

1. Course Name :					
Analytical Biostatistics					
2. Course Code:					
None					
3. Semester / Year:					
Semester System / Third Stage					
4. Description Preparation Date:					
10 – 1 - 2025					
5. Available Attendance Forms:					
My presence					
6. Number of Credit Hours (Total) / Number of Units (Total):					
(4) hours and (2) units: 72 hours					
7. Course administrator's name (mention all, if more than one name)					
Name Dr. Maytham Khazal Kazim			Email: maythambio@gmail.com		
8. Course Objectives					
Course Objectives : The student able to : The current course aims to: • Introduce the student to the importance and how to conduct statistical tests • Introduce the student to the types of statistical tests in a manner that suits the research objective • How to reach and interpret research results • How to reach conclusions in light of test results					
9. Teaching and Learning Strategies					
Strategy	• 1. Active Learning • 2. Collaborative Learning • 3. Project-Based Learning • 4. Inquiry				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Syllabus of Theoretical part					
1	2	Probabilities	Using the model	Using the model	Homework
2	2	Distributions	In-person presentation	In-person presentation	Live Discussion
3	2	Correlation	Using the model	Using the model	Q&A
4	2	Regression Analysis	Lecture	Lecture	Cos
5	2	Hypothesis Testing	Using the blackboard	Using the blackboard	Homework
6	2	level of significance	Using the blackboard	Using the blackboard	Discussion

7	2	Z-test	Using the blackboard	Using the blackboard	Q&A
8	2	t-test	Explanation and practical	Explanation and practical	Cos
9	2	Test	Lecture	Lecture	Homework
10	2	Chi-square test	Using the blackboard	Using the blackboard	Discussion
11	2	Analysis of Variance	Using the blackboard	Using the blackboard	Q&A
12	2	(ANOVA)	Using the blackboard	Using the blackboard	Cos
13	2	Questionnaire	Using the blackboard	Using the blackboard	Homework
14	2	Final Report	In-person exam	In-person exam	Discussion
15	2	Revision		Using the model	Q&A

Syllabus of The Practical Course

1	4	Elementary Probability Theor	Elementary Probability Theor	Using the model	Homework
2	4	=	=	In-person presentation	Live Discussion
3	4	Statistical Estimation Theory (Estimation of Population parameters, by Point and by Interval)	Statistical Estimation Theory (Estimation of Population parameters, by Point and by Interval)	Using the model	Q&A
4	4	=	=	Lecture	Cos
5	4	Test of Significa : Degree of freedom, P-Value and level of Significant .Type and Type I I Error	Test of Significant : Degree of freedom, P-Value and level of Significant .Type I and Type I I Errors	Using the board	Homework
6	4	=	=	Using the board	Discussion
7	4	=	=	Using the board	Q&A
8	4	Different type of t-	Different type of t- test	Using the board	Cos
9	4	=	=	Explanation and practical	Homework
10	4	Chi-Square Significance tests	Chi-Square Significance tests	Lecture	Live Discussion
11	4	One way ANOVA t	One way ANOVA test	Using the board	Q&A
12	4	=	=	Using the board	Cos
13	4	Simple Correlation Coefficients	Simple Correlation Coefficients	Using the board	Homework
14	4	=	=	Using the board	Discussion
15	4	Exam	Exam	In-person exam	Final Exam

11.Course Evaluation

The following evaluation methods are adopted:

- 1. Quiz
- 2. Discussion
- 3. Homework

- 4. Midterm Exam

Distribution of grades:

- 1- 3 attendance marks
- 2- 3 participation marks
- 3- 14 marks for practical examination
- 4- 20 marks for theoretical examination
- 5- 25 marks for the final practical examination and 35 marks for the final theoretical examination, so the total is 60 marks for the final examination
- 6- Total is 40 marks for the examination and 60 marks for the examination, so the total is 100 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Academic description of the Medical Laboratories Department for the subject of Analytical Biostatistics - Third Stage

Dr. Maitham Khazal Kazim

Course Description Form

1. Course Name: Histopathology2					
2. Course Code:					
3. Semester / Year: 2 st semester /2024 -2025					
4. Description Preparation Date: 10/1/2025					
5. Available Attendance Forms: Morning/evening					
6. Number of Credit Hours (Total) 30 h / Number of Units (Total) 4 unit					
7. Course administrator's name (mention all, if more than one name)					
Name: Hajras Shaker Saleh					
Email: hajsalsaleh@gmail.Com					
8. Course Objectives					
Course Objectives			• A knowledge: •- It is to provide an idea and basic informant about histopathology and the diseases they cause and develop the student's ability and skill understanding their pathological analyses. 2- The student learns the skill, how and who diseases are diagnostic - 3- The student learns the skill of conduct pathological examinations and different method diagnosis. - Evaluation methods 1- Conducting daily qu exams Quizzes 2- Conducting monthly exams 3- Conducting semester and final exams norms in biological studies • C3: Working as a team		
9. Teaching and Learning Strategies					
Strategy		Lectures and practical lessons - outcome-based learning - learning project-based learning - group work-based learning - problem-based learning - community-based learning - self-learning.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2T + 4 P	The Define Environmental factors and overview; Lifestyle factors	Environmental and Lifestyle-Related Pathology	Lectures and practical lessons -Discussion	Theory exams - practical -

2		Describe how the causes of Diseases ; The student learns the who unhealthy diet . Pathogenesis; Laboratory Diagnosis	Nutrition-Related Diseases; Laboratory Diagnosis	Brainstorming	Discussions
3	2T + 4 P	The student learns and Identify the Hereditary disorders and Congenital diseases.	Genetic Diseases: There are several types of genetic abnormalities that affect the structure and function of proteins, disrupting cellular homeostasis and contributing to disease	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
4	2T + 4 P	The student will learn the Nomenclature of Tumors, two types Benign and malignant tumors	Clinical Aspects of Neoplasia: It is a genetic disorder of cell growth that is triggered by acquired or less commonly inherited mutations affecting a single cell	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
5	2T + 4 P	Explain the Cancer is an unregulated proliferation of cells due to loss of normal controls, resulting in unregulated growth, lack of differentiation, local tissue invasion and metastasis.	Molecular Basis of Cancer. Cancer is a collection of diseases characterized by abnormal and uncontrolled growth.	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
6	2T + 4 P	The student will learn Categorizing viral infections by the organ system most commonly affected (eg, lungs, GI tract, skin, liver, CNS mucous membranes) can be clinically useful, although	Diseases Caused by Viruses	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions

