



Course Specifications

Course Title:	Clinical Biochemistry (2)
Course Code:	373320-3
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

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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: 9 th Level/ Third Year
4. Pre-requisites for this course (if any): Clinical Biochemistry (1)/ 373310-3
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

1. Course Description

The purpose of this course is to make students understand the basic mechanisms involved in normal and abnormal biochemical processes, identify the role of enzymes and other biochemical substances involved in derangement of these processes. The students are also expected to know the clinical biochemical investigations involved in diagnosis of gastrointestinal, bone metabolism as well as inherited metabolic diseases and identify techniques involved in these measurements.

2. Course Main Objective

At the end of studying this course, the students should be able to recall the enzymes and analytes used in assessment of gastrointestinal, bone, heme metabolism and inherited metabolic disorders, diabetes mellitus and cancer, outline investigations and interpret laboratory data used in diagnosis of these disorders and perform procedures and techniques used in clinical chemistry laboratory.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Identify the different methods for laboratory diagnosis of biochemical investigations in relation to diabetes mellitus, obesity, bone, nervous system disorders, oxidative stress and cancer.	K2
1.2	Recognize techniques and procedures for the collection of different types of specimen and know the principles of storage, handling and analysis.	K2
2	Skills:	
2.1	Perform tests using instruments and biochemical analyzer in clinical chemistry laboratory in a proficient and safe manner.	S1
2.2	Interpret laboratory data and its correlation with disease process.	S2
3	Values:	
3.1	Demonstrate professionalism during performance of biochemistry tests with commitment of quality and completion time.	V1
3.2	Exhibit responsibility by creating awareness among community in areas related to the course.	V2

C. Course Content (Theory)

No	List of Topics	Contact Hours
1	Gastrointestinal disorders and obesity (Presentation) <ul style="list-style-type: none"> • Digestion and absorption of nutrients • Gastric, pancreatic and intestinal absorption • Definition, types and causes of obesity • Complication of obesity 	3
2	Diabetes Mellitus and hypoglycemia (Presentation) <ul style="list-style-type: none"> • Definition and signs of DM • Types of DM • Diagnosis of DM • Complication of DM • Hypoglycemia 	3
3	Biochemical investigations in bone disorders (Presentation) <ul style="list-style-type: none"> • Bone matrix and its cell types • Bone remodeling • Metabolic bone disorders • Calcium and phosphorus homeostasis 	3
4	Heme metabolism disorders (Presentation) <ul style="list-style-type: none"> • Iron metabolism • Ferritin, transferrin and TIBC • Biochemical changes in heme disorders 	3

	<ul style="list-style-type: none"> • Porphyria 	
5	<p>Biochemical investigations in nervous system disorders (Presentation)</p> <ul style="list-style-type: none"> • Central nervous system classes • Neurotransmitters • Cerebrospinal fluid 	3
6	<p>Inherited metabolic disorders I (protein metabolism) (Book Chapter 27; Pages 374-378)</p> <ul style="list-style-type: none"> • Phenylketonuria • Maple syrup disease • Homocystinuria • Tyrosinosis • Alkaptonuria 	3
7	<p>Inherited metabolic disorders II (Carbohydrate metabolism) (Book Chapter 27; Pages 379-381)</p> <ul style="list-style-type: none"> • Inborn errors: definition, types and pathophysiology • Galactose inborn error • Fructose inborn error • Glycogen storage disease 	3
8	<p>Inherited metabolic disorders III (Lipid metabolism) and Nutritional disorders (Presentation)</p> <ul style="list-style-type: none"> • Fatty acid oxidation defects • Refsum's disease • Tay- Sachs disease • Niemann- pick disease • Nutritional deficiencies • Malnutrition (definition, causes and types) 	3
9	<p>Luminex multiplex assay technique (Presentation)</p> <ul style="list-style-type: none"> • Luminex multiplex assay principle • Luminex assay used for: quantification of protein and RNA assays • The differences between Luminex and conventional assays • Advantages for using Luminex assay technique 	3
10	<p>Oxidative stress and cancer biochemistry (Presentation)</p> <ul style="list-style-type: none"> • Definition of oxidants and antioxidants • Oxidative and antioxidative stress • How do the oxidant and antioxidant work? • Oncogene and tumor suppressor gene • Telomere and telomerase • Tumor markers 	3
Total		30

