



Course Specifications

Course Title:	Clinical Biochemistry (1)
Course Code:	373310-3
Program:	Bachelor in Clinical Laboratory Sciences; Level-6 (Program Code: 373000)
Department:	Clinical Laboratory Sciences Department
College:	College of Applied Medical Sciences
Institution:	Taif University

Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective.....	3
3. Course Learning Outcomes	4
C. Course Content	4
D. Teaching and Assessment	5
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods.....	5
2. Assessment Tasks for Students	6
E. Student Academic Counseling and Support	7
F. Learning Resources and Facilities	7
1. Learning Resources	7
2. Facilities Required.....	8
G. Course Quality Evaluation	8
H. Specification Approval Data	8

A. Course Identification

1. Credit hours: 3 Hours (2 T + 1 P)
2. Course type
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"/>
3. Level/year at which this course is offered: 8 th Level/ Third Year
4. Pre-requisites for this course (if any): Medical Biochemistry/ 373226-3
5. Co-requisites for this course (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
	Total	60 Hours

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>This course provides the ground knowledge of clinical biochemistry, laboratory tests and how to interpret its results in different diseases. This course includes Acid-Base disorders and blood gases, Plasma proteins, Liver and kidney function tests, Water and Electrolytes disorders, atherosclerosis and cardiac bio-markers.</p>
<p>2. Course Main Objective</p> <p>Recall the enzymes and analytes used in assessment of the function of liver, kidney and heart, interpret laboratory data in relation to diseases of these organs and perform procedures and techniques used in clinical chemistry laboratory.</p>

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Recognize the functions of vital organs and their role in metabolism.	K1
1.2	Describe techniques and procedures for the collection of different types of specimen and the principles of storage, handling, and analysis.	K2
2	Skills:	
2.1	Perform proficient work with kits and reagents and act promptly on exposure to any hazards posed by these.	S1
2.2	Interpret laboratory data and its correlation with disease process.	S2
2.3	Demonstrate effective communication of concepts, principles and information effectively by oral and written means with clarity and confidence.	S4
3	Values:	
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	Water and Electrolytes disorders (Presentation) <ul style="list-style-type: none"> Water distribution and its importance Maintenance of normal body fluid content Maintenance of normal sodium and potassium balance Electrolytes disorders 	3
2	Acid-Base disorders and blood gases (Clinical Biochemistry & Metabolic Medicine /Chapters 23; Pages 59-83) <ul style="list-style-type: none"> Buffer system Metabolic acidosis and alkalosis Respiratory acidosis and alkalosis Blood gases 	3
3	Plasma proteins (Presentation) <ul style="list-style-type: none"> Plasma proteins electrophoresis Functions of plasma proteins Plasma portions disorders 	3
4	Liver function tests (Clinical Biochemistry & Metabolic Medicine /Chapters 18; Pages 252-270)	3

	<ul style="list-style-type: none"> • Liver functions • Classification of liver tests according to its function • Advantage and disadvantage of liver tests 	
5	<p>Hepatitis and cholestasis (Presentation)</p> <ul style="list-style-type: none"> • Causes and type of hepatitis • Alcoholic liver disease stages • Investigation of hyperbilirubinemia types • Causes of liver cirrhosis 	3
6	<p>Kidney function tests and urinalysis (Presentation)</p> <ul style="list-style-type: none"> • Estimation of glomerular function tests • Estimation of tubular function test • Types of urine sample • Physical and chemical examination of urine • Microscopic examination of urine 	3
7	<p>Nephrotic syndrome and kidney failure (Presentation)</p> <ul style="list-style-type: none"> • Causes and types of proteinuria • Acute kidney injury • Chronic kidney disease • Definition, types and causes of hyperuricemia 	3
8	<p>Cardiac biomarkers and myocardial infarction (Presentation)</p> <ul style="list-style-type: none"> • Definition of acute myocardial infarction • Parameters used for acute myocardial infarction diagnosis 	3
9	<p>Lipid profile and atherosclerosis (Presentation)</p> <ul style="list-style-type: none"> • Type of lipoproteins • Hyperlipoproteinemia • Investigation of lipid profiles • Atherosclerosis 	3
10	<p>Diagnostic methods in Biochemistry (Presentation)</p> <p>Protein detection and identification</p> <ul style="list-style-type: none"> • 2-dimensional electrophoresis • Western Blotting • MALDI- TOF analysis <p>Immunoassay and Elisa</p>	3
Total		30