		certain viral disorders (eg, mumps)	Pathogenicity; Laboratory Diagnostic		
		Features; Laboratory Diagnosis.			
7	2T + 4 P	To identify types of There are many different types of amyloidosis caused by about 30 different amyloid-forming proteins. Most types are systemic, affecting more than one organ or tissue ; symptoms.	Immunopathology Including Amyloidosis: Amyloidosis is the name for a group of disorders where people have proteins that fold in an abnormal way to form fibrils.	- Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
8	2T + 4 P	Interpret the Hereditary disorders and Congenital diseases. Lab. Diagnosis, including microscopic examination.	Genetic Diseases: There are several types of genetic abnormalities that affect the structure and function of proteins, disrupting cellular homeostasis and contributing to disease	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
9	2T + 4 P	To Assess the effectiveness mineral content of aged bones declines, eventually resulting in Osteoporosis a condition in which bones become more fragile and prone to fractures	Bone: As humans age, the rate of bone resorption by osteoclast cells outpaces the rate of bone formation	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
10	2T + 4P	To learn about Multiple factors contribute to the structural integrity of whole bones: the total bone mass, the bone geometry, and the properties of the constituent tissue.	Techniques for analyzing bone	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions

11	2T + 4P	Describe the Competence in muscle biopsy evaluation is a core component of neuropathology practice. Lab diagnostic	Neuropathology and Muscle biopsies	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
12	2T + 4P	Define key Skeletal muscle biopsy remains an important investigative tool in the diagnosis of a variety of muscle disorders.	Muscle Biopsies	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
13	2T + 4P	To learn about Molecular pathology represents the application of the principles of basic molecular biology to the investigation of human disease processes.	Molecular pathology	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
14	2T + 4P	To learn about T techniques are numerous but include quantitative polymerase chain reaction (qPCR), multiplex PCR, DNA microarray, in situ hybridization, in situ RNA sequencing, DNA sequencing, antibody based immunofluorescence tissue assays, molecular profiling of pathogens, Lab diagnosis.	Techniques in Molecular pathology	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions
15	2T + 4P		Exam	Lectures and practical lessons -Discussion Brainstorming	Theory exams - practical - Discussions

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Histology for Pathologists 2. Principle of Medical Physiology
Main references (sources)	Medical Pathology: A Self-instructional T

Recommended books and references (scientific journals, reports...)	1- NCBI 2- PubMed 3- You tube
Electronic References, Websites	American Diabetes Association Professional Practice Committee (2019). "Professional Practice Committee: Standards of Medical Care in Diabetes—2019". Diabetes Care. 42 (Supplement 1): s46–s60. doi:10.2337/dc19-S005.

1. Course Name : Medical Virology					
2. Course Code:					
3. Semester / Year: 2 nd / 2024-2025					
4. Description Preparation Date: 1-1-2025					
5. Available Attendance Forms: Attending Lectures					
6. Number of Credit Hours (Total) / Number of Units (Total):					
30 hrs. / 3 Units					
7. Course administrator's name (mention all, if more than one name)					
Name: Assistant Professor Dr, Hekmat Kadhum Ateya Email: hekmatkadhum@shu.edu.iq					
8. Course Objectives					
Course Objectives : The study of Virology introduces students to Studying the common steps of the viral reproductive cycle, illustrated with a set of representative viruses, and considering mechanisms by which these viruses can cause disease provides an integrated overview of the biology of these infectious agents.					
9. Teaching and Learning Strategies					
Strategy		1-Lectures (brain storm, discussion) using board, data shows. 2-Self learning by preparing essays and presentations (internet researches and faculty library) 3- Practical (application of laboratory diagnosis and data show).			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Syllabus of Theoretical part					
1	2	Understanding the topic	General Properties of Viruses and Structure of Viruses	Lecture,	Quiz
2	2	Understanding the topic	Classification and Nomenclature of Viruses; Atypical Virus-like agents (Prions, Defective viruses, Pseudovirion,	Lecture,	Quiz

			and Viroids)		
3	2	Understanding the topic	Viral Genetics and Viral Replication	Lecture,	Quiz
4	2	Understanding the topic	Viral Pathogenesis and Transmission	Lecture,	Quiz
5	2	Understanding the topic	Immunity & Laboratory Diagnosis of Viruses	Lecture,	Quiz
6	2	Understanding the topic	Herpes virus and Pox virus	Lecture,	Quiz
7	2	Understanding the topic	Hepatitis virus	Lecture,	Quiz
8	2	Understanding the topic	Human Immunodeficiency Virus (HIV)	Lecture,	Quiz
9	2	Understanding the topic	Orthomyxoviruses	Lecture,	Quiz
10	2	Understanding the topic	Paramyxovirus	Lecture,	Quiz
11	2	Understanding the topic	Enteric viruses (Rota, Polio, and Reo viruses)	Lecture,	Quiz
12	2	Understanding the topic	Rabies virus	Lecture,	Quiz
13	2	Understanding the topic	Coronavirus	Lecture,	Quiz
14	2	Understanding the topic	Bacteriophages	Lecture,	Quiz
15	2	Understanding the topic	Oncogenic viruses and Antiviral Drugs & Viral Vaccines	Lecture,	Quiz

Syllabus of The Practical Course

1	4		Laboratory safety guidelines and aseptic techniques	Practical Assays	Reports
2	4		Specimen Collection, Transport, and Storage	Practical Assays	Reports
3	4		Direct viral examination (Light Microscopy Electron Microscopy)	Practical Assays	Reports
4	4		Isolation and cultivation viruses	Practical Assays	Reports
5	4		Complement Fixation test	Practical Assays	Reports
6	4		Virus Neutralization test	Practical Assays	Reports
7	4		Hemagglutination test	Practical Assays	Reports
8	4		Hemagglutination	Practical Assays	Reports

			inhibition test		
9	4		Radioimmunoassay (RIA)	Practical Assays	Reports
10	4		ELISA test	Practical Assays	Reports
11	4		Immunofluorescence test	Practical Assays	Reports
12	4		Western Blot test	Practical Assays	Reports
13	4		PCR (Conventional PCR)	Practical Assays	Reports
14	4		Real Time-PCR	Practical Assays	Reports
15	4		In Situ Hybridization Technique	Practical Assays	Reports

