

Program Specification

1. Program Identification and General Information

Program Title	Laboratory Medicine
Responsible faculty to grant degree	Laboratory Medicine
Responsible Departments	Biochemistry and molecular biology, Microbiology and parasitology, Hematology
Other Departments with major Teaching Contributions	Physiology, Anatomy and Histology, Pathology, Pharmacology
Coordinators	Associated Prof. Dr. Riyadh Saif-Ali
Language of study	<i>English</i>
System of study	<i>Integrated system and semester</i>
Total credit hours needed for completion of the program	167 Hours
Time period of study in the program	4 years (8 semester) and 6 months Internship (practical training)
Award granted on completion of the Program	Bachelor degree in laboratory medicine
Location(s) where the program is offered	Faculty of Laboratory Medicine, University of 21 September for Medical and Applied Sciences
Date of program development	2016/2017
Approval date:	2020

2. Mission & Aims of the Faculty

Mission of the Faculty

The mission of the faculty of laboratory medicine at the University of 21 September is to develop and maintain superior educational in the field of laboratory medicine. Graduates of the faculty will be knowledgeable, highly skilled, well trained and ethical, prepared to practice as competent professional at the national, regional, and international levels and capable to grow with the future of laboratory medicine.

Aims of the Faculty

1. To provide students a superior and comprehensive educational program in laboratory medicine
2. To graduate students with knowledge base required to practice laboratory medicine effectively and carefully
3. To graduate professionally competent laboratory medicine prepared to meet the workforce needs of Yemen and the regions
4. To graduate individuals exhibiting sense of commitment to the ethical and humane aspects of patient care, and recognizing the role in assuring quality health care.
5. To graduate students with effective communication, management and leadership, problem solving/ critical thinking skills that provide compassionate patient care.
6. To graduate students who value the importance of professional development to patient care and laboratory medicine field through life-long learning and meet the needs of the laboratory medicine community.

3. External References

- The college of American Pathologist Laboratory Accreditation Program
- University of Sharjah
- University of Bradford
- Jordan University of Science and Technology

4. Program Mission

The mission of The laboratory medicine Program develop and maintain superior educational in the field of laboratory medicine. Graduates of the faculty will be knowledgeable, highly skilled, well trained and ethical, prepared to practice as competent professional at the national, regional, and international levels and capable to grow with the future of laboratory medicine

5. Program Aims

1. To provide students a superior and comprehensive educational program in laboratory medicine
2. To graduate students with knowledge base required to practice laboratory medicine effectively and carefully
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4. To graduate individuals exhibiting sense of commitment to the ethical and humane aspects of patient care, and recognizing the role in assuring quality health care.

5. To graduate students with effective communication, management and leadership, problem solving/ critical thinking skills that provide compassionate patient care.
6. To graduate students who value the importance of professional development to patient care and laboratory medicine field through life-long learning and meet the needs of the laboratory medicine community.

6. Intended Learning Outcomes: (ILOs)

A- Knowledge skills:

When student has completed the program, he will be able to:

A1- Discuss the core aspects of laboratory medicine including Biochemistry, Anatomy, histology, Physiology, Cell Biology, Pathology, Immunology, Microbiology, Epidemiology, and Public Health Medicine

A2- Demonstrate advanced knowledge of his Laboratory Medicine specialist area; such as genetics, cellular pathology, clinical biochemistry, clinical immunology, hematology and transfusion science, and medical microbiology

A3- Explain the pathophysiology, symptoms and causes of common medical conditions affecting various organ of the human body.

A4- Recognize various drugs and toxic substances acting on human body organs and /or interfere with the laboratory tests

A5- Detect different diagnostic markers and laboratory tests for each human body organs and common medical conditions

A6- Identify quality assurance measures and participate in performance improvement activities in the clinical laboratory

A7-

B- Intellectual skills:

When student has completed the program, he will be able to:

B1- Integrate knowledge of basic Medical Sciences such as physiology, biochemistry ...etc. with the Applied and Clinical Medical Sciences such as Pathology, Clinical Biochemistry ...etc.

B2- Diagnose common medical conditions affecting various organs of the human body.