C. Course Content (Practical)

No	List of Topics	Contact Hours
1	Estimation of serum electrolytes (Lab Manual)	3
2	Estimation of blood gases and determination of blood pH (Lab Manual) <ul style="list-style-type: none"> • Use, maintenance of blood gas analyzer • Handling of blood samples for gas analysis 	3
3	Estimation of serum albumin and globulin (Lab Manual)	3
4	Estimation of serum total proteins (Lab Manual)	3
5	Separation of plasma proteins using electrophoresis (Lab Manual)	3
6	Liver function tests: (Lab Manual) <ul style="list-style-type: none"> • Alanine transaminase • Aspartate transaminase • Lactate dehydrogenase • Alkaline phosphatase 	3
7	<ul style="list-style-type: none"> • Liver function tests cont. (Lab Manual) • Gamma-glutamyl transferase • Bilirubin: total, direct and indirect 	3
8	Kidney function tests: (Lab Manual) <ul style="list-style-type: none"> • Estimation of blood urea • Estimation of serum creatinine • Creatinine clearance 	3
9	<ul style="list-style-type: none"> • Estimation of cardiac enzymes: (Lab Manual) • Troponins • Creatine kinase-MB 	3
10	Estimation of serum uric acid (Lab Manual)	3
Total		30

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	Knowledge and Understanding		
1.1	Recognize the functions of vital organs and their role in metabolism.	• Lectures	• Written Exam
1.2	Describe techniques and procedures for the collection of different types of specimen and the principles of storage, handling, and analysis.	• Lectures • Practical sessions	• Written Exam • Practical Exam • Lab Reports

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.0	Skills		
2.1	Perform proficient work with kits and reagents and act promptly on exposure to any hazards posed by these.	<ul style="list-style-type: none"> Practical Sessions 	<ul style="list-style-type: none"> Practical Exam Lab Report
2.2	Interpret laboratory data and its correlation with disease process.	<ul style="list-style-type: none"> Lecture Problem-Based Learning 	<ul style="list-style-type: none"> Written Exam OSPE
2.3	Demonstrate effective communication of concepts, principles and information effectively by oral and written means with clarity and confidence.	<ul style="list-style-type: none"> Group Discussion 	<ul style="list-style-type: none"> Scientific Activities
3.0	Values		
3.1	Display professional and responsible attitude while performing tasks related to the course.	<ul style="list-style-type: none"> Practical Sessions 	<ul style="list-style-type: none"> Practical Exams

2. Assessment Tasks for Students

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

*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

Required Textbooks	<ul style="list-style-type: none">• Carl A. Burtis, Edward R. Ashwood, and David E. Bruns, editors. Tietz Fundamentals of Clinical Chemistry, 6th edition. St Louis, MO: Saunders/Elsevier, 2008, ISBN 978-0-7216-3865-2.• Michael L. Bishop, Janet L. Duben-Engelkirk, Edward P. Fody. Clinical Chemistry: PRINCIPLES, PROCEDURES AND CORRELATIONS, 4th Edition, 2000, Lippincott Williams and Wilkins. ISBN-10 : 0781717760, ISBN-13: 978-0781717762.• Martin Crook, Clinical Biochemistry & Metabolic Medicine, 8th Edition CRC Press, 2013.
Essential References Materials	<ul style="list-style-type: none">• None
Electronic Materials	<ul style="list-style-type: none">• Websites, Search engines (Saudi Digital Library, PubMed, Google Scholar)
Other Learning Materials	<ul style="list-style-type: none">• Journals, Scientific Magazines and Articles.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and Laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, Blackboard and A/V
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<ul style="list-style-type: none"> • Spectrophotometry • Glassware and automatic pipettes • Biochemical kits

G. Course Quality Evaluation

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

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

Course Title:	Hematology 2
Course Code:	373323-3
Program:	Bachelor in Clinical Laboratory Sciences; Level-6 (Program Code: 373000)
Department:	Clinical Laboratory Sciences Department
College:	College of Applied Medical Sciences
Institution:	Taif University

Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective.....	3
3. Course Learning Outcomes	4
C. Course Content	4
D. Teaching and Assessment	5
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods.....	5
2. Assessment Tasks for Students	6
E. Student Academic Counseling and Support	6
F. Learning Resources and Facilities	7
1. Learning Resources	7
2. Facilities Required.....	7
G. Course Quality Evaluation	7
H. Specification Approval Data	8

A. Course Identification

1. Credit hours: 3 Hours (2 T + 1 P)
2. Course type
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"/>
3. Level/year at which this course is offered: 8 th Level/ Third Year
4. Pre-requisites for this course (if any): Hematology 1/ 373313-3
5. Co-requisites for this course (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
	Total	60 Hours

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>This course is intended to provide the students with the basic concepts of the generation, structure, function and metabolism of white blood cells. Moreover, It's a combined lecture and laboratory course covering methods for analysis of white blood cells, the classification and laboratory investigation of benign and malignant conditions and other common disorders involving white blood cells.</p>
<p>2. Course Main Objective</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
1	Knowledge and Understanding	
1.1	Explain white 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
2	Skills	
2.1	Perform basic white blood cells hematological techniques used in a diagnostic laboratory in a safe and effective manner	S1
2.2	Analyze clinical cases and interpret the white 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
3	Values:	
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	Leukocytosis (Presentation)	3
2	Quantitative and Qualitative disorders of White blood cells (Presentation)	3
3	Leukemia Classification (Presentation)	3
4	Acute lymphoblastic leukemia (Presentation)	3
5	Acute Myelogenous leukemia (Presentation)	3
6	Myelodysplastic Syndromes & Myeloproliferative Neoplasm (Presentation)	3
7	Chronic Myelogenous Leukemia and other Myeloid Neoplasms (Presentation)	3
8	Chronic Lymphocytic Leukemia and other Lymphoid Neoplasms (Presentation)	3
9	Lymphoid Neoplasm (Presentation)	3
10	Hodgkin Lymphoma and Non- Hodgkin Lymphoma (Presentation)	3
Total		30

C. Course Content (Practical)

No	List of Topics	Contact Hours
1	Introduction (Lab Manual)	3
2	Total Leucocyte count (Lab Manual)	3
3	Differential leucocyte count I (Lab Manual)	3
4	Differential leucocyte count II (Lab Manual)	3
5	Morphology of White Blood Cells (Normal & abnormal) (Lab Manual)	3
6	Role of cytochemical stains in diagnosis of leukemia I (Lab Manual) Myeloperoxidase & Sudan Black B stains	3
7	Role of cytochemical stains in diagnosis of leukemia II (Lab Manual) Acid phosphatase & Periodic Acid Schiff's (PAS)	3
8	Flowcytometry (Lab Manual)	3
9	Role of Cytogenetic in The Diagnosis of Hematological Malignancies 1 (Lab Manual)	3
10	Histogram (Lab Manual)	3
Total		30

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

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"> Group Discussion 	<ul style="list-style-type: none"> Scientific Activity
3.0	Values		
3.1	Display professional and responsible attitude while performing tasks related to the course.	<ul style="list-style-type: none"> Practical Session 	<ul style="list-style-type: none"> Practical Exam

2. Assessment Tasks for Students

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

*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

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

2. Facilities Required

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

G. Course Quality Evaluation

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

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

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

Course Title:	Histopathological Techniques
Course Code:	373312-3
Program:	Bachelor in Clinical Laboratory Sciences; Level-6 (Program Code: 373000)
Department:	Clinical Laboratory Sciences Department
College:	College of Applied Medical Sciences
Institution:	Taif University

Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective.....	3
3. Course Learning Outcomes	4
C. Course Content	4
D. Teaching and Assessment	5
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods.....	5
2. Assessment Tasks for Students	6
E. Student Academic Counseling and Support	7
F. Learning Resources and Facilities	7
1. Learning Resources	7
2. Facilities Required.....	8
G. Course Quality Evaluation	8
H. Specification Approval Data	8

A. Course Identification

1. Credit hours: 3 Hours (2 T + 1 P)
2. Course type
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"/>
3. Level/year at which this course is offered: 8 th Level/ Third Year
4. Pre-requisites for this course (if any): General and Systemic Pathology/ 373238-2
5. Co-requisites for this course (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
	Total	60 Hours

