li>Lab Report</li> </ul>
<b>2.0</b>	<b>Skills</b>		
2.1	Perform basic red blood cells hematological techniques used in a diagnostic laboratory in a safe and effective manner.	<ul style="list-style-type: none"> <li>Practical Session</li> </ul>	<ul style="list-style-type: none"> <li>Practical Exam</li> <li>Lab Report</li> </ul>
2.2	Analyze clinical cases and interpret the red blood cells hematological results to determine a final diagnosis.	<ul style="list-style-type: none"> <li>Lecture</li> <li>Practical Session</li> <li>Problem-Based Learning</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> <li>OSPE</li> </ul>

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.3	Apply effective communication of scientific and hematological concepts clearly, concisely and logically.	<ul style="list-style-type: none"> <li>Group Discussion</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> <li>Scientific Activity</li> </ul>
3.0	<b>Values</b>		
3.1	Display professional and responsible attitude while performing tasks related to the course.	<ul style="list-style-type: none"> <li>Practical Session</li> </ul>	<ul style="list-style-type: none"> <li>Practical Exam</li> </ul>

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-Term Exam	5 <sup>th</sup> week	15%
2	Activity	Throughout	5%
3	Practical report	Throughout	10%
4	Final Practical Exam	11 <sup>th</sup> week	20%
5	Final Exam	12 <sup>th</sup> /13 <sup>th</sup> week	50%
<b>Total</b>			<b>100%</b>

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

### Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- Course instructors are available for individual consultation in their free time. They are usually full-time permanent members present on-campus from 8:00 am to 2:30 pm on all working days. Appointments can be made in person with the instructor through email etc. Days and time availability of each instructor are posted on their doors. Course instructors provide a range of academic and course management advice including course planning and its progression.
- Each student at the department of Clinical Laboratory Sciences has an academic adviser who is available for individual consultation and guidance. Appointments can be made in person with the instructor through email etc. Days and time availability of each adviser are posted on their doors. The academic adviser can provide support with time management, exam preparation, clarification of subject requirements, feedback on performance and dealing with personal issues as well.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ul style="list-style-type: none"> <li>Shirlyn McKenzie, Kristin Landis-Piwowar, Linne Williams (2019). <i>Clinical Laboratory Hematology</i>, 4<sup>th</sup> Edition, Pearson Publishers. ISBN-13: 978-0134709390; ISBN-10: 013470939X</li> <li>Jacqueline H. Carr (2021). <i>Clinical haematology Atlas</i>, 6<sup>th</sup> Edition, Elsevier Publishers. ISBN-13: 978-0323711920; ISBN-10: 0323711928</li> <li>Victor Hoffbrand and David Steensma (2019). <i>Hoffbrand's Essentials: Haematology</i>, 8<sup>th</sup> Edition. John Wiley and Sons Ltd. ISBN-13: 978-1119495901; ISBN-10: 1119495903</li> </ul>
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Electronic Materials</b>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Other Learning Materials</b>	<ul style="list-style-type: none"> <li>Saudi Digital Library</li> </ul>

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and Laboratories
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Data show, Blackboard and A/V
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<ul style="list-style-type: none"> <li>- Complete blood count machine</li> <li>- Light Microscopes</li> <li>- Hb Electrophoresis</li> </ul>

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student's feedback on effectiveness of teaching.	<ul style="list-style-type: none"> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester.</li> </ul>
Quality of learning resources (laboratory and library) related to each course.	<ul style="list-style-type: none"> <li>Students</li> <li>Staff members</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester related to learning resources.</li> </ul>
Evaluation of teaching	<ul style="list-style-type: none"> <li>Peer evaluators</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Peer evaluation</li> </ul>



Evaluation Areas/Issues	Evaluators	Evaluation Methods
Evaluation of exam quality and assessment.	<ul style="list-style-type: none"> <li>Exam committee</li> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li><b>Direct:</b> Exam paper/ exam blueprint review</li> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester.</li> </ul>
Achievement of course learning outcomes	<ul style="list-style-type: none"> <li>Course Coordinators</li> <li>Development and accreditation committee</li> </ul>	<ul style="list-style-type: none"> <li><b>Direct:</b> Student's Performance assessed through item analysis and rubrics.</li> </ul>

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

Council / Committee	Department Council
Reference No.	Meeting Number 11
Date	19/05/2022