11.Course Evaluation

The following evaluation methods are adopted:

- Quizzes
- Mid- Term Exam
- Attending
- Final Exams

Distribution of grades:

12.Learning and Teaching Resources

Required textbooks (curricular books if any)	Principles of Virology, 5th Edition, 2020, ASM press. By Jane Flint, Vincent R. Racaniello, Glenn F.Rall, Theodora Hatzioannoe, and Ann Marie Skalka. - Richman DD, Whitley RJ, Hayden FG, editors. Clinical virology. Fourth edition. Washington, DC: ASM Press; 2017. 1489 p.
Main references (sources)	- Jawetz, R., J.L. Melnick, and E.A. Adelberg, Review of Medical Microbiology, Twenty-Eighth Edition, 2019. - Knipe DM, Howley PM, (editors-in-chief): Fields Virology, 5th ed. Lippincott Williams & Wilkins, 2007.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Virology . Blog

Academic description of Medical Laboratories department for Medical
Virology – Third Stage
Name : Dr. Hekmat K, Ateya

1. Course Name:					
Immunology(2)					
2. Course Code:					
3. Semester / Year:					
Second Academic Year\third stage					
4. Description Preparation Date:					
2025\01\20					
5. Available Attendance Forms:					
Face to face\Online					
6. Number of Credit Hours (Total) / Number of Units (Total):					
o \60					
7. Course administrator's name (mention all, if more than one name)					
Dr. Mohammad Hadi Mortada mortada56@gmail.com					
8. Course Objectives					
Course Objectives			The nature of the components of the immune system, its characteristics, diversity and function. Agriculture and vaccines. • Diseases associated with the immune system		
9. Teaching and Learning Strategies					
Strategy		Displaying scientific content on the projector Using the graph as a means of explanation on the projector Using the necessary images and videos on the projector			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Syllabus of The Theoretical Course					
1	2	Learn to define and activate the complement.	Complement: definition, activation, type of activation, complement deficiency, properdin.	interactive–visual	Oral quiz

2	2	Apply the MHC 1 & 2 Their role in presenting antigen to the memory cell	MHC: definition, types, Antigen Presentation and Processing,	interactive– visual	Oral quiz
3	2	Apply the MHC 1 & 2 Their role in presenting antigen to the memory cell	MHC: definition, types, Antigen Presentation and Processing,	interactive– visual	Oral quiz
4	2	Evaluate role of cytokines and mediators in producing cooperation between cells	Cytokines & Mediators.	interactive– visual	Oral quiz
5	2	Remember and understanding the types of allergies 1 2 3 4	Hypersensitivity: types, and diseases that are caused by hypersensitivity.	interactive– visual	Oral quiz
6	2	Remember and understanding the types of allergies 1 2 3 4	Hypersensitivity: types, and diseases that are caused by hypersensitivity.	interactive– visual	Oral quiz
7	2	Improve immune system function Full performance	Tolerance: Central and peripheral, mechanisms, Anergy	interactive– visual	Oral quiz
8	2	Analyze and understanding autoimmunity, its types and how it works	Autoimmunity: definition, mechanisms, types.	interactive– visual	Oral quiz
9	2	Define Organ transplantation of all types from foreign bodies to the same blood type	Transplantation: Introduction, types of graft rejection, immunosuppressive therapy of allograft rejection, immunology of xenogeneic	interactive– visual	Oral quiz

			transplantation, and organ transplantation.		
10	2	Define organ transplantation of all types from foreign bodies to the same blood type	Transplantation: Introduction, types of graft rejection, immunosuppressive therapy of allograft rejection, immunology of xenogeneic transplantation, and organ transplantation.	interactive–visual	Oral quiz
11	2	Apply vaccination process in terms of benefits and harms	Vaccines & Vaccination, definition, types, advantages & disadvantages.	interactive–visual	Oral quiz
12	2	Apply vaccination process in terms of benefits and harms	Vaccines & Vaccination, definition, types, advantages & disadvantages.	interactive–visual	Oral quiz
13	2	Knowledge of acquired and hereditary immunodeficiency	Immunodeficiencies: types, primary and secondary Immunodeficiency.	interactive–visual	Oral quiz
14	2	Remember and knowing cancerous tumors and the role of immunity in fighting cancer	Tumor, Anti–tumor immunity, types, immune defense against tumors.	interactive–visual	Oral quiz
15	2	Remember and knowing cancerous tumors and the role of immunity in fighting cancer	Tumor, Anti–tumor immunity, types, immune defense against tumors.	interactive–visual	Oral quiz
Syllabus of The Practical Course					
1	2	Apply pregnancy	Precipitation test.	interactive–	Oral–written

		and sedimentation test application	Pregnancy test.	visual	quiz– practical application
2	2	Analyze ASO Analysis Application	Anti- streptolysin -O test	interactive– visual	Oral–written quiz– practical application
3	2	Evaluate Inflammation test application	CRP test	interactive– visual	Oral-written quiz-practical application
4	2	Remember VDRL, RPR test	VDRL, RPR test	interactive– visual	Oral-written quiz-practical application
5	2	Apply Autoimmune Test Application	Antigen preparation, bacterial Ag, R.B.Cs Ag, protein Ag.	interactive– visual	Oral-written quiz-practical application
6	2	Apply Autoimmune Test Application	Autoimmunity: SLE test, RF test.	interactive– visual	Oral-written quiz-practical application
7	2	Application of the method of immune diffusion	Immunodiffusion assay	interactive– visual	Oral-written quiz-practical application
8	2	Learn the method of electrophoresis in immunity	Immunoelectrophoresis assay	interactive– visual	Oral-written quiz-practical application
9	2	Learn the method of electrophoresis in immunity	Immunoelectrophoresis assay	interactive– visual	Oral-written quiz-practical application
10	2	Elisa analysis	Enzyme-linked immunosorbent assay (ELISA). e.g. Anti-citrullinated peptide antibody (ACPA) test.	interactive– visual	Oral-written quiz-practical application
11	2	Elisa analysis	Enzyme-linked immunosorbent assay (ELISA). e.g. Anti-citrullinated peptide	interactive– visual	Oral-written quiz-practical application

			antibody (ACPA) test.		
12	2	How to isolate B T cells	Lymphocyte isolation: T-cell and B-cell.	interactive– visual	Oral-written quiz-practical application
13	2	How to isolate B T cells	Lymphocyte isolation: T-cell and B-cell.	interactive– visual	Oral-written quiz-practical application
14	2	Remember allergy recognition techniques	Hypersensitivity: uses of tests.	interactive– visual	Oral-written quiz-practical application
15	2	Remember allergy recognition techniques	Hypersensitivity: uses of tests.	interactive– visual	Oral-written quiz-practical application