B3- Interpret medical laboratory and experimental data and present the data in an appropriate format

B4- Evaluate experimental and clinical laboratory techniques and be able to apply them to experimental and laboratory investigations

B5- Integrate and interpret test results, recognize errors, and create a way of action to solve problems

B6- Develop critical and analytical thinking to solve problems.

B7- Evaluate published scientific research results and new techniques in the field of Laboratory Medicine.

C- Practical/clinical skills

When student has completed the program, he will be able to:

C1- Perform clinical laboratory tests commonly encountered in a hospital laboratory in the areas of Clinical Chemistry, Hematology, Immunochemistry, Immunology, Microbiology, Histopathology and, Molecular Diagnostics.

C2- Apply the safety laboratory rules and regulations in handling and processing of test samples and

maintaining working environment.
C3- Examine the acceptability of samples for testing and decide on which samples to use or reject for particular test(s).
C4- Operate common lab equipment ranging from simple pipetting to the operation of sophisticated Medical Laboratory equipment.
C5- Use Standards quality assurance and quality control to assure the accuracy and precision of test results.
C6- Solve commonly encountered equipment problems.
C7- Take responsibility in analysis and clinical decision-making such as recognizing and resolving issues related to pre-analytical, analytical, and post-analytical steps of the testing process
C8- Demonstrate a high degree of professionalism in practicing ethical and social issues related to patient health and maintain confidentiality
C9- Utilize laboratory information system, and work independently and in cooperation with others and Consult with other members of the health care team
D- General or transferable skills When student has completed the program, he will be able to:
D1- Educate the general public and to assist patients through acceptable customer service interactions
D2- Demonstrate oral and written effective communication skills,
D3- Collaborate with patients, communities, organizations, and with members of the health team.
D4- Demonstrate responsibility for professional Laboratory Medicine practice including the essential values of ethics, self-respect, honesty, autonomy, humanity and social justice.
D5- Apply acquired learned skills and knowledge to new situations
D6- Follow directions, guidance, and instruction

7. Teaching and Assessment Strategies

Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
A. Knowledge skills		The assessment strategy is designed to allow student to demonstrate achievement of the learning outcomes.
A1- Discuss the core aspects of laboratory medicine including Biochemistry, Anatomy, histology, Physiology, Cell Biology, Pathology, Immunology, Microbiology, Epidemiology, and Public Health Medicine	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Case studies • Small group discussion • Directed reading • Work-based training • PBL 	<ul style="list-style-type: none"> • Short assay question • MCQ • Coursework assignments • Practical exam • Writing Reports • Oral Exam • Case studies • Oral presentation
A2- Demonstrate advanced	<ul style="list-style-type: none"> • Formal lectures 	<ul style="list-style-type: none"> • Short assay question

<p>knowledge of his Laboratory Medicine specialist area; such as genetics, cellular pathology, clinical biochemistry, clinical immunology, hematology and transfusion science, and medical microbiology</p>	<ul style="list-style-type: none"> • Laboratory practice • Tutorials • Case studies • Small group discussion • Directed reading • Work-based training • PBL 	<ul style="list-style-type: none"> • MCQ • Coursework assignments • Practical exam • Writing Reports • Oral Exam • Case studies • Oral presentation
<p>A3- Explain the pathophysiology, symptoms and causes of common medical conditions affecting various organ of the human body.</p>	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Case studies • Small group discussion • Directed reading • Work-based training • PBL 	<ul style="list-style-type: none"> • Short assay question • MCQ • Coursework assignments • Writing Reports • Oral Exam • Case studies • Oral presentation
<p>A4- Recognize various drugs and toxic substances acting on human body organs and /or interfere with the laboratory tests</p>	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Case studies • Small group discussion • Directed reading • Work-based training • PBL 	<ul style="list-style-type: none"> • Short assay question • MCQ • Coursework assignments • Practical exam • Writing Reports • Oral Exam • Case studies • Oral presentation
<p>A5- Detect different diagnostic markers and laboratory tests for each human body organs and common medical conditions</p>	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Case studies • Small group discussion • Directed reading • Work-based training • PBL 	<ul style="list-style-type: none"> • Short assay question • MCQ • Coursework assignments • Writing Reports • Practical exam • Oral Exam • Case studies • Oral presentation
<p>A6- Identify quality assurance measures and participate in performance improvement activities in the clinical laboratory</p>	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Case studies • Small group 	<ul style="list-style-type: none"> • Short assay question • MCQ • Coursework assignments • Practical exam • Writing Reports

