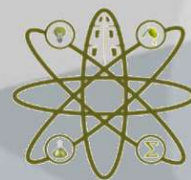
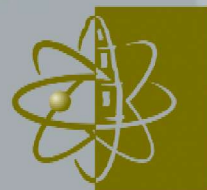


College of Science Chemistry Program



كلية العلوم
College of Science



جامعة الجوف
Jouf University

Report on the extended adequacy of facilities



<https://www.ju.edu.sa/en/colleges/science-college/college-of-science/departments/department-of-chemistry/>

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المملكة العربية السعودية
وزارة التعليم
جامعة الجوف
كلية العلوم
رمزه (51/9/44)

تقرير عن التجهيزات المعملية بقسم الكيمياء

في إطار حرص قسم الكيمياء علي تطوير البرامج الاكاديمية و رفع مستوى و كفاءة الخريج بحيث تتواءم قدراته ومواصفاته مع متطلبات سوق العمل فان الاهتمام بالجانب العملي متمثلا في إمكانيات عالية المستوى من الاجهزة و الادوات و التي تمكن عضو هيئة التدريس و الطالب من الاستفادة و إجراء البحوث و الدراسات العلمية.

لذا نتقدم بعرض امكانيات القسم حسب التقرير المرفق

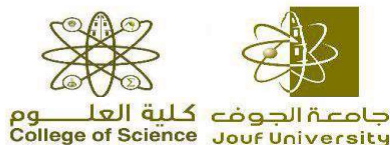
رئيس القسم

رئيس اللجنة

د/ حازم محمد علي

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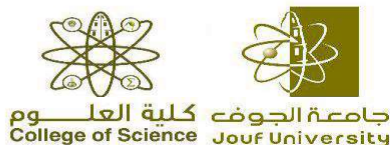
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Report of Chemistry Department Laboratories

1) Inorganic chemistry Lab

Department		Chemistry	
Name of Laboratory		Inorganic Chemistry Lab	
Laboratory number		G121	
Courses Offered		CHM 103	General Chemistry
		CHM 101	General Chemistry
		CHM 251	Volumetric and Gravimetric analysis
		CHEM 250	Volumetric and Gravimetric analysis
Equipments			
No.	Instrument Name	Model and Company	Quantity
1	Milli-Q water apparatus	Millipore, Usa	1
2	Water distillation system	Isolab, Germany	1
3	balance	A&D, Japan	1
4	PH Meter	Hanna, Romania	1
5	Oven	Binder, Germany	2
6	Fumehood	Biobase, China	2

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2) Organic chemistry Lab

Department		Chemistry	
Name of Laboratory		Organic Chemistry Lab	
Laboratory number		G122	
Courses Offered	CHM 103	General Chemistry	
	BCH 101	General Biochemistry	
	CHM 101	General Chemistry	
	CHEM 240	Principles of Organic Chemistry I	
	CHM 342	Biochemistry	
	CHEM 341	Polymer Chemistry	
	CHM 243	Practical Organic Chemistry (1)	
	CHM 222	Practical Inorganic Chemistry II	
Equipments			
No.	Instrument Name	Model and Company	Quantity
1	Water distillation system	Aquatron, UK	1
2	Heating mantle	Electrothermal, UK	1
3	Conductivity meter	Boeco, Germany	1
4	Balance	A&D , Japan	2
5	Oven	Binder, Germany	1
6	water bath	Labtech, indonesia	1
7	Water distillation system	Isolab, Germany	1
8	Ice maker	Scotsman, Italy	1
9	Ice maker,	Brema, Italy	1
10	Fume hood	Biobase, China	2

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3) Physical chemistry Lab

Department		Chemistry	
Name of Laboratory		Physical Chemistry Lab	
Laboratory number		G123	
Courses Offered		CHM 103	General Chemistry
		CHEM 101	General Chemistry
		CHM 335	Corrosion
		CHM 101	General Chemistry
		CHEM 331	Electrochemistry
		CHM 332	Practical Physical Chemistry
Equipments			
No.	Instrument Name	Model and Company	Quantity
1	Milli-Q water Apparatus	Malipore, USA	1
2	Oven	Binder, USA	1
3	Sonicator	Branson, Mexico	1
4	Water distillitor	Aquatron, UK	1
5	Muffle furnace	Carbolite, UK	1
6	Water bath	Julabo, Germany	1
7	Oil bath	JSR, Korea	1
8	PH meter	Hanna, Romania	1
9	Balance	A&D, Japan	2
10	Ice maker	Brema, Italy	1
11	Waterbath	Julabo, Germany	1
12	Potentiostat/Galvanostat apparatus	Eg&g, USA	1
13	Fume hood	Biobase, China	1

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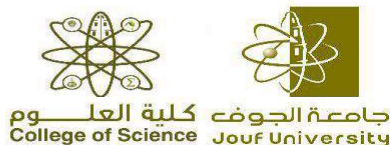


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4) Organic chemistry Lab

Department	Chemistry		
Name of Laboratory	Organic Chemistry Lab (Training and research Lab)		
Laboratory number	G126		
Courses Offered	Scientific research, Field training and student research project		
Equipments			
No.	Instrument Name	Model and Company	Quantity
1	Rotatory evaporator	IKA, China	3
2	Hotplate	Ovan, EU	1
3	Hotplate	Stuart, UK	1
4	Hotplate	Velp, Italy	3
5	Muffle furanace	Barnstead/ Thermolyne, USA	1
6	Oven	Binder, Germany	1
7	Balance	A&D, Japan	1
8	Balance	Shimadzu, Japan	1
9	FTIR	Buck, USA	1
10	Freeze dryer	Labconco, USA	1
11	Heating mantle	Electrothermal, UK	1
12	Fumehood	Biobase, China	2

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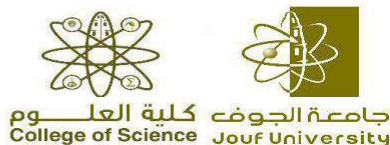


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5) Analytical chemistry Lab

Department	Chemistry		
Name of Laboratory	Analytical Chemistry Lab		
Laboratory number	G090		
Courses Offered	CHEM 497	Field Training	
	CHEM 351	Electroanalytical method	
	CHEM 454	Industrial analysis	
	CHEM 101	General Chemistry	
	CHEM 330	Chemistry Kinetics	
	CHM 351	Instrumental analytical method	
	CHM 352	Separation Methods and Chromatography	
	CHEM 102	General Chemistry 2	
	CHEM 451	Environment Chemistry and Pollution	
	CHEM 432	Surface Chemistry and Catalysis	
Equipments			
No.	Instrument Name	Model and Company	Quantity
1	Sonicator	Branson, USA	1
2	Oven	Binder, Germany	1
3	PH meter	Jenway, UK	1
4	Balance	A&D, Japan	1
5	Spectrophotometer	Camspec, UK	4
6	High performance liquid chromatography-Diode array Detector, Fluorescence detector , reflective index detector	Thermo, USA	1
7	Mill-Q water Apparatus	Millipore, USA	1
8	Hotplate	Stuart, UK	1
9	Gas chromatography – Flame ionization dtector	Thermo, USA	1
10	Spectrofluorimeter	Agilent, USA	1
11	Spectrophotometer	Labomed, USA	2
12	Fumehood	Biobase, China	2

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6) Analytical chemistry Lab

Department		Chemistry	
Name of Laboratory		Analytical Chemistry Lab (Training and research Lab)	
Laboratory number		F058	
Courses Offered		Scientific research, Field training and student research project	
Equipments			
S. No.	Instrument Name	Model and Company	Quantity
1	Gas chromatography-mass spectrometer (GC-MS)	Thermo, USA	1
2	High performance liquid chromatography-Diode array detector, Fluorescence detector And refractive index detector	Thermo, USA	1
3	Liquid chromatography-mass spectrometer (LC-MS)	Thermo, USA	1
4	Spectrofluorimeter	Agilent, USA	1
5	Spectrophotometer	Agilent, USA	1
6	Potentiostate/galvanostat apparatus	EG&G, USA	1
7	Balance	Shimadzu, Japan	1
8	Balance	A&D, Japan	1
9	Eppendorf Centrifuge	Eppendorf, Germany	1
10	Centrifuge	OHAUS, Germany	1
11	PH meter	Jenway, UK	1

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12	FTIR	Shimadzu, Japan	1
13	Sonicator	Bandelin, Germany	1
14	Waterbath	Julabo, Germany	1
15	Waterbath	Grant, UK	1
16	Milli-Q water apparatus	Thermo, USA	1
17	Vortex mixer	Stuart, UK	1
18	Fumehood	Biobase, China	2
19	Hotplate	Velp, Italy	3
20	Heating mantle	Electrothermal, UK	2

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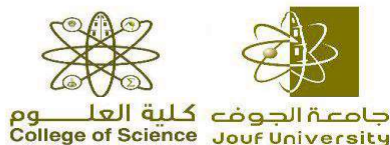


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7) Biochemistry chemistry Lab

Department		Chemistry	
Name of Laboratory		biochemistry Lab (Training and research Lab)	
Laboratory number		F114	
Courses Offered		CHEM 457	Petrochemical Industries
		CHEM 230	Chemical Thermodynamics
		CHEM 242	Principles of Organic Chemistry II
Equipments			
No.	Instrument Name		Quantity
1	Oven		1
2	Balance		1
3	Oven		1
4	Milli-Q water apparatus		1
5	PH meter		1
6	Waterbath		1
7	Hotplate		2
8	centrifuge		1
9	Muffle Furance		1
10	Sonicator		1
11	Water distillator		1
12	Spectrophotometer		1
13	Fumehood		2

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8) Physical and inorganic chemistry Lab

Department		Chemistry	
Name of Laboratory		Physical and inorganic Chemistry Lab (Training and research Lab)	
Laboratory number		F115	
Courses Offered		Scientific research, Field training and student research project	
Equipments			
S. No.	Instrument Name	Model and Company	Quantity
1	Oven	Binder, Germany	1
2	Strirrer hotplate	Velp, Italy	2
3	Ultrafiltration system	Amicon, USA	1
4	Balance	A&D, Japan	2
5	Balance	Boeco, Germany	1
6	Conductivity meter	Hanna, Romania	1
7	Freezedryer	Labconco, USA	1
8	Electrospinning	Dingzinano, China	1
9	Sonicator	Branson ,USA	1
10	Rotatory Evaporator	Buchi, Switzerland	1
11	Hotplate	Ovan, UK	3
12	Fumehood	Biobase, China	2

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Spectrophotometer



Spectrofluorometer



Flame Atomic Absorption Spectrophotometer (FAAS)



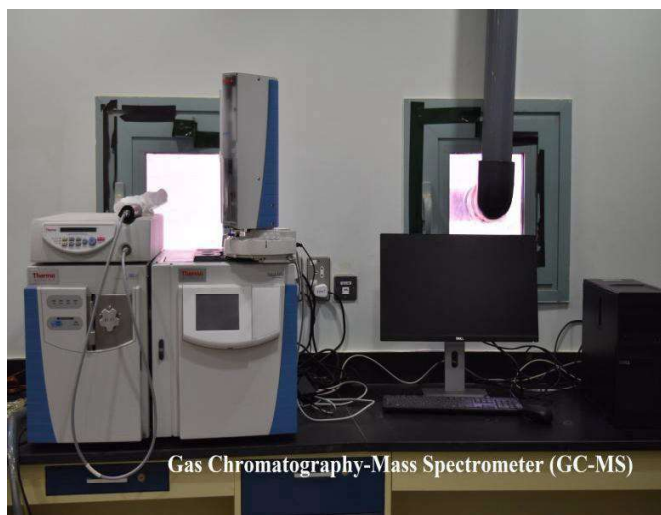
Graphite Furnace Atomic Absorption Spectrophotometer (GF-AAS)



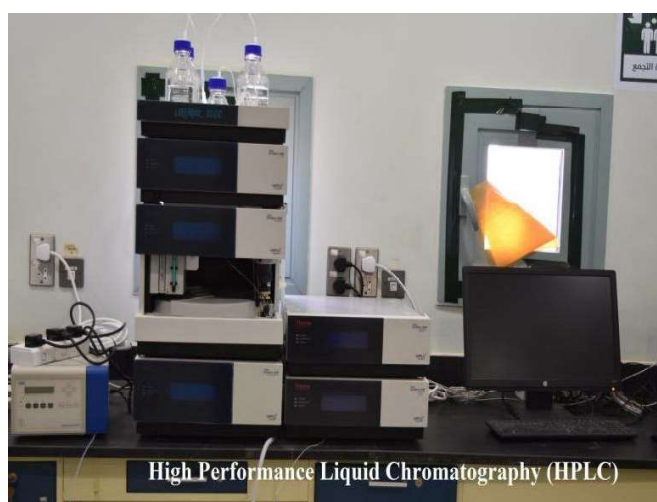
Fourier-Transform Infrared Spectroscopy (FTIR)



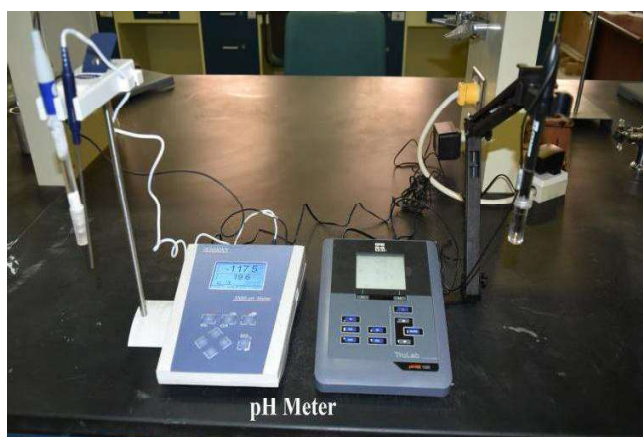
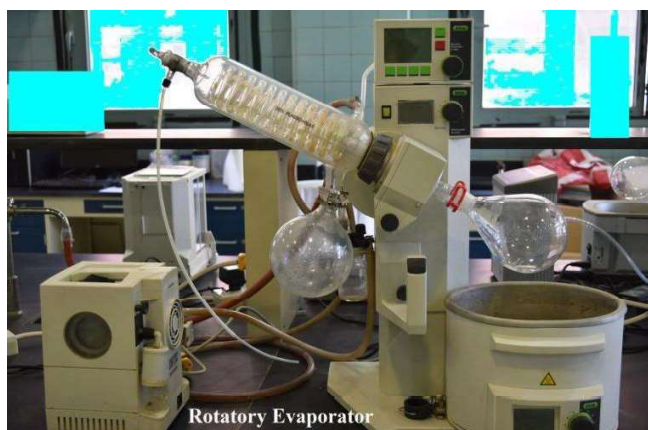
Gas Chromatography-Flame Ionization Detector (GC-FID)



Gas Chromatography-Mass Spectrometer (GC-MS)



High Performance Liquid Chromatography (HPLC)



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قاعات و معامل شطر الطالبات



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معامل شطر الطالبات

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Report of Chemistry Department Laboratories

1) Organic chemistry Lab

Department		Chemistry		
Name of Laboratory		Organic Chemistry Lab		
Laboratory number		B115		
Courses Offered		CHM 103	General Chemistry	
		CHM 101	General Chemistry	
		CHM 251	Volumetric and Gravimetric analysis	
Equipments				
No.	Instrument Name		Model and Company	Quantity
1	ice meaker		BREMA	1
2	Water bath		Julabo	1
3	Electric oven		BINDER	2
4	Heating		VELP SCIENTIFICA	8
5	IR		SHIMADZU	1
6	Microwave		GEEPAS	1
7	Electronic balance		SHIMADZU	1
8	Ultrasonic		Grant	1
9	Distiller		GFL	1
10	Electrothermal Engineering		Thermo scientific	1
11	Water bath		Jlabtech	1
12	Rotary		IKA	1

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2) General chemistry Lab

Department		Chemistry	
Name of Laboratory		General Chemistry Lab	
Laboratory number		B 117	
Courses Offered		CHM 103	General Chemistry
		BCH 101	General Biochemistry
		CHM 101	General Chemistry
		CHM 342	Biochemistry
		CHM 243	Practical Organic Chemistry (1)
		CHM 222	Practical Inorganic Chemistry II
Equipments			
No.	Instrument Name	Model and Company	Quantity
1	Ice marker	BREMA	2
2	FLAME PHOTOMETER	JENWAY	1
3	Oven	Bamstead Thermolyn	2
4	Rotary	IKA	1
5	Water path	LABTECH	1
6	Distiller	GFL	1
7	Balance	AND	1
8	Spectorphoto Meter	Fisher - Scientific	1
9	pH meter	HANNA	1

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3) Biochemistry Lab

Department	Chemistry		
Name of Laboratory	Biochemistry Lab		
Laboratory number	B104		
Courses Offered	CHM 103	General Chemistry	
	CHM 101	General Chemistry	
	CHM 335	Corrosion	
	CHM 101	General Chemistry	
	CHM 331	Electrochemistry	
	CHM 332	Practical Physical Chemistry	
Equipments			
No.	Instrument Name	Model and Company	Quantity
1	water bath	labtech	3
2	SPECTRO PHOTOMETER	Camspec	3
3	Balance	AND	3
4	OVEN	BINDER	1
5	Ultrasonic BATH	BRANSON	1
6	Digital ultrasonic bath	Grant	1
7	Centrifuge	HETTICH	1
8	ROTARY EVAPOTATOR	IKA	1
9	Conductivity meter	Boeco	2
10	HOT PLATE	ARE	4
11	Atomic absorption spectroscopy	THERMO SCIENTIFIC	1
12	ice marker	BREMA	1
13	Disitiller	GFL	1

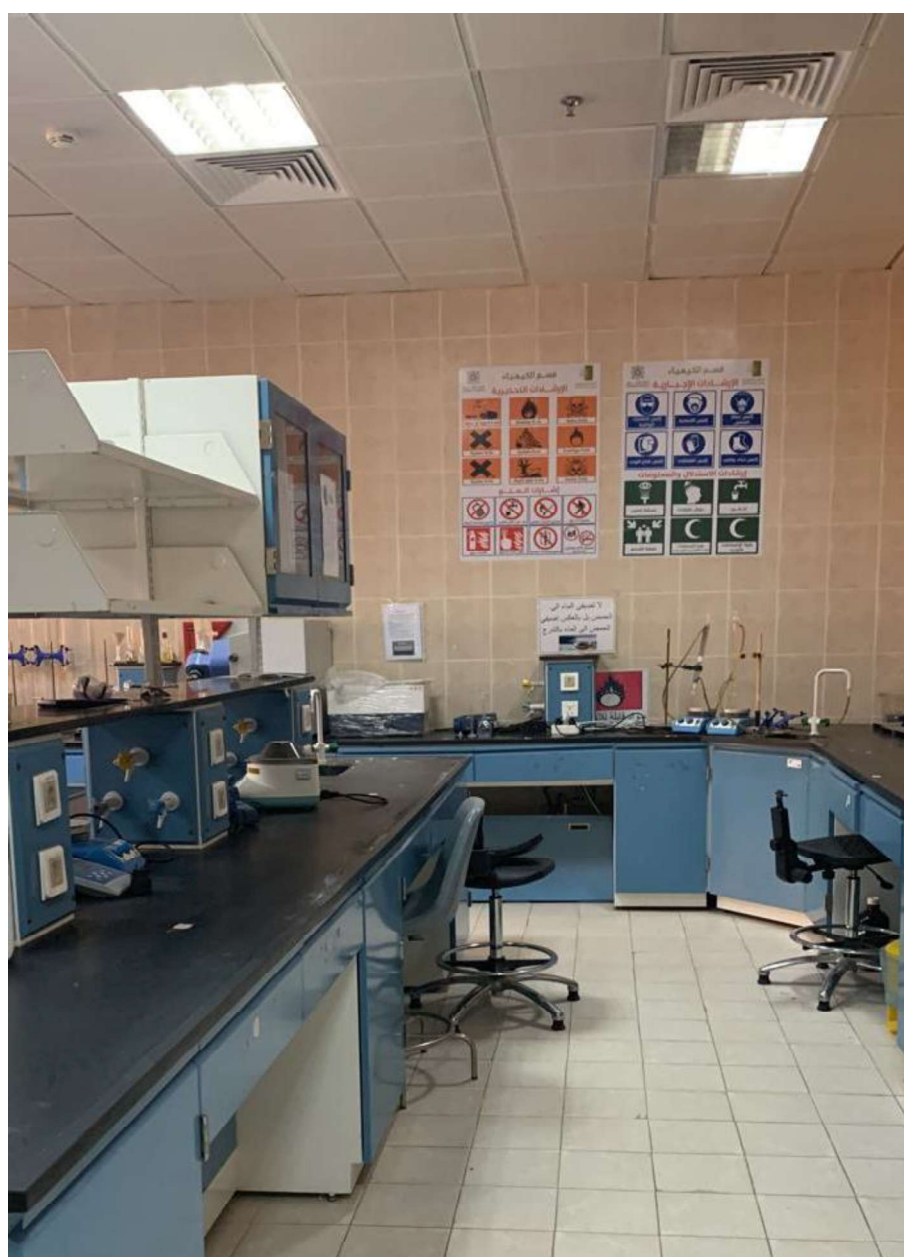
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4) Physical chemistry Lab

Department	Chemistry		
Name of Laboratory	Physical Chemistry Lab		
Laboratory number	B 120		
Courses Offered	CHM 497	Field Training	
	CHM 351	Electroanalytical method	
	CHM 454	Industrial analysis	
	CHM 101	General Chemistry	
	CHM 330	Chemistry Kinetics	
	CHM 351	Instrumental analytical method	
	CHM 352	Separation Methods and Chromatography	
	CHM 102	General Chemistry 2	
	CHM 451	Environment Chemistry and Pollution	
	CHM 432	Surface Chemistry and Catalysis	
Equipments			
No.	Instrument Name	Model and Company	Quantity
1	Electronic Balance	shimadzu corporation	3
2	water bath	Grant	1
3	Electronic Heater	VELP scientifica	1
4	Distiller	G F L	1
5	PH meter	JENWAY	1