11.Course Evaluation

The grade is distributed out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, reports, etc.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1. Immunology/ kuby8th ed. 2. <i>Essentials of clinical immunology</i> / Helen Chapel....7th ed. 3. Practical Immunology / Hudson& Hay 3^{ed} ed.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name : Cytogenetic 2					
2. Course Code: None					
3. Semester / Year: Semester					
4. Description Preparation Date: 10. 1. 2025					
5. Available Attendance Forms: Theoretical and practical lectures					
6. Number of Credit Hours (Total) / Number of Units (Total): 60 hours/ Course and 4 hour / week (Theoretical + Practical)					
7. Course administrator's name (mention all, if more than one name)					
Name: Safaa Hussein Abdullah			Email: Safaahussein1988@gmail.com		
8. Course Objectives					
Course objectives: - Identify the types of mutations, mutagenic substances and the mechanism of mutations. - Diagnose genetic diseases genetically. - Know cancers and carcinogenic substances. - Know gene therapy and its types. - Know and understand the tests for proving Prenatal diagnosis. - Know the Human Genome Project.					
9. Teaching and Learning Strategies					
Strategy	1. Introducing students to cancers and carcinogens. 2. Training students theoretically, practically and applied to diagnose cancers genetically. 3. Applying the topics studied in theoretical lectures at the practical level. 4. Asking students to learn about Human Genome Project and the reason for its establishment.				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Syllabus of Theoretical part					
1	2 hours theoretical	Define lec.	Mutation	Theoretical lec.	- Attend - Quiz
2	2 hours theoretical	Define lec.	Mutagens	Theoretical lec.	- Attend - Quiz
3	2 hours theoretical	Understand lec.	Single nucleotide polymorphism	Theoretical lec.	- Attend - Quiz
4	2 hours theoretical	Clarify lec.	Identifying diseases gene	Theoretical lec.	- Attend

					- Quiz
5	2 hours theoretical	Explain lec.	Oncogenes	Theoretical lec.	- Attend - Quiz
6	2 hours theoretical	Understand lec.	Tumor suppressor gene	Theoretical lec.	- Attend - Quiz
7	2 hours theoretical	Understand lec.	The genetic of cancer	Theoretical lec.	- Attend - Quiz
8	2 hours theoretical	Classify lec.	Classification of genetic disease	Theoretical lec.	- Attend - Quiz
9	2 hours theoretical	Understand lec.	genetic counselling	Theoretical lec.	- Attend - Quiz
10	2 hours theoretical	Define lec.	Gene therapy	Theoretical lec.	- Attend - Quiz
11	2 hours theoretical	Explain lec.	Immunogenetics	Theoretical lec.	- Attend - Quiz
12	2 hours theoretical	Understand lec.	Stem cell technology	Theoretical lec.	- Attend - Quiz
13	2 hours theoretical	Understand lec.	Prenatal diagnosis	Theoretical lec.	- Attend - Quiz
14	2 hours theoretical	Organize lec.	Human genome project	Theoretical lec.	- Attend - Quiz
15	2 hours theoretical	Understand lec.	microRNA	Theoretical lec.	- Attend - Quiz

Syllabus of The Practical Course

1	2 hours practical	Explain lec.	Extraction of DNA from bacteria infected human and tissue	- Practical Lec.	- Attend - Quiz
2	2 hours practical	demonstrate lec.	PCR	- Practical Lec.	- Attend - Quiz
3	2 hours practical	Understand lec.	Conventional PCR	- Practical Lec. - Videos	- Attend - Discussion
4	2 hours practical	Understand lec.	Reverse PCR	- Practical Lec.	- Attend - Quiz
5	2 hours practical	Understand lec.	Multiplex PCR	- Practical Lec. - Videos	- Attend - Quiz
6	2 hours practical	Understand lec.	Real time PCR	- Practical Lec. - Videos	- Attend - Discussion
7	2 hours practical	Apply lec.	Gel electrophoresis	- Practical Lec.	- Attend - Quiz
8	2 hours practical	Evaluate lec.	Gel electrophoresis for different sample size	- Practical Lec.	- Attend - Quiz
9	2 hours practical	Understand lec.	Data analysis for genetics analyzer	- Practical Lec.	- Attend - Quiz
10	2 hours practical	Classify lec.	Single nucleotide polymorphism	- Practical Lec. - Videos	- Attend - Discussion
11	2 hours practical	Understand lec.	Primer design	- Practical Lec.	- Attend - Quiz
12	2 hours practical	Understand lec.	Practical Primer design	- Practical Lec. - Videos	- Attend - Discussion
13	2 hours practical	Understand lec.	Sequencing	- Practical Lec. - Videos	- Attend - Quiz
14	2 hours practical	Evaluate lec.	Analysis of Sequencing data	- Practical Lec. - Videos.	- Attend - Quiz

11.Course Evaluation

The following evaluation methods are adopted:

- Theoretical and practical quiz.
- Attendance and discussion.

Distribution of grades:

- Monthly examination for theoretical lectures (20 marks).
- (5 marks) for activation and attendance.
- Monthly examination for practical lectures (15 marks).
- Total marks for cytogenetic 2 is (40 marks).
- Final distribution examination marks as (35 marks) for theoretical and (25 marks) for practical, and the final marks for cytogenetic is (100 marks).