C. Course Content (Practical)

No	List of Topics	Contact Hours
1	Estimation of serum pancreatic amylase and lipase (Lab Manual)	3
2	Spectrophotometric estimation of glucose and ketone bodies in urine (Lab Manual)	3
3	Glucose tolerance test (Lab Manual)	3
4	Determination of glycated hemoglobin (Lab Manual)	3
5	Determination of serum calcium and phosphorus (Lab Manual)	3
6	Determination of 25-hydroxyvitamin-D in blood (Lab Manual)	3
7	Determination of parathyroid hormone in blood (Lab Manual)	3
8	Determination of G6PD levels in blood (Lab Manual)	3
9	Determination of pyruvate kinase levels in blood (Lab Manual)	3
10	Cerebrospinal fluid examination (Lab Manual) <ul style="list-style-type: none"> • Test for proteins • Test for glucose 	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	Identify the different methods for laboratory diagnosis of biochemical investigations in relation to diabetes mellitus, obesity, bone, nervous system disorders, oxidative stress and cancer.	<ul style="list-style-type: none"> • Lectures • Practical Session 	<ul style="list-style-type: none"> • Written Exam • Practical Exam
1.2	Recognize techniques and procedures for the collection of different types of specimen and know the principles of storage, handling and analysis.	<ul style="list-style-type: none"> • Lecture • Practical Session 	<ul style="list-style-type: none"> • Written Exam • Practical Exam • Lab Report
2.0	Skills		
2.1	Perform tests using instruments and biochemical analyzer in clinical chemistry laboratory in a proficient and safe manner.	<ul style="list-style-type: none"> • Practical Session 	<ul style="list-style-type: none"> • Practical Exam • Lab report

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
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
3.0	Values		
3.1	Demonstrate professionalism during performance of tasks related to biochemical analysis.	<ul style="list-style-type: none"> Group Discussion 	<ul style="list-style-type: none"> Activity
3.2	Exhibit responsibility by creating awareness among community in areas related to the course.	<ul style="list-style-type: none"> Service Learning 	<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	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"> Denise Ferrier. Lippincott's Illustrated Reviews, 7th edition, Wolter Kluwer, Philadelphia, 2017. ISBN-10 : 1496344499; ISBN- 13: 978-1496344496. Thomas M Devlin. Textbook of Biochemistry with Clinical Correlations, 7th edition, John Wiley and Sons, 2015, eText ISBN: 9780470609767, 0470609761. 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"> None
Other Learning Materials	<ul style="list-style-type: none"> None

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)	Microscope, centrifuge ELISA washer and reader.

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:	Clinical Bacteriology
Course Code:	373322-3
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

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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: 9 th Level/ Third Year
4. Pre-requisites for this course (if any): Basic of Medical Microbiology/ 373228-3
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

1. Course Description

The course covers studying of the common bacterial human pathogens regarding: their classification, pathogenicity, morphology, cultural characters and the different methods for laboratory diagnosis of the infections caused by them. The course also covers studying of infections of the different body systems regarding: the possible causative pathogens, methods of collection and transport of clinical samples to diagnose these infections as well as methods of laboratory examination of these samples.