## Course Specifications

<b>Course Title:</b>	<b>Toxicology</b>
<b>Course Code:</b>	<b>373324-2</b>
<b>Program:</b>	<b>Bachelor in Clinical Laboratory Sciences; Level-6 (Program Code: 373000)</b>
<b>Department:</b>	<b>Clinical Laboratory Sciences Department</b>
<b>College:</b>	<b>College of Applied Medical Sciences</b>
<b>Institution:</b>	<b>Taif University</b>

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## A. Course Identification

<b>1. Credit hours:</b> 2 Hours (1 T + 1 P)
<b>2. Course type</b> a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 7 <sup>th</sup> Level/ Third Year
<b>4. Pre-requisites for this course (if any):</b> None
<b>5. Co-requisites for this course (if any):</b> None

## 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2 hours /week = 20 hours/semester	40%
2	Blended	None	0%
3	E-learning	None	0%
4	Distance learning	None	0%
5	Other (Laboratory)	3 hours /week= 30 hours/semester	60%

## 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	20
2	Laboratory/Studio	30
3	Tutorial	N/A
4	Others (specify)	NA
	<b>Total</b>	<b>50 Hours</b>

## B. Course Objectives and Learning Outcomes

### 1. Course Description

Toxicology covers the studying of poisonous chemicals, drugs, carcinogens, and other exogenous compounds. The adverse effects of these chemicals in each body system, as well as their metabolism and detoxification from the body will be covered in this course.

The course will also cover dose/effect relationships and route of exposure in addition to public health implications and types of toxicology (Analytic/forensic, clinical, environmental and food toxicology).

### 2. Course Main Objective

The student will know, interpret and explain concepts of toxicology and how to solve complex toxicological emergency situations using critical thinking skills. The student will also be able to design and formulate experiments to test or challenge hypotheses presented in the toxicology laboratory.

### 3. Course Learning Outcomes

CLOs		Aligned-PLOs
1	<b>Knowledge and Understanding</b>	
1.1	Describe the effect of the chronic and acute exposures to toxic chemicals on different body systems, and the toxicological mechanisms with special emphasis on their dose response, metabolism and detoxification.	K1
1.2	Identify principles of applied clinical toxicological laboratory including instrumentation, methods, and results interpretation for targeted organs and indicators.	K2
2	<b>Skills:</b>	
2.1	Perform sample preparation for toxicological analysis, analytical practice for skills in methodology and post-analytical interpretive conclusive remarks.	S1
2.2	Interpret laboratory data and correlate it with clinical manifestation of toxic chemical type.	S2
3	<b>Values:</b>	
3.1	Display knowledge on toxicological adverse effect of drug abuse through increasing community awareness.	V2

### C. Course Content (Theory and Practical)

No	List of Topics (THEORY)	Contact Hours
1	<p>Principles of toxicology (<b>Book Ch.2, P. 11</b>)</p> <ul style="list-style-type: none"> <li>• Definitions, areas, abbreviations of toxicology</li> <li>• Risk, safety and tolerance</li> <li>• Types of Chemical Interactions</li> <li>• Adverse effects types</li> <li>• Drug development and toxicity</li> <li>• Dose response relationship</li> <li>• Therapeutic index and toxicity rating</li> <li>• Why do we need toxicity testing?</li> </ul>	2
2	<p>Mechanisms of toxicology (<b>Book Ch.3, P. 45</b>)</p> <ul style="list-style-type: none"> <li>• Allergic response types</li> <li>• Receptor, ion channel and enzyme-mediated toxicity</li> <li>• Biochemical pathways and organ-directed toxicity</li> <li>• Mutagenesis, carcinogenesis, and teratogenicity</li> <li>• Snake Bites in Saudi Arabia and its antidotes</li> </ul>	2