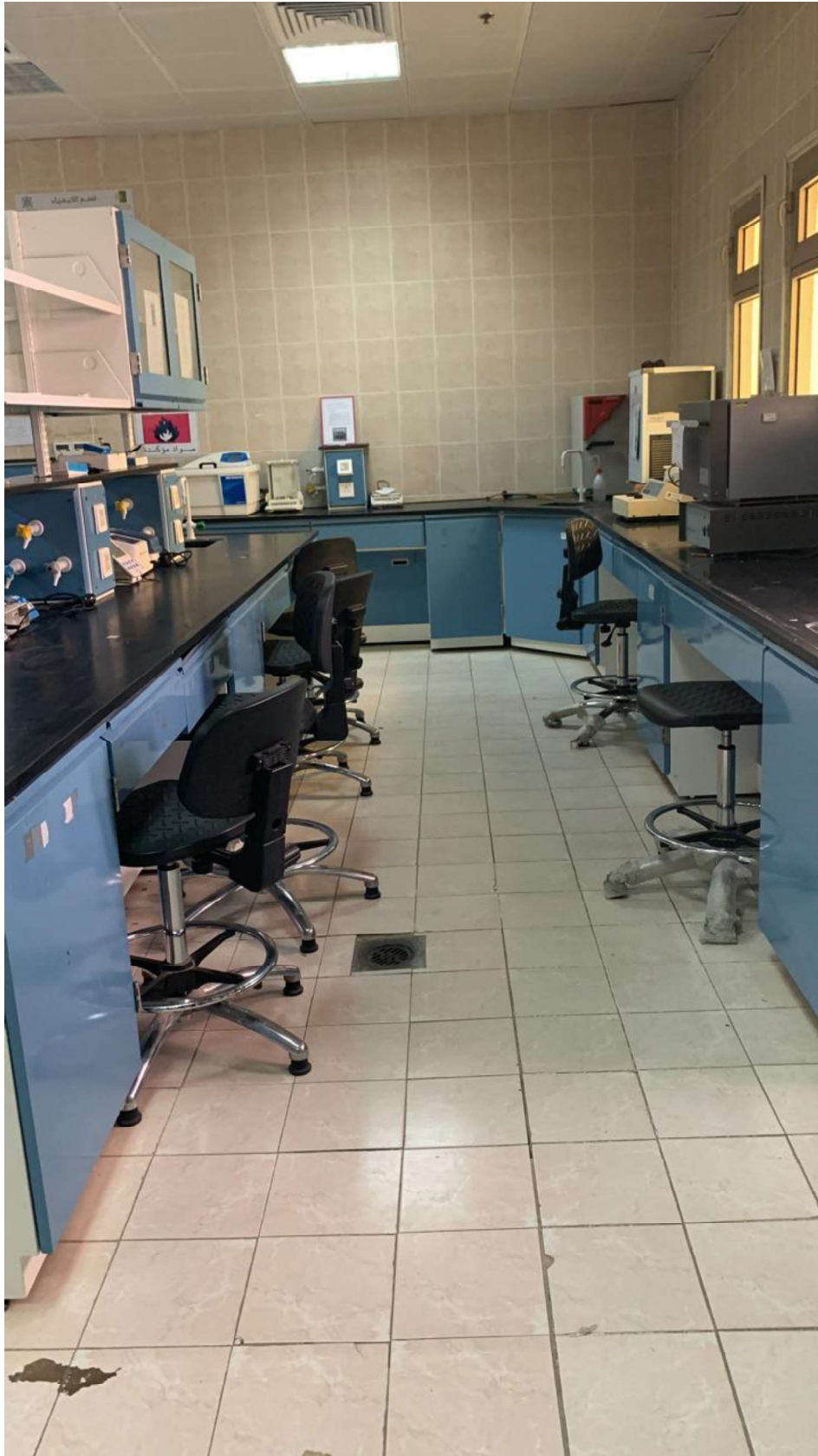
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مختبر کیمیا

CHEMISTRY LAB



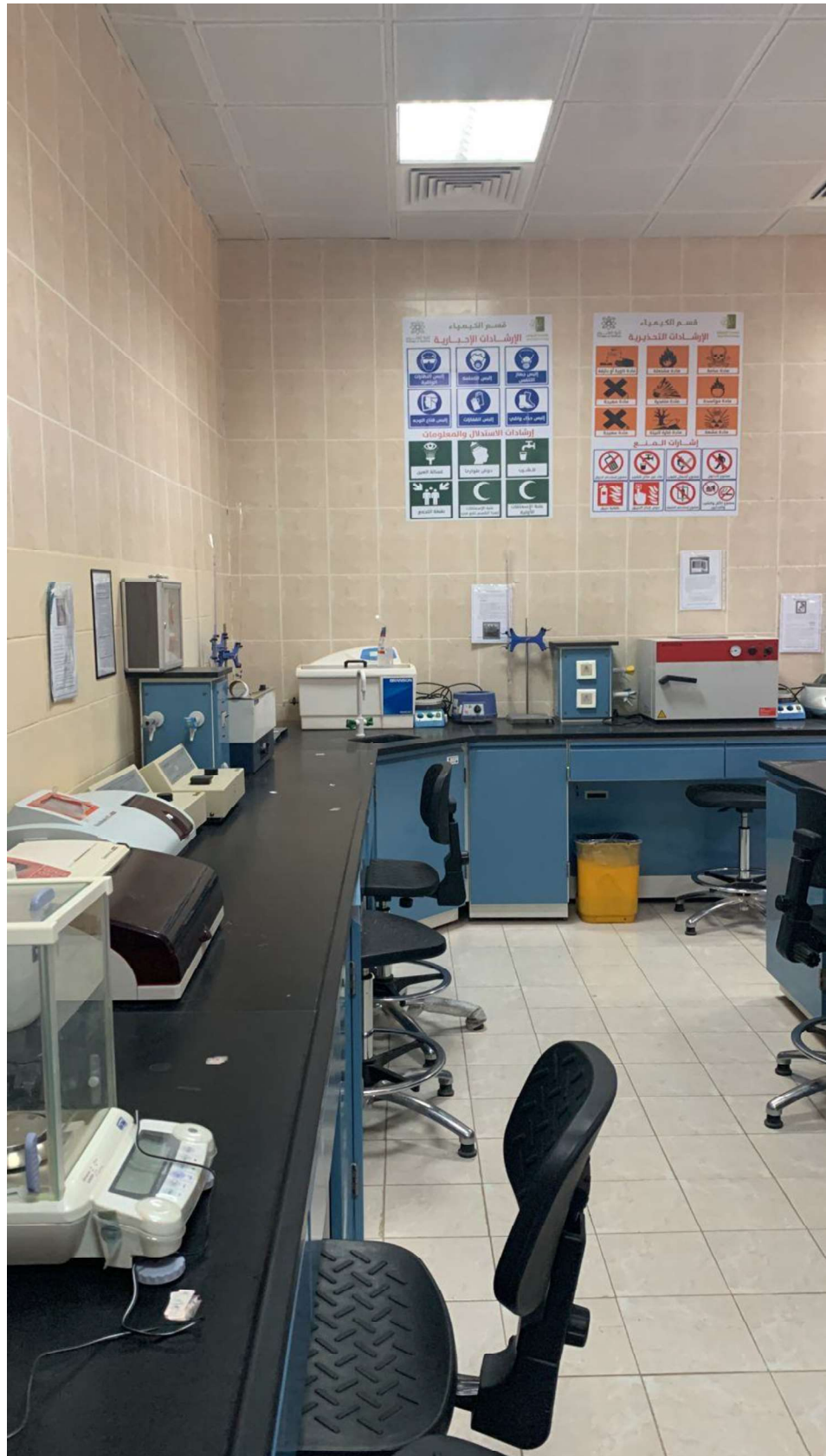












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مختبر الكيمياء الفيزيائية

كلية العلوم
College of Science
جامعة جوف
Jouf University

إرشادات الأمن والسلامة في مختبر الكيمياء

المهم إدراك أن مختبر الكيمياء مكان له تقديره واحترامه؛ لذا لابد عند دخولك المختبر أن يكون عملك جاداً ودقيقاً. وكل عمل يقومون به ينبغي أن يكون عملاً محسوباً يسبقه لحظة تفكير؛ لأن عتق وأي عمل عشوائي قد ينتج عنه أذى لجسمك أو ملابسك أو لمختبرك أو زملائك.

لا يجب أن تتبع التعليمات الآتية

يجب جداً على إرشادات الدكتور والذين تجاري لم تطلب منك إلا بعد استشارتها.
همل في لبس معطف المختبر والكمامات والنظارات الواقية والقفازات عند التعامل مع المواد الكيميائية أثناء تواجدك في مختبرها على سلامتك.
في من أسماء المواد الكيميائية قبل استعمالها والتدريج في استخدامها فضعها قد يكون حارفاً أو كاواً ساماً ولا تستعمل في مادة من المواد الخطيرة كالأحماض المركزة أو القواعد المركزة إلا بعد معرفة شروط استخدامها.
تسبب ولا تتوهم ولا تمشي في مواد كيميائية.
تربط عند التعامل مع الزئبق وإذا انسكب على الأرض بكمية كبيرة فلا تجمعها بيدك وإذا كانت بسيطة فيمكنك التخلص منها في كمية من الكبريت.
لا استعمال اللهب بأي شيء جيداً أن المواد القابلة للاشتعال (الأنابيب "الكحول" "البنزين" "المذيبات" المصهور).
تجنب إشعال عود الشاي أو لا تم مشهور الغاز وليس العكس. لطيفي عود الشاي فوراً بعد استعمال اللهب ولا تدرك به في مختبر لإشغال ليد آخر. لا تمشي عود الشاي في أي مكان بل تكد في إطفائه ووضع في سلة المهملات. لطيفي اللهب فور الانتهاء من استعماله.
تجنب ملامسة الأنابيب عند تسخين أية مادة في أسبورة الاختبار مع مراعاة عدم توجيه فوهة الأسبورة التي يجهت أو وبها إلى زملائك.
يجب تجنب الاختبار بشريها على اللهب من أسفل إلى أعلى بطريقة مستمرة مع عدم تركيز التسخين في منطقة واحدة في لا يذفع المخول منها مرة واحدة مسبقاً حرق.
عند إجراء التجارب التي يتساعد فيها الحرق أو غازات في خزائن الغازات الموجودة المختبر مع تجنب شم رائحة الغازات.
ملاحظة من التجارب التي تكون غازات سامة أو مارة وإذا كانت رائحة الغاز الغير سام من السمات المميزة له تحركي بيدك لطيفي الماء إلى الحوض المركز بل أضيفي الحوض إلى الماء، وبكميات قليلة في كل مرة مع الرج أو التحريك وبرد مخول إذا ارتفعت درجة الحرارة.
لا الاحتكاك أية مادة كيميائية كبيرة من زجاجات المواد لا تتركب غطاء الزجاجات على طاولة المختبر خذي حاجتك وإغلق الزجاجات بعد استخدامها إلى مكانها ولا تشقي زجاجات المواد بعيداً عن أماكنها كما يجب مراعاة عدم فتح عدة زجاجات في وقت واحد في طاولة لتجنب مع بعضها الأمر الذي يسبب توتن المخزونات.
تجنب التخلص من أية مادة سائلة أضيفها في الحوض الخاص بذلك وليس عليها كمية كبيرة من الماء (توجد في بعض المختبرات زجاجات كبيرة لجمع السوائل المصهورة مع مراعاة غسل يدك جيداً بالماء فور الانتهاء من استعمال أية مادة كاوية مثل الأحماض والقواعد والاحتفاظ بيدك جافة أثناء العمل).
لا تطلي المواد السائلة الزائدة عن حاجتك وكذلك أواني التسخين المستخدمة في الحوض بل ضعها في السلات الخاصة بها. يجب عدم الإصرار مع استعمال المواد الكيميائية المستخدمة وكذلك السباح أو الكهراء أو الغاز.
عند الانتهاء من كل تجربة فومي بنظافة الأدوات التي استخدمتها وأعيدنها إلى مكانها في المختبر مع مراعاة تنظيف طاولتك من شوائبها قبل مغادرتك المختبر.
تجنب على تلوين ملاحظاتك مما تشاهده أو لا تأمل وكل ما تستلزمه من مشاهدات حتى لو كان حدوثها غير متوقع.
تجنب تلوين المصهورة فور وقوع حادث لك أو لزملائك حتى لو كان الحادث بسيطاً لتفادي تقديم المساعدة اللازمة فوراً. تجنب تناول الأكل أو المشروبات أو التدخين أو تزيين من الماء المخصص للمختبر. وصحح لتطواري في المختبر.
تجنب بدهو داخل المختبر وعدم الانطباع في المشي أو التحرك المفاجئ وترك اللهب والمراجل داخل المختبر.





Report on the number of laboratories and classrooms in the physics program

The Physics Department has an appropriate number of laboratories and classrooms equipped with many teaching aids such as computers, display screens and various experiments to serve the educational process, in accordance with the general policy of Jouf University and its statement as follows:

Section	Resources	Quantity
Male section	Number of classrooms allocated to department	5
	Number of undergraduate laboratories	9
	Number of research laboratories	1
Female section	Number of classrooms allocated to department	9
	Number of undergraduate laboratories	9

تقرير عن اعداد المختبرات والقاعات التدريسية ببرنامج الفيزياء

يتوفر بقسم الفيزياء عدد مناسب من المعامل والقاعات التدريسية المجهزة باحدث الوسائل التعليمية من اجهزة كمبيوتر وشاشات عرض وتجارب متنوعة لخدمة العملية التعليمية وذلك وفقا للسياسة العامة لجامعة الجوف وبيانها كالتالى:

اولا: المختبرات بشطر الطلاب

م	اسم المختبر	الرقم التسلسلي	الفني المسنول
1	مختبر فيزياء البصريات	G060	أ. ركان سعود الهذاج
2	مختبر فيزياء عامة 2	F044	
3	مختبر فيزياء الكهرومغناطيسية	G059	أ. عبد الله صالح العلي
4	مختبر فيزياء الإلكترونيات	G059	
5	مختبر الأبحاث	G067	
6	مختبر فيزياء عامة 1	F039	أ. مساعد حران الرويلي
7	مختبر فيزياء حديثة	G061	أ. عدنان عايد الربيعان
8	مختبر فيزياء النووية	G061	
9	مختبر فيزياء الجوامد	G67	
10	معمل حاسب الى	F 81	

ثانيا: المختبرات بشطر الطالبات

م	اسم المختبر	الرقم التسلسلي	الفني المسنول
1	مختبر فيزياء الجوامد	B 114	أ. مرام العنزي
2	مختبر كهرومغناطيسية	B 114	

	B 118	مختبر فيزياء البصريات	3
	B 118	مختبر نووية و اشعاعية	4
	B 114	مختبر الالكترونيات	5
أ. زريفة الفهقي	B 102	مختبر الفيزياء العامة 2	6
	B 102	مختبر الفيزياء عامة 1	7
	B 121	مختبر الفيزياء حديثة	8
	C 23	معمل حاسب الى	9

ثالثاً: القاعات التدريسية بشطر الطلاب

م	النشاط	الرقم التسلسلي	المبنى
1	قاعة تدريسية	F 71	مبنى كلية العلوم- المدينة الجامعية - الدور الاول
2	قاعة تدريسية	F 72	مبنى كلية العلوم- المدينة الجامعية - الدور الاول
3	قاعة تدريسية	F 73	مبنى كلية العلوم- المدينة الجامعية - الدور الاول
4	قاعة تدريسية	F 74	مبنى كلية العلوم- المدينة الجامعية - الدور الاول
5	قاعة تدريسية	F 75	مبنى كلية العلوم- المدينة الجامعية - الدور الاول

رابعاً : القاعات التدريسية بشطر الطالبات:

م	النشاط	الرقم التسلسلي	المبنى
1	قاعة تدريسية للمقررات النظرية	217	مبنى و بشطر الطالبات
2	قاعة تدريسية للمقررات النظرية	218	مبنى و بشطر الطالبات
3	قاعة تدريسية للمقررات النظرية	219	مبنى و بشطر الطالبات
4	قاعة تدريسية للمقررات النظرية	220	مبنى و بشطر الطالبات
5	قاعة تدريسية للمقررات النظرية	221	مبنى و بشطر الطالبات
6	قاعة تدريسية للمقررات الشبكية	230	مبنى د بشطر الطالبات
7	قاعة تدريسية للمقررات الشبكية	231	مبنى د بشطر الطالبات
8	قاعة تدريسية للمقررات النظرية	222	مبنى و بشطر الطالبات
9	قاعة تدريسية للمقررات النظرية	223	مبنى و بشطر الطالبات

A photo report on the laboratories in the main campus













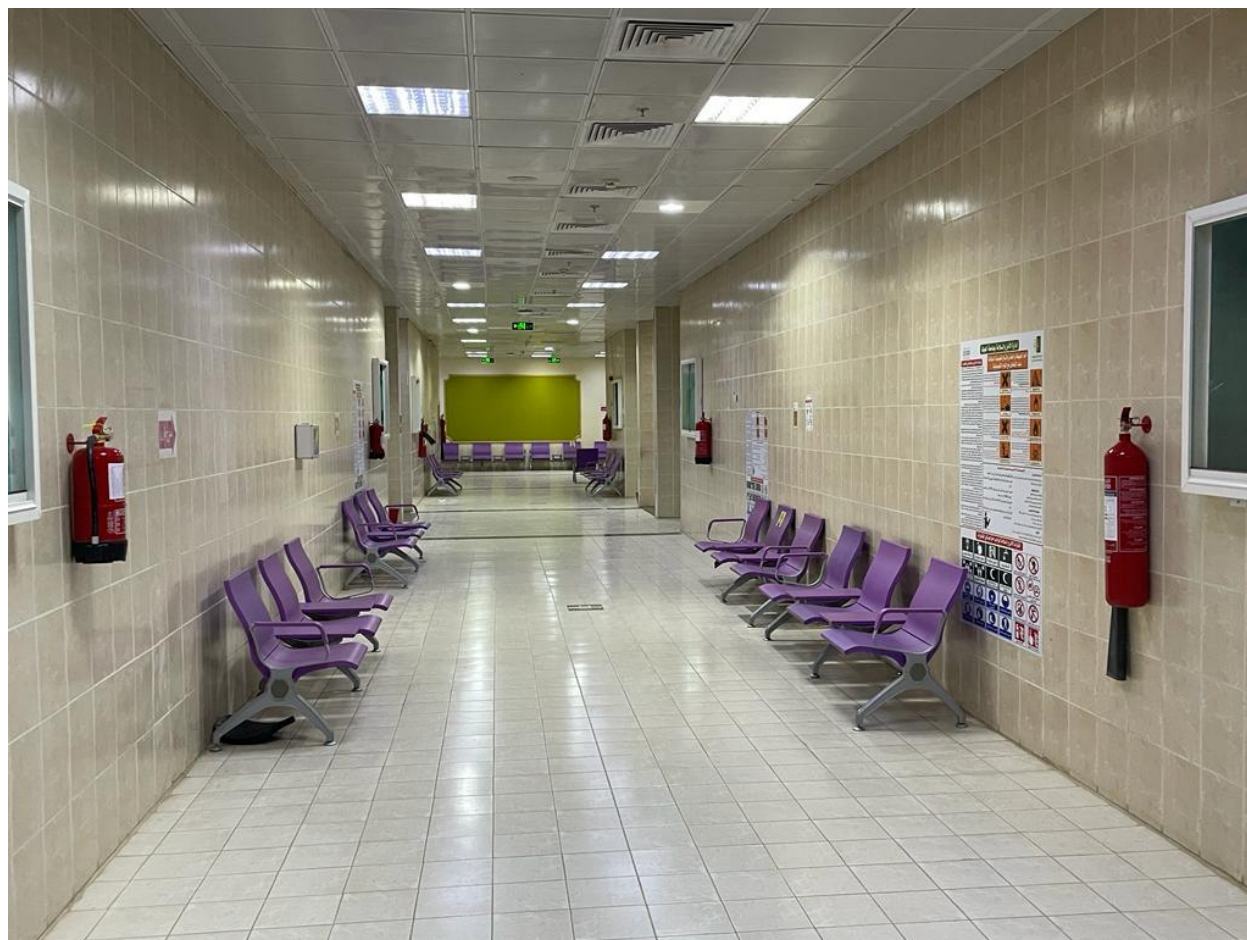








A photo report on the laboratories in the female campus



مبنى (ب) (وحدة المعامل والمختبرات المتخصصة) ويشمل			
الدور الأرضي		الدور الأول	
رقم القاعة	المسمى	رقم القاعة	المسمى
١٠٢	فيزياء عامة		
١٠٣	أسس التمريض		
١٠٤	كيمياء حيوية		
١٠٥	فطريات		
١٠٦	أمراض الدم		
١٠٧	علم الأمراض		
١٠٩	علم الجراثيم		
١١٠	علم الأنسجة		
١١١A	العلاج الطبيعي		
١١١C	العلاج الطبيعي		
١١٢	علم الحيوان		
١١٣	علم النبات		
١١٤	فيزياء جوامد المواد والكهرومغناطيسية		
١١٥	كيمياء عضوية		
١١٧	كيمياء عامة		
١١٨	فيزياء بصريات وليزر ونووية وللإشعاعات		
١١٩	مكتب مشرفة المختبرات		
١١١B	مكتب فنيات المعامل		
١٠٨	غرفة تحضير ١		
١١٦	غرفة تحضير ٢		

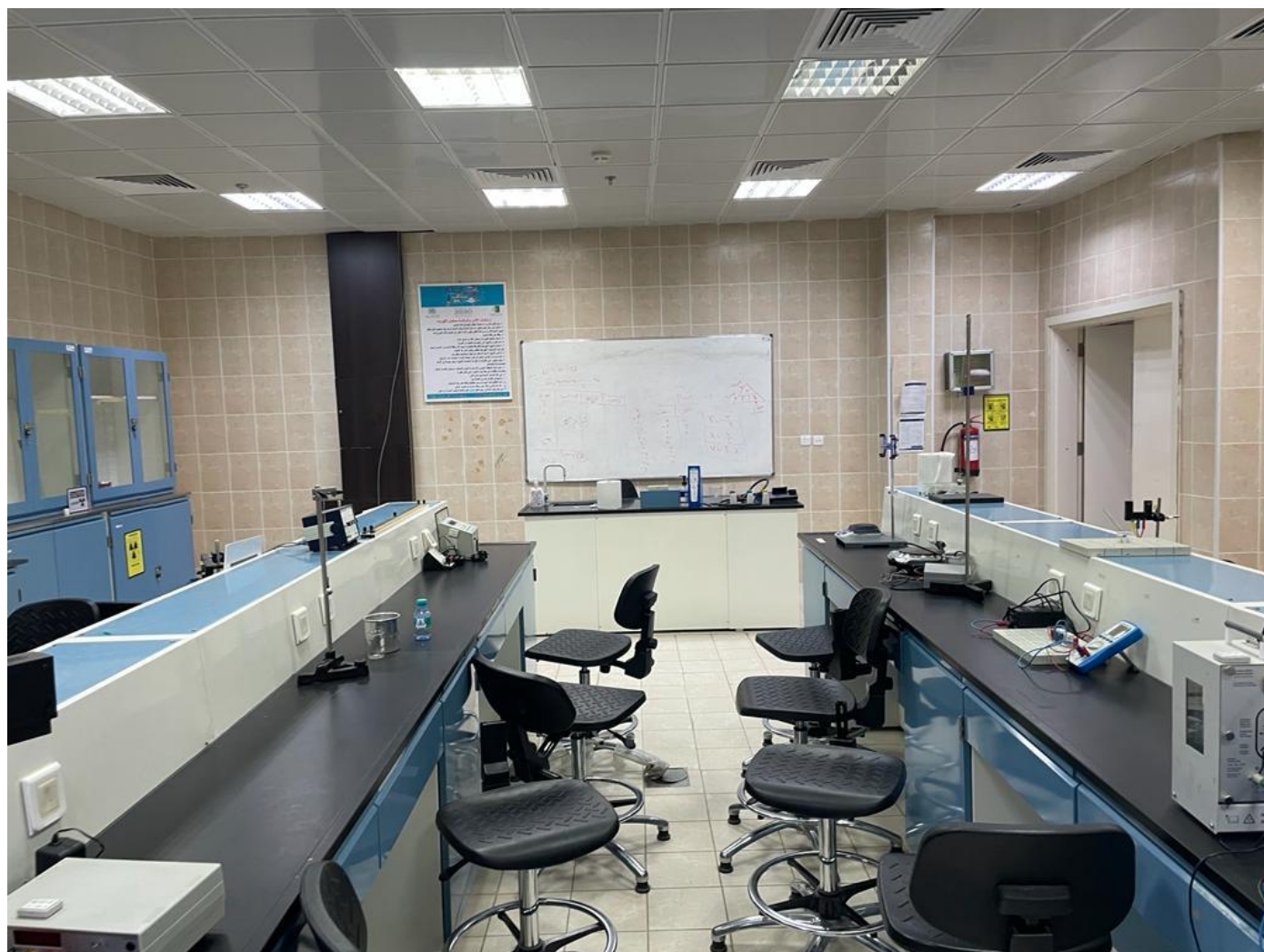
إدارة مجمع كليات البنات













تقرير مصور عن القاعات التدريسية بشطر الطلاب















تقرير مصور عن القاعات التدريسية بشطر الطالبات





د. وائل سعد محمد

رئيس لجنة المعامل بقسم الفيزياء



Biology Program (BP)

Report on laboratories, laboratories and their equipment, and their adequacy to conduct research and scientific studies supported by pictures

To have practiced alumni of Biology program to fulfil the labor market, the program should focus on the practical sections. The most important and crucial player of the practical part in any program is the well-equipped laboratories with sophisticated equipment together with the availability of different tools and chemicals required for both the educational process and the scientific research. Biology program has sufficient sophisticate equipment with many copies of each both in male section building or in female section building, which support effectively the educational process, and the scientific research in the program. .