2. Course Main Objective

The students will gain adequate knowledge about different classes of bacteria that infect human regarding their pathogenicity, laboratory characteristics and different methods for laboratory diagnosis of infections caused by these bacteria. They will also be able to select and interpret the different diagnostic tests for bacterial infections and perform the different laboratory tests for diagnosing bacterial infections in a safe and effective manner both independently and within a team work.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Discuss the pathogenicity, virulence factors and mode of transmission of the different common human bacterial pathogens, as well as their classification and morphological features.	K1
1.2	Identify cultural characters and biochemical reactions of the different common bacterial pathogens as well as the different methods for laboratory diagnosis of the infection caused by these bacteria.	K2
1.3	Recognize the methods of collection, transport and laboratory examination of different clinical specimens.	K2
2	Skills	
2.1	Perform the different laboratory tests for diagnosing bacterial infections in a safe and proficient manner.	S1
2.2	Interpret correctly the results of the various laboratory bacterial diagnostic tests and evaluate these results in correlation with the clinical condition of the patient.	S2
3	Values	
None		

C. Course Content (Theory)

No	List of Topics	Contact Hours
1	Staphylococci (Presentation) <ul style="list-style-type: none">- Classification- <i>Staphylococcus aureus</i>- Coagulase negative Staphylococci	3
2	Streptococci and Enterococci (Presentation) <ul style="list-style-type: none">- Classification- <i>Streptococcus pyogenes</i>- <i>Streptococcus S. agalactiae</i>- <i>Viridans streptococci</i>- <i>Streptococcus pneumoniae</i>	3

	<ul style="list-style-type: none"> - <i>Enterococcus faecalis</i> 	
	<p>Neisseria (Presentation)</p> <ul style="list-style-type: none"> - Gonococci - Meningococci 	
3	<p>Corynebacterium (Presentation)</p> <ul style="list-style-type: none"> - <i>Corynebacterium diphtheriae</i> 	3
	<p>Bacillus (Presentation)</p> <ul style="list-style-type: none"> - <i>Bacillus anthracis</i> 	
	<p>Clostridia (Presentation)</p> <ul style="list-style-type: none"> - <i>Clostridium tetani</i> - <i>Clostridium botulinum</i> - <i>Clostridium perfringens</i> - <i>Clostridium difficile</i> 	
4	<p>Enterobacteriaceae (Presentation)</p> <ul style="list-style-type: none"> - <i>Escherichia coli</i> - Klebsiella - Proteus - Salmonella - Shigella 	3
	<p>Pseudomonas (Presentation)</p> <ul style="list-style-type: none"> - <i>Pseudomonas aeruginosa</i> 	
5	<p>Gram-negative bacilli related to the enteric tract (Presentation + Bailey & Scott's Diagnostic Microbiology, chapters 28 & 36)</p> <ul style="list-style-type: none"> - <i>Vibrio cholerae</i> - <i>Campylobacter jejuni</i> - <i>Helicobacter pylori</i> 	3
	<p>Gram-negative bacilli related to the respiratory tract (Presentation + Bailey & Scott's Diagnostic Microbiology, chapters 34, 37 & 39)</p> <ul style="list-style-type: none"> - <i>Haemophilus influenzae</i> - <i>Bordetella pertussis</i> - <i>Legionella pneumophila</i> 	
6	<p>Zoonotic Gram- negative bacilli (Presentation)</p> <ul style="list-style-type: none"> - Brucella - Yersinia pestis 	3
	<p>Anaerobic Gram-negative bacilli (Presentation)</p> <ul style="list-style-type: none"> - Bacteroides - Laboratory diagnosis of suspected anaerobic infections - How to achieve anaerobic conditions 	
	<p>Mycoplasma (Presentation)</p> <ul style="list-style-type: none"> - Important properties 	