3	<p>Toxicokinetics (<b>Book Ch.7, P. 305</b>)</p> <ul style="list-style-type: none"> <li>• Absorption and bioavailability</li> <li>• Distribution</li> <li>• Biotransformation</li> <li>• Excretion and Clearance</li> <li>• Importance of Toxicokinetics and its applications</li> </ul>	2
4	<p>Agonists- antagonists &amp; Dote-antidote (<b>Presentation</b>)</p> <ul style="list-style-type: none"> <li>• Agonists &amp; Antagonists</li> <li>• Competitive &amp; non-competitive antagonists</li> <li>• Antidotes</li> <li>• Poisoning in Saudi Arabia</li> <li>• Antidotes available in emergency department &amp; pharmacy</li> </ul>	2
5	<p>Organ Toxicity: Liver toxicity (<b>Book Ch.13, P. 557</b>)</p> <ul style="list-style-type: none"> <li>• Liver structure &amp; functions</li> <li>• Types of liver injury and its laboratory indications</li> <li>• Mechanisms of hepatotoxicity</li> <li>• Types of hepatocinants &amp; its metabolic activation</li> </ul>	2
6	<p>Organ Toxicity: Kidney toxicity (<b>Book Ch.14, P. 583</b>)</p> <ul style="list-style-type: none"> <li>• Kidney structure &amp; functions</li> <li>• Types of kidney injury and its laboratory indications</li> <li>• Mechanisms of nephrotoxicity</li> <li>• Types of nephrotoxicants</li> </ul>	2
7	<p>Organ Toxicity: Respiratory and nervous toxicity (<b>Presentation</b>)</p> <ul style="list-style-type: none"> <li>• Anatomy &amp; functions of respiratory system</li> <li>• Respiratory system injury and its laboratory indications</li> <li>• Occupational &amp; environmental lung diseases/cancer</li> <li>• Toxicants that induce respiratory system injury &amp; remodeling</li> <li>• Anatomy &amp; functions of nervous system</li> <li>• Toxicants effects on nervous system (Demyelination, axonopathy, neuronopathy, &amp; impaired Synaptic Function)</li> <li>• In vivo &amp; in vitro tests for neurotoxicity</li> </ul>	2
8	<p>Environmental toxicology (<b>Book Ch.29, P. 1117</b>)</p> <ul style="list-style-type: none"> <li>• Heavy metals</li> <li>• Pesticides &amp; insecticides</li> <li>• Environmental hazardous waste &amp; its effect on health</li> <li>• Effects of environmental hazards on respiratory tract, skin, eye, nervous system, liver, and kidneys</li> </ul>	2

9		<p>Food and domestic toxicology (<b>Book Ch.30, P. 1191</b>)</p> <ul style="list-style-type: none"> <li>• Safety Requirements for Dietary Supplements</li> <li>• Adverse Reactions to Food &amp; laboratory indications</li> <li>• Microbiological Agents in food</li> <li>• Toxins in Fish &amp; seafood</li> <li>• Toxins in processed food (contamination in storage/processing)</li> <li>• Household hazardous materials (cleaning products, pesticides, painting supplies, batteries, cosmetics &amp; drugs)</li> <li>• Emergency management</li> </ul>	2
10		<p>Forensic toxicology (<b>Presentation</b>)</p> <ul style="list-style-type: none"> <li>• Criminal poisoning</li> <li>• Toxicologic investigation of a poison death</li> <li>• Forensic drug abuse testing</li> <li>• Illegal athlete drugs</li> <li>• Interpretation of Analytic Results</li> </ul>	2
<b>Total theoretical hours</b>			<b>20</b>
<b>No</b>	<b>List of Topics (PRACTICAL)</b>		<b>Contact Hours</b>
11	<b>Practical</b>	<p>Introduction: Methods in toxicology I (<b>Lab Manual</b>)</p> <ul style="list-style-type: none"> <li>• Clinical and preclinical toxicological investigations</li> <li>• Cell culture techniques</li> <li>• Cell culture instruments Inverted microscope, fluorescent microscope, laminar flow, CO<sub>2</sub> incubator, ect...)</li> <li>• Cells separation from body fluids</li> <li>• Cell toxicity techniques</li> </ul>	3
12		<p>Introduction: Methods in toxicology II (<b>Lab Manual</b>)</p> <ul style="list-style-type: none"> <li>• In vivo toxicity studies</li> <li>• Assessing of General Health</li> <li>• Types and precautions of injections and oral administration</li> <li>• Blood Collection types and precautions</li> <li>• Anesthesia and Analgesia</li> <li>• Specific acute toxicity studies: Irritation studies</li> </ul>	3