Most of equipment needed to perform the practical syllabi of the biology program are present in both sections. However, available instruments in the female section are less than available instruments in male section (As illustrated in the following table).

To minimize the gap between the two sections several measures are taken:

- 1- The female campus is temporary and will be shifted to the main campus, in this case allocation of all instrumentation will be done immediately.
- 2- Whenever needed, female staff members as well as female students can conduct their experiments in male campus.
- 4- All chemicals are shared between the two sections but sent to female campus gradually upon request because of current limited space in the female section.

Analysis report on the availability of learning resources, facilities and equipment in the Biology Program (BP)

	Male Campus		Female Campus		Notes
	Description	Size	Description	Size	
Facilities					
Class rooms	Total 11 classrooms 6 classrooms in the 1st floor: F 95, F 96, F73, F74, F80, F89) 3 class rooms in the 1st floor (F63, F97 and F100) 2 classrooms in the 2nd floor (S56 and S59)	2 rooms: 6m *9m (F95 and F96) 4 rooms: 4 m * 6m (F73, F74, F80, F89) 10 m * 12m Approximate 8m * 10 m	Total 15 classrooms 10 classrooms in the 2nd floor (201 W, 202 W, 204 W, 205 W, 206 W, 219 W, 220 W, 221 W, 223 W, 224) 2 classrooms in the 2nd floor: 227 W, and 230 W) 3 classrooms in the second floor (207 W, 217 W and 218 W)	Approximate 5m * 7m Approximate size 7 m * 10m Approximate 12m * 8m	Female section classrooms are in common with other programs in the college and other colleges
Relaxation space	Brake space supplied with restaurant, coffee shop and cafeteria	Approximately the size of this space is 10 m* 25m with seat and cafeteria and coffee shop	Brake space supplied with restaurant, coffee shop and cafeteria for all students in the campus	Approximately the size of this space is 25 m * 50m with	
Staff Offices	10 staff offices, 1 office for the head of the Department, 1 office for Secretary of the Head of the Department and -1 meeting rooms.	-The areas of these offices range approximately from 20 to 40 m². -The areas of these meeting room is approximately 120 m².	3 staff offices, 1 office of the Coordinator of the Department and 1 office of meeting	Staff offices are approximately 7m x20 m Department coordinator office is approximately 6m x5m Meeting room is approximately 10x 20m	

IT tools and software					
Percentage of Staff members having computers	100 %		100 %		
Percentage of Staff members having printers	100 %		100 %		
Percentage of Staff members having scanners	50 %		20 %		
The required software	Available		Available		
Wi-Fi-connection and internet access point	Available		Available		
Central library					
Number of available books	4735				
Number of available data base	171				
International Journals	Available				
Digital resources within the University	Available				
Access to the digital resources from outside of the University	Available				
Borrowing and photocopying service	Available				
Laboratories and their facilities					
Laboratories and research facilities	10 research and practical labs in the ground floor (G 92-G97-G-	The sizes of these labs ranged from 90 to 120 m ²		8 labs as follow: 4 research and practical labs in the ground floor	The sizes of these labs are approximately 7mx12m

	105-G106-G107-G113 and G114, G 83, G 87) and 1 in the first floor (F 110)			of the female section (Zoology Lab, Mycology Lab, Botany Lab and Histology Lab in addition to Chemistry and Physics labs)	
				2 Labs in the male section (main campus) were appointed for female students (G 92-Histology and Histochemistry lab, G 87-Undergraduate research lab),	
Equipment in each lab	Molecular Biology and Research Lab (Research lab) (F110) Compound microscope Digital balance Spectrophotometer PH meter Hot air oven Magnetic stirrer Sonicator Hot plate Water bath Vortex Microplate reader (Elisa reader) PCR Centrifuge CBC Flame photometer Microwave Freezer (-86°C) Automatic tissue processing Soxhlet		Mycology lab (B 105) Compound microscope Digital balance Spectrophotometer PH meter Hot air oven Magnetic stirrer Sonicator Hot plate Water bath Vortex Incubators Ditillator Centrifuge Freezer (-40°C) Autoclave Biosafety cabinet Botany lab (B 113) Compound microscope Digital balance Spectrophotometer		

	Gel documentation system Electrophoresis Rotary evaporator Shaker Incubator Autoclave Homogenizer (Torlox) Histology and Histochemistry lab (G 92) Dissecting microscope Compound microscope Digital balance Distillator Spectrophotometer Microtome (manual) Microtome (semi automatic) Microtome (automatic) Ice microtome PH meter Hot air oven Magnetic stirrer Cryostat Wax embedding machine Water bath Vortex Autoclave Biosafety cabinet Sonicator Microbiology Lab (G97) Dissecting microscope Compound microscope Digital balance Distillator Sonicator Spectrophotometer Biosafety cabinet PH meter Hot air oven Magnetic stirrer Incubators Hot plate Water bath Vortex Autoclave Cell counter		PH meter Hot air oven Magnetic stirrer Sonicator Hot plate Water bath Vortex Incubators Distillator Centrifuge Growth chamber Zoology lab (B 112) Compound microscope Digital balance Spectrophotometer PH meter Hot air oven Magnetic stirrer Sonicator Hot plate Microtome Water bath Distillator Vortex Microplate reader (Elisa reader) PCR Centrifuge Freezer (-86°C) Autoclave Histology lab (B 110) Compound microscope Digital balance Spectrophotometer PH Water bath Distillator Vortex Centrifuge Autoclave Undergraduate Research Lab (G87) Dissecting microscope Compound microscope	
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	Animal Physiology and immunology Lab (G105) Dissecting microscope Compound microscope Digital balance Distillator Spectrophotometer PH meter Hot air oven Magnetic stirrer Sonicator Hot plate Water bath Vortex Microplate reader (Elisa reader PCR Centrifuge Haemocytometer Freezer (-40°C) Hematocrit Plant Morphology and Taxonomy Lab (G106) Different kinds of microscopes Dissecting tools Parasitology and Entomology Lab (G107) Different kinds of microscopes Insect specimens Digital Balance Plant Physiology Lab (G113) Dissecting microscope Compound microscope Digital balance Distillator Spectrophotometer PH meter Hot air oven Magnetic stirrer Sonicator Hot plate Water bath		Microscope with camera Digital balance Centrifuge Microtomes		
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	Vortex Growth chamber Centrifuge Anatomy and Embryology Lab (G114) Dissecting microscope Compound microscope Digital balance Spectrophotometer PH meter Hot air oven Magnetic stirrer Sonicator Hot plate Water bath Vortex refrigerator Freezers Undergraduate Research Lab (G87) Dissecting microscope Compound microscope Microscope with camera Digital balance Centrifuge Microtomes Postgraduate Research Lab (G83) Dissecting microscope Compound microscope Microscope with camera Digital balance Centrifuge Microtomes Water bath Refrigerator				
Chemicals	Available		Available		
Plastic and glass tools	Available		Available		
Slides, models and specimens	Available		Available		

Strengths, weaknesses and priorities for improvement of learning resources LRs in Biology Program (BP)

Strengths

1. The program has sufficient and sophisticated equipment required for both the educational process as well as the scientific research with sufficient copies from each equipment.
2. The Biology program has clear procedures for maintaining equipment and devices.
2. The BP has clear procedures for regular assessments of the quality of learning resources, facilities and equipment.
3. The building has adopted management, hygiene, maintenance, safety precautions, and established rules for all its facilities
4. The digital library resources are available to all program employees (students and staff members).
5. Facilities such as classrooms and faculty offices are adequately equipped with the necessary educational tools and electronic media.

Weaknesses

- 1- More training of students and technicians on sophisticated equipment.

Area of improvement

1. Training of student and technicians on the new sophisticated equipment.

Priorities of improvement

- 1- Training of student and technicians on the new sophisticated equipment.

Action Plan Progress Report

Action plan	Planned completion date	Responsible person	Completed	If not completed give...	
				Reason	Proposed action
Training of student and technicians on the new sophisticated equipment	August 2024	Program coordinator with the Laboratory committee in the program	In progress	-	In progress

يعتمد

رئيس القسم/ د. بركات بن معالي الرشيدى

التوقيع/ 

تقرير عن مدى كفاية الاجهزة فى المختبرات

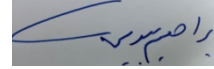
يوجد عدد من الاجهزة باكثر من نسخة تفي بمتطلبات العملية التعليمية لكل من مرحلتي البكالوريوس والماجستير حيث يحتوي القسم على عدد من الاجهزة ذات التقنية العالية والتي تخدم البحث العلمي وكذلك العملية التعليمية وهذا جدول يوضح اعداد النسخ من كل جهاز مع صور لبعض الاجهزة التي توجد بالقسم

رئيس القسم



أ.د/ موسى قرموش

لجنة المختبرات بالقسم



د/ إبراهيم بيومي

أسماء واعداد نسخ الاجهزة الموجودة بالقسم والتي تخدم برنامجي الاحياء وكذلك برامج الدراسات العليا

العدد	اسم الجهاز
2	Safety Cabinet
5	Spectrophotometer
4	Hot air oven
6	Water Distillator
1	Flame photometer
12	Microtome
1	Soxhlet

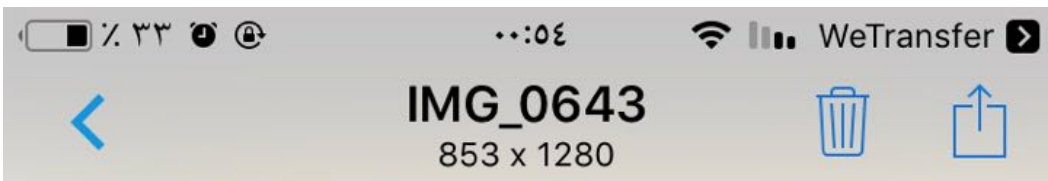
Autoclave	3
cryostat	1
PCR unit	2
Homogenizer	1
Centrifuge	6
Rotary evaporator	2
Vortex	3
Water bath	12
Shaking incubator	1
Automatic tissue processor	1
Shaker	1
CBC Counter (automatic)	1
Haematocrite	1
Gel electrophoresis Mini and Max (horizontal and vertical)	12
Blood Pressure equipment	10
Ultra sonicator	6



IMG_0658

1280 x 853















3/39/25905

المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

جامعة الجوف
كلية العلوم
قسم الاحياء



الأجهزة المعملية

في مختبرات قسم الأحياء

شطر الطالبات



اعداد

د. مرفت أحمد بخيت

رئيسة لجنة المعامل

٢٠١٧



3/39/25905

المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

جامعة الجوف
كلية العلوم
قسم الاحياء



مقدمة

تحظى كلية العلوم تخصص الاحياء اهتماما كبيرا بالمسابقات العلمية والمختبرات وتجهيزها بالأجهزة المعملية الحديثة، حيث تعتبر المختبرات العمود الفقري للتخصص وقد شهد التخصص تطورا كبيرا في تجهيزات مختبراته والمعدات والادوات التي تحتويها، وهذه المختبرات تخدم كافة المسابقات العلمية ومنها الاحياء الدقيقة وعلم النبات وعلم الحيوان والمقررات التي تدرس في كل علم من هذه العلوم وتفعيل العملي يؤدي الى تخرج جيل من الباحثين قادرين علي ربط علوم الأحياء وتطبيقاتها وعلاقتها بالمجتمع والبيئة التي تواجه خطط التنمية في المملكة في ضوء الخطط الدراسية المقررة.



3/39/25905

المملكة العربية السعودية
KINGDOM OF SAUDI ARABIAجامعة الجوف
كلية العلوم
قسم الاحياء

الأجهزة المعملية في معامل الأحياء (شطر الطالبات)

اسم الجهاز	صورة توضيحية
<u>الأوتوكلاف (Autoclave)</u> الهدف من الجهاز: يستعمل الأوتوكلاف في تعقيم كثير من البيئات الغذائية السائلة أو المضاف إليها الآجار ومحاليل السكريات ومحاليل الأملاح المختلفة، وكذلك يستعمل في قتل المزارع القديمة قبل التخلص منها، وكذلك في تعقيم الملابس والقفازات وأدوات الجراحة و جميع الأدوات التي تتأثر بالحرارة الرطبة. Autoclave normally used to sterilize many liquid or solid media as well as it is used in killing old cultures, in sterilization of clothing, gloves and surgical instruments. خطوات التشغيل: 1. تنظيف الأدوات وتجفيفها جيدا. 2. تغليف الأدوات وخاصة تلك التي سيتم تخزينها بعد التعقيم وترقيمها وكتابة بيانات تعريفها. 3. ترتيب الأدوات في الاوتوكلاف بطريقة تسمح بمرور تيار البخار ووصوله لكل أجزائها مع مراعاة سعة الاوتوكلاف ومناسبته للكمية المراد تعقيمها. 4. مراعاة تعليمات تشغيل الجهاز بدقة. 5. يبدأ حساب الوقت المطلوب لتعقيم عند وصول درجه	



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الحرارة للدرجة المطلوبة.

٦. بعد الانتهاء من التعقيم، يجب التأكد من ترك الجهاز حتى يبرد ويفرغ البخار عن طريق فتح الصمام الخاص بذلك، ويترك الجهاز ٢٠-٣٠ دقيقة ليبرد ثم يفتح الغطاء العلوي ببطء للسماح بخروج باقي البخار، مع البعد عن مسار الهواء الساخن.

٧. تترك الأدوات لتبرد قبل رفعها من الجهاز (قد يصل الوقت لرفعها الى ٣٠ دقيقة أخرى وذلك حسب المادة التي تم تعقيمها).

٨. يتم تخزين الأدوات المعقمة (في حال عدم استخدامها الفوري) في مكان جاف بعيدا عن أي مصدر تلوث.

تركيب الجهاز :

١- **المرجل :** هو الجدار الخارجي للموصدة وهو دائري سميك من المعدن.

٢- **السلة :** مصنوعة من السلك أو الشبك أو معدن خفيف وتوضع فيها المواد والأدوات المراد تعقيمها.

٣- **الغطاء :** يستخدم لإغلاق الموصدة بإحكام.

٤- **ملازم الغطاء :** تضمن إغلاق الجهاز بإحكام وتمنع البخار من الخروج.

٥- **صمام الأمان :** يوضع في قمة المرجل فوق الغطاء .

٦- **مقياس الحرارة أو مقياس الضغط :** يثبت على غطاء الموصدة ليبين مقدار الضغط أو درجة الحرارة أو كليهما .

٧- **سلك التيار الكهربائي :** يستخدم التيار الكهربائي لتوليد الحرارة اللازمة لتبخير الماء في الموصدة.

٨- **مفتاح التشغيل :** يتوافر هذا المفتاح في الأجهزة التي تعمل بالتيار الكهربائي.

٩- **ضابط التحكم في الحرارة :** للتحكم في درجة الحرارة.





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المجهر (Microscope)

الهدف من الجهاز:

جهاز يستخدم في فحص و تكبير الكائنات الدقيقة، و نظرية عمله هي استخدام عدستين احدهما تسمى العدسة العينية وهي التي يستخدمها الشخص في الرؤية أمام عينة و الأخرى تسمى الشيئية و توجد أعلى الشيء المراد فحصه (وهي مجموعة من العدسات) بقوات تكبير متنوعة (٥، ١٠، ٤٠، ١٠٠).

Device used in the examination and magnification of microorganisms, its principles theory depend on use of two lenses, one called the eyepiece which is used by a person of vision in front of the sample and the other is called objective-oriented which have the highest share of the object to be (a set of lenses) troops magnified Miscellaneous (5.10, 40 100).

خطوات التشغيل:

- ١- نظف العدسات العينية والشيئية.
- ٢- تأكد من أن العدسة الشيئية الصغرى في مركزها الصحيح فوق ثقب المنضدة.
- ٣- ضع شريحة على المنضدة وثبت الشريحة بواسطة الضاغط.
- ٤- انظر خلال العدسة العينية بكلتي عينيك، وحرك الضابط الكبير إلى أعلى للحصول على اوضح صورة.
- ٥- بعد الانتهاء من الفحص ازل الشريحة وأعد المجهر الى مكانه الاصلي.





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تركيب الجهاز :



- ١- **العدسة العينية:** هي العدسة التي نرى من خلالها.
- ٢- **الاسطوانة:** هي الجزء الاسطواني في المجهر التي تحمل في أعلاها العدسة العينية.
- ٣- **العدسة الشيئية:** هي مجموعة من ثلاث إلى أربع عدسات متصلة.
- ٤- **المنضدة:** هي السطح الذي نضع عليه الأجسام المراد فحصها.
- ٥- **المكثف:** يوجد المكثف تحت فتحة المنضدة، ووظيفته تجميع أشعة الضوء .
- ٦- **الحجاب الحدي:** هو جزء مثبت على السطح السفلي للمنضدة وبواسطته نستطيع تنظيم كمية الضوء الداخلة.
- ٧- **الضابط الكبير:** عجله كبيرة موجودة على جانبي المجهر تستعمل لتنظيم المسافة بين المنضدة والعدسة الشيئية.
- ٨- **الضابط الصغير:** عجلة صغيرة موجودة على جانبي المجهر حيث تستخدم للمساعدة على رؤية الهدف بصورة أوضح.
- ٩- **المرآة أو المضيء:** تعمل على عكس وتوجيه الأشعة من مصدر خارجي إلى العدسة الشيئية مارة بالشريحة المراد تكبيرها.
- ١٠- **الضاغط:** يستعمل لتثبيت الشرائح.
- ١١- **الذراع:** الدعامة التي تستعمل لحمل المجهر.
- ١٢- **القاعدة:** الجزء السفلي الذي يرتكز عليه المجهر.



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جهاز الطرد المركزي (Centrifuge)

الهدف من الجهاز :

يستخدم هذا الجهاز لفصل المواد عن بعضها، معتمداً في ذلك على قوى الطرد المركزية الناتجة من الحركة الدائرية التي يدور فيها، والجهاز عبارة عن آلة يتم فيها فصل الجزيئات من المحلول تبعاً: للحجم، الشكل، الكثافة، لزوجة الوسط، وسرعة الدوران.

This device is used to separate materials from each other, depending on centrifugal resulting from the circular movement that is going on in strength. This Machine separate the particles from the solution where depending on: the size, shape, density, viscosity of the center and the speed of rotation.

تركيب الجهاز :

- ١- المحور المركزي: يدور بسرعة كبيرة ويحمل الرأس .
- ٢- الرأس : وظيفته حمل الدلاء التي توضع فيها الأنابيب.
- ٣- الدلاء: وظيفتها حمل الأنابيب المحتوية على العينة وحفظها .
- ٤- ساعة التوقيت : تستخدم لتحديد الفترة الزمنية اللازمة للعمل .
- ٥-عداد الدورات : يحدد بوساطته عدد الدورات المطلوبة في الدقيقة .

طريقة التشغيل:

- ١- ضع العينة المراد ترسيبها (أو فصل مكوناتها) في أنبوب اختبار مناسب.
- ٢- يجب وضع أوزان متساوية في كل انبوبيتين متقابلتين





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أو استخدام انبوبا اخر من نوع الانبوب الاول مع وضع كمية من الماء تساوي وزن العينة المقابلة في الانبوب الاول .

٣- أغلق غطاء الجهاز قبل بدء الدوران .

٤- حدد الفترة الزمنية اللازمة للترسيب باستخدام ساعة التوقيت .

٥- حدد عدد الدورات اللازمة في الدقيقة باستخدام ضابط عدد الدورات ومتابعة في عداد الدورات .

٦- حدد درجة الحرارة اللازمة للترسيب .

٧- اضغط مفتاح التشغيل وانتظر الى أن يتوقف الجهاز عن الدوران وحده "تعمل ساعة التوقيت في بعض الاجهزة عمل مفتاح التشغيل "

٨- اخرج الانبوب المحتوي على العينة بعد ان يتوقف الجهاز عن العمل ، واسكب ما فيه من سائل لتحصل اما على المادة المترسبة او الرائق .

مقياس الأس الهيدروجيني (pH meter)

الهدف من الجهاز :

هي أداة إلكترونية تستعمل لقياس درجة الحموضة أو القاعدية لسائل معين. عادة ما يتكون من قطب خاص (قطب زجاجي) متصل بمقياس إلكتروني يقيس ويعرض رقم الأس الهيدروجيني من ١-١٤.

It is an electronic instrument used to measure acidity or alkalinity of certain solution usually, it consists of a special electrode (glass electrode) connected to a letter scale measures and displays the number of Ph from 1-14.