	<ul style="list-style-type: none"> - Lab diagnosis of suspected <i>Mycoplasma pneumoniae</i> infection 	
7	Mycobacteria (Presentation) <ul style="list-style-type: none"> - <i>Mycobacterium tuberculosis</i> - Laboratory diagnosis of active TB disease - Laboratory diagnosis of latent TB infection - <i>Mycobacterium leprae</i> 	3
8	Chlamydia (Presentation) <ul style="list-style-type: none"> - Important properties - <i>Chlamydia trachomatis</i> - <i>Chlamydia pneumoniae</i> - <i>Chlamydia psittaci</i> 	3
	Spirochetes (Presentation) <ul style="list-style-type: none"> - <i>Treponema pallidum</i> - Syphilis 	
9	Upper and lower respiratory tract infections (Presentation) <ul style="list-style-type: none"> - Commensals - Possible pathogens - Collection and transport of adequate specimens - Laboratory examination 	3
	Meningitis (Bailey & Scott's Diagnostic Microbiology, chapter 55) <ul style="list-style-type: none"> - Major categories of meningitis and possible pathogens - Collection and transport of cerebrospinal fluid (CSF) - Laboratory examination of CSF 	
	Urogenital infections (Bailey & Scott's Diagnostic Microbiology, chapter 58) <ul style="list-style-type: none"> - Male urethritis - Vaginitis - Cervicitis - Genital ulcers 	
10	Urinary tract infections (Presentation) <ul style="list-style-type: none"> - Commensals and need for quantitative culture - Possible pathogens - Collection and transport of adequate urine specimens - Laboratory examination 	3
	GIT infection (Presentation) <ul style="list-style-type: none"> - Common causes of gastrointestinal infections - Commensals - Collection and transport of stool specimens - Laboratory examination of stool 	
	Wound and soft tissue infections (Presentation + Bailey & Scott's Diagnostic Microbiology, chapter 60) <ul style="list-style-type: none"> - Possible pathogens - Collection and transport of pus - Laboratory examination of pus 	
Total		30

C. Course Content (Practical)

No	List of Topics	Contact Hours
1	Laboratory diagnosis of infections caused by Staphylococci (Lab Manual)	3
2	Laboratory diagnosis of infections caused Streptococci and Enterococci (Lab Manual)	3
3	Laboratory diagnosis of infections caused by Neisseria (Lab Manual)	3
	Laboratory diagnosis of infections caused by Corynebacterium (Lab Manual)	
	Laboratory diagnosis of infections caused by Bacillus (Lab Manual)	
	Laboratory diagnosis of infections caused by Clostridia (Lab Manual)	
4	Laboratory diagnosis of infections caused by Enterobacteriaceae (Lab Manual)	3
5	Laboratory diagnosis of infections caused by Enterobacteriaceae (continue) (Lab Manual)	3
	Laboratory diagnosis of infections caused by Pseudomonas (Lab Manual)	
	Laboratory diagnosis of infections caused by enteric Gram-negative bacilli (Lab Manual)	
6	Laboratory diagnosis of infections caused by respiratory enteric Gram-negative bacilli (Lab Manual)	3
	Laboratory diagnosis of infections caused by zoonotic enteric Gram-negative bacilli (Lab Manual)	
	Laboratory diagnosis of infections caused by anaerobic enteric Gram-negative bacilli (Lab Manual)	
	Laboratory diagnosis of infections caused by Mycobacteria (Lab Manual)	
7	Introduction to specimen collection and management (Lab Manual)	3
	Antibiotic sensitivity tests (Lab Manual)	
8	Examination of upper and lower respiratory tract specimens (Lab Manual)	3
	Examination of pus (Lab Manual)	
9	Examination of urogenital specimens (Lab Manual)	3
	Examination of urine (Lab Manual)	
10	Examination of stool (Lab Manual)	3
	Blood culture (Lab Manual)	
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	Discuss the pathogenicity, virulence factors and mode of transmission of the different common human bacterial pathogens, as well as their classification and morphological features.	<ul style="list-style-type: none"> • Lecture 	<ul style="list-style-type: none"> • Written Exam • Assignment
1.2	Identify cultural characters and biochemical reactions of the different common bacterial pathogens, as well as the different methods for laboratory diagnosis of the infection caused by these bacteria.	<ul style="list-style-type: none"> • Lecture • Practical Session 	<ul style="list-style-type: none"> • Written Exam • Practical Exam • Lab Report
Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.3	Recognize the methods of collection, transport and laboratory examination of different clinical specimens.	<ul style="list-style-type: none"> • Lectures • Practical Session 	<ul style="list-style-type: none"> • Written Exam • Practical Exam
2.0	Skills		
2.1	Perform the different laboratory tests for diagnosing bacterial infections in a safe and proficient manner	<ul style="list-style-type: none"> • Practical Session 	<ul style="list-style-type: none"> • Practical Exam • Lab Report
2.2	Interpret correctly the results of the various laboratory bacterial diagnostic tests and evaluate these results in correlation with the clinical condition of the patient.	<ul style="list-style-type: none"> • Lecture • Practical Session • Problem-Based Learning 	<ul style="list-style-type: none"> • Written Exam • OSPE
3.0	Values		
None			