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	None
Main references (sources)	None
Recommended books and references (scientific journals, reports...)	Jorde,L.B.;Carey,J.C&Bamshad,M.J.(2019).Medical genetics. Sixth Edition, june 1.
Electronic References, Websites	None

Academic description of Medical Laboratories department for Cytogenetic 2 - Third Stage
Dr. Safaa Hussein Abdullah

1. Course Name:	
Computer Applications 2	
2. Course Code:	
3. Semester / Year:	
Chapter One Stage Three Medical Laboratory Techniques	
4. Description Preparation Date:	
2025/1/10	
5. Available Attendance Forms:	
My presence - my description	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 theoretical hours and 30 practical hours, equivalent to 60 study hours, first semester - 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Mr. Mahdi Saleh Kazim Email: salhmhdy128@gmail.com	
8. Course Objectives	
Course Objectives	• Introducing the student to computer applications such as the Excel program and learning about its benefits, specifications, and methods of operating and closing it. • Learning how to open a saved file, enter data, perform mathematical operations, and how to adjust and format data. • Helping the student link the information acquired in the lecture and link it to the labor market to keep pace with scientific development.
9. Teaching and Learning Strategies	
Strategy	The learning and teaching strategy is based on the modern interactive method in university education, where the student is a participating member in the scientific information, through acquisition, analysis and dissemination. Theoretical lectures are based on direct classroom interaction between the instructor and the students through presenting the lesson and direct discussion between the instructor and his students on the one hand and between the students themselves on the other hand through presenting mini-research on scientific vocabulary. As for practical lectures, they are based on explaining the program practically to the student, so that he can then try the program himself and work on some special files in the lecture assignments and try new examples to develop his skills and link theoretical information to practical information and record the variables afterwards.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Syllabus of The Theoretical Course					
1	1	Introduction to SPSS	Introduction to the SPSS program in general	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
2	1	Learn about running and closing the program	Run and close the SPSS program	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
3	1	Mention the steps of statistical analysis in the SPSS program	Steps to analyze data in the program	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
4	1	Understand the components of the home screen and how to enter data	Home screen components and data entry	Theoretical lecture	Exam in the last 10 minutes of the lecture
5	1	Learn about saving and retrieving data and data types	Save and retrieve data and data types	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
6	1	Clarify key terms and sort and switch data	Sort and switch data	Theoretical lecture	Exam in the last 10 minutes of the lecture
7	1	Identify variable insertion and descriptive statistics	Insert a variable or case, descriptive statistics, merge files	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
8	1	Clarify the summary and know the data	Statistical summary of the given data and the use of data	Theoretical lecture	Exam in the last 10 minutes of the lecture
9	1	Introduction to Power Point and how to turn it on and off	Power Point concept , running and closing	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
10	1	How presentations work and what they are useful for	Making presentations and their usefulness	Theoretical lecture	Exam in the last 10 minutes of the lecture

11	1	Clarification of the work of adding fees and modifying	Add graphics with available drawing tools	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
12	1	How to recognize the text and floor modification of the slide	Modify the text and change the color and floor control plan of the slide	Theoretical lecture	Exam in the last 10 minutes of the lecture
13	1	How to add images and zoom in and out	Zoom in, zoom, crop and add natural images	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
14	1	Make and clarify the addition of charts	Add charts from Excel	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
15	1	How to switch between slides and learn about display commands	View and move between slide commands	Theoretical lecture	Ask a question in the last 10 minutes of the lecture.
Syllabus of The Practical Course					
1	2	Introduction to the SPSS program in general	Introduction to SPSS	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.
2	2	Learn about running and closing the program	Run and close the SPSS program	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.
3	2	Mention the steps of statistical analysis in the SPSS program	Steps to analyze data in the program	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.
4	2	Understand the components of the home screen and how to enter data	Home screen components and data entry	Practical lecture through practical application of the term	Exam in the last 10 minutes of the lecture
5	2	Learn about saving and retrieving data and data types	Save and retrieve data and data types	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.
6	2	Clarify key terms and sort and switch data	Sort and switch data	Practical lecture through practical application of the term	Exam in the last 10 minutes of the lecture
7	2	Identify variable insertion and descriptive statistics	Insert a variable or case, descriptive statistics, merge files	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.

8	2	Clarify the summary and know the data	Statistical summary of the given data and the use of data	Practical lecture through practical application of the term	Exam in the last 10 minutes of the lecture
9	2	Introduction to Power Point and how to turn it on and off	Power Point concept , running and closing	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.
10	2	How presentations work and what they are useful for	Making presentations and their usefulness	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.
11	2	Clarification of the work of adding fees and modifying	Add graphics with available drawing tools	Practical lecture through practical application of the term	Exam in the last 10 minutes of the lecture
12	2	How to recognize the text and floor modification of the slide	Modify the text and change the color and floor control plan of the slide	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.
13	2	How to add images and zoom in and out	Zoom in, zoom, crop and add natural images	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.
14	2	Make and clarify the addition of charts	Add charts from Excel	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.
15	2	How to switch between slides and learn about display commands	View and move between slide commands	Practical lecture through practical application of the term	Ask a question in the last 10 minutes of the lecture.

11. Course Evaluation

The grade is distributed out of 100 over the entire course and the student takes two official university exams. The endeavour is worth 40 points and is divided as follows:

5 points for class participation and attendance

15 points for a written practical exam

20 points for a written theoretical exam

The final is worth 60 points and is divided as follows:

25 points for written practical
35 points for written theoretical

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1) Faith Abbey(2022): MY EXCEL GUIDE, Beginners, Intermediate, Advanced, Microsoft Excel. 2) Kevin Pitch(2023) :Excel Guide for Success , Independently published . 3) Aldrich, James . o (2016):Using IBM _ SPSS_Statistics Second Edition .