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يقيس الأس الهيدروجيني تبعا لنشاط الأيونات الهيدروجينية المحيطة بالبصيلة الزجاجية (bulb) ذات الجدار الرقيق. هذه البصيلة موجودة على طرف القطب.

٢-المقياس

قياس فرق الكمون، مثل مقياس الجهد الكهربائي، غير أنه يعرض القياسات كوحدات الأس الهيدروجيني بدلا من وحدات الفولط.

خطوات تشغيل الجهاز:

١- تتم المعايرة عن طريق محلولين منظمين ، على الأقل ، ولكن من الافضل استعمال ثلاثة محاليل منظمة . يحتاج الجهاز المعايرة تقريبا عند كل استعمال . هناك بعض الاجهزة الحديثة الصنع التي يمكن ان تحتفظ بالمعايرة لمدة شهر .

٢- يتم اختيار المحلول المنظم الثاني تبعا لمجال الاس الهيدروجيني الذي ستم فيه القياسات . في معظم الاحيان الاس الهيدروجيني ١٠ للمحاليل القاعدية و٤ للمحاليل الحمضية .

٣- عند القياس يوضع القطب (الاليكترود) في المحلول المراد قياس رقمه الهيدروجيني ويترك حوالي ٣٠ ثانية .
٤- يخرج القطب من المحلول ويغسل بماء مقطر ويمسح برفق بمنديل ورقي ، ثم يغسل بماء مقطر مرة اخرى ويجفف بمنديل ورقي ويستخدم لقياس محلول اخر .

٥- عند الانتهاء من الاستخدام يغسل القطب (الاليكترود) بماء مقطر ويمسح بمنديل ورقي ويوضع في جرابة المحتوي على قطن مبلل بماء مقطر أو محلول KCl حتى لا يجف .





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الحمام المائي (Water bath)

الهدف من الجهاز :

- عبارة عن وعاء يحتوي على سخان كهربائي يرفع درجة حرارة الماء إلى درجات مختلفة حسب الحاجة، و يستخدم لتسخين المواد القابلة للتلف بالحرارة المباشرة مثل الأوساط الغذائية.

A reservoir containing an electric heater that raises the temperature of the water to different degrees as needed. In addition, it is used for heating combustible materials, which are damaged by the direct heat.



تركيب الجهاز :

يتكون من:

- ١- حوض استالس على شكل مستقيم
- ٢- يوجد في اخر الحوض سخان
- ٣- كما يتكون من الثرموستات لتحكم في درجة الحرارة
- ٤- تايمر زمني لضبط الوقت

طريقة عمل الجهاز:

- ١- يملئ الحوض بالماء المقطر (لمنع ترسب الأملاح) الى أن يغطي السخان والمستشعر بالكامل.
- ٢- يوصل القابس بالتيار الكهربائي .
- ٣- يشغل مفتاح التشغيل.
- ٤- يضبط مفتاح الأمان الخاص بدرجة الحرارة ويفضل



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أن تكون أعلى بقليل من درجة الحرارة المطلوبة.

٥- يضبط وقت التشغيل.

٦- هناك موديلات كثيرة منها الرقمي والعادي ، يجب

إتباع خطوات التشغيل المدونة في كتالوج المصنع .

٧- يجب التأكد من مستوى الماء باستمرار، وغلق

الجهاز بعد الاستخدام، ونزع القابس.

السخان الكهربائي المسطح (Hot plate)

الهدف من الجهاز :

تستخدم هذه الأجهزة في بسط مقاطع الأنسجة وتجفيفها وكذلك في تسخين المحاليل التي يلزم رفع درجة الحرارة لتجهيزها مثل محاليل تحضير الأوساط الغذائية للكائنات الدقيقة، وتكوين محلول غروي من النشا أو الجيلاتين.



This device is used in the extension of tissue sections and dried them as well as in heating solutions that need to raise the temperature of the processed food such as colloidal solutions of cultural media and the formation of starch or gelatin.



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تركيب الجهاز :

يتركب من :

- ١ - صفيحة تسخين.
- ٢ - مفتاح للتحكم في درجات الحرارة.
- ٣ - ترموستات للفصل والتشغيل الاتوماتيكي كعامل امان
- ٤ - لمبه بيان لتوضيح وضعيه التشغيل
- ٥ - قاعده متزنه

طريقة التشغيل:

- ١ - وصل التيار الكهربائي.
- ٢ - ضع الشي الماد على صفيحة التسخين.
- ٣ - اضبط دجة الحرارة المناسبة تبعا لنوع المادة المراد تسخينها.



جهاز تقطير المياه (Water Distillator)

الهدف من الجهاز :

التقطير هو عملية فصل المواد الصلبة (المذاب) عن الوسط المذيب (الماء) بوساطة التبخير بالحرارة، وهي لا تحتاج إلى إضافات أخرى أو مذيبيات أو كيماويات.



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Distillation is the process of separating dissolved solids from water by evaporation; this process does not need boiling solvents or other additives or chemicals.

طريقة التشغيل :

- ١- قبل تشغيل الموتور يجب التأكد من وجود الماء وذلك بكشف الغطاء الاحمر العلوي ، وعند عدم وجود الماء يتم تعبئة الخزان الايسر الى النصف.
- ٢- تشغيل الموتور الموجود أسفل البنش والصنبور مغلق.
- ٣- يتم فتح صنبور الماء فتحة بسيطة جدا.
- ٤- تشغيل جهاز التقطير من الزر ثم الكهرباء .
- ٥- يجب تفريغ الخزان الأيمن عند الامتلاء والتأكد من خلوه من الماء.

إغلاق الجهاز:

يتم غلق الموتور.

إيقاف تشغيل الجهاز مع الزر.

إغلاق الماء.



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جهاز المقلب المغناطيسي Magnetic (stirrer)

الهدف من الجهاز :

المقلبات المغناطيسية تستخدم لتحريك المواد المراد إذابتها في محلول معين.

Magnetic stirrers is used to move materials to be dissolved in a given solution. The device is a metal cylinder under a flat spin that cause the rotation of magnet pieces covered by tevlon placed in the vessel.

تركيب الجهاز :

تكون في الأساس من مغناطيس دوار بفعل مغناطيس أو مجال مغناطيسي آخر غير متصل معه. و الجهاز عبارة عن اسطوانة حديدية تدور تحت سطح و تتسبب في دوران قطعة مغناطيس مغطاة بالتيفلون توضع في حيز الوعاء.

طريقة التشغيل :

يكون أحد المغناطيسين الدائمين متصل بمحرك كهربائي بينما يغمر القضيب المغناطيسي الآخر في السائل. عند دوران المغناطيس السفلي يتأثر القضيب المغناطيسي المغمور في السائل ويحاول الدوران بنفس اتجاه المغناطيس المدار دون أي اتصال ميكانيكي بينهما.





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الحضانة المعملية (Incubator)

الهدف من الجهاز :

جهاز كهربائي له دور مهم للغاية في عملية زراعة وتنمية النباتات أو الأحياء الدقيقة المنزرعة على المستنبتات المختلفة.

Electrical device has a very important role in the cultivation of plants or microorganisms and the development of microbes on different cultural media.

تركيب الجهاز

١- الباب الخارجي: يكون إطاره غالبا من المعدن ومزودا بنافذة من الزجاج بالإضافة إلى مقبض لإغلاق الحضنة بشكل محكم.

٢- الباب الداخلي: يصنع عادة من الزجاج المقاوم للحرارة.

٣- جسم الجهاز: يتكون من جدارين : الخارجي وهو مصنوع من معدن مطلي بطلاء مناسب.

٤- ميزان الحرارة: يثبت في أعلى الوجه الأمامي للجهاز ويعمل على قياس درجة الحرارة الداخلية للحضنة.

٥- منظم الحرارة: يكون في الغالب على شكل قرص دائري يتحكم في مقدار الحرارة اللازمة للعمل داخل الحضنة.

٦- مفتاح التشغيل: يستخدم لتشغيل الجهاز عند الحاجة.

٧- الضوء الأحمر: يوجد هذا الضوء في معظم الأجهزة ويضيء عندما تصل درجة الحرارة داخل الحضنة إلى الدرجة المثبتة على قرص منظم الحرارة.

٨- الرفوف: تتحرك من أماكنها بسهولة لتوسيع المسافة.





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٩-فتحات التهوية : تستخدم لتهوية الجهاز.

١٠- ساعة التوقيت :تزود بعض الحاضنات بهذه الحاضنات بهذه الساعة لتحديد الفترة الزمنية.

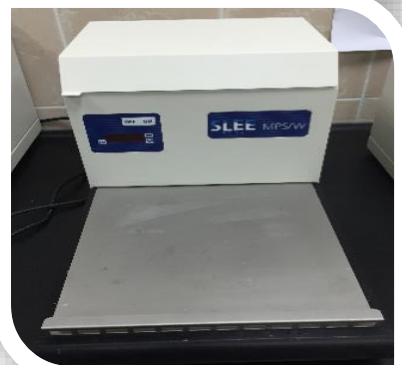
طريقة عمل الجهاز:

١-ضع المحلول في كأس أو ورق أو أي إناء مناسب مع مراعاة تجفيف قاعدة الإناء (كلما أمكن ذلك) ثم وضعه فوق السخان بطريقة آمنة.

٢-شغل الجهاز للتسخين (إذا كان لا يراد تقليب) أو شغله حتى يدور المغناطيس دوران منتظم ويكون في منتصف الوعاء، مع مراعاة ضبط شدة الدوران.

٣-اضبط درجة الحرارة ووقت الدوران إذا كان الضابط أوتوماتيكيا أو باستخدام ساعة تنبيه يدوية.

٤-بعد تمام الطبخ أو التسخين أو الاذابة، أغلق الجهاز وانزع القابس، واخرج المغناطيس بساق حديدية مغطاة بالتيفلون نظيفة واحذر من سخونة الإناء.

**Histology apparatus (microtomes)****الهدف :**

أجهزه تستخدم لتحضير القطاعات النسيجية ويستخدم الميكروتوم في عمل قطاعات في العينات لفحص الانسجة.

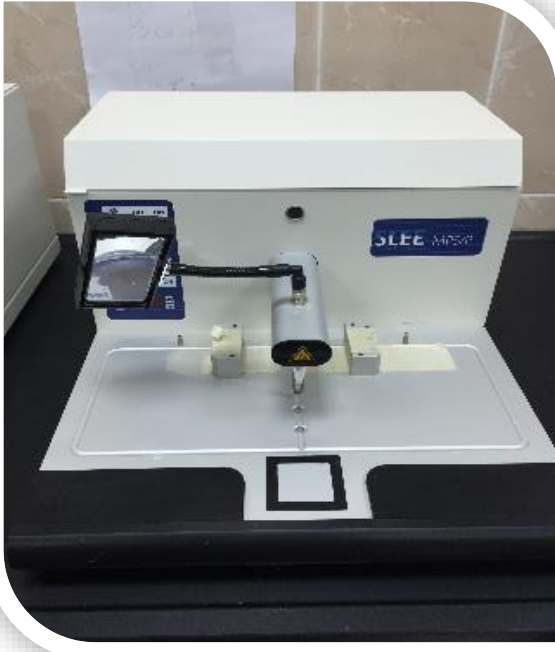
These devices are used to preparation of tissues. Microtomes are used to make sections for histological examination.



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تركيب الميكروتوم:

يتركب من أجزاء رئيسية:

١- سكين حاد تعمل على عمل قطاعات رقيقة جدا من خلال تدريج يحتوي على مؤشر لتحديد سمك القطاع.

٢- حامل يثبت عليه قطعة من شمع البرافين والمحتوية على النسيج الماد تقطيعه.

طريقة العمل:

١- يوضع كتلة الشمع المحتوية على النسيج في المكان المحدد لها .

٢- تدار عجلة الميكروتوم يدوياً.

٣- عند إدارة العجلة تتحرك الكتلة الشمعية إلى أعلى وإلى أسفل في اتجاه عامودي على السكين.

٤- بتكرار إدارة العجلة تلامس الكتلة الشمعية السكين وتنفصل القطاعات بحسب السمك المطلوب.

٥- توضع القطاعات على شرائح لاستكمال عملية فحص الانسجة.





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الميزان الحساس (Delicate scales)

الهدف من الجهاز :

من أهم الأجهزة المعملية التي تخدم كافة التخصصات العلمية والمعملية، ولا غناء عنه في أي معمل. وتطور شكل وتركيب الموازين إلى أن وصل للشكل الحالي المتطور الرقمي. وتختلف حساسية الميزان من جهاز إلى الآخر. وهي أجهزة ميكانيكية تستخدم لتحديد كتلة الاجسام.

It is one of the most important laboratory equipment that serves all scientific laboratories and in dispensable in any laboratory. The form and the installation of the scales were evolved until it reached the current form of advanced digital. The sensitivity of the balance are varied from one device to another.

تركيب الجهاز:

- ١ - كفة واحدة
- ٢ - شاشة رقمية لعرض قيمة الوزن عليها.
- ٣ - غطاء زجاجي كامل.
- ٤ - باب زجاجي
- ٥ - قاعدة

طريقة الاستخدام:

- ١ - يتم تصفير الميزان على صفر قبل وزن الشيء المراد وزنه.
- ٢ - يوضع الشيء المراد وزنه على الكفة.
- ٣ - أمسك الأوزان و المواد المراد وزنها بملقط و ضعها في كمنتصف كفة الميزان .
- ٤ - لا توزن الأجسام و هي حارة .
- ٥ - لا تحمل الميزان وزنا أعلى من طاقته .





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Biomedical Freezer

الهدف من الجهاز :

حفظ المواد القابلة للتلف وكذلك لتخزين العينات النباتية والحيوانية المستخدمة في التجارب و تبقى صالحة لأطول فترة زمنية ممكنة. وهي مطلب مهم لكل باحثي الدراسات العليا في مجال علوم الحياة.

For the storage of perishable materials as well as for the storage of plant and animal samples that used in experiments and remain valid for the longest period of time. Also, It is requirement for all graduate researchers in the field of life sciences.

تركيب الجهاز:

The device composes of the follows:

-Door Handle -Door latch .Access port- Lock, the door can be locked- Control panel- Caster .Defrost mark .Leveling foot- Space for temperature recorder- Storage container- Defrost water vessel & storage containe -Remote alarm terminal - Battery switch and power.

طريقة الاستخدام:

١- توصيل التيار الكهربى

٢- ضبط درجة الحرارة حسب الدرجة المطلوبة.

٣- وضع الشيء المراد الاحتفاظ به داخل الفريزر.

٤- اغلق الباب جيدا عن طريق المقبض.





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Growth Chambers

الهدف من الجهاز :

له مستوى عال من الدقة والسلامة لجميع احتياجات النمو من احتياجات ضوئية وحرارية لتضمن حالة تحضين مثلى فيعتب حضان مثالي لنمو النبات.

A high level of precision, reliability and safety for all growth parameters ensures optimum incubation condition

تركيب الجهاز :

غرف النمو تحتوي على Stands وهي بدورها تحتوي على ارفف مضاءة توضع عليها المزارع والعوامل البيئية الازم توافرها عند زراعة الانسجة وهي ذات رطوبة مناسبة للمحافظة على الانسجة من الجفاف و درجة حرارة مناسبة واحتياجات ضوئية مناسبة .

It offers the optimum environment for stress-free growth of plants such as Arabidopsis under constant culture conditions, or for applications with highly specialized, controlled, extreme conditions

طريقة الاستخدام :

- ١- تضبط درجة الحرارة تبعا لنوع النبات.
- ٢- توضع الاواني الزجاجية أو الاكياس المحتوية انواع مختلفة من النباتات .
- ٣- كتابة البيانات على كل عينة.
- ٤- تترك لفترة زمنية مناسبة حسب الفتة المناسبة لنمو النبات.



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Synergy 2 Multi-Detection

Microplate Reader

الهدف من الجهاز :

يستخدم في بحوث علوم الحياة. وهو يستخدم نظام الكشف الضوئي ذو مرشحات عميقة و مرايا مزدوجة اللون لأفضل مستوى من الأداء في البحوث وتطبيقات الفرز.

It designed for the life science research and drug discovery markets. Its fluorescence detection system uses deep blocking filters and dichroic mirrors for the best level of performance in research and screening applications.

Features

- * Flexibility of monochromator based absorbance with high performance filter-based fluorescence/luminescence
- * Low volume (2 μ L) nucleic acid and protein quantification with Take3 Micro-Volume Plates
- * Cell friendly orbital shaking and advanced 4-Zone™ incubator design to 50 °C with condensation control
- * Dual reagent injectors for inject/read applications, such as enzyme kinetics and Dual-Luciferase® Reporter
- * AlphaScreen®/AlphaLISA® assay capable
- * Modular and upgradable
- * Powerful Gen5 Software for reader control and all data reduction needs
- * Advanced shaking profiles including linear and orbital
- * Compatible with BioStack and 3rd party automation
- * Cold room (4 °C or 10 °C) compatible



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طريقة الاستخدام :

- ١- يسطب برنامج Gene 5 الخاص بتشغيله.
- ٢- من البرنامج نفتح الدرج الخاص بوضع plate in الذي يحتوي على sample المراد قياس (Absorbance, fluorescence) لها.
- ٣- ثم من قائمة protocol نختار actions ثم read ومنها نختار نوع القياس.
- ٤- ثم نحدد عدد العينات
- ٥- ثم نضغط read now
- ٦- ثم نضغط على export data للحفظ
- ٧- ثم نضغط على plate out عند الانتهاء



Purifier biochemical safety cabinet

It is an enclosed, ventilated laboratory workspace for safely working with materials contaminated with (or potentially contaminated with) pathogens requiring a defined biosafety level.

هو مساحة عمل مختبرية مغلقة ومهواة للعمل بأمان مع المواد الملوثة (أو التي يحتمل أن تكون ملوثة) مسببات الأمراض التي تتطلب مستوى محدد للسلامة الأحيائية.



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طريقة الاستخدام:

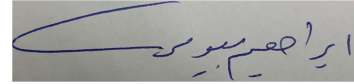
- ١- تعقيم السطوح عن طريق الكحول او الديتول وتترك لمدة دقائق.
- ٢- تشغيل المروحة
- ٣- تشغيل اللهب.
- ٤- توضع البينات او العزلات الميكروبية داخل الغرفة.
- ٥- بعد الانتهاء من العمل يتم اطفاء اللهب
- ٦- تعقم الغرفة مرة اخرى.
- ٧- نزع الادوات وحفظها في أماكنها الاولى.

شارك في العمل

أ.أريج السلمي - أ. سندس الهاجوج - أ. امل محول- أ. غالية الفهيري

اجتمعت اللجنة لحصر القوائم الواردة من أعضاء هيئة التدريس والتي اعدت لكل مقرر وقد تم تجميع وتصنيف البنود الواردة وقد خلصت اللجنة الي اعداد قوائم نهائية لاحتياجات القسم من الأدوات الزجاجية والبلاستيكية والمواد الكيميائية والكيّسات والشرايح الطلابية والعينات المحفوظة والأجهزة وذلك لرفعها الي سعادة الدكتور رئيس القسم ليتكرم برفعها الي إدارة الكلية ثم إدارة الجامعة لتأمين تلك الاحتياجات لضمان سير العملية التعليمية بالقسم.

لجنة المختبرات



أولا الكيماويات

م	اسم المادة	الوحدة	الكمية		سعر الوحدة	السعر الاجمالي
			قسم الطلاب	قسم الطالبات		
1	Trichloro acetic acid (TCA)	500 g	4	4		
2	Colchicine	1 g	10	20		
3	White phenol	1 Kg	2	2		
4	Buffered phenol	1 L	2	4		
5	Isopropanol	2.5 L	4	4		
6	Diphenylamine	500 g	4	4		
7	Tris-base	500 g	4	4		
8	Tris-acid	1 Kg	4	4		
9	Acrylamide (Electrophoresis grade)	1 Kg	1	1		
10	Coomassie Brilliant Blue R 250	25 g	1	2		
11	Ammonium persulphate (APS)	100 g	7	12		
12	Bromophenol Blue	250 g	2	2		
13	Giemsa Stain	500 mL	1	2		
14	Dodecyl Hydrogen Sulphate Sodium Salt	1 Kg	1	2		
15	Ethidium Bromide	10 g	4	4		
16	2- Mercaptoethanol	500 mL	2	2		
17	N,N,N,N-Tetramethyllenediamide(TEMED)	250 mL	1	2		
18	Bis/acrylamide	500 g	1	2		
19	Agarose	250 g	2	4		
20	Basic Fuchsin stain	25 g	1	2		
21	Potassium meta bisulphate	500 g	4	4		
22	API20E	250 g	2	2		
23	MacConkey broth	500 g	1	1		
24	S-S medium	500 g	1	1		

		4	4	250 g	Agar	25
		2	4	250 g	Peptone	26
		2	4	500 g	Nutrient agar	27
		5	10	1Kg	Paraffin wax	28
		1	1	500 g	Mercuric Chloride	29
		6	6	1 L	Toluene	30
		5	5	1 L	Formic acid	31
		4	4	500 g	Calcium oxalte	32
		4	4	500 g	Sodium formate	33
		4	4	100 g	Calcium formol	34
		2	2	10 g	Carmic acid	35
		4	4	1 L	Lactic acid	36
		4	4	50 g	Alcian blue	37
		4	4	50 g	Methyle green	38
		4	4	50 g	Na- Glycerophosphate	39
		2	2	5 g	Hemosidrin	40
		2	2	5 g	Silver sulphide	41
		4	4	25 g	Sodan black-B	42
		2	2	25 g	Pyronine	43
		6	6	1 L	Hydrogen peroxide	44
		4	4	50 g	Phenol phthalene	45
		4	4	50 g	Methyl orange	46
		4	4	50 g	Diphenyl amine	47
		4	4	250 g	Potassium dichromate	48
		1	2	50 ml	Heparin	49
		1	2	50 g	Negrosin	50
		1	1	50 g	Crystal violot	51
		1	2	50 g	Malakite green	52
		1	1	100 mL	Cedar oil	53
		4	4	250 g	Sodium borate	54
		4	4	50 g	Polyethylenglycol	55

		6	6	1 L	Butanol	56
		6	6	500 mL	Di ethyle ether	57
		2	2	1 Kg	potato dextrose agar (P D A)	58
		2	2	1 Kg	Sabaroud	59
		2	2	500 g	Shabakes	60
		3	4	250 g	Cobalt chloride	61
		1	1	500 g	Ammonium aluminum	62
		2	2	5 g	Rose bengal	63
		2	2	5 g	Aceto-carmin	64
		2	2	5 g	Toluidine blue	65
		2	2	1L	Paraformaldehyde	66
		5	5	1L	1-Butanol	67
		5	5	1L	2-Butanol	68
		5	5	1L	2-Methyl-2-Propanol	69
		1	1	1 Kg	1-Naphthol	70
		1	1	1 Kg	2-Naphthol	71
		4	4	1L	2-Pentanone	72
		4	4	1L	2-Propanol	73
		4	4	1L	3-Pentanone	74
		-	2	1 Kg	Acetamide	75
		-	2	1Kg	Acetaminophen	76
		5	5	1L	Acetic Acid	77
		2	2	1L	Acetyl Chloride	78
		2	2	1Kg	Activated Carbon	79
		-	1	1Kg	Adipic Acid	80
		-	2	1Kg	Alanine	81
		-	2	1 Kg	Albumin	82
		5	5	1L	Ammonium hydroxide	83
		2	2	1Kg	Ammonium Chloride	84
		-	1	500 g	Ammonium molybdate	85
		1	1	1Kg	Ultra fine Aluminium oxide, 0.05 micron	86