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"> Patricia Tille, Bailey & Scott's Diagnostic Microbiology (2021), 15th Edition, Elsevier, ISBN-13: 978-0323681056, ISBN-10: 0323681050.
Essential References Materials	<ul style="list-style-type: none"> Stefan Riedel , Stephen Morse , Timothy Mietzner , Steve Miller. Jawetz Melnick & Adelbergs Medical Microbiology, 2019, 28th Edition, New York: McGraw Hill Medical, ISBN-13: 978-1260012026, ISBN-10: 1260012026 Warren Levinson, Peter Chin-Hong , Elizabeth A. Joyce , Jesse Nussbaum , Brian Schwartz , Review of Medical Microbiology and Immunology, 2022, 17th Edition, New York : McGraw Hill Medical, ISBN-13: 978-1264267088, ISBN-10: 1264267088.
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"> Journal of Bacteriology Journal of Bacteriology and Parasitology Journal of Clinical Microbiology Journal of Medical Microbiology Journal of Microbiology and Biotechnology

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"> Biological safety cabinet. Autoclave. Hot air oven. Incubator. Different bacteriological media for isolation of the different types of bacteria. Bacterial stains (Gram stain and Ziehl-Nelsen). Reagents & kits to perform the biochemical reactions for identification of different types of bacteria. Antibiotic discs & Muller-Hinton agar for performing antibiotic sensitivity tests.

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:	Cytopathology
Course Code:	373326 - 2
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

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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..... 7

G. Course Quality Evaluation 8

H. Specification Approval Data 8

A. Course Identification

1. Credit hours: 2 Hours (1 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: 9 th Level/ Third Year			
4. Pre-requisites for this course (if any): Histopathological Techniques/ 373312-2			
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	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
	Total	50 Hours

B. Course Objectives and Learning Outcomes

1. Course Description

This course will provide the students with basic knowledge of the theoretical and applied aspects of cytological specimen's collection and preparation techniques for different cytological samples, the ability to discriminate the cellular composition of female genital tract and other body systems, including cells of epithelial and non-epithelial origin, inflammatory reactive cellular changes and features associated with malignancy cellular changes. Also provide the students the ability for reporting methods and organizations of screening cytology.

2. Course Main Objective

By the end of this course, students should be able to:

1. Gain proper knowledge about methods of collection, preparation and staining of different cytological samples
2. Demonstrate and interpret the abnormal pathological finding in cervical and other cytological smear
3. Perform the basic steps in cytological samples preparation as centrifugation, fixation and staining.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	List the main types of epithelial and non-epithelial cells.	K1
1.2	Define the terms cytology, dyskerosis, atypia and screening program.	K1
1.3	Know the different methods of collection, preparation and staining of various cytological samples.	K2
2	Skills:	
2.1	Perform basic methods of preparation, fixation and staining of cytological sample.	S1
2.2	Assess the inflammatory and neoplastic changes in cells in terms of the nuclear and cytoplasmic alterations.	S1
2.3	Interpret the diagnostic finding in cytopathology based on laboratory results.	S2
3	Values:	
3.1	Gain the ability of completing cytopathology laboratory tasks in professional manner.	V1