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>This course will provide the students with Basic knowledge of the theoretical and applied aspects of tissue specimen's collection and preparation techniques, ability to perform the different histopathological techniques as well as the knowledge and ability to perform routine and special tissue staining techniques.</p>
<p>2. Course Main Objective</p> <p>By the end of this course, students should be able to:</p> <p>Gain proper knowledge about different techniques used in tissue preparation and staining for diagnostic purpose, choose the proper histopathological techniques and proper stain for each pathological situation and perform the paraffin sections, frozen sections, decalcification, fixation and routine as well as special staining.</p>

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding:	
1.1	Describe the principle and purposes of fixation, different steps of tissue processing, routine tissue staining as well as immunohistochemical technique.	K2
1.2	Recognize proper techniques of preparation and demonstration by routine and special methods (histochemistry) for different tissue component in different pathological conditions.	K2
2	Skills:	
2.1	Perform tissue fixation, tissue processing, tissue embedding and tissue sectioning as well as routine and special staining proficiently.	S1
2.2	Interpret the results of routine and special staining techniques and correlate abnormal results with different pathological tissue conditions.	S2
2.3	Employ quality assurance measures in performing all histopathological techniques and identify faults and remedy during tissue preparation and staining.	S3
3	Values:	
3.1	Display professional attitude while conducting tasks related to the course.	V1

C. Course Content (Theory)

No	List of Topics	Contact Hours
1	Methods of tissue Preparation & Examination and Tissue sampling (Presentation) <ul style="list-style-type: none"> Fresh tissues and cell examination Vital staining Sectional methods (histopathology) Histochemical and Immunohistochemical staining Microincineration Types of tissue biopsies Guidelines for gross examination 	3
2	Fixatives and Tissue Fixation (Presentation /Book Ch.4, pages 40 - 52) <ul style="list-style-type: none"> Aim of fixation Properties of ideal fixatives Methods of fixation Factors affecting rate of fixation Types of fixatives 	3
3	Decalcification techniques (Presentation /Book Ch.4) <ul style="list-style-type: none"> Decalcifying agents Methods of decalcification Factors affecting rate of decalcification 	3
4	Tissue processing and Tissue embedding (Presentation /Book Ch.6, pages 73 - 82)	3

	<ul style="list-style-type: none"> • Principle of tissue processing • Factors influencing the rate of processing • Paraffin technique • Frozen section technique • Embedding (embedding media-General Embedding Procedure-tissue orientation) 	
5	Microtome & Tissue sectioning techniques for Paraffin and Frozen Tissue Sections (Presentation /Book Ch.7) <ul style="list-style-type: none"> • Types of microtome • Parts and structure of microtome • Tissue sectioning procedures • Flootation 	3
6	Theory of Stain & Hematoxylin and Eosin Routine Tissue Staining (Presentation /Book Ch. 9 & 10) <ul style="list-style-type: none"> • Methods of coloration of tissues • Structure of dyes used in histology • Types and reaction of dyes with tissue during staining • Progressive and regressive tissue staining 	3
7	Mounting media, slide adhesives and Histochemical techniques of Nucleic acid (Presentation /Ch.7 & Appendix I - Classical histochemical methods) <ul style="list-style-type: none"> • Types of mounting media • Technique of mounting • Fixation and decalcification of nucleic acid • Methods of histochemical staining of nucleic acids 	3
8	Histochemical techniques of Carbohydrates and Lipid demonstration (Book Chapter 11,12 - Pages (161-186, 187-216)) <ul style="list-style-type: none"> • Histochemical demonstration of glycogen (fixation and staining methods) • Diagnostic application of histochemical glycogen demonstration • Histochemical staining methods of different types of mucin • Diagnostic application of histochemical mucin demonstration 	3
9	Histochemical techniques of Pigments and Minerals demonstration (Book Chapter 14- Pages (233-260)) <ul style="list-style-type: none"> • Classification of tissue pigments • Staining methods of haematogenous tissue pigments • Staining methods of Non haematogenous tissue pigments • Staining methods of endogenous minerals • Types and staining methods of exogenous pigments 	3
10	Immunohistochemical technique (Book Chapter 23 - Pages (493-516)) <ul style="list-style-type: none"> • Types of labels in immunohistochemistry • Immunohistochemical methods (direct and indirect) • Enzyme label immunohistochemical techniques • Colloidal metal labels immunohistochemical techniques • Immunofluorescence technique • Diagnostic applications of immunohistochemistry 	3
Total		30