		1	1	1Kg	Ammonium Sulphate	87
		2	2	1L	Amyl Alcohol	88
		2	2	1L	Aniline	89
		1	1	100 g	Asparagine	90
		1	1	500 g	Aspirin	91
		2	2	1 Kg	Barium Chloride	92
		2	2	1 Kg	Barium Sulphate	93
		4	5	1L	Bendict's Solution	94
		4	4	1L	Benzaldehyde	95
		-	1	1 Kg	Benzanilide	96
		4	4	1L	Benzene	97
		1	2	1Kg	Benzoic Acid	98
		1	2	1L	Bromine Water	99
		-	1	1L	Bromobenzene	100
		1	1	1L	Butylamine	101
		1	1	500g	Caffeine	102
		6	6	500g	Calcium Carbonate	103
		2	2	1Kg	Calcium Sulfate	104
		1	1	500 g	Casine	105
		1	1	500g	Cellulose	106
		1	1	500g	Chloral Hydrate	107
		1	1	1L	Chlorobenzene	108
		1	1	1Kg	Cinnamic Acid	109
		2	2	1Kg	Citric Acid	110
		-	2	500g	Cobalt Sulfide	111
		1	1	500 g	Copper Acetate	112
		2	2	500 g	Copper Chloride	113
		10	10	unit	Copper Rod	114
		1	1	1 Kg	Copper Sulfate	115
		1	2	1 L	Cyclohexanol	116
		1	2	1L	Cyclohexanone	117

		1	1	500 g	Cysteine	118
		1	1	500 g	Cystine	119
		4	4	1L	Dibutylamine	120
		1	1	1L	Diethyl Malonate,	121
		4	4	500 g	Disodium EDTA	122
		-	1	1L	Erythrulose	123
		2	2	1L	Ethyl Acetoacetate	124
		4	4	1L	Ethylene Glycol	125
		5	5	1L	Fehling's Reagent A	126
		5	5	1L	Fehling's Reagent B	127
		2	2	500 g	Ferric Ammonium Sulfate	128
		2	2	500g	Ferrous Sulfate	129
		4	4	1L	Formaldehyde	130
		1	1	1Kg	Fructose	131
		2	2	1L	Glycerol	132
		1	1	500g	Glycine	133
		2	2	500g	Hexamine	134
		1	1	500g	Hippuric Acid	135
		10	10	1L	Hydrochloric Acid	136
		1	1	500g	Hydroxylamine Hydrochloride	137
		2	3	1L	Iodoform Reagent triiodomethane	138
		10	10	unit	Iron Rod	139
		1	1	500g	Lead Chloride	140
		1	1	1L	Linoleic Acid	141
		2	3	1L	Lucas Reagent Anhydrous Zinc Chloride In Concentrated Hydrochloric Acid	142
		2	2	500g	Manganese Dioxide	143
		1	1	500 g	Mannitol	144

		1	1	500g	Methionine	145
		1	2	1L	Methyl Acetate	146
		2	2	1L	Methyl Ethyl Ketone	147
		2	2	1L	Methyl Iodide	148
		2	2	1L	Methyl Isobutyl Ketone	149
		2	2	1L	Methyl Salicylate	150
		1	1	1L	Methylaniline	151
		2	2	100g	Methylene Blue	152
		1	1	500g	Magnesium sulfate Anhydrous	153
		1	1	1L	Molybdate Reagent	154
		1	1	1L	N,N-Dimethylaniline	155
		2	2	500g	Nickel Chloride	156
		1	1	500g	Ninhydrin	157
		1	2	100g	O-Phenanthroline	158
		2	2	100g	Orange II	159
		1	1	500g	Orcinol	160
		4	4	1Kg	Oxalic Acid	161
		1	1	1L	P-Cresol	162
		2	2	100g	Phenacetin	163
		1	1	500g	Phenylalanine	164
		1	1	1L	Phenylhydrazine	165
		1	1	1L	Phosphoric Acid	166
		1	1	500g	Phthalic Anhydride	167
		2	2	500g	Potassium Chlorate	168
		2	2	500g	Potassium Chromate	169
		1	2	100g	Potassium Cyanide	170
		4	4	500g	Potassium Hydroxide	171
		4	4	500g	Potassium Iodate	172
		4	4	500g	Potassium Iodide	173
		1	1	1Kg	Potassium Permanganate	174

		1	1	500g	Potassium Persulfate	175
		2	2	100g	P-Toluidine	176
		2	2	100g	Ribulose	177
		2	3	100g	Salicylamide	178
		1	1	500g	Salicylic Acid	179
		2	2	1L	Schiff Reagent	180
		2	2	100g	Semicarbazide Hydrochloride	181
		4	3	100g	Sodium Hypochlorite	182
		1	1	500g	Sodium Benzoate	183
		1	1	500g	Sodium Bisulphate	184
		1	1	500g	Sodium Carbonate.	185
		3	3	500g	Sodium Chloride	186
		4	4	1Kg	Sodium Citrate	187
		1	1	250g	Sodium Diphenylamine Sulfonate	188
		4	4	1Kg	Sodium Hydroxide	189
		1	1	500g	Sodium Lauryl Sulfate	190
		2	2	1Kg	Sodium Oxalate	191
		2	2	500g	Sodium Phthalate	192
		2	2	500g	Sodium Potassium Citrate	193
		2	2	1Kg	Sodium Sulphate	194
		2	2	1Kg	Sodium Sulphite	195
		1	1	500g	Sorbitol	196
		2	2	500g	Succinic Acid	197
		1	1	500g	Sulfanilamide	198
		1	1	250g	Sulfonyl Chloride	199
		2	2	100g	Sulphanilic Acid	200
		1	1	500g	Thiourea	201
		2	2	100g	Tryptophan	202
		2	2	100g	Tyrosine	203
		3	3	500g	Urea	204
		2	2	100g	Valine	205

		2	2	100g	Vitamin C	206
		2	2	100g	Vitamin D	207
		2	2	100g	Vitamin E	208
		4	4	500g	Zinc Oxide	209
		10	10	1L	Ethanol	210
		10	10	1L	Methanol	211

ثانياً: الكيتمسات والانزيمات البيولوجية

م	Kit	الوحدة	الكمية		سعر الوحدة	السعر الاجمالي
			قسم الطلاب	قسم الطالبات		
1	Kits for DNA isolation	Kit	2 (100 samples)	2 (100 samples)		
2	Kits for RNA isolation	Kit	2 (100 samples)	2 (100 samples)		
3	Primers (different groups)	Package	1000 base pair	1000 base pair		
4	dNTPs Mix	Tube (2mh)	10	10		
5	RNase enzyme	Package	500 units	500 units		
6	Taq polymerase enzyme	Package	1000 units	1000 units		
7	RT-enzyme	Package	10,000 units	10,000 units		
8	Lipase enzyme	100 gm	1	1		
9	Protein marker (low molecular weights)	Package	1	2		
10	Protein marker (Broad molecular weights)	Package	1	2		
11	Protein marker (high molecular weights)	Package	1	2		
12	DNA markers 1 Kb DNA ladder (250-12000bp)	Package	1	2		
13	DNA markers 100bp DNA ladder(100-1500bp)	Package	1	2		
14	Anti-A for blood grouping	Package	1	2		
15	Anti-B for blood grouping	Package	1	2		
16	Anti- D for blood grouping	Package	1	2		

		2	2	Kit	ASOT (Anti-streptolysin-O- titre)	17
		2	4	Kit	Rheumatoid factor (RF)	18
		2	4	Kit	C-reactive protein (CRP)	19
		2	4	Kit	AST kit—liver function	20
		2	4	Kit	ALT kit – liver function	21
		2	4	Kit	Albumin	22
		2	4	Kit	Total protein	23
		2	4	Kit	Bilirubin	24
		2	4	Kit	Uric acid	25
		2	4	Kit	Total lipid	26
		2	4	Kit	Triglycerides	27
		2	4	Kit	Hemoglobin	28
		2	4	Kit	Antibodies for Pregnancy test	29
		2	4	Kit	Cholesterol	30
		2	4	Kit	HDL (high density lipid)	31
		1	1	50 g	Diastase enzyme	32
		1	1	50 g	Infertase enzyme	33
		1	1	50 g	Lipase enzyme	34
		1	1	50 g	Protease enzyme	35
		2	4	Kit	Glucose	36
		2	4	Kit	Alkaline phosphatase	37

ثالثاً: الأدوات الزجاجية والبلاستيكية

أ- الزجاجيات						
السعر الإجمالي	سعر الوحدة	الكمية		الوحدة	اسم الصنف المطلوب	
		قسم الطالبات	قسم الطلاب			
		1000	1000	tube	Centrifuge tubes –10 ml	1
		100	200	Funnel	Glass funnel 100 mm	2
		2000	2000	tube	Test tubes 15 ml (pyrex)	3
		5	5	كرتون	Petri dish with cover 100 mm(pyrex)	4
		100	200	Package	Glass slides	5
		50	100	bottle	Reagent bottles500 ml (pyrex)	6
		50	100	bottle	Reagent bottles 200 ml (pyrex)	7
		50	100	bottle	Reagent bottles 1L (pyrex)	8
		10	20	Package	Slide cover (glass)	9
ب- البلاستيكيات						
		250	500	Coat	Lab coat (single use)	1
		250	500	واقى قدم	Shoe protection	2
		150	300	Package	Plastic gloves M size	3
		150	300	Package	Plastic gloves M size	4
		5	10	Package	Plastic cuvettes	5
		2	5	Roll	Parafilm (paraffin)	6
		25	50	نظارة	Eye goggle (UV protection)	7
		10	20	Bag	Falcon tubes 50 ml	8
		5	10	Bag	Falcon tubes 15 ml	9

		250	500	Tube	Blood collecting tubes (heparinized)	10
		250	500	Tube	Blood collecting tubes (non- heparinized)	11
		50	100	plate	96-well plates	12
		50	100	plate	48-well plates	13
		50	100	plate	24 well plates	14
		50	100	plate	6-well plates	15
		1	2	Bag	Pasteur pipettes - plastic	16
		1	2	Bag	Fungal isolating needle	17
		1	2	Bag	Darham tubes	18
		10	20	Bag	Eppendorf tubes 1.5 ml	19
		10	20	Bag	Eppendorf tubes 1.0 ml	20
		10	20	Bag	Eppendorf tubes 0.5 ml	21
		10	20	Bag	Eppendorf tubes 0.2 ml	22
		50	100	dish	Dissecting dish (metal filed with wax)	23
ج- الأدوات						
		50	100	Package	Dissecting tools	1
		5	10	شكاكة	Automatic lancet	2
		25	50	Package	Filter paper (big size)	3
		25	50	Package	Filter paper (small size)	4
		10	20	هاون	Mortar (7cm)هاون خزفي	5

رابعاً: الشرائح الطلابية والعينات المحفوظة

(أ) - الشرائح						
السعر الإجمالي	سعر الوحدة	الكمية		الوحدة	اسم الصنف المطلوب	
		قسم الطلّابات	قسم الطلاب			
		25	50	Slide	V.S in amphioxus skin	1
		25	50	Slide	V.S in petromyzon skin	2
		25	50	Slide	VS in cartilagenous fish skin	3
		25	50	Slide	VS in bonny fish skin	4
		25	50	Slide	VS in amphibian skin	5
		25	50	Slide	VS in reptiles skin	6
		25	50	Slide	VS in bird skin	7
		25	50	Slide	VS in mammalian skin	8
		25	50	Slide	T. S. in Aves testis	9
		25	50	Slide	T. S. in Aves ovary	10
		25	50	Slide	W.M. Frog sperm	11
		25	50	Slide	W.M. Human sperm	12
		10	10	Slide	W.M. Amphioxus fertilized ovum	13
		10	10	Slide	W.M. Amphioxus unfertilized ovum	14
		10	10	Slide	W.M. Amphioxus first cleavage stage	15
		10	10	Slide	W.M. Amphioxus second cleavage stage	16
		10	10	Slide	W.M. Amphioxus third cleavage stage	17
		10	10	Slide	W.M. Amphioxus fourth cleavage stage	18
		10	10	Slide	W.M. Amphioxus blastula	19
		10	10	Slide	W.M. Amphioxus gastrula	20
		10	10	Slide	W.M. Amphioxus neural plate	21

					stage	
		10	10	Slide	W.M. Amphioxus myotomes stage	22
		10	10	Slide	W.M. Frog fertilized ovum	23
		10	10	Slide	W.M. Frog unfertilized ovum	24
		10	10	Slide	W.M. Frog first cleavage stage	25
		10	10	Slide	W.M. Frog second cleavage stage	26
		10	10	Slide	W.M. Frog third cleavage stage	27
		10	10	Slide	W.M. Frog fourth cleavage stage	28
		10	10	Slide	W.M. Frog third cleavage stage	29
		10	10	Slide	W.M. Frog blastulae	30
		25	50	Slide	W.M. Frog neural plate stage	31
		25	50	Slide	W.M. Frog neural fold stage	32
		25	50	Slide	W.M. Frog embryo 3 mm	33
		25	50	Slide	T. S. in frog nasal plate embryo 3 mm	34
		25	50	Slide	T. S. in frog eye embryo 3 mm	35
		25	50	Slide	T. S. in frog auditory vesicle and heart embryo 3 mm	36
		25	50	Slide	T. S. in frog liver embryo 3 mm	37
		25	50	Slide	W.M. Frog embryo 7 mm	38
		25	50	Slide	W.M. Frog embryo 10 mm	39
		10	10	Slide	W.M. Chicken fertilized ovum	40
		10	10	Slide	W.M. Chicken unfertilized ovum	41
		10	10	Slide	W.M. Chicken first cleavage	42

					stage	
		10	10	Slide	W.M. Chicken second cleavage stage	43
		10	10	Slide	W.M. Chicken third cleavage stage	44
		10	10	Slide	W.M. Chicken fourth cleavage stage	45
		10	10	Slide	W.M. Chicken blastula	46
		25	50	Slide	W.M. Chicken embryo 13 hour	47
		25	50	Slide	W.M. Chicken embryo 18 hour	48
		25	50	Slide	W.M. Chicken embryo 21 hour	49
		25	50	Slide	W.M. Chicken embryo 24 hour	50
		25	50	Slide	W.M. Chicken embryo 33 hour	51
		25	50	Slide	W.M. Chicken embryo 48 hour	52
		25	50	Slide	W.M. Chicken embryo 72 hour	53
		25	50	Slide	W.M. Chicken embryo 96 hour	54
		25	50	Slide	W.M. Cimex lectularius	55
		25	50	Slide	W.M. Pediculus humanus corporis	56
		25	50	Slide	W.M. Pediculus humanus capitis	57
		5	10	Slide	W.M. Menacanthus stramineus	58
		5	10	Slide	W.M. Columbicola columbae	59
		25	50	Slide	W.M. Culex pipiens	60
		25	50	Slide	W.M. Anopheles sp.	61

		25	50	Slide	W.M. Pulexirritans	62
		25	50	Slide	W.M. Ctenocephalidescanis	63
		25	50	Slide	W.M. Xynopsyllacheopis	64
		25	50	Slide	Ctenocephalidesfelis	65
		25	50	Slide	W.M. Hard Ticks	66
		25	50	Slide	W.M.Argaspersicus	67
		25	50	Slide	W.M. Cyclops sp	68
		25	50	Slide	W.M.Amoeba	69
		25	50	Slide	W.MTrophozoite stage of Entamoebahistolytica	70
		25	50	Slide	W.M.Cyst stage of Entamoebahistolytica	71
		25	50	Slide	W.MTrophozoite stage of Entamoeba coli	72
		25	50	Slide	W.M.Promastigote of Trypanosoma	73
		25	50	Slide	W.M.Promastigote of Lishmania	74
		25	50	Slide	Trophozoite stage of Entamoebahistolytica	75
		25	50	Slide	W.M.Trichomonasvaginalis	76
		25	50	Slide	W.M.Trophozoite stage of Blantidiumcloi	77
		25	50	Slide	W.M.Taeniasaginata	78
		25	50	Slide	Scolex of Taeniasaginata	79
		25	50	Slide	W.M. Onchospheres	80
		25	50	Slide	W.M. Eggs of SchistosomaHaematobium	81
		25	50	Slide	W.M. Cercaria of Schistosoma	82
		25	50	Slide	W.M. Meracidium of Schistosoma	83

		25	50	Slide	W.M. Cercaria of <u>Fasciola hepatica</u>	84
		25	50	Slide	W.M. Heterophyes heterophyes	85
		25	50	Slide	W.M. Eggs of Fasciola hepatica	86
		25	50	Slide	W.M. Eggs of <u>Ascaris lumbricoides</u>	87
		25	50	Slide	W.M. Eggs of Ancylostomaduodenale	88
		25	50	Slide	T.S. in Ommatidium of compound eye	89
		25	50	Slide	Cockroaches Chewing mouth-parts	90
		25	50	Slide	W.M. Honey bee Biting and Lapping mouth-parts	91
		25	50	Slide	W.M. house fly mouth-parts	92
		25	50	Slide	W.M. Sucking mouth -parts	93
		25	50	Slide	W.M. Piercing and sucking mouth-parts	94
		25	50	Slide	W.M. Sand fly Phlebotomus papatasi	95
		25	50	Slide	W.M. Glossina sp.	96
		25	50	Slide	شرائح الحشرات الكاملة - الذباب الأزرق	97
		25	50	Slide	W.M. Tachina larvarum	98
		10	20	Slide	W.M. Obtect pupa	99
		10	20	Slide	W.M. Exarate pupa	100
		10	20	Slide	W.M. Coarctate pupa	101
		10	20	Slide	W.M. Campodeiform larva	102
		10	20	Slide	W.M. Scarabaeiform larva	103
		10	20	Slide	Vermiform larva	104

		10	20	Slide	Eruciform larva	105
		25	50	Slide	Setaceous antenna	106
		25	50	Slide	Filiform antenna	107
		25	50	Slide	Moniliform antenna	108
		25	50	Slide	Serrate antenna	109
		25	50	Slide	antenna Clavate	110
		25	50	Slide	antennaCapitate	111
		25	50	Slide	Lamellate antenna	112
		25	50	Slide	Geniculate antenna	113
		25	50	Slide	Bipectinate antenna	114
		25	50	Slide	AntennaPlumose	115
		25	50	Slide	AntennaPilose	116
		25	50	Slide	antennaStylate	117
		25	50	Slide	AntennaAristate	118
		25	50	Slide	Unipectinate antenna	119
		25	50	Slide	Running leg	120
		25	50	Slide	Jumping leg	121
		25	50	Slide	Swimming leg	122
		25	50	Slide	Collecting leg	123
		25	50	Slide	Clinging leg	124
		25	50	Slide	Walking on smooth & steep surfaces	125
		25	50	Slide	Seizing prey leg	126
		25	50	Slide	Burrowing leg	127
		25	50	Slide	جناح جلدي (في الصرصور) Leathery	128
		25	50	Slide	الأجنحة في الحشرات Elytra	129
		25	50	Slide	الأجنحة في الحشرات Scaly	130

		25	50	Slide	Halter الأجنحة في الحشرات	131
		25	50	Slide	Membranous الأجنحة في الحشرات	132
		25	50	Slide	Hairy الأجنحة في الحشرات	133
		25	50	Slide	Hamuli- Furcula- Claspers - Anal Cerci - Ovipositor- Sting	134
		25	50	Slide	Life cycle of locust	135
		25	50	Slide	Life cycle of silk worm moth	136
		10	20	Slide	W.M. of <i>Cosmarium</i> (Algae)	137
		10	20	Slide	W.M. of <i>Oscillatoria</i> (Algae)	138
		10	20	Slide	W.M. of <i>Gleocapsa</i> (Algae)	139
		10	20	Slide	W.M. of <i>Merismopedia</i> (Algae)	140
		10	20	Slide	W.M. of <i>Lyngbya</i> (Algae)	141
		10	20	Slide	W.M. of <i>Pediasium</i> (Algae)	142
		10	20	Slide	W.M. of <i>Vaucheria</i> (Algae)	143
		10	20	Slide	W.M. of <i>Gonium</i> (Algae)	144
		10	20	Slide	W.M. of <i>Pandorina</i> (Algae)	145
		10	20	Slide	W.M. of <i>Stigeoclonium</i> (Algae)	146
		10	20	Slide	W.M. of <i>Macrocystis</i> (Algae)	147
		10	20	Slide	W.M. of <i>Scenedesmus</i> (Algae)	148
		10	20	Slide	W.M. of <i>Spirulina</i> (Algae)	149
		10	20	Slide	W.M. of <i>Mougetia</i> (Algae)	150
		10	20	Slide	T.S. Young dicot root	151
		10	20	Slide	T.S of Young monocot root	152
		10	20	Slide	T.S. of Young dicot stem	153
		10	20	Slide	T.S. of Young monocot stem (Zea mays)	154
		10	20	Slide	T.S. of Dicot leaf	155

		10	20	Slide	T.S. of Monocot leaf (Zeamays)	156
		10	10	Slide	Annular Xylem lignifications	157
		10	10	Slide	Pitted Xylem lignification	158
		10	10	Slide	scalariform Xylem lignification	159
		10	10	Slide	spiral Xylem lignification	160
		10	10	Slide	Reticulum Xylem lignification	161
		10	10	Slide	Armed parenchyma	162
		10	10	Slide	T.S. in Elodea stem	163
		10	10	Slide	Bon shape stomata	164
		10	10	Slide	Sunken stomata	165
		10	10	Slide	Sunken stomata with hairs	166
		10	10	Slide	cystolith	167
		10	10	Slide	Raphids crystal	168
		10	10	Slide	T.S. in Petiole of Begonia	169
		10	10	Slide	Lacunar collenchyma	170
		10	10	Slide	Angular collenchyma	171
		10	10	Slide	Lamellar	172
		10	10	Slide	T.S. in Begonia Stem	173
		10	10	Slide	T.S. in Helianthus annus stem	174
		10	10	Slide	Glandular hairs	175
		10	10	Slide	Lysogenous glad	176
		10	10	Slide	Schyzogenous gland	177
		10	10	Slide	Rhizobium(W.M)	178
		10	10	Slide	Monococcus(W.M)	179
		10	10	Slide	Diplococci(W.M)	180
		10	10	Slide	Streptococci(W.M)	181
		10	10	Slide	Tetracocci(W.M)	182
		10	10	Slide	Sarcina(W.M)	183