C. Course Content (Theory)

No	List of Topics	Contact Hours
1	Introduction to cytopathology (Presentation) <ul style="list-style-type: none"> • Objectives of cervical cytology • Types of exfoliative cytology samples • Sampling & preparation methods 	2
2	Cytological sample collection and preparation (Cytology Diagnostic Principles and Clinical Correlates. Chapter one; Pages 5-8) <ul style="list-style-type: none"> • Preparation of suspension fluids • Effusion fluid sample • Gastric lavage 	2

3	<p>Concept of cytological specimen collection and preparation (Presentation)</p> <ul style="list-style-type: none"> • Preservation of cytological sample before processing • Processing of Cytological Sample • Fixation and staining of cytological samples 	2
4	<p>Reporting system of cervical cytology (Cytology Diagnostic Principles and Clinical Correlates. Chapter one; Pages 8-10)</p> <ul style="list-style-type: none"> • Sensitivity and specificity of cytology • Diagnostic Terminology and Reporting Systems • Epithelial cell abnormalities 	2
5	<p>Cell of epithelial origins, squamous and glandular (The Bethesda System for Reporting Cervical Cytology. Chapter two; Pages 29-40)</p> <ul style="list-style-type: none"> • Normal histology and cytology of female genital • Endometrial cells in cervical smears • Spontaneously exfoliated endometrial cells 	2
6	<p>Lower female genital tract infections (The Bethesda System for Reporting Cervical Cytology. Chapter two; Pages 18-25)</p> <ul style="list-style-type: none"> • Inflammatory cells • Neutrophils and histiocytes • Organisms and Infections 	2
7	<p>Inflammatory changes in cytological sample (Cytology Diagnostic Principles and Clinical Correlates. Chapter one; Pages 18-23)</p> <ul style="list-style-type: none"> • Bacterial vaginosis • Trichomonas Vaginalis • Chlamydia Trachomatis 	2
8	<p>Benign morphological changes in squamous and endocervical cells (Presentation)</p> <ul style="list-style-type: none"> • Inflammatory/reactive changes • Radiation changes • Endocervical reactive changes 	2
9	<p>Squamous intraepithelial lesion Low-Grade (The Bethesda System for Reporting Cervical Cytology. Chapter 4; Pages 5-10)</p> <ul style="list-style-type: none"> • Squamous intraepithelial lesion • Low-Grade Squamous Intraepithelial Lesion • Grading Squamous Intraepithelial Lesions 	2
10	<p>Squamous cell carcinoma (Cytology Diagnostic Principles and Clinical Correlates. Chapter one; Pages 43-48)</p> <ul style="list-style-type: none"> • Management of squamous cell carcinoma • Atypical squamous cells • Atypical squamous cells of undetermined significance 	2
Total		20

(Practical)