13	<p>Classification of samples and toxicological tests <b>(Lab Manual)</b></p> <ul style="list-style-type: none"> <li>• Containers for specimens collection</li> <li>• Tier I toxicology testing</li> <li>• Stat quantitative serum &amp; urine toxicology assays</li> <li>• Tier II toxicology testing</li> <li>• Tests for the diagnosis of any poisoning/toxicity (toxicological, hematological, microbiological, serological, clinical, cytological, histological, genetic tests and body fluid analysis)</li> </ul>	3
14	<p>Emergency poisoning symptoms <b>(Lab Manual)</b></p> <ul style="list-style-type: none"> <li>• General poisoning symptoms</li> <li>• Specific poisoning symptoms</li> <li>• Vomiting color meaning and causes</li> </ul>	3
15	<p>Common drugs abuse tests <b>(Lab Manual)</b></p> <ul style="list-style-type: none"> <li>• Classification of common drugs of abuse</li> <li>• Specimens for drug abuse detection</li> <li>• Turnaround time for each drug</li> <li>• Tests, kits, and instruments to detect drugs of abuse</li> </ul>	3
16	<p>Analytical toxicology tests I <b>(Lab Manual)</b></p> <ul style="list-style-type: none"> <li>• Electrolytes types</li> <li>• Anion gap and its laboratory indications</li> <li>• Electrolytes defect types</li> <li>• Osmolar gap and its laboratory indications</li> </ul>	3
17	<p>Analytical toxicology tests II <b>(Lab Manual)</b></p> <ul style="list-style-type: none"> <li>• Toxicological screening tests</li> <li>• Glucose level, liver function tests, urine analysis,</li> <li>• Blood Creatine Kinase, Blood urea nitrogen (BUN) and creatinine</li> <li>• Chemical Spot Tests</li> <li>• Electrocardiogram</li> <li>• Gas chromatographic screening for drugs , Thin layer chromatography, HPLC</li> <li>• Direct (colorimetric tests) in serum or urine sample</li> <li>• Toxicity for specific drug</li> </ul>	3



18	<p>Therapeutic Drug Monitoring (<b>Lab Manual</b>)</p> <ul style="list-style-type: none"> <li>• TDM definition &amp; concept</li> <li>• When TDM is required?</li> <li>• Drugs that do not need TDM</li> <li>• Commonly monitored drugs</li> <li>• TDM for Aminoglycosides</li> <li>• Guidelines for specimen collection and timing for TDM</li> <li>• Interpretive criteria</li> <li>• Factors that affect TDM results</li> <li>• Reasons for pharmacokinetic variability</li> <li>• Analytical methods for TDM</li> <li>• Clinical significance of TDM</li> </ul>	3
19	<p>Metal poisoning detection (<b>Lab Manual</b>)</p> <ul style="list-style-type: none"> <li>• Metal Poisoning symptoms &amp; specimens</li> <li>• Methods for detection of metal poisoning in human specimens for different metals.</li> <li>• Instruments for metal poisoning detection</li> <li>• Antidote for metal poisoning</li> </ul>	3
20	<p>Genetic toxicity tests (<b>Lab Manual</b>)</p> <ul style="list-style-type: none"> <li>• Genotoxicity types</li> <li>• Genotoxic agents</li> <li>• Genotoxicity tests</li> <li>• Instruments to detect genotoxicity (RT-PCR, next-generation sequencing, and confocal microscope)</li> <li>• Molecular Testing: small DNA mutations, single nucleotide polymorphism, DNA Fingerprinting, Variable Number Tandem Repeats (VNTR) Analysis</li> <li>• Cytogenetic tests: comet test, micronucleus assays, karyotyping</li> <li>• Tests for genetic disorders (Homogeneous disorders, heterogeneous disorders, chromosomal numerical defect syndromes, and chromosomal aberrations or rearrangements)</li> </ul>	3
<b>Total practical hours</b>		<b>30</b>

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Describe the effect of the chronic and acute exposures to toxic chemicals on different body systems, and the toxicological mechanisms with special emphasis on their dose response, metabolism and detoxification.	<ul style="list-style-type: none"> <li>Lecture</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> </ul>
1.2	Identify principles of applied clinical toxicological laboratory including instrumentation, methods, and results interpretation for targeted organs and indicators.	<ul style="list-style-type: none"> <li>Lecture</li> <li>Practical Session</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> <li>Practical Exam</li> <li>Lab Report</li> </ul>
<b>2.0</b>	<b>Skills</b>		
2.1	Perform sample preparation for toxicological analysis, analytical practice for skills in methodology and post-analytical interpretive conclusive remarks.	<ul style="list-style-type: none"> <li>Practical session</li> </ul>	<ul style="list-style-type: none"> <li>Practical Exam</li> <li>Lab Report</li> </ul>
2.2	Interpret laboratory data and correlate it with clinical manifestation of toxic chemical type.	<ul style="list-style-type: none"> <li>Lecture</li> <li>Practical Session</li> <li>Problem-Based Learning</li> </ul>	<ul style="list-style-type: none"> <li>Written Exam</li> </ul>
<b>4.0</b>	<b>Values</b>		
4.1	Display responsible attitude through increasing community awareness on toxicological adverse effect of drug abuse.	<ul style="list-style-type: none"> <li>Service Learning</li> </ul>	<ul style="list-style-type: none"> <li>Activity</li> </ul>