		10	10	Slide	Staphylococci(W.M)	184
		10	10	Slide	Monbacillus(W.M)	185
		10	10	Slide	Diplobacilli(W.M)	186
		10	10	Slide	Streptobacilli(W.M)	187
		10	10	Slide	(W.M)Spirillum	188
				Slide	Vibrio(W.M)	189
		10	10	Slide	Spirochetes(W.M)	190
		10	10	Slide	Actinomycetes(W.M)	191
		25	50	Slide	W.M. Saprolegnia	192
		25	50	Slide	W.M. Achlya	193
		25	50	Slide	W.M. Teleutospores of Puccinia graminis	194
		25	50	Slide	W.M. Aecia and pycnia of rust	195
		25	50	Slide	V. S. in Calviceps purpurea	196
		25	50	Slide	W.M. in Albugo candida	197
		25	50	Slide	W.M. of Fusarium oxysporum	198
		25	50	Slide	V.S. in gills of Agaricus	199
		25	50	Slide	V.S. in Tirmanianivea	200
		25	50	Slide	Uredospores of Puccinia	201
		25	50	Slide	W.M. of Aspergillus	202
		25	50	Slide	W.M. of Penicillium	203
		10	10	Slide	W.M. of Rhizoctonia sp.	204
		10	10	Slide	W.M. of Arthrospira sp.	205
		10	10	Slide	W.M. of Phythium sp.	206
		10	10	Slide	W.M. of Stigonema sp (Algae)	207
		10	10	Slide	W.M. of Anabaena sp (Algae)	208
		10	10	Slide	W.M. of Rivularia sp (Algae)	209
		10	10	Slide	W.M. of Chlorella sp (Algae)	210

		10	10	Slide	W.M. of Alternaria sp.	211
		10	10	Slide	W.M. of Peronospora sp.	212
		10	10	Slide	W.M. of Phytophthora Parasitica	213
		10	10	Slide	W.M. of Hydrodictyonsp (Algae)	214
		10	10	Slide	W.M. of Zygnemaspp (Algae)	215
		10	10	Slide	W.M. of Cladophorasp (Algae)	216
		10	10	Slide	W.M. of Oedogoniumsp (Algae)	217
		10	10	Slide	W.M. of Ectocarpussp (WM) (Algae)	218
		10	10	Slide	W.M. of Sargassum sp (Algae)	219
		10	10	Slide	W.M. of Vaucheriasp (Algae)	220
		10	10	Slide	W.M. of Trichoderma sp.	221
		10	10	Slide	Sordariaspp	222
(ب) - العينات والعلب المحفوظة من الحشرات						
		10	20	Sample	W.M. Simuliumsp	1
		10	20	Sample	W.M. Muscadomestica	2
		10	20	Sample	W.M. Horsefly Tabanuspp	3
		10	20	Sample	W.M. Sarcophagacarnaria	4
		10	20	Sample	Shrimps	5
		10	20	Sample	Crap	6
		25	50	Sample	W.M. Honey bee workers	7
		25	50	Sample	Honey bee male	8
		25	50	Sample	Honey bee Queen	9
		10	20	Sample	Androctonus amoreuxi	10
		10	20	Sample	The Black Widow	11

		25	50	Package	W.M.Queen – Workers- Male	12
		25	50	Package	W.M.Silk worm moth	13
		25	50	Package	W.M.Loucst -	14
		25	50	Package	W.M.praying mantis -	15
		25	50	Package	W. M.Collembola .-	16
		25	50	Package	Periplaneta Americana-	17
		25	50	Package	-Blattaorientalis	18
		25	50	Package	Supellalongipalpa	19
		25	50	Package	Blatellagermanica	20
		25	50	Package	Crocothemiserythraea	21
		25	50	Package	Ischnurasenegalensis	22
		25	50	Package	Calliphora - Lucilia	23
		25	50	Package	Thysanoptera	24
		25	50	Package	Aphis sp	25
Note:N.B., Vertical section (V.S), Transverse section (T.S), and whole mount (M.N)						

خامسا: الأجهزة

سعر الوحدة	الكمية		الصنف	م
	قسم الطالبات	قسم الطلاب		
	1	2	PCR cyclor	1
	1	1	Plant growth chamber	2
	1 mini	1 mini	Vertical electrophoresis chambers for SDS PAGE,	3
	1 maxi	1 maxi	Vertical el ectrophoresis chambers for SDS PAGE,	4
	2 mini	2 mini	Horizontal Electrphoresis system	5
	2 maxi	2 maxi	Horizontal Electrphoresis system	6
	1	2	Power supply	7
	10	15	Potometer	8
	1	1	Biosafety cabinet	9
	15	20	GanongRespirometer	10
	1	2	Sonicator	11
	1	2	Elisa Reader	12
	1	--	Autoclave	13
	1	1	Rotary Evaporator Vacuum Pumps, IKA-HB-10 basic -for	14
	1	1	Gel documentation system	15
	1	1	Rotary Microtomeautomatic	16
	1	2	Rotary Microtomesemi- automatic	17
	3	4	Water Double Distiller	18

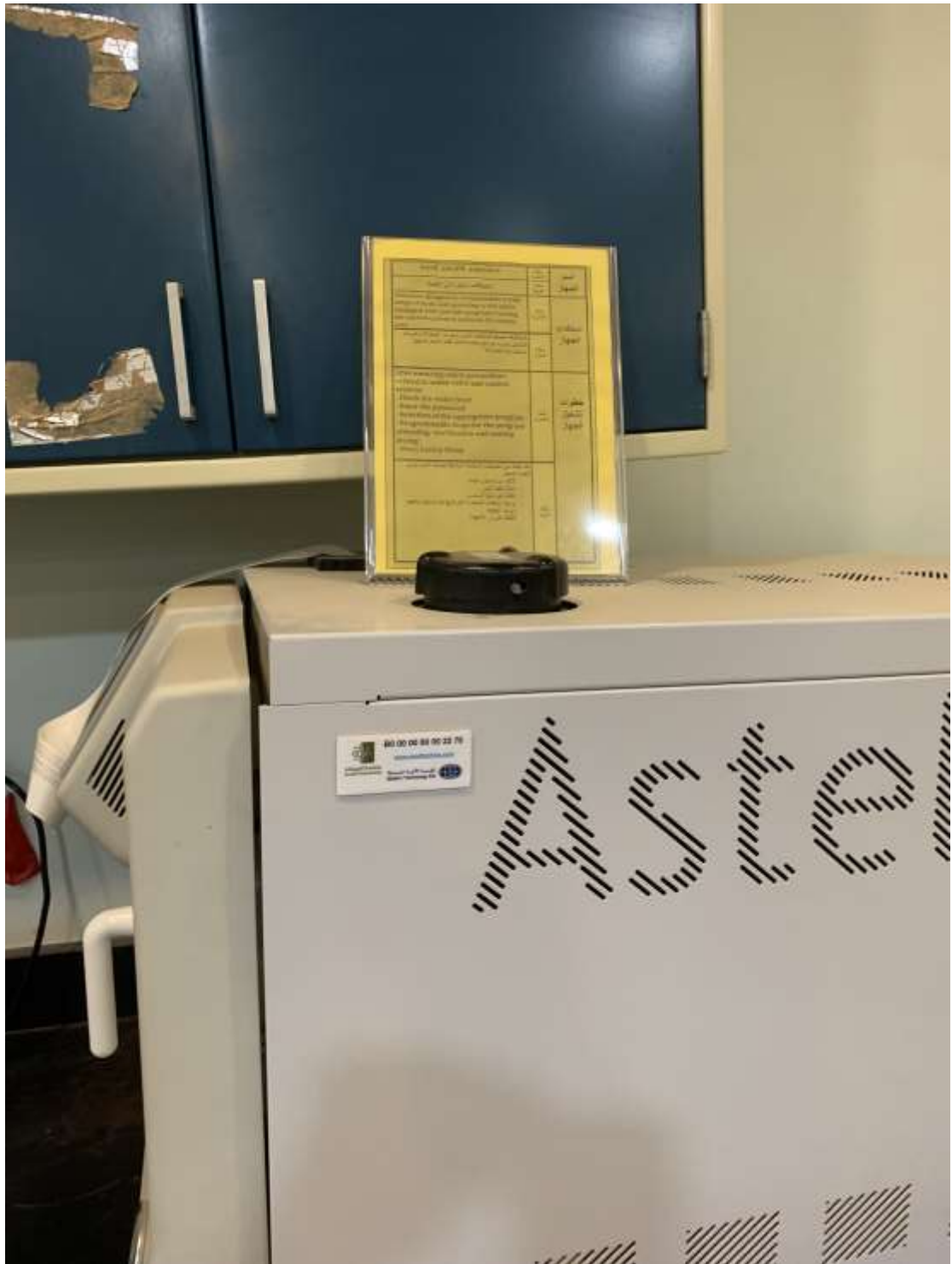


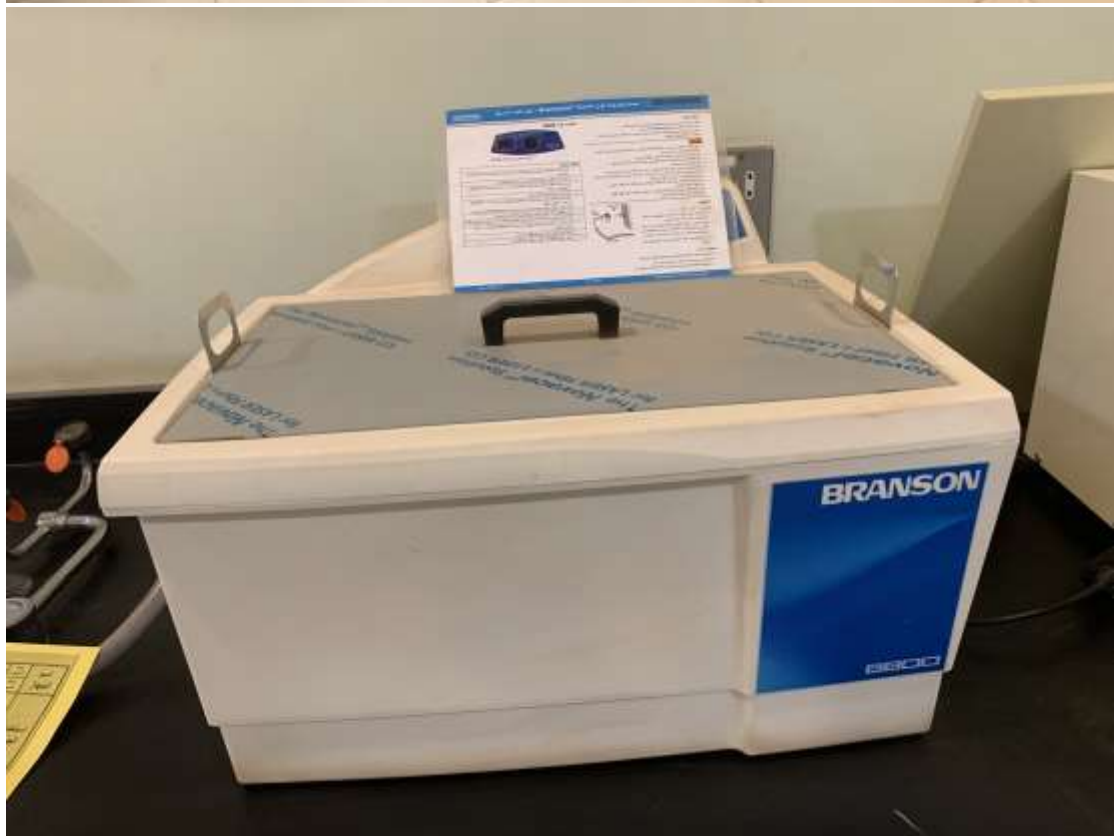




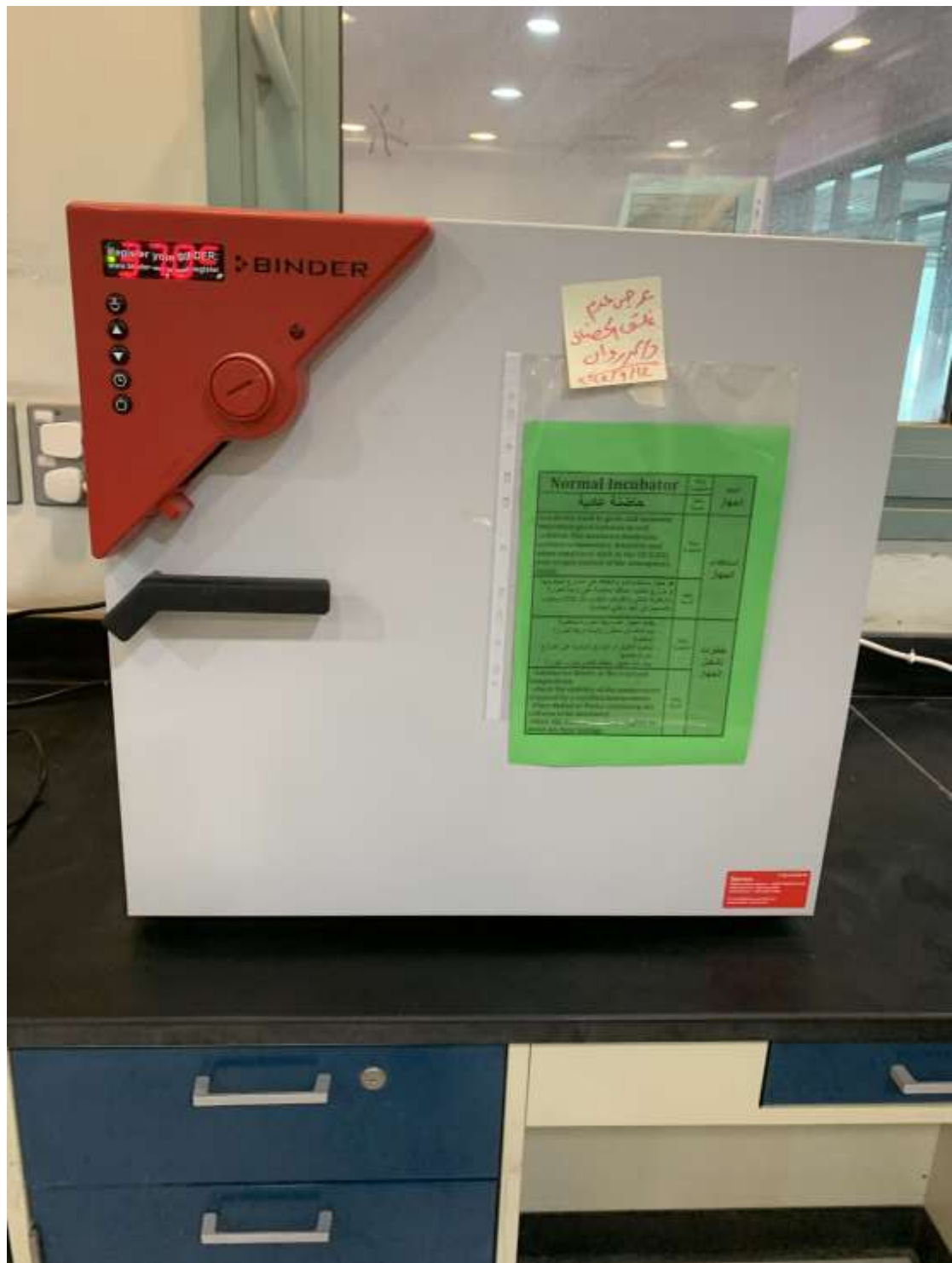
Microbiology Lab (G 97)



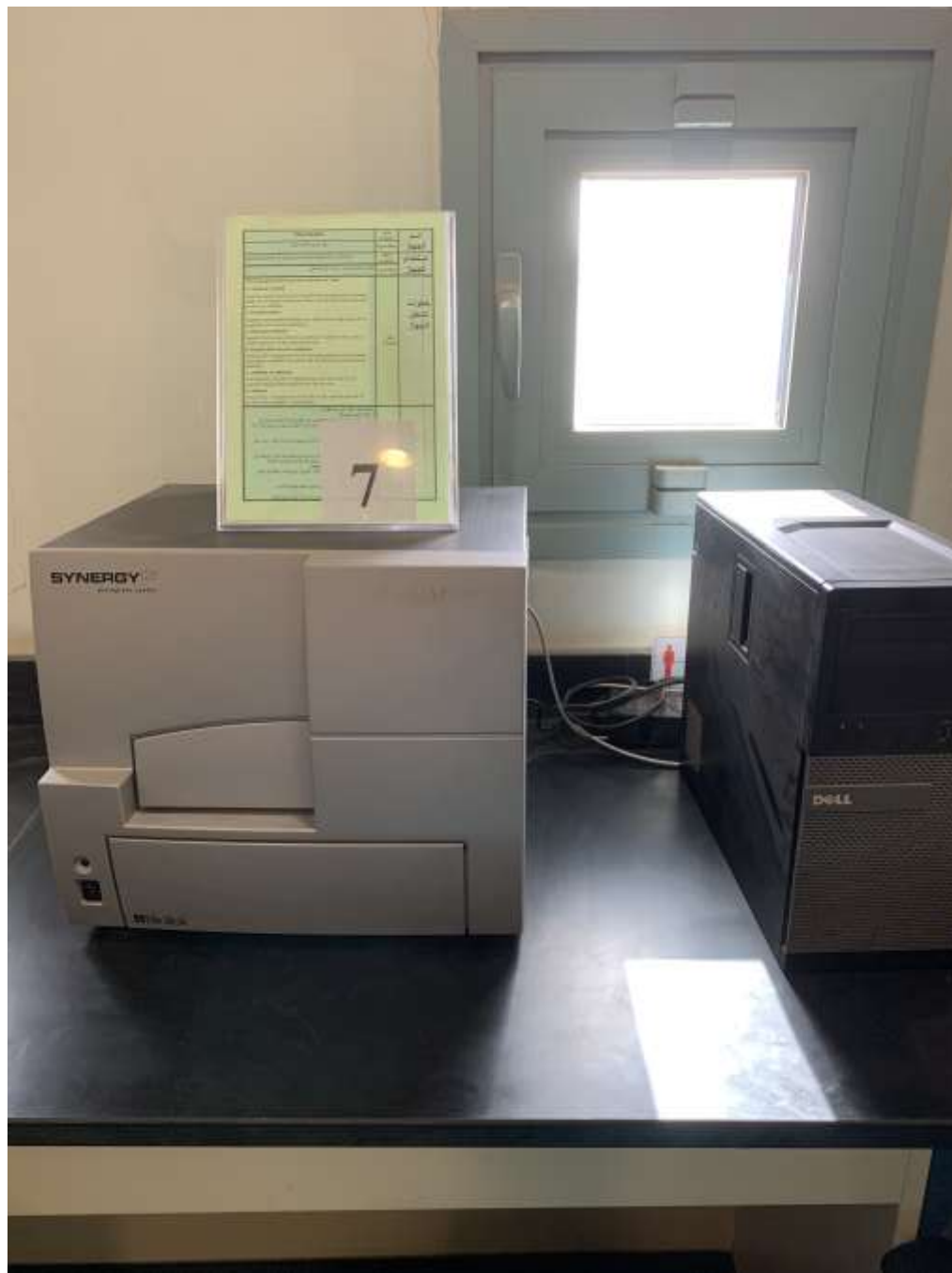








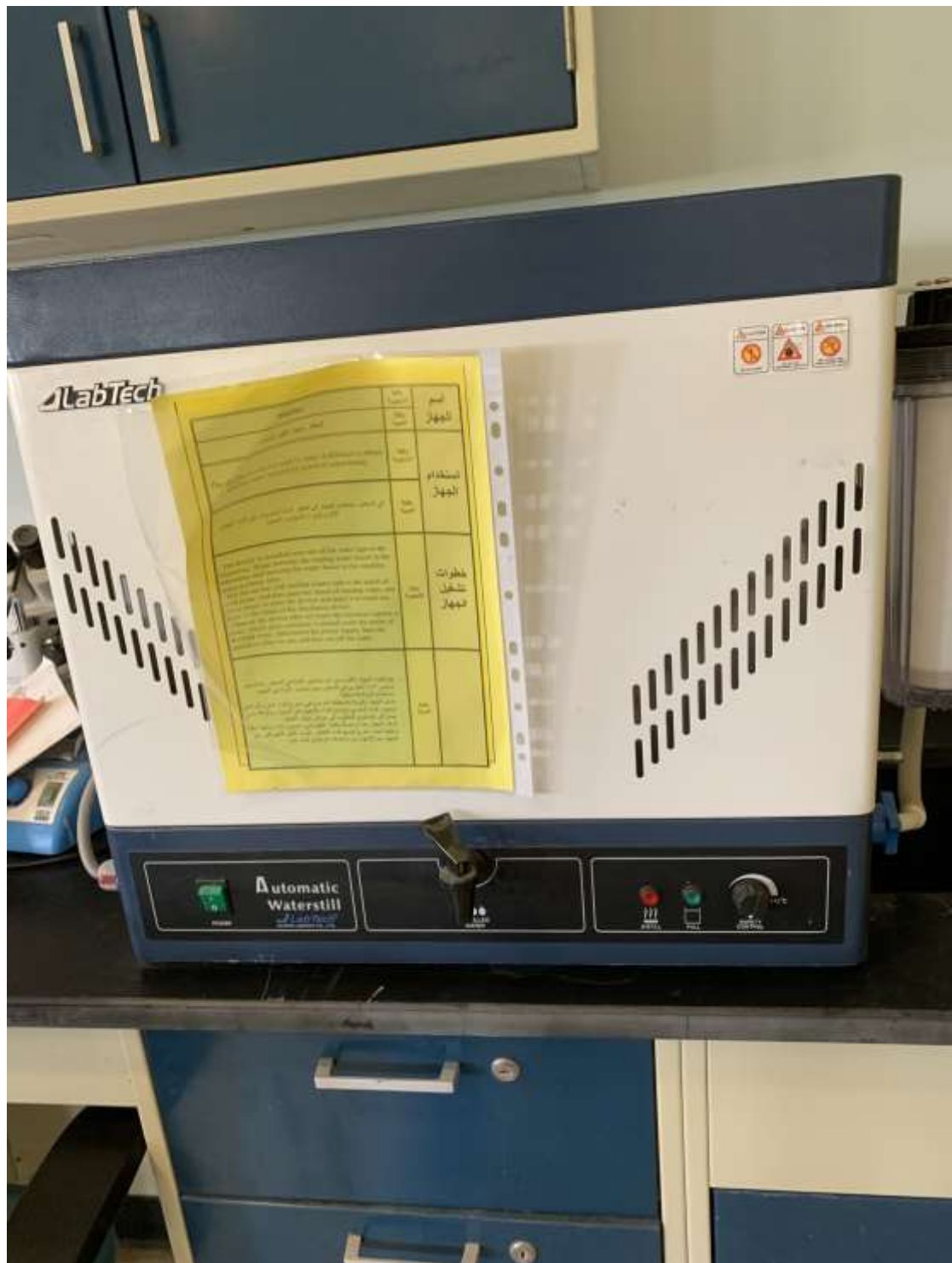




















الخطة الدراسية

ساعات الخطة : ١٣٤

نوع الخطة : رئيسي

الكلية : كلية العلوم

القسم : قسم الأحياء

الجنس : كليهما

الدرجة : البكالوريوس

الفصل : ٣٩١

الإصدار : ٣

التخصص : BIOL٣٠ الأحياء بسكاكا

المجموعة : إجبارية ١

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BIO ٣١٥	أنسجة حيوانية	٢			
BIO ٣٢٣	وظائف أعضاء نبات	٣			
BIO ٣٣٢	فيروسات وبكتيريا	٣			
BIO ٣٥٢	التحضيرات المجهرية	٢			
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BIO ٣١٧	علم الأجنة	٣			
BIO ٣٢٤	تصنيف النباتات الزهرية	٣			
BIO ٣٤٢	التلوث وحماية البيئة	٣			
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BIO ٤٣٤	علم الفطريات	٢			
BIO ٤٤٣	البيئة الصحراوية	٢			
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BIO ٤١٩	التشريح المقارن	٣			
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CIS ١٠١	مهارات الحاسب	٣			
EDU ١٠١	مهارات الحياة الجامعية	٢			
ENGL ١٠٣	اللغة الإنجليزية (١)	٣			
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MTH ١٠١	مقدمة في الرياضيات	٣			
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CHM ١٠١	كيمياء عامة (١)	٤			
ENGL ١٠٤	اللغة الإنجليزية (٢)	٣			
ISL ١٠٠	دراسات في السيرة النبوية	٢			
MTH ١٠٢	حساب التفاضل	٣			
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المستوى الثالث					
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ARB ١٠٢	التحرير الكتابي	٢			
BIO ٢١١	علم الحيوان العام	٣			
BIO ٢٢١	علم النبات العام	٣			
BIO ٢٣١	علم الأحياء الدقيقة	٣			
CHM ٢١٣	كيمياء عضوية	٣			
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BIO ٢٢٢	مؤفولوجي وتشريح نبات	٣			
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الخطة الدراسية