	<p>discussion</p> <ul style="list-style-type: none"> • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Oral Exam • Case studies • Oral presentation • Project report
Intellectual skills		
<p>B1- Integrate knowledge of basic Medical Sciences such as physiology, biochemistry ...etc. with the Applied and Clinical Medical Sciences such as Pathology, Clinical Biochemistry ...etc.</p>	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Case studies • Small group discussion • Directed reading • Work-based study • PBL 	<ul style="list-style-type: none"> • MCQ • Coursework assignments • Writing Reports • Oral Exam • Case studies • Oral presentation
<p>B2- Diagnose common medical conditions affecting various organs of the human body.</p>	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Case studies • Small group discussion • Directed reading • Work-based training • PBL 	<ul style="list-style-type: none"> • Short assay question • MCQ • Coursework assignments • Practical exam • Writing Reports • Oral Exam • Case studies • Oral presentation
<p>B3- Interpret medical laboratory and experimental data and present the data in an appropriate format</p>	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Case studies • Small group discussion • Directed reading • Work-based training • PBL 	<ul style="list-style-type: none"> • MCQ • Coursework assignments • Practical exam • Writing Reports • Oral Exam • Case studies
<p>B4- Evaluate experimental and clinical laboratory techniques and be able to apply them to experimental and laboratory investigations</p>	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Case studies • Small group discussion 	<ul style="list-style-type: none"> • Coursework assignments • Practical exam • Writing Reports • Oral Exam • Oral presentation • Project report

	<ul style="list-style-type: none"> • Directed reading • Work-based training <p>PBL</p>	
B5- Integrate and interpret test results, recognize errors, and create a way of action to solve problems	<ul style="list-style-type: none"> • Formal lectures • Tutorials • Case studies • Small group discussion • Directed reading • Work-based training <p>PBL</p>	<ul style="list-style-type: none"> • Coursework assignments • Practical exam • Writing Reports • Case studies • Oral Exam • Oral presentation <p>Project report</p>
B6- Develop critical and analytical thinking to solve problems.	<ul style="list-style-type: none"> • Case studies • Small group discussion • Directed reading • Work-based training <p>PBL</p>	<ul style="list-style-type: none"> • MCQ • Coursework assignments • Writing Reports • Oral Exam • Case studies • Oral presentation • Project report
B7- Evaluate published scientific research results and new techniques in the field of Laboratory Medicine.	<ul style="list-style-type: none"> • Small group discussion • Directed reading • Work-based training • PBL 	<ul style="list-style-type: none"> • Coursework assignments • Writing Reports • Oral Exam • Oral presentation • Project report
Practical/clinical skills		
C1- Perform clinical laboratory tests commonly encountered in a hospital laboratory in the areas of Clinical Chemistry, Hematology, Immunohematology, Immunology, Microbiology, Histopathology and, Molecular Diagnostics.	<ul style="list-style-type: none"> • Laboratory practice • Work-based training 	<ul style="list-style-type: none"> • Practical exam • Writing Reports • Oral Exam
C2- Apply the safety laboratory rules and regulations in handling and processing of test samples and maintaining working environment.	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Short assay question • MCQ • Practical exam • Writing Reports • Oral Exam • Project report