### 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-Term Exam	4 <sup>th</sup> Week	15%
2	Practical Report	6 <sup>th</sup> Week	10%
3	Activity	8 <sup>th</sup> Week	5%
4	Final Practical Exam	11 <sup>th</sup> Week	20%
5	Final Exam	12 <sup>th</sup> Week	50%
	<b>Total</b>		<b>100%</b>

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

### Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- Course instructors are available for individual consultation in their free time. They are usually full-time permanent members present on-campus from 8:00 am to 2:30 pm on all working days. Appointments can be made in person with the instructor through email etc. Days and time availability of each instructor are posted on their doors. Course instructors provide a range of academic and course management advice including course planning and its progression.
- Each student at the department of Clinical Laboratory Sciences has an academic adviser who is available for individual consultation and guidance. Appointments can be made in person with the instructor through email etc. Days and time availability of each adviser are posted on their doors. The academic adviser can provide support with time management, exam preparation, clarification of subject requirements, feedback on performance and dealing with personal issues as well.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ul style="list-style-type: none"> <li>• Casarett &amp; Doull's Toxicology: The Basic Science of Poisons, 9th Edition, 2019 McGraw-Hill, Medical Publishing Division. ISBN-13: 978-125986374</li> <li>• Barbarajejan Magnani, Michael G. Bissell, Tai C. Kwong, Alan H.B. Wu, CLINICAL TOXICOLOGY TESTING: A GUIDE FOR LABORATORY PROFESSIONALS - PUB220. ISBN: 978-0-9837068-1-6</li> <li>• Frank A. Barile. Barile's Clinical Toxicology Principles and Mechanisms. 3rd Edition 2019, CRC Press (Taylor and Francis Group) ISBN: 9781498765305.</li> </ul>
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>• CASARETT AND DOULL'S Toxicology. 7th Edition. Curtis D. Klaassen, 2008, McGraw-Hill, Medical Publishing Division.</li> </ul>
<b>Electronic Materials</b>	<p><a href="http://ban1080.org.au/wp-content/uploads/2019/11/casarett_and_doull_s_toxicology-the_basic_science_of_poisons_7th_edition_2008.pdf">http://ban1080.org.au/wp-content/uploads/2019/11/casarett_and_doull_s_toxicology-the_basic_science_of_poisons_7th_edition_2008.pdf</a></p>
<b>Other Learning Materials</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>

## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and Laboratories
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Data show, Blackboard and A/V
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Microtiter reader for absorbance, centrifuge, incubator, fluorescence microscope, real-time thermocycler, electrophoresis system, and pipettes.

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student's feedback on effectiveness of teaching.	<ul style="list-style-type: none"> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester.</li> </ul>
Quality of learning resources (laboratory and library) related to each course.	<ul style="list-style-type: none"> <li>Students</li> <li>Staff members</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester related to learning resources.</li> </ul>
Evaluation of teaching	<ul style="list-style-type: none"> <li>Peer evaluators</li> </ul>	<ul style="list-style-type: none"> <li><b>Indirect:</b> Peer evaluation</li> </ul>
Evaluation of exam quality and assessment.	<ul style="list-style-type: none"> <li>Exam committee</li> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li><b>Direct:</b> Exam paper/ exam blueprint review</li> <li><b>Indirect:</b> Questionnaire Survey at the end of each semester.</li> </ul>
Achievement of course learning outcomes	<ul style="list-style-type: none"> <li>Course Coordinators</li> <li>Development and accreditation committee</li> </ul>	<ul style="list-style-type: none"> <li><b>Direct:</b> Student's Performance assessed through item analysis and rubrics.</li> </ul>

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

<b>Council / Committee</b>	Department Council
<b>Reference No.</b>	Meeting Number 11
<b>Date</b>	19/05/2022