ساعات الخطة : ١٣٤

نوع الخطة : رئيسي

الكلية : كلية العلوم

القسم : قسم الأحياء

الجنس : كليهما

الدرجة : البكالوريوس

الفصل : ٣٩١

الإصدار : ٣

التخصص : BIOL٣٠ الأحياء بسكاكا

المجموعة : إختيارية ٥ (٤)

المستوى الثامن						
رمز المقرر	اسم المقرر	س	مع	مس	سج	المتطلب سنوي
BIO ٤٨١	سلوك الحيوان	٢				- BIO ٤٤٣ / س
BIO ٤٨٢	المعلومات الحيوية	٢				- BIO ٤٥٤ / س
BIO ٤٨٣	النباتات الاقتصادية في المملكة العربية السعودية	٢				- BIO ٣٢٤ / س
BIO ٤٨٤	مجتمعات نباتية	٢				- BIO ٣٢٤ / س
BIO ٤٨٥	فونا المملكة العربية السعودية	٢				- BIO ٤٤٣ / س
BIO ٤٨٦	بيئة ميكروبية	٢				- BIO ٣٣٢ / س
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المستوى الثالث						
رمز المقرر	اسم المقرر	س	مع	مس	سج	المتطلب سنوي
ISL ١٠٧	أخلاقيات المهنة	٢				-
ISL ١٠٨	قضايا معاصرة	٢				-
ISL ١٠٩	المرأة ودورها التنموي	٢				-
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المستوى الخامس						
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BUS ١٠١	ريادة الأعمال	٢				-
EDU ١٠٢	العمل التطوعي	٢				-
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المستوى السادس						
رمز المقرر	اسم المقرر	س	مع	مس	سج	المتطلب سنوي
BIO ٣٦١	وظائف أعضاء حيوان متقدم	٢				- BIO ٣١٤ / س
BIO ٣٦٢	الأشجونات	٢				- BIO ٢٢١ / س
BIO ٣٦٣	علم المناعة	٢				- BIO ٣١٤ / س
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المجموعة : إختيارية ٤ (٤)

المستوى السابع						
رمز المقرر	اسم المقرر	س	مع	مس	سج	المتطلب سنوي
BIO ٤٧١	مفصليات طبية واقتصادية	٢				- BIO ٣١٦ / س
BIO ٤٧٢	كيمياء الأنسجة	٢				- BIO ٣٤٢ / س
BIO ٤٧٣	زراعة الأنسجة النباتية	٢				- BIO ٣٢٣ / س
BIO ٤٧٤	فسيولوجيا الاجهاد	٢				- BIO ٣٢٣ / س
BIO ٤٧٥	امراض النبات	٢				- BIO ٣٣٢ / س
BIO ٤٧٦	تقنية حيوية	٢				- CHM ٣٤٢ / س
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المجموعة : إختيارية ٥ (٤)



PRACTICAL EXPERIMENTS HANDBOOK

BIOLOGY PROGRAM



2022/2023

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I- Compulsory Courses

LEVEL 1

	Course Name: Principles of Biology	Course Code: BIO 101	Level: 1
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Microscopes and types of cells (Prokaryotic- Eukaryotic- Animal cell- Plant cell).	- Microscopes. - Permanent prepared slides of bacteria, plant and animal cells.	-
2	Plant tissues (Parenchyma- Collenchyma- Xylem) and plant anatomy.	- Microscopes - Permanent prepared slides of parenchyma, collenchyma, sclerenchyma, xylem, monocot and dicot roots, monocot and dicot stems, monocot and dicot leaves.	-
3	Epithelial tissues.	- Microscopes - Permanent prepared slides of simple (squamous-cuboidal-columnar-pseudostratified) and stratified (squamous-transitional) epithelial tissues.	-
4	Connective tissues.	- Microscopes. - Permanent prepared slides of areolar connective tissue, hyaline cartilage, dense bone, blood of human and blood of toad.	-
5	Muscular tissues and nervous tissues.	- Microscopes. - Permanent prepared slides of smooth (unstriated), skeletal (striated) and cardiac muscles	-

		and T.S. in spinal cord of rabbit.	
6	Protozoa	- Microscopes. - Permanent prepared slides of <i>Amoeba</i> , <i>Euglena</i> , <i>Trypanosoma</i> and <i>Paramecium</i> .	-
7	Sponge and Coelenterata	- Microscopes. - Sponge samples, Permanent prepared slides of <i>Hydra</i> , <i>Obelia</i> polyp and medusa.	-
8	Platyhelminthes	- Microscopes. - Permanent prepared slides of <i>Schistosoma</i> male and female <i>Fasciola</i> .	-
9	Nematoda	- Microscopes. - Permanent prepared slides of T. S. in male and female <i>Ascaris</i> .	-
10	Annelida and Arthropoda	- Microscopes. - Permanent prepared slides and samples of Earth worm and Prawn, Crab, Spider, Scorpion and Cockroach samples.	-
11	Final Practical Exam	- Microscopes. - Slides and samples.	-

LEVEL 4

1	Course Name: General Zoology	Course Code: BIO 211	Level: 4
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Microscopes and examining	- Microscopes.	-

	plant and animal cells.	- Prepared slides of plant and animal cells.	
2	Examining epithelial tissues.	- Microscopes. - Prepared slides.	-
3	Examining connective tissues.	- Microscopes. - Prepared slides	-
4	Examining muscular and nervous tissues.	- Microscopes. - Prepared slides.	-
5	Examining protozoa	- Microscopes. - Prepared slides.	-
6	Porifera, Coelenterata	- Microscopes. - Sponge specimens. - Prepared slides.	-
7	Platyhelminthes (Trematoda-Cestoda) and Nematoda. Examining sample of <i>Fasciola</i> egg, infective stage (metacercaria). Examining sample of <i>Schistosoma</i> egg, cercaria. Examining samples of <i>Taenia</i> eggs. Examining sample of <i>Ascaris</i> eggs. Examining sample of <i>Anclystoma</i> eggs.	- Microscopes. - Prepared slides.	-
8	Annelida (Earth worm, Nereis and Hirudo).	- Microscopes. - Prepared slides and samples.	-
9	Arthropoda.	Prawn, Crab, Spider, Scorpion and Cockroach samples.	-
10	Mollusca, <i>Sepia</i> .	<i>Sepia</i> and starfish samples.	-

	Echinodermata, starfish.		
11	Final Practical Exam	- Microscopes. - Slides and samples.	-
2	Course Name: General Botany	Course Code: BIO 221	Level: 4
WEEKS	Experiments	Materials	
		Tools	Chemicals
1	Kingdom Monera and shape of bacteria and cyanobacteria.	- Microscopes. - Permanent prepared slides of bacteria, Nostoc, Oscillatoria.	-
2	Kingdom Fungi.	- Microscopes. - Permanent prepared slides of Rhizopus, Aspergillus, Yeast, Penicillium, Agaricus.	-
3	Kingdom of Protista.	- Microscopes. - Permanent prepared slides of Chlamydomonas, Spirogyra, Volvox, Fucus, Vaucheria, Diatoms.	-
4	Lichens and mycorrhizae.	- Microscopes. - Permanent prepared slides.	-
5	Archegoniates (Antheridium, Archegonium, Riccia Sporophyte, Marchantia and Funaria sporophytes-Cones of gymnosperms.	- Microscopes. - Permanent prepared slides. - Samples.	-
6	Flowers of angiosperms (morphology of the flower), inflorescences and fruits.	Samples.	-
7	Morphology of Roots / Morphology of Stems /	- Fresh specimens of different types of plant roots.	-

	Morphology of leaves.	- Fresh specimens of different types of plant stems – different buds types – specimens for stem adaptation. - Fresh specimens of different types of plant leaves including leaf venation, leaf margin, leaf apex, leaf blade – leaf base- shape of lamina- types of leaves- leaf stipules- segmentation of lamina- Leaf heterophylly- leaf adaptation.	
8	Plant tissues.	- Microscopes. - Slides of epidermal tissues – stomata- hairs-fixed slides of different forms of parenchyma- different forms of collenchyma- slides of fibers and sclerides with different forms – slides showing different types of vascular bundles (open collateral- closed vascular bundles – amphiphasal and radial vascular bundles.	-
9	Anatomy of roots /Anatomy of stems/ Anatomy of leaves.	- Microscopes. - Slide of monocot and dicot plants (different organs) (roots – stems and leaves) (old and young plants - slides + Covers + Dissecting tools.	-
10	Final Practical Exam.	- Microscopes. - Slides and samples.	-

LEVEL 5

1	Course Name: Microbiology	Course Code: Bio 231	Level: 5
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Weeks	Experiments	Materials	
		Tools	Chemicals
1	- Recognition Instruments and materials used in Lab. of Microbiology - Biosafety in Lab. of Microbiology	Incubators- Autoclave- Oven- Refrigerator- Lyophilizer-Shaker- Balance- Water bath- pH meter - Thermometers- Water Distillator- Spectrophotometer- Centrifuges -Compound Microscopes- Oil Immersion Lens- Eyepiece micrometer- Isolation Cabinet- Colonies counter- Bunsen burner - Automatic pipettes- Conical Flasks- Beakers-Volumetric Flasks- Measuring Cylinders - Burettes- Bel jars- Desiccators- Test tubes-Pipettes- Petri dishes- Slides- Glass cover- Cavity slides- Bent glass rod- Inoculation needles-Inoculation loop needles- Cork borers - Forceps— Scissors Filter paper discs- Bacterial filters.	Beef extract - Peptone Yeast extract- Agar agar Gelatin- Indian ink – Silica - Methylene blue-Nigrosin Crystal violet-Ethyl alcohol Safranin—Malachite green-Disinfectants- Cedar oil- Dehydrated and prepared media- Iodine- Vaseline- Antibiotics API 20E
2	- Sterilization (physical - chemical - mechanical) methods - Size, forms and aggregation of bacteria, fungi and algae.	Autoclave - Oven - Bunsenburner- Bacterial filters – Microwave- Ocular micrometer - Stage micrometer - Compound Microscope - Oil Immersion Lens- Prepared microscope slides whole mounts – glass slides – glass cover slides.	Cedar oil – Disinfectants (Dettol & Ethanol 70% etc.
3	Preparation of media for cultivation and isolation of bacteria.	Conical Flasks Balance- Autoclave. Isolation Cabinet.	Peptone -Beef extract - Yeast extract - Agar agar Dehydrated and prepared media

4	Cultivation and isolation of bacteria from different sources.	Conical Flasks- Balance- Autoclave - Isolation Cabinet - Petri dishes- Bunsen burner - Automatic pipettes - Pipettes- Test tubes- Colonies counter.	Peptone -Beef extract - Yeast extract - Agar agar Dehydrated and prepared media
5	Detection of bacterial growth.	- Microscopes, slides and Petri dishes.	-
6	Morphological characteristics of bacterial colonies.	- Microscopes, slides and Petri dishes.	-
7	Staining of bacteria.	Compound Microscopes - Oil Immersion Lens - Eyepiece micrometer – Slides - Glass cover.	Methylene blue Indian ink Nigrosin - Crystal violet- Safranin- Iodine- Malachite green- Ethyl alcohol.
8	Examination of bacterial motility.	Glass cover - Cavity slides- Compound Microscopes- Oil Immersion Lens.	Vaseline
9	Preparation of cultural media for growth and fixation of algae Cultivation and isolation of algae from different sources % & Identification of main groups of algae + examination of fixed slides of main algal genera.	* Autoclave * Stirrer hot plate * Five 250 ml conical flasks * Plastic Rap * Aluminum foil * Medical cotton * Isolation cabinet * Illumination growth chamber * Twenty-five plastic Petri dish * Microscopes – glass slides – glass cover slides – fixed slides of main algal genera.	20 grams agar-agar Bold medium GB11 medium Dettol for sterilization Ethanol sterilization Nutrient medium prepared from the previous work Dettol for sterilization Ethanol 70%
10	Preparation of media for cultivation and isolation of	Conical Flasks - Balance – Autoclave - Isolation Cabinet –	Potatoes – glucose – agar – PDA medium –

	fungi. Cultivation and isolation of fungi from different sources. Identification of main groups of fungi Examination of fixed slides of main fungal genera	Microwave – Hot plate – Aluminum foil – plastic bags – rubber bands – Incubator – Bunsen burner - Automatic pipettes- Pipettes- Test tubes. Microscopes – glass slides – glass cover slides. Microscopes – fixed slides of main fungal genera (available).	Czapek's medium – Sabouraud medium- Ethanol 70%- Dettol.
11	Final Practical Exam	- Microscopes - Fixed slides	-
2	Course Name: Cell Biology	Course Code: BIO 251	Level: 5
Weeks	Experiment	Materials	
		Tools	Chemicals
1	Microscopes.	Compound and dissecting microscopes.	-
2	Identify the different types of cells (prokaryotic cell - animal cell - and plant cell) and the differences between them.	Slides and covers Slides of samples	Ethyl Alcohol Formalin
3	Study the structure and function of the cell wall and cell membrane of cell.	Electron Microscope photos of cell membrane.	-
4	Mitochondria of cell Examination.	Electron Microscope photos of mitochondria.	-
5	Examination of the smooth and rough Endoplasmic Reticulum of cell. Study the structure and function of Golgi apparatus.	Electron Microscope photos of Golgi apparatus, RER& SER.	-
6	Identification of the Chloroplast of animal cell Identification of the	Electron Microscope photos of plant cell and animal cell.	-

	Centromere of Animal cell.		
7	Cilia and Flagella of <i>Paramecium</i> and <i>Euglena</i> Identifications. Identification of Lysosomes of animal cell.	Electron Microscope photos of <i>Paramecium</i> and <i>Euglena</i> . Electron Microscope photos of animal cell.	-
8	Examination of the Nucleus of cell.	Electron Microscope photos of nucleus.	-
9	Mitosis division.	Microscope photos of mitosis division.	-
10	Meiosis division.	Microscope photos of meiosis division.	-
11	Final Practical Exam	- Microscopes - Fixed slides - Photos of the cell organelles	-

LEVEL 6

1	Course Name: Chordata	Course Code: BIO 212	Level: 6
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Subphylum Urochordata	- Slides for Whole animal Ascidia - PowerPoint slides for Ascidia	-
2	General introduction about chordates and subphylum Hemichordata	PowerPoint slides for Balanoglossus: Whole animal: L. S. for Balanoglossus	-
3	Subphylum Cephalochordata	- Light Microscope - Slides for <i>Amphioxus</i> (Head, Trunk, Tail cross sections).	-
4	Class Cyclostomata	- PowerPoint slide for the whole animal Petromyzon. - Microscopes. - Fixed slides.	-

5	Class Chondrichthyes	- Microscopes - Fixed slides of Dogfish body sections (Head, Trunk, Tail cross sections). - Dogfish dissection - Dissection tools	-
6	Class Osteichthyes	- Microscopes. - Fixed Slides of Nile Tilapia body sections (Head, Trunk, Tail cross sections). - Nile Tilapia dissection - Dissection tools	-
7	Class Amphibia	Amphibians models	
8	Class Reptilia	Reptilian models	-
9	Class Aves	- Pigeon dissection - Dissection tools	-
10	Class Mammalia	- Rabbit dissection - Dissection tools	-
11	Final Practical Exam	- Microscopes - Fixed slides - Samples	-

2	Course Name: Plant Morphology and Anatomy	Course Code: BIO 222	Level: 6
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Types of seeds and seeds germination.	- Growth chamber for seed germination. - Seeds (<i>Vicia faba</i> - <i>Triticum aestivum</i> - <i>Phaseolus vulgaris</i> - <i>Zea</i>	Distilled water

		<i>mays</i>). -Petri dishes- Filter papers - Cotton.	
2	Types of roots.	-Samples of some plants collected from the garden. -Samples from vegetable and fruits (Potato, carrot, Raphanus, Turnip- Beta vulgaris- onion- Colcasia). - Roots of some Leguminosae plants.	-
3	Morphology of the stem, function and modification.	-Samples of some plants collected from the garden.	
4	Types of leaves- leaf composition- leaf forms- leaf venation- leaf stipules- leaf base- leaf margin- leaf apex, buds and its shapes	-Samples of some plants collected from the garden. -Samples from vegetable and fruits.	-
5	- Morphological types of flowers, inflorescence and fruits. - Meristematic tissues	-Samples of some plants collected from the garden. -Samples from vegetable and fruits. - Microscopes - Fixed slide for meristematic cells (root apex). - Onion - Slides - slide cover.	-
6	Plant cell and Permanent tissues (ground tissues and vascular tissues)	- Microscopes - Slides and slides covers - onion - Fixed slides for epidermal tissues - Fixed slides showing hairs - Fixed slides of stomata - Fixed slides for starch grains, cystolith, chloroplasts - Fixed slides for parenchyma, collenchyma (lacunar, lamellar and angular collenchyma)	Safranin stain

		- Fibers and sclerides - Xylem vessels (scalariform-reticulate- pitted – spiral phloem).	
7	- Types of vascular bundles - Anatomy of young monocot and dicot roots. - Secondary growth in roots.	-Microscopes - Fixed slides for open collateral bundles, closed collateral bundles- radial bundles – amphiphasal bundles). - T.S in <i>Zea</i> stem, <i>Helianthus annuus</i> stem, <i>Luffa</i> stem, <i>Vicia faba</i> root. - Microscopes - T.S. in young monocot root (<i>Zea mays</i> roots). - T.S. in young Dicot root (<i>Vicia faba</i> roots) - Fixed slides T.S. in old dicot root	-
8	- Anatomy of young monocot stems. - Anatomy of young dicot stems.	- Microscopes. - Fixed slides. - T.S. in young monocot Stem (T.S. in <i>Zea mays</i> stem). - T.S. in young Dicot stem.	-
9	Secondary growth in stems.	-Microscopes. - Fixed slides. - T.S. in old Dicot stem. - Xylem rings	-
10	- Anatomy of young monocot leaves. - Anatomy of young dicot leaves. - Effect of environmental conditions on plant morphology and anatomy.	- Microscopes. - Fixed slides. - T.S. in young monocot leaves (T.S. in <i>Zea mays</i> or Wheat leaf). - T.S. in young Dicot leaf. Fixes slides for: T.S. in <i>Elodea</i> stems. V.S. in <i>Elodea</i> leaf.	-

		T.S. in Nerium oleander leaf. T.S. in Nerium oleander leaf. T.S. in Ammophiila arenaria leaf.	
11	Final Practical Exam.	- Microscopes. - Fixed slides. - Samples.	-
3	Course Name: Fundamental Ecology	Course Code: BIO 241	Level: 6
Weeks	Experiment	Material	
		Tools	Chemicals
1	Vegetation analysis (I).	PowerPoint slides on data show.	-
2	Vegetation analysis (II).	PowerPoint slides on data show.	-
3	Measuring weather variables (rainfall, relative humidity).	- Photos of devices for measuring light intensity and wind speed & direction.	-
4	Measuring weather variables (light, wind).	- Photos of devices for measuring light intensity and wind speed & direction.	-
5	Mechanical analysis of soil by sieve method.	- Set of sieves. - Electric balance.	-
6	Mechanical analysis of soil by pipette method.	Electric balance Conical flask 250 ml Pipette 5, 10 ml Cylinder 100 ml, 1 L.	Sodium hydroxide Hydrogen peroxide Hydrochloric acid
7	Measuring soil water content and soil total soluble salts	Electric balance Oven Hot plate Beaker 50,100 ml Crucible	-

		Pipette 5, 10 ml Conical flask 250 ml Filter papers	
8	Measuring soil pH and soil electrical conductivity	pH-meter Electrical conductivity meter Electric balance Conical flask 250 ml Pipette 5, 10 ml Funnel Filter papers	-
9	Measuring soil chloride Measuring soil calcium carbonate	Electric balance Burette Conical flask 250 ml Pipette 5, 10 ml Funnel Filter papers	Silver nitrate Potassium dichromate Sodium hydroxide Hydrochloric acid Phenolphthalein
10	Measuring soil organic carbon	Electric balance Burette Conical flask 250 ml Pipette 5, 10 ml Funnel	Hydrochloric acid Phosphoric acid Diphenyl amine Potassium dichromate
11	Final Practical Exam.	Devices- instruments- glasses	Required chemicals

LEVEL 7

1	Course Name: Invertebrates	Course Code: BIOL 313	Level: 7
Weeks	Experiment	Materials	
		Tools	Chemicals
1	Flagellates (<i>Trypanosoma</i> and <i>Euglena</i>).	- Microscopes - Permanent prepared slides of <i>Trypanosoma</i> and <i>Euglena</i> .	-