No	List of Topics	Contact Hours
1	Introduction to Cytology lab and cytopathology request form (Laboratory manual)	3
2	Practicing collection of cytological sample buccal smear (Laboratory manual)	3
3	Urine sample preparation, fixation and staining (Laboratory manual)	3
4	Pap stain for sputum sample and Barr's body test (Laboratory manual)	3
5	MGG stain for body fluid (Laboratory manual)	3
6	Microscopical Identification of squamous cell and glandular cells (Laboratory manual)	3
7	Microscopical Identification of infectious agents in Pap cervical smear (Laboratory manual)	3
8	Microscopical Identification of benign changes in Pap cervical smear (Laboratory manual)	3
9	Identification of low-grade squamous abnormalities (Presentation)	3
10	Identification of high squamous abnormalities (Presentation)	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	List the main types of epithelial and non-epithelial cells.	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written Exam Assignment
1.2	Define the terms cytology, dyskerosis, atypia and screening program.	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written Exam
1.3	Know the different methods of collection, preparation and staining of various cytological samples.	<ul style="list-style-type: none"> Lecture Practical Session 	<ul style="list-style-type: none"> Written Exam Practical Exam Lab Report
2.0	Skills		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.1	Perform basic methods of preparation, fixation and staining of cytological sample.	<ul style="list-style-type: none"> Practical Session 	<ul style="list-style-type: none"> Practical Exam
2.2	Assess the inflammatory and neoplastic changes in cells in terms of the nuclear and cytoplasmic alterations.	<ul style="list-style-type: none"> Practical Session 	<ul style="list-style-type: none"> Practical Exam
2.3	Interpret the diagnostic finding in cyto pathology based on laboratory results.	<ul style="list-style-type: none"> Lecture Practical Session Problem-Based Learning 	<ul style="list-style-type: none"> Written Exam OSPE
3.0	Values		
3.1	Gain the ability of doing tasks related to the course in a professional manner.	<ul style="list-style-type: none"> Group Discussion 	<ul style="list-style-type: none"> Activity

1. 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">• Edmund S, Cibas MD, Barbara S, Ducatman MD, Diagnostic Principles and Clinical Correlates, (2014). Saunders Publishers, ISBN-13: 978-1-4557-4462; ISBN-10: 1-4557-4462X• Nayar, Ritu and Wilbur, David, The Bethesda System for Reporting Cervical Cytology. ISBN: 978-3319-11074-5.
Essential References Materials	<ul style="list-style-type: none">• Acta cytological journal of cytopathology, KARGER PUBLISHERS, Germany• Journal of diagnostic cytopathology, Wiley Online Library
Electronic Materials	Websites, Search engines (Saudi Digital Library, PubMed, Google Scholar)
Other Learning Materials	<ul style="list-style-type: none">• Acta cytological journal of cytopathology• Journal of diagnostic cytopathology

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"> • Light microscopes • Cyto-centrifuge • Multi headed teaching microscope • Liquid base cytology machine • Pathology slides teaching sets for cytopathology

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:	Diagnostic Molecular Biology
Course Code:	373314-3
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

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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: 9 th Level/ Third Year
4. Pre-requisites for this course (if any): Medical Genetics/ 373216-3
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

1. Course Description

This course focus on the DNA and gene expressions, understanding the Molecular Biology and its role in diseases and forensic, and focus on the Laboratory techniques that are used in the molecular lab for both diagnosis and research.

2. Course Main Objective

The student should be able to understand the role of molecular biology in the diagnosis of infectious diseases, cancer and other genetic disorders and cover the basic molecular Biology techniques such as DNA extractions, PCR, mutagenesis, diagnostic DNA cloning that are important in molecular research labs. They should be able to apply the knowledge of diagnostic molecular biology principles which are used in research and diagnostic laboratories, and perform quality assurance in the molecular diagnostic laboratory.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Explain role of molecular biology in the clinical and research laboratory and recognize basic molecular diagnostic techniques.	K1
1.2	Describe application of molecular biology in forensic medicine, genetic fingerprinting, genetic engineering and diagnosis of various diseases.	K1
2	Skills:	
2.1	Perform the lab work with chemicals, dyes, laboratory wares and instruments used in molecular biology laboratory in a proficient way.	S1
2.2	Interpret information and develop ideas on methodologies and techniques within the context of molecular biology.	S2
2.3	Assess the importance of molecular diagnostic techniques in diagnosing genetic disorders, human cancer and infectious diseases.	S2
3	Values:	
3.1	Exhibit responsible behaviour through creating awareness among community in context of molecular diagnostic techniques.	V2