C3- Examine the acceptability of samples for testing and decide on which samples to use or reject for particular test(s).	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Short assay question • MCQ • Practical exam • Writing Reports • Oral Exam
C4- Operate common lab equipment ranging from simple pipetting to the operation of sophisticated Medical Laboratory equipment.	<ul style="list-style-type: none"> • Laboratory practice • Tutorials • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Practical exam • Writing Reports • Oral Exam
C5- Use Standards quality assurance and quality control to assure the accuracy and precision of test results.	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Tutorials • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Short assay question • MCQ • Coursework assignments • Practical exam • Writing Reports • Oral Exam • Project report
C6- Solve commonly encountered equipment problems.	<ul style="list-style-type: none"> • Laboratory practice • Tutorials • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Practical exam • Writing Reports • Oral Exam
C7- Take responsibility in analysis and clinical decision-making such as recognizing and resolving issues related to pre-analytical, analytical, and post-analytical steps of the testing process	<ul style="list-style-type: none"> • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Oral Exam • Project report
C8- Demonstrate a high degree of professionalism in practicing ethical and social issues related to patient health and maintain confidentiality	<ul style="list-style-type: none"> • Formal lectures • Laboratory practice • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Short assay question • Coursework assignments • Practical exam • Writing Reports • Oral Exam • Project report
C9- Utilize laboratory information system, and work independently and in cooperation with others and Consult with other members	<ul style="list-style-type: none"> • Laboratory practice • Tutorials • Small group discussion 	<ul style="list-style-type: none"> • Coursework assignments • Writing Reports • Oral Exam • Oral presentation

of the health care team	<ul style="list-style-type: none"> • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Project report
C- General or transferable skills		
D1- Educate the general public and to assist patients through acceptable customer service interactions	<ul style="list-style-type: none"> • Formal lectures • Tutorials • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Writing Reports • Oral Exam • Oral presentation • Project report
D2- Demonstrate oral and written effective communication skills,	<ul style="list-style-type: none"> • Laboratory practice • Tutorials • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Short assay question • Coursework assignments • Writing Reports • Oral Exam • Oral presentation • Project report
D3- Collaborate with patients, communities, organizations, and with members of the health team.	<ul style="list-style-type: none"> • Formal lectures • Tutorials • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Oral Exam • Oral presentation • Project report
D4- Demonstrate responsibility for professional Laboratory Medicine practice including the essential values of ethics, self-respect, honesty, autonomy, humanity and social justice.	<ul style="list-style-type: none"> • Formal lectures • Tutorials • Small group discussion • Directed reading • Work-based training 	<ul style="list-style-type: none"> • Practical exam • Writing Reports • Oral Exam • Oral presentation • Project report
D5- Apply acquired learned skills and knowledge to new situations	<ul style="list-style-type: none"> • Small group discussion • Directed reading • Work-based training • PBL 	<ul style="list-style-type: none"> • Coursework assignments • Practical exam • Writing Reports • Oral Exam • Oral presentation • Project report
D6- Follow directions, guidance, and instruction	<ul style="list-style-type: none"> • Small group discussion • Work-based training • PBL 	<ul style="list-style-type: none"> • Oral Exam • Oral presentation • Project report

8. System of Study

Terms of study.	Semester each semester 16 weeks, each year 2 semesters for 4 years and 6 months practical training
Study Credit.	
Program Requirement	%
• University Requirements	7.2
• Faculty Requirements	6.6
• Program requirements	86.2

9. Study plan

<u>University requirement</u>	Hours			
	Theory	practical	Tutorial	Credit hour
English Language 1	2			2
English Language 2	2			2
Computer skills	2			2
Arabic Language	2			2
Islamic Culture	2			2
Communication skills	2			2
				12

<u>Faculty requirement</u>	Hours			
	Theory	Practical	Tutorial	Credit hour
Medical terminology	2			2
Biostatistics	2	1		3
Medical ethics	2			2
Chemistry	2			2
Physics	2			2
				11

<u>Program requirements</u>	Hours			
	Theory	practical	Tutorial	Credit hour
Subjects				
Introduction to Fundamentals of Nursing	2	1		3
General Anatomy	2	1		3
General Physiology	2	1		3
General Biochemistry	2	1		3
General Histology	2	1		3