Recommended books and references (scientific journals, reports...)	Global Publishers Microsoft Excel Functions and Formulas with Excel 2019/Office 365
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1. Course Name:	
Hematology 2	
2. Course Code:	
3. Semester / Year:	
second semester– Third year	
4. Description Preparation Date:	
6-1-2025	
5. Available Attendance Forms:	
Attendance Education in classroom	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 teaching hours : 30 hours theory + 30 practical hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Husain Awad Bneed Email: Husain.awad@yahoo.com	
8. Course Objectives	
Course Objectives	Definition of diseases affecting human blood cells, their ingredients, their properties and changes occurring in different diseases • Familiarize the student with how to deal with blood samples and save them and the necessary tests to measure them and diagnose their meaning • Assisting the student in linking information gained to the labour market to keep abreast of the scientific and technological development related to the examinations
9. Teaching and Learning Strategies	
Strategy	The learning and education strategy is based on the modern interactive method in university education as the student is a member participating in scientific information acquisition, analysis and publication. The theoretical lectures are based on the direct classroom interaction between teaching and students through the presentation of the lesson and direct discussion between teaching and students on the one hand and between students themselves on the other by offering them mini-research on the scientific vocabulary. Practical lectures are based on the theoretical and practical explanation of experiences in front of the student to return them to himself on real human blood samples to develop his skills, like

	theoretical information to the process, record the variable and as if were examining in a medical selection, and then analyze the results based on universally and scientifically approved natural measurements.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Syllabus of The Theoretical Course					
1	2	It allows students to deepen their information white cell types and functions.	Leukocytes (white blood cells)	Theoretical lecture	Exam in the last minutes of the lecture
2	2	Teaching the theoretical student general information about white cell diseases and how to use laboratory information to the laboratory diagnosis	Leukocytes disorder	Theoretical lecture and theoretical research dividing students into groups	Exam in the last minutes of the lecture
3	2	Teaching and developing students' information about white cell carcinoma lymphoblastic bleaching	Leukemia	Theoretical lecture and theoretical research dividing students into groups	Exam in the last minutes of the lecture
4	2	Teaching and training students on acute lymphoblastic bleaching is a type of leukemia and bone marrow	Acute leukemia	Theoretical lecture Giving Homework Research	Exam in the last minutes of the lecture
5	2	Teaching students and developing their skills about	Chronic leukemia	Theoretical lecture	General questions by dividing students into

		chronic lymphoblastic leukemia is cancerous disease of the B-type lymphocyte			groups and o evaluations
6	2	Detailed explanation of students Hodgkin lymphoma, a known Hodgkin's disease is a type lymphoma, which cancer arises from white blood cells called lymphocytes	Hodgkin's lymphoma	Theoretical lecture a theoretical research dividing students in groups	Exam in the last minutes of t lecture
7	2	Train students to identify Non-Hodgkin's lymphoma, which is a group of blood cancers that includes any type of lymphoma except Hodgkin's. Non-Hodgkin lymphoma types are different in importance and ferocity.	Non-Hodgkin's lymphoma	Theoretical lecture a theoretical research dividing students in groups	Exam in the last minutes of t lecture
8	2	The evolution of students' skill and knowledge in thrombocytopathies is the change in the function of platelets. In this case, an increase in bleeding time is expected.	Platelets and platelet disorders	Theoretical lecture	Exam in the last minutes of t lecture

		hemorrhagic syndrome and the absence of thrombocytopenia and linking theoretical information to the process.			
9	2	Teaching students and an in-depth explanation of hemostasis is the body's method of stopping bleeding from infected blood vessels.	Hemostasis	Theoretical lecture theoretical research dividing students into groups	Exam in the last minutes of the lecture
10	2	Explanation and training students on blood clotting. An anomaly or disturbance in a part of this device or sentence, which controls the hemorrhage, can lead to excessive bleeding overflowing, both of which are dangerous.	Bleeding disorders	Theoretical lecture theoretical research dividing students into groups	Exam in the last minutes of the lecture
11	2	Defining students and learning about thrombophlebitis is an inflammatory process that causes the formation of blood clots and blockage of one	Thrombosis (arterial venous thrombosis)	Theoretical lecture theoretical research dividing students into groups	Exam in the last minutes of the lecture

		more veins			
12	2	Teaching and discussing students about multiple myeloma is a cancer of plasma cells where a plasma cell multiplies unchecked in bone marrow, purity and making many copies of itself.	Multiple myeloma	Theoretical lecture and theoretical research dividing students into groups	Exam in the last minutes of the lecture
13	2	Define and teach students about the types of blood groups and their characteristics and methods of examination and the purpose of their examination for transfusion, transplant and pregnancy women	ABO system	Theoretical lecture and theoretical research dividing students into groups	Exam in the last minutes of the lecture
14	2	Training students and teaching them about blood transfusion and the medical and scientific need for transfusion procedures patients	Blood transfusion	Theoretical lecture and theoretical research dividing students into groups	Exam in the last minutes of the lecture
15	2	Train students and teach them about the problems they face in the transfusion process, heterogeneity	Complications of blood transfusion	Theoretical lecture	Exam in the last minutes of the lecture

		the cliques and the possible side hazards.			
Syllabus of The Practical Course					
1	2	Teach and train students practice on the general census white blood cell and the universal ratios allowed both sexes and ages	Total White blood cell count	Practical lecture through a laboratory experience	Evaluate the modulus operation and adherence laboratory control and readal results with written report the experiment and compare the results with the correct measurement the sample.
2	2	Teaching students and training the globally complete blood count (full blood image) is one of the types of blood tests. This test is used to examine the general state of health and detect a large number of pathological conditions such as anemia, infection and leukemia.	Absolute count of leukocytes	Practical lecture through a laboratory experience	Evaluate the modulus operation and adherence laboratory control and readal results with written report the experiment and compare the results with the correct measurement the sample.
3	2	Identifying and practically training students in the examination of leukemia or the differential census of white blood cells (it is examination	Differential count of leukocytes	Practical lecture through a laboratory experience	Evaluate the modulus operation and adherence laboratory control and readal results with written report the experiment and compare the

		measure the proportion of types of white blood cells present in the body).			results with the correct measurement of the sample.
4	2	Explaining practically to training students on acid cells is the abnormal increase of the level of acid in the blood. Acid are defined as type of white blood cell that battles pathogens and substances in the body, such as parasites, and have a role in allergic reactions.	Eosinophil count	Practical lecture through a laboratory experience	Evaluate the modus operandi and adherence to laboratory control and read results with a written report of the experiment and compare the results with the correct measurement of the sample.
5	2	Teaching students practically on the blood film is a laboratory examination of different blood cells microscopically where it is used to detect blood diseases or some parasites within the blood, examining the external shape of different blood cells.	Blood film for leukemia	Practical lecture through a laboratory experience	Evaluate the modus operandi and adherence to laboratory control and read results with a written report of the experiment and compare the results with the correct measurement of the sample.
6 and	2	Training students in leukemia is the cancer of the body's blood.	Special stain for leukemia	Practical lecture through a laboratory experience	Evaluate the modus operandi and adherence to laboratory control