2	Sarcodina (<i>Amoeba</i>), Ciliophora (<i>Paramecium</i>) and Sporozoa (<i>Plasmodium</i>)	- Microscopes - Permanent prepared slides of <i>Amoeba</i> , <i>Paramecium</i> and <i>Plasmodium</i> .	-
3	Phylum Porifera, its classification, and different types of sponges (Ascon, Sycon, Leucon).	- Microscopes - Permanent prepared slides of: spicules and spongin fibers, W.M. of <i>Leucosolenia</i> , T.S. of <i>Sycon</i> and specimens of <i>Euspongia</i> .	-
4	Phylum Cnidaria. Study of Hydrozoa (<i>Hydra</i>), Schyphozoa (<i>Aurelia</i>), and Anthozoa (<i>Anemonia</i>).	- Microscopes - Permanent prepared slides of: W.M. and T.S. of <i>Hydra</i> . - Specimens of <i>Aurelia</i> , <i>Anemonia</i>	-
5	Phylum Platyhelminthes (Flatworms), studying representatives of free living flatworms (<i>Planaria</i>), Infectious species of flatworms such as liver flukes (<i>Fasciola</i>), blood flukes (<i>Schistosoma</i>) and Tapeworms (<i>Taenia solium</i> and <i>Taenia saginata</i>)	- Microscopes - Permanent prepared slides of: W.M. of <i>Planaria</i> , W.M. of <i>Fasciola</i> , male and female of <i>Schistosoma</i> , and their stages of life cycle (eggs, sporocyst, cercaria, redia), Specimens of freshwater snail hosts (<i>Lymnaea</i> , <i>Bulinus</i> , and <i>Biomphalaria</i>) and W.M. of scolex, mature and gravid proglottids of both <i>Taenia</i> <i>solium</i> and <i>Tenia saginata</i> .	-
6	Phylum Nematoda, studying parasitic species of medical importance (<i>Ascaris</i>).	- Microscopes - Permanent prepared slides of: T.S. of male and female <i>Ascaris</i> . - Specimens of male and female <i>Ascaris</i> .	-
7	Phylum Annelida, examples of annelids: Polychaeta (<i>Nereis</i>), Oligochaeta (<i>Allolobophora</i>) and Hirudinea (<i>Hirudo</i>).	- Microscopes - Permanent prepared slides of: T.S. of <i>Nereis</i> , <i>Allolobophora</i> , <i>Hirudo</i> .	-

		- Specimens of <i>Nereis</i> , <i>Allolobophora</i> , <i>Hirudo</i> .	
8	Phylum Arthropoda, study of Crustacea (<i>Penaeus</i>), Insecta (<i>Periplaneta</i>) and Arachnida (<i>Buthus</i> , <i>Lycosa</i> , <i>Argas</i> and <i>Ixodes</i>).	- Microscopes - Permanent prepared slides of: W.M. of <i>Argas</i> and <i>Ixodes</i> - Specimens of <i>Penaeus</i> , <i>Periplaneta</i> , <i>Buthus</i> , <i>Lycosa</i>	-
9	Phylum Mollusca, study of Gastropoda (<i>Helix</i>), Bivalvia (<i>Anodonta</i>) and Cephalopoda (<i>Sepia</i>) and (<i>Octopus</i>).	Specimens of <i>Helix</i> , <i>Anodonta</i> , <i>Sepia</i> and <i>Octopus</i> .	-
10	Phylum Echinodermata, study of (Starfish, Brittle star, Sea urchin and Sea cucumber).	Specimens of Starfish, Brittle star, Sea urchin and Sea cucumber	-
11	Final Practical Exam	- Microscopes - Slides - Specimens	-
2	Course Name: Animal Physiology	Course Code: BIO 314	Level: 7
Weeks	Experiment	Materials	
		Tools	Chemicals
1	- Introduction on the practical course and biosafety instructions - Identification of the laboratory ware, instruments and how to use them in the practical physiology classes.	Power point slides on data show	-
2	Handling and different routes of injection of the experimental	Power point slides on data show	-

	animals that used, how to get blood samples. Concentrations and dilutions.		
3	Carbohydrates identification tests: *Molisch's test *Benedict's test	Electric water bath Test tubes. Flame.	Sugar solution (Glucose, fructose, Sucrose) Ethanol 96 % Alcoholic α -naphthol Conc. sulfuric acid Sodium Citrate Sodium carbonate Distilled water Copper sulfate
4	Biuret's test	Test tubes	Protein solution (egg albumin), Sodium hydroxide, Copper sulphate
5	Solubility Acrolein test (for Glycerol)	- Test tubes. - Pipettes. - Flame.	Glycerol Dist. Water Alcohol Ether anhydrous sodium hydrogen sulphate Sulphoric acid
6	How to differentiate between serum and plasma, and its preparation	- Test tubes. - Spectrophotometer. - Lancets	Blood sample EDTA
7	Haemin test	- Glass slides	0.1 Potassium

		- Flame	chloride Acetic acid
8	Red blood cell count test/ White blood cell count test	- Hemocytometer - Lancets - Medical Cotton - Slide cover - Eppendorf tubes - Microscope	Blood sample 0.9%NaCL EDTA Glacial acetic acid Gentian violet (1% solution in water). Distilled water Methylen blue stain
9	Hemoglobin and hematocrite value tests / Blood group, RH	- Blood Lancets - Alcohol - Medical Cotton - Sahli's Hemoglobinometer - Capillary tubes - Spectrophotometer - White ceramic plate - Glass rod for stirring	0.1 HCL Anti A Anti B Anti D
10	Glucose, protein and Lipid content.	-Spectrophotometer -Automatic Pipette - Test tubes	-Kits for total blood protein -Kits for total blood lipid -Kits for blood glucose
11	Final Practical Exam	Devices Instruments	Required chemicals

3	Course Name: Animal Histology	Course Code: BIOL 315	Level: 7
Weeks	Experiment	Materials	
		Tools	Chemicals
1	- Introduction of histology and its relation with other biological sciences. - Recognition of different main types of tissues.	Power point slides on data show	-
2	Epithelial tissue, glands	Light microscopes Slides for: T. S. in artery & vein V. S. in toad and mammalian skin T. S. in kidney T. S. in stomach, intestine T. S in toad esophagus T. S in trachea T. S. in rat testis T. S. in cat ovary S. in mammalian liver	-
3	Connective tissue: -Connective tissues proper (Areolar , adipose, fibrous and elastic connective tissues) - Skeletal connective tissues (Cartilage and Bone tissues) - Vascular connective tissues	Light microscope Slides for: T. S. in stomach, intestine V. S. in mammalian skin T. S. in Tendon T. S. in Artery T.S. in Trachea	-

	examination.	T. S. & L. S. in bone tissues Blood films of toad and human	
4	- Muscular tissue (Striated skeletal muscles- Non-striated smooth muscles- Cardiac muscles) - Nervous tissue	Light microscope Slides for: T. S. in stomach and intestine T. S in Skeletal muscle T. S. in cardiac muscle T.S. in sciatic nerve T.S. in spinal cord	-
5	T.S in Rabbit skin and Frog skin	Light microscope Slides for: T. S. in skin of toad V. S. in skin of mammals	-
6	T.S in Frog stomach and rabbit intestine, T.S in liver of Pig	Light microscope Slides for: T. S. in stomach of toad T.S. in intestine of Rabbit S. in liver of Pig	-
7	T.S in Trachea	Light microscope Slides for: T. S. in trachea of rabbit	-
8	T.S in Artery and Vein of rabbit	Light microscope Slides for: T. S. in artery and vein of rabbit	-
9	T. S in kidney of rabbit, T.S in Urinary bladder of rat	Light microscope Slides for:	-

		T. S. in kidney of rabbit	
10	T.S in testis of rabbit, testis of frog and Ovary of rabbit	Light microscope Slides for: T.S. in testis of rabbit T.S. in testis of frog T.S. in ovary of rabbit (or cat)	-
11	Final Practical Exam	Microscopes Fixed slides	-
4	Course Name: Microtechniques	Course Code: BIOL 352	Level: 7
Weeks	Experiment	Materials	
		Tools	Chemicals
1	Lab Equipment's and safety Microscopic preparations.	Microtome Embedding device Oven Distillation water device Water bath Electric heater Cutting Cryostat Electrical balance	-
2	Microscopes and direct preparations.	Microscopes Slides and cover slides Water and soil specimens	Methylene bleu stain
3	- Blood smear preparation	Microscopes	Alcohol Wright-Leishman

	- Onion squash preparation.	Slides and cover slides Cotton needle Water bath Electric heater Rooted onion	stain Safranin stain or Aceto-carmin HCL (10%).
4	Bacterial smear preparation. Animal Preparation – specimens obtaining – fixation.	Bacterial colonies and /or yoghurt Electric heater Microscopes Slides and cover slides Anatomy tools Flasks and cylinders Rabbit	Cedar wood oil safranin or methylene bleu stain Sodium chloride Picric acid Acetic acid Formalin
5	Washing and dehydration with ascending alcohol. Complete dehydration and clearing.	Flasks and cylinders	Ethyl alcohol Distal water Xylene
6	Paraffin wax infiltration	Oven	Paraffin wax
7	Embedding	Embedding device Electric heater Embedding molds	Paraffin wax
8	Trimming	Knives	-
9	Sectioning (cutting)	Microtome Water bath	-

		Blades slides	
10	Staining. Permanent slides preparation and examination.	Staining Jars Microscopes Stained slides and cover slides	Xylene- Ethyl alcohol Hematoxylin- Eosin Hcl- Distal water Mounting adhesive (D.P.X)
11	Final Practical Exam	Microscopes- Slides Devices	Required chemicals

LEVEL 8

1	Course Name: Viruses and Bacteria	Course Code: BIO 332	Level: 8
Weeks	Experiments	Materials	
		Tools	Chemicals
1	- Lab. instruction & biosafety in Lab. of Microbiology.	- Power point slides on data show. - Biosafety instruments.	-
2	Recognition instruments and materials used in Lab of Microbiology. - Sterilization (physical - chemical mechanical) methods.	Incubators- Autoclave Oven- Refrigerator- Lyophilizer- Shaker- Balance- Water bath- pH meter -Thermometers- Water Distillator- Spectrophotometer- Centrifuges - Compound Microscopes- Oil Immersion Lens-Eyepiece micrometer- Isolation Cabinet- Colonies counter- Bunsen burner- Automatic pipettes- Conical Flasks- Beakers- Volumetric Flasks- Measuring Cylinders -	Beef extract - Peptone Yeast Extract- Agar agar. Gelatin- Indian ink - Silica - Methylene blue- Nigrosin Crystal violet- Ethyl alcohol. Safranin- Malachite green-Disinfectants- Cedar oil- Dehydrated and

		Burettes- Bel jars- Desiccators- - Test tubes-Pipettes Petri dishes- Slides Glass cover- Cavity slides Bent glass rod- Inoculation needles-Inoculation loop needles- Cork borers - Forceps- Scissors- Filter paper discs- Bacterial filters.	prepared media Iodine- Vaseline- Antibiotics- API 20E
3	Methods of isolation, cultivation of and purification of plant and bacterial viruses.	Scientific films	-
4	Methods of laboratory diagnosis for the detection of viruses	Electron microscope (EM) Photos, ELISA and polymerization chain reaction (PCR).	-
4	Size ,forms and aggregation of bacteria	- Ocular micrometer - Stage micrometer - Microscope - Oil Immersion Lens - Prepared microscope slides whole mounts	Cedar oil
5	Preparation of media for cultivation and isolation of bacteria	- Conical Flasks- Balance- Autoclave - Isolation Cabinet	Peptone -Beef extract- Yeast extract- Agar agar Dehydrated and prepared media
6	Cultivation and isolation of bacteria from different sources(1)	Conical Flasks- Balance- Autoclave- Isolation Cabinet- Petri dishes- Bunsen burner - Automatic pipettes- Pipettes- Test tubes- Colonies counter	Peptone -Beef extract- Yeast extract- Agar agar Dehydrated and prepared media
7	Cultivation and isolation of bacteria from different sources(2)	Conical Flasks- Balance Autoclave- Isolation Cabinet- Petri dishes- Bunsen burner - Automatic pipettes- Pipettes- Test tubes- Colonies counter	Peptone -Beef extract- Yeast extract- Agar agar Dehydrated and prepared media
8	- Morphological characteristics of bacterial colonies	Conical Flasks- Balance- Autoclave- Isolation Cabinet-	Peptone -Beef extract- Yeast

	- Purification and Preservation of bacterial cultures	Petri dishes- Inoculation loop needles- Bunsen burner - Automatic pipettes- Pipettes- Test tubes- Lyophilizer	extract- Agar agar Dehydrated and prepared media- Glycerol-Liquid nitrogen
9	Examination of bacterial motility Staining of bacteria	Glass cover- Cavity slides- Compound Microscopes- Oil Immersion Lens Compound Microscopes- Oil Immersion Lens-Eyepiece micrometer- Slides- Glass cover	Vaseline- Methylene blue- Indian ink Nigrosin - Crystal violet- Safranin-Iodine - Malachite green Ethyl alcohol
10	- Examination of Bacterial water quality(1) - Examination of Bacterial water quality(2) - Some metabolic activities of bacteria - Antibiotic susceptibility testing	Test tubes-Durham tubes Incubator-Isolation cabinet- Inoculation loop needles- Water bath- Test tubes-Durham tubes Incubator-Isolation cabinet- Inoculation loop needles- Water bath- Filter paper Platinum needle Test tubes Forceps- Filter paper discs	Dehydrated and prepared media Hydrogen peroxide Oxidase reagent Starch-Iodine Tween 80 phosphate buffer methyl red indicator glucose α -naphthol KOH Tryptophan (tryptone) Kovács reagent API 20E Antibiotics- Dehydrated and prepared media
11	Final Practical Exam	Microscopes Slides- Petri dishes Devices	Required chemicals
2	Course Name: Plant Physiology	Course Code: 323	Level: 8
Weeks	Experiments	Materials	

		Tools	Chemicals
1	Preparation of colloidal solutions. Effect of temperature on colloidal solution (solation and gelation) Brownian movement	Microscopes – slides – covers – water bath- conical flasks- pipettes	Gelatin Starch
2	Electrical charges of colloidal particles (Electrical Adsorption)	Filter papers Droplet bottles	Eosin –Methylene blue – Congo red
3	Mechanical Adsorption in colloidal solutions.	Funnels – conical flasks - Filter papers	Ethanol- Methylene blue- Charcoal
4	Neutralization of colloids electrical charges.	Funnels – conical flasks - Filter papers	Calcium Chloride
5	- Osmosis by plasmolysis. - Osmosis by Osmotic tree. -Estimation of osmotic absorption efficacy using Ricinus petioles. -Estimation of osmotic absorption efficacy by weight.	Petri dishes- slides - covers - microscope - fresh algae (spirogyra) - Onion Electrical balance - Ricinus communis leaves - Potato- Petri dishes	Copper sulphate- potassium ferocyanide- sodium chloride
6	Effect of temperature on permeability of cell membrane.	Beakers - thermometers - water baths - <i>Beeta vulgaris</i> - knife - glass jars- Test tubes - racks	Acetone - chloroform - ethanol - methanol
7	Effect of alcohol on permeability of cell membrane.	Beakers- <i>Beeta vulgaris</i> - knife - glass jars- Test tubes - racks	
8	-Proving of transpiration. -Estimation of transpiration by weight. -Extraction of photosynthetic pigments.	Oven - Filter paper - Petri dishes - rubber- Balance- glass slides Plant leaves - Beakers - Water bath- aluminum foil- plastic pots - glass jars- Woolf bottles - air pump- rubber- germinated seeds	Paraffin - cobalt chloride- Methanol - acetone- Iodine- Sodium hydroxide- Barium hydroxide

	- Investigation of starch in plant Leaves. - Importance of light for photosynthesis. - Importance of carbon dioxide for photosynthesis. -Emission of carbon dioxide during respiration.		
9	Investigation of invertase in yeast.	Water bath - test tubes - conical flasks - funnels - filter papers	Yeast powder- Fehling A and B - sucrose
10	-Effect of temperature on enzymes. - Effect of alcohol on enzymes. -Investigation and determination of some primary and secondary metabolites in plant materials.	Water bath - Petri dishes Test tubes - conical flasks - Beakers - pipettes- capped brown bottles- water bath - filter paper - sonicator – electrical balance- vortex - centrifuge - spectrophotometer - electrical grinder.	Diastase- Starch- Fehling A and B – Iodine- Ethyl alcohol Alpha naphthol – sulphuric acid – hydrochloric acid – sodium hydroxide – sodium carbonate – Folin ciocalteau- Acetic acid – acetic anhydride – chloroform – Ferric chloride – copper sulphate –Ethanol – methanol – anthrone – glucose – vanillin – gallic acid - saponins
11	Final Practical Exam	Microscopes	Final Practical Exam
3	Course Name: Entomology	Course Code: 316	Level: 8
Weeks	Experiments	Materials	

		Tools	Chemicals
1	External features of insects The Head capsule	Dissecting and Compound microscopes	-
2	The Antennae	Dissecting and Compound microscopes Prepared slides	-
3	Types of insect mouth parts 1- Biting or Chewing mouth-parts 2- Chewing and lapping mouth parts	Dissecting and Compound microscopes Slides & covers Prepared slides	Ethyl Alcohol Formalin
4	Types of insect mouth parts 3- Sponging sucking mouth-parts 4- piercing and sucking mouth-parts 5-siphoning mouth-parts	Dissecting and Compound microscopes Slides & covers Prepared slides	Ethyl Alcohol Formalin
5	Insect Thorax The legs	Dissecting and Compound microscopes Slides & covers Prepared slides	Ethyl Alcohol Formalin
6	The wings Types of insect Wings	Dissecting and Compound microscopes Slides & covers Prepared slides	Ethyl Alcohol Formalin
7	Insect Abdomen	Dissectingand Compound microscopes Slides & covers Prepared slides	Ethyl Alcohol Formalin
8	Classification	Dissectingand Compound microscopes Slides & covers Prepared slides	Ethyl Alcohol Formalin
9	The reproductive system	Dissectingand Compound microscopes Slides & covers Prepared slides	Ethyl Alcohol Formalin
10	Metamorphosis in insects 1- Types of Larvae 2- Types of Pupae	Dissectingand Compound microscopes Slides & covers Prepared slides	Ethyl Alcohol Formalin

11	Final Practical Exam	Dissecting and Compound microscopes Dissecting tools Slides & covers Prepared slides	-
LEVEL 9			
1	Course Name: Embryology	Course Code: BIO 317	Level: 9
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Introduction on the practical course of embryology	Microscopes	-
2	Toad male urogenital system- T.S of toad testis- T.S. of rat testis	- Microscopes - Illustrative model for the female urogenital system of the toad - toad and rat testis slides	-
3	Female urogenital system of toad; T.S of toad ovary; T.S of cat ovary	- Microscopes - Illustrative model for the female urogenital system of the toad Slides for T.S of toad and cat ovaries	-
4	Structure of the human testis – section in the seminiferous tubules	Microscopes T.S. of rat testis Model for the testis	-
5	Sperm structure and types of sperms	- Photos of different kind of sperms - T.S. of rat or cat testis - Microscopes	-
6	Female genital system- structure and types of ova	- Microscopes - Models for ova structure and types of ova	-
7	Different stages of sperm and	- Models for sperm and ova formation	-

	ova formation	- Whole specimen for rat sperm, ova	
8	Amphioxus ova, fertilization , cleavage, blastula and gastrula	- Microscopes - Ova of amphioxus, models for blastula and gastrula	-
9	Toad ova, blastula and gastrula stages, 2mm and 8 mm stage	- Models for blastula and gastrula of toad - Colored photos for different stages , models for 2mm and 8 mm of toad pole -colored photos for different stages	-
10	Fertilized chicken ova, 20 and 24 ,48 and 72 hours chick embryo and Embryonic membranes	Slides of 20 and 24 chick embryo Models for 48 and 72 hour of chick embryo-Models for embryonic membranes Colored photos for embryonic membranes	-
11	Final Practical Exam	Microscopes Slides Models	-
2	Course Name: Taxonomy of Flowering plants	Course Code: BIO 324	Level: 9
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Flower structure	Microscope Slides Slide covers Anatomy tools Flowers	-
2	Examination of flower placentation	Microscope Slides Slide covers Anatomy tools Flowers	-

3	Types of inflorescences	Different types of inflorescences samples	-
4	Types of fruits	Different types of fruits samples	-
5	Structure of Rosaceae and Mimosaceae flowers	Microscope Slides Slide covers Anatomy tools Flowers	-
6	Structure of Ceasalpinaceae and Papillionaceae flowers	Microscope Slides Slide covers Anatomy tools Flowers	-
7	Structure of Malvaceae and Brassicaceae flowers	Microscope Slides Slide covers Anatomy tools Flowers	-
8	Structure of Apiaceae and Solanaceae flowers	Microscope Slides Slide covers Anatomy tools Flowers	-
9	Structure of Convolvulaceae and Apocynaceae flowers	Microscope Slides Slide covers Anatomy tools Flowers	-
10	Structure of Poaceae and Asteraceae and Chenopodiaceae flowers Structure of Liliaceae and Arecaceae (Palmae) flowers	Microscope Slides Slide covers Anatomy tools Flowers	-
11	Final Practical Exam	Microscope Slides Slide covers Anatomy tools Flowers	-

3	Course Name: Pollution and Environment Protection	Course Code: BIO 342	Level: 9
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Introduction on the practical course and biosafety instructions Identification of the laboratory ware, instruments and how to use them in the practical classes	-	-
2	Fluorometric and precipitation methods for the measurement of air pollutants	Fluorescence Spectrophotometer	-
3	Systems of air pollutants removal and methods of prevention of air pollutants	Electrostatic <i>precipitator</i> Filters Wet filters Mechanical collectors	-
4	Measuring total dissolved salts in water	Hot blades – beakers –conical flasks - pipettes	-
5	Measuring total dissolved salts in soil	Hot blades – beakers –conical flasks - pipettes	-
6	Measuring water PH Measuring soil PH	PH meter – beakers –conical flasks - pipettes	-
7	Measuring dissolve and BOD	300 ml glass Bottles pipettes	-
8	Carbonates and bicarbonates in soil and water	beakers –conical flasks - pipettes	Manganese sulfate alkali-iodide-azide concentrated sulfuric acid starch solution Sodium thiosulfate

9	Ways of wastewater treatment and recycling processing	Visiting wastewater treatment plants	
10	- Measuring microbial pollution of water and food - Ways of solid wastes treatment and recycling processing	beakers –conical flasks – pipettes, test tubes, Durham tubes Scientific films	MacCKonkey medium
11	Final Practical Exam	-