General Molecular Biology	2	1		3
Basic Nutrition	2			2
Introduction to Embryology	2			2
Parasitology	1	1		2
General Microbiology	2	1		3
General Pathology	3	1		4
General Pharmacology	2	1		3
Molecular Genetics	2	1		3
General Immunology	2			2
Introduction Primary Health Care	2			2
Respiratory system	4	2		6
Cardio-vascular system	4	2		6
Haemopoietic & Lymphatic system	4	2		6
Cellular and molecular Immunology	2	1		3
Gastro-intestinal system	4	2		6
Endocrine system	5	1		6
Musculo-skeletal system	4	2		6
Forensic Medicine & Toxicology	2	1		3
Neuroscience	6	2		8
Urogenital system	6	2		8
Behavioral Psychology	2			2
Health Administration	2	-		2
Diagnostic parasitology	2	1		3
Blood transfusion and banking	2	1		3
Drug interfering lab test	1			1
Diagnostic microbiology 1 (bacteria, viruses and fungus)	2	2		4
Clinical chemistry 1	2	1		3
Leukemia and lymphoma	2	1		3
Drug monitoring	1			1
Diagnostic hematology	2	1		3
Clinical and diagnostic immunology	2	1		3
Immunohaematology, Organ transplantation, and banking	2	1		3
Molecular diagnostic	2	1		3
Diagnostic microbiology 2 (bacteria, viruses and fungus)	2	1		3
Clinical chemistry 2	2	1		3
Quality assurance and quality control	2	1		3
Research Project	-	2		2
Total	101	43		144

First year first semester 1	Hours			
	Theory	practical	Tutorial	Credit hour
Islamic Culture	2			2
English Language	4			4
Physics	2			2
Chemistry	2			2
Medical Ethics	2			2
Arabic Language	2			2
Introduction to Fundamentals of Nursing	2	1		3
Medical Terminology	2			2
Computer skills	2			2
Total	20	1		21

First year Semester 2:	Hours			
	Theory	practical	Tutorial	Credit hour
General Anatomy	2	1		3
General Physiology	2	1		3
General Biochemistry	2	1		3
General Histology	2	1		3
General Molecular Biology	2	1		3
Basic Nutrition	2			2
Communications skills	2			2
Introduction to Embryology	2			2
Total	16	5		21

Second year Semester 1:	Hours			
	Theory	practical	Tutorial	Credit hour
Parasitology	1	1		2
General Microbiology	2	1		3
General Pathology	3	1		4
General Pharmacology	2	1		3
Molecular Genetics	2	1		3
General Immunology	2			2
Introduction to Primary Health Care	2			2
Total	14	5		19

Second year Semester 2:	Hours			
	Theory	Practical	Tutorial	Credit hour
Respiratory system	4	2		6
Cardio-vascular system	4	2		6
Haemopoietic & Lymphatic system	4	2		6

Cellular and molecular Immunology	2	1		3
Total	14	7		21

Third year Semester 1:	Hours			
	Theory	practical	Tutorial	Credit hour
Gastro-intestinal system	4	2		6
Endocrine system	5	1		6
Musculo-skeletal system	4	2		6
Forensic Medicine & Toxicology	2	1		3
Total	15	6		21

Third year Semester 2:	Hours			
	Theory	practical	Tutorial	Credit hour
Neuroscience	6	2		8
Urogenital system	6	2		8
Behavioral Psychology	2			2
Health Administration	2	-		2
Total	16	4		20

Fourth year Semester 1:	Hours			
	Theory	practical	Tutorial	Credit hour
Diagnostic parasitology	2	1		3
Blood transfusion and banking	2	1		3
Drug interfering lab test	1			1
Diagnostic microbiology 1 (bacteria, viruses and fungus)	2	2		4
Clinical chemistry 1	2	1		3
Leukemia and lymphoma	2	1		3
Drug monitoring	1			1
Biostatistics	2	1		3
Total	14	7		21

Fourth year Semester 2:	Hours			
	Theory	Practical	Tutorial	Credit hour
Diagnostic hematology	2	1		3
Clinical and diagnostic immunology	2	1		3
Immunohaematology, Organ transplantation, and banking	2	1		3
Molecular diagnostic	2	1		3
Diagnostic microbiology 2 (bacteria, viruses and fungus)	2	1		3
Clinical chemistry 2	2	1		3

Quality assurance and quality control	2	1		3
Total	14	7		21

Six Months Practical Training (internship)

	Credit hour
Endnote	
SPSS and EPI info programs	
Research Projects	2
	Practical Contact hours
Parasitology	50
Hematology	100
Pathology	100
Immunology	50
Microbiology	100
Clinical chemistry and drug monitoring	100
Blood bank and organ transplantation	50
Molecular genetics	50