		forming tissue including bone marrow and lymphatic system			and read results with written report the experiment and compare the results with the correct measurement the sample.
8	2	Teaching student and training them to measure the number platelets in the blood sample drawn	Platelets count	Practical lecture through a laboratory experience	Evaluate the modulus operation and adherence laboratory control and read results with written report the experiment and compare the results with the correct measurement the sample.
9	2	Teaching and practically training student to determine the speed of blood clotting to stop bleeding that may result from different factors	Bleeding time	Practical lecture through a laboratory experience	Evaluate the modulus operation and adherence laboratory control and read results with written report the experiment and compare the results with the correct measurement the sample.
10	2	Training student on clotting time measuring the time it takes to form a clot after bleeding begins.	Clotting time	Practical lecture through a laboratory experience	Evaluate the modulus operation and adherence laboratory control and read results with written report the experiment

					and compare the results with the correct measurement of the sample.
11	2	Practically training students on prothrombin time test is a test used to evaluate blood clotting. Prothrombin is a protein produced by the liver, which is one of several factors in the blood that helps coagulate appropriately.	Prothrombin time	Practical lecture through a laboratory experience	Evaluate the modus operandi and adherence to laboratory controls and read the results with a written report of the experiment and compare the results with the correct measurement of the sample.
12	2	Practically training students on this test is the intrinsic pathway examination (intrinsic pathway) blood clotting, and the test is usually used to examine the effect of intravenous and clotting drugs such as heparin and to examine the blood clotting system in cases where the patient is unusually bleeding.	Partial thromboplastin time	Practical lecture through a laboratory experience	Evaluate the modus operandi and adherence to laboratory controls and read the results with a written report of the experiment and compare the results with the correct measurement of the sample.
13	2	Students' education and training on coagulation	Detection of coagulation factors deficiency by coagulometry	Practical lecture through a laboratory experience	Evaluate the modus operandi and adherence to laboratory controls

		analysis determine whether or not there is a problem related to coagulation factors, such as lack of one, or even inefficient work, as a disruption associated with			and read the results with a written report of the experiment and compare the results with the correct measurement of the sample.
14	2	Training students in quality control (QC) in medical laboratories is a set of procedures and activities designed to ensure that laboratory tests are conducted accurately and reliably. Quality control procedures are used to control the performance of laboratory equipment, detectors and staff, and to identify and correct problems that may arise.	Quality control laboratory	Practical lecture through a laboratory experience	Evaluate the modus operandi and adherence to laboratory control and read the results with a written report of the experiment and compare the results with the correct measurement of the sample.
15	2		Global revision		

11. Course Evaluation

The student grades are distributed from 100 points to the full course and the student examines two university examinations.
The midterm exam is for 40 points and divided according to the following:
5 points of class participation and attendance

15 points Written Practical Examination
 20 points Written Theoretical Examination
 The Final is for 60 points and divided according to the following:
 25 points for practical exam
 35 points for theoretical exam

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	References 1. Hoffbrand's essential hematology. A. Victor Hoffbrand and Paul A.H. Moss, 7th edition, Wiley Blackwell (2016). 2. Hematology in clinical practice. Roberts. S. Hillman and Kenneth A, 5th edition, McGraw Hill Lange medical books (2011). 3. Dacie and Lewis Practical hematology. S. Mitchell. Lewis and Barbara J. Bain, 10th edition, Churchill Livingstone Elsevier (2006)
Recommended books and references (scientific journals, reports...)	Global Publishing Houses springer Elsevier pubmed
Electronic References, Websites	www.who.int WHO website

1. Course Name:					
Clinical endocrinology					
2. Course Code:					
3. Semester / Year:					
3 rd – Second term–quarterly					
4. Description Preparation Date:					
05/01/2025					
5. Available Attendance Forms:					
Face to face					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4 / 6					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Mohammed Saad El-Gedamy					
Email: mselgedamy@mans.edu.eg					
8. Course Objectives					
Course Objectives			- Introducing the student to the basic principles related to clinical endocrinology with regard to clinical chemistry and introducing the student to them. - The curriculum includes topics on the theoretical and practical foundations of laboratory tests in clinical chemistry, especially for evaluating the clinical endocrine functions of various diseases, and introducing important experiments with modern techniques in laboratory diagnosis, thus giving the student a new opportunity to become familiar with qualitative tests.		
9. Teaching and Learning Strategies					
Strategy		Lectures Discussions Demonstrations Lab. Work E. learning			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Syllabus of The Theoretical Course					
1	2	Explain the basic function of endocrine glands and their role in	Introduction to Endocrinology and types of glands, Definition of	interactive-visual	Exams and quizzes

		the human body.	Hormones, Similarities and Dissimilarities of Hormone and Enzyme. Classification of Hormones, Factors Regulating Hormone Action and Regulation of hormones secretion.		
2	2	Describe how hormones regulate gene expression by interacting with nuclear chromatin.	MECHANISM OF ACTION OF HORMONES: 1-Interaction with nuclear chromatin (nuclear action). 2- Membrane receptors. 3-Stimulation of enzyme synthesis at the ribosomal. 4- Direct activation at the enzyme level. 5-c-AMP and hormone action.	interactive-visual	Exams and quizzes
3	2	Define polyphosphoinositol and diacylglycerol and identify their roles in hormone signaling.	MECHANISM OF ACTION OF HORMONES: 6- Role of polyphosphoinositol and diacylglycerol in hormone action. 7-Role of calcium in hormone action. 8-Role of c-GMP in hormone action. 9- Role of phosphorylation of tyrosine kinase	interactive-visual	Exams and quizzes
4	2	Explain the role of releasing factors in regulating pituitary gland functions.	The Hypothalamus releasing factors	interactive-visual	Exams and quizzes
5	2	Describe the anatomical relationship between the hypothalamus and the anterior pituitary gland.	The pituitary anterior gland	interactive-visual	Exams and quizzes
6	2	Define melanocyte-stimulating hormone (MSH) and identify its source in the intermediate lobe.	The Melanocyte-Stimulating Hormone (MSH) produced by middle (intermediate) lobe. The Posterior Pituitary gland	interactive-visual	Exams and quizzes
7	2	Identify the location and structural components of the thyroid gland (e.g., follicles and parafollicular cells).	The Thyroid gland	interactive-visual	Exams and quizzes
8	2	List the hormones secreted by the thyroid gland, including thyroxine (T4),	The Thyroid gland	interactive-visual	Exams and quizzes