C. Course Content (Practical)

No	List of Topics	Contact Hours
1	Introduction to histopathology lab and guideline for histopathology lab safety (Lab Manual)	3
2	Practicing direct examination / Tissue Grossing (Lab Manual)	3
3	Preparation of micro-anatomical tissue fixatives preparation (Lab Manual)	3
4	Practicing determination of end point of decalcification (Lab Manual)	3
5	Practicing tissue processing and use tissue processor (Lab Manual)	3
6	Practicing tissue embedding (Lab Manual)	3
7	Practicing Tissue sectioning (Lab Manual)	3
8	Practicing routine H&E tissue staining (Lab Manual)	3
9	Practicing carbohydrate staining using periodic acid Schiff method (Lab Manual)	3
10	Practicing collagen fiber staining using Van Gieson method (Lab Manual)	3
Total		30

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	Knowledge and Understanding		
1.1	Describe the principle and purposes of fixation, different steps of tissue processing, routine tissue staining as well as immunohistochemical technique.	<ul style="list-style-type: none"> Lecture Practical Session 	<ul style="list-style-type: none"> Written Exam Practical Exam
1.2	Recognize proper techniques of preparation and demonstration by routine and special methods (histochemistry) for different tissue component in different pathological conditions.	<ul style="list-style-type: none"> Lectures Practical Session 	<ul style="list-style-type: none"> Written Exam Lab Report

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.0	Skills		
2.1	Perform tissue fixation, tissue processing, tissue embedding and tissue sectioning as well as routine and special staining proficiently.	<ul style="list-style-type: none"> Practical Session 	<ul style="list-style-type: none"> Practical Exam Lab Report
2.2	Interpret the results of routine and special staining techniques and correlate abnormal results with different pathological tissue conditions.	<ul style="list-style-type: none"> Lecture Problem-Based Learning 	<ul style="list-style-type: none"> Written Exam OSPE
2.3	Evaluate quality assurance measures in performing all histopathological techniques and identify faults and remedy during tissue preparation and staining.	<ul style="list-style-type: none"> Lecture Practical Session 	<ul style="list-style-type: none"> Written Exam Practical Exam
3.0	Values		
3.1	Display professional attitude while conducting tasks related to the course.	<ul style="list-style-type: none"> Group Discussion 	<ul style="list-style-type: none"> Activity

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-Term Exam	5 th week	15%
2	Activity	8 th week	5%
3	Practical Report	10 th week	10%
4	Final Practical Exam	11 th week	20%
5	Final Exam	12 th /13 th week	50%
	Total		100%

*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

Required Textbooks	<ul style="list-style-type: none">• Kim S Suvarna, Christopher Layton, John D. Bancroft (2018). Bancroft's Theory and Practice of Histological Techniques, 8th Edition. Elsevier-Health Sciences Publishers. ISBN-10: 10 0702068640; ISBN-13: 13 9780702068645.
Essential References Materials	<ul style="list-style-type: none">• M.D. Nayak Ramadas (2017). Histopathological Techniques and its Management, 1st Edition. Jaypee Brothers Medical Publishers. ISBN-10: 9789352702343; ISBN-13: 978-978-9352702343.• Santosh Kumar Mondal (2017), Manual of Histological Techniques 1st Edition. Jaypee Brothers Medical Publishers. ISBN-10: 9386261197; ISBN-13: 978-9386261199.
Electronic Materials	<ul style="list-style-type: none">• Websites, Search engines (Saudi Digital Library, PubMed, Google Scholar)
Other Learning Materials	<p>https://www.youtube.com/watch?v=4DJm4NLECOs https://www.youtube.com/watch?v=wW8cNMI_jVQ</p>

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and Laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, Blackboard and A/V
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<ul style="list-style-type: none"> • Teaching microscope • Microtomes • Tissue processing machine • Tissue strainer • Embedding center.

G. Course Quality Evaluation

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

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