C. Course Content (Theory)

No	List of Topics	Contact Hours
1	Introduction (Presentation)	3
2	Tools for Molecular Diagnosis I (Book chapter 6, pages 101-111) - Restriction enzymes (Definition, types and its properties) - Gel electrophoresis (principle, types of gel and its applications) PCR: - Definition, its components and steps - Thermal cycler - RT-PCR (definition, its dyes and applications) - Other types of PCR (colony, allele specific, multiplex and In-situ)	3
3	Tools for Molecular Diagnosis II (Book chapter 2, pages 18-24) Nucleic Acid Hybridizations: - Principle - Applications Blotting:	3

	- Southern blot (procedure and its applications) - Northern blot (procedure and its applications) - Western blot (procedure and its applications)	
4	- DNA Mapping, Mutagenesis and DNA fingerprinting (Book chapter 17, pages 346-360) -DNA sequencing: Maxam and Gilbert's method Sanger's method Automated sequencing	3
5	- Recombinant DNA technology: (Book chapter 3, pages 81-124) Cloning vectors (plasmid, phage, cosmid, BAC and YA) -Transformation and selection -Application of cloning -Genomic and cDNA libraries -Expression vector and its applications	3
6	Bioinformatics and proteomics (Book chapter 9, pages 157-175)	3
7	Molecular Diagnostic Applications (Presentation) Genetic Testing: Principles and Practice (Presentation)	3
8	Transgenesis and knockout (Presentation)	3
9	Human genome project (Presentation) Genetic testing in individual and populations (Presentation)	3
10	Cancer Genetics (Presentation)	3
Total		30

C. Course Content (Practical)

No	List of Topics	Contact Hours
1	DNA extraction from strawberry (Lab Manual)	3
2	DNA extraction from blood (Lab Manual)	4
3	Determining the Concentration and Purity of DNA (Lab Manual)	3
4	Polymerase Chain Reaction (PCR) (Lab Manual)	4
5	Restriction Enzymes (digestion) (Lab Manual)	3
6	Gel Electrophoresis (Lab Manual)	4
7	Gel documentation system (Lab Manual)	3
8	RFLP (Lab Manual)	3
9	Theoretical Background (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 role of molecular biology in the clinical and research laboratory and recognize basic molecular diagnostic techniques.	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written Exam
1.2	Describe application of molecular biology in forensic medicine, genetic fingerprinting, genetic engineering and diagnosis of various diseases.	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written Exam Assignment
2.0	Skills		
2.1	Perform the lab work with chemicals, dyes, laboratory wares and instruments used in molecular biology laboratory in a proficient way.	<ul style="list-style-type: none"> Practical Session 	<ul style="list-style-type: none"> Practical Exam Lab Report
2.2	Interpret information and develop ideas on methodologies and techniques within the context of molecular biology.	<ul style="list-style-type: none"> Lecture Problem-Based Learning 	<ul style="list-style-type: none"> Written Exam OSPE
2.3	Assess the importance of molecular diagnostic techniques in diagnosing genetic disorders, human cancer and infectious diseases.	<ul style="list-style-type: none"> Lectures Practical Session 	<ul style="list-style-type: none"> Written Exam OSPE
3.0	Values		
3.1	Exhibit responsible behaviour through creating awareness among community in context of molecular diagnostic techniques.	<ul style="list-style-type: none"> Service Learning 	<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	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">• Sandy Primrose and Richard Twyman, Principles of Gene Manipulation and Genomics (2006), 7th Edition, Wiley-Blackwell, ISBN: 978-1-405-13544-3• Brown, T.A. Genomes 3. (2006), 3rd edition, Garland Science, ISBN: (Paperback) 9780815341383.• William Thieman and Micheal Palladino, Introduction to Biotechnology (2013) 3rd edition, Pearson, ISBN-10 : 0321766113; ISBN-13 : 978-0321766113
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.• https://www.journals.elsevier.com/journal-of-molecular-biology/

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"> • Kits for extraction of DNA and RNA • PCR machine • Agarose electrophoresis, PAGE • Gel documentation system • UV transilluminator • Set up for Southern and Western Blotting

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
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