		triiodothyronine (T3), and calcitonin.			
9	2	Identify the location and structural components of the parathyroid glands in the human body.	The Parathyroid glands	interactive-visual	Exams and quizzes
10	2	List the hormones secreted by the pancreas, including insulin, glucagon, somatostatin, and pancreatic polypeptide.	The Pancreas gland	interactive-visual	Exams and quizzes
11	2	Identify the location and structural components of the adrenal glands, including the cortex and medulla.	The Adrenal glands	interactive-visual	Exams and quizzes
12	2	Demonstrate the effects of adrenaline and cortisol on the body during stress.	The Adrenal glands	interactive-visual	Exams and quizzes
13	2	Describe the zonation of the adrenal cortex (zona glomerulosa, zona fasciculata, zona reticularis) and the role of the adrenal medulla.	The Gonadal hormones	interactive-visual	Exams and quizzes
14	2	Identify the other glandular tissues that secrete hormones, including the JG cells of the kidney, thymus, pineal gland, and the gastrointestinal (GI) tract.	Several other glandular tissues are considered to secrete hormones, viz.:(<i>JG cells of kidney, Thymus, Pineal gland and GI tract</i>)	interactive-visual	Exams and quizzes
15	2	List the glandular tissues that secrete hormones beyond traditional endocrine organs, including JG cells of the kidney, thymus, pineal gland, and the GI tract.	Several other glandular tissues are considered to secrete hormones, viz.:(JG cells of kidney, Thymus, Pineal gland and GI tract)	interactive-visual	Exams and quizzes

Syllabus of The Practical Course

1	2	Identify common methods used for estimating GH levels, such as blood tests measuring GH concentration, insulin-like growth factor 1 (IGF-1) levels, and GH stimulation or suppression tests.	Estimation of GH	interactive-visual	Oral-written quiz-practical application
2	2	Describe the principles behind the diagnostic tests for GH, including the	Estimation of GH	interactive-visual	Oral-written quiz-practical application

		rationale for using specific markers like IGF-1 for GH evaluation.			
3	2	Identify common methods used to estimate insulin levels, such as blood tests, C-peptide measurements, and homeostasis model assessment (HOMA).	Estimation of Insulin	interactive-visual	Oral-written quiz-practical application
4	2	Describe the principle of TSH estimation methods, including the use of antibodies that bind specifically to TSH for its measurement.	Estimation of TSH	interactive-visual	Oral-written quiz-practical application
5	2	Illustrate the process of sample collection, preparation, and testing for T3 and T4 estimation, ensuring accuracy in laboratory procedures.	Estimation of T3 and T4	interactive-visual	Oral-written quiz-practical application
6	2	Describe the principle behind the measurement of prolactin levels using immunoassays, including the use of antibodies specific to prolactin.	Estimation of Prolactin	interactive-visual	Oral-written quiz-practical application
7	2	Describe the principle of immunoassays in measuring hCG levels, focusing on the use of specific antibodies to detect the hormone in blood or urine samples.	Estimation of human chorionic gonadotrophin (hCG)	interactive-visual	Oral-written quiz-practical application
8	2	Identify the laboratory methods commonly used for estimating oestradiol levels, such as enzyme-linked immunosorbent assay (ELISA), radioimmunoassay (RIA), and chemiluminescence immunoassay	Estimation of Oestradiol	interactive-visual	Oral-written quiz-practical application

		(CLIA).			
9	2	Illustrate the procedures involved in sample collection (blood, urine), preparation, and analysis for accurate estrogen measurement.	Estimation of Estrogen	interactive-visual	Oral-written quiz-practical application
10	2	Describe the principle behind the measurement of progesterone using immunoassay techniques, including the use of antibodies that specifically bind to progesterone molecules.	Estimation of progesterone	interactive-visual	Oral-written quiz-practical application
11	2	Describe the principles behind the measurement of LH and FSH using immunoassay techniques, including antibody-antigen interactions and hormone-specific detection.	Estimation of LH and FSH	interactive-visual	Oral-written quiz-practical application
12	2	Illustrate the standard procedures involved in collecting blood or urine samples and preparing them for LH and FSH estimation.	Estimation of LH and FSH	interactive-visual	Oral-written quiz-practical application
13	2	Illustrate the steps involved in sample collection, preparation, and analysis for accurate ACTH estimation.	Estimation of Adrenocorticotrophic hormone ACTH	interactive-visual	Oral-written quiz-practical application
14	2	Identify the clinical indications for measuring cortisol levels, such as in the diagnosis of Cushing's syndrome, Addison's disease, and suspected adrenal insufficiency.	Estimation of Cortisol	interactive-visual	Oral-written quiz-practical application
15	2	Illustrate the procedure for sample collection (serum, amniotic fluid) and processing for AFP	Estimation of a-Fetoprotein (AFP)	interactive-visual	Oral-written quiz-practical application

		estimation in clinical settings.			
11.Course Evaluation					
Exams Quiz Report Attendance Class activity Technical Practice					
12.Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Textbook of biochemistry (Sixth Edition) For Medical Students DM Vasudevan, Sreekumari S and Kannan Vaidyanathan.		
Main references (sources)			- Clinical Biochemistry Lecture Notes.Tenth Edition Hoboken, NJ: Wiley, 2018. Peter Rae. Mike Crane. Rebecca Pattenden. - Biochemistry. Fourth Edition, 2013. Dr. U. Satyanarayana Dr. U. Chakrapani. Elsevier India Private Limited. - Clinical biochemistry &metabolic medicineeighth edition published in 2012 by Hodder Arnold. Professor Martin Andrew Crook. - Textbook of Medical Biochemistry Eighth Edition 2012. MN Chatterjea Rana Shinde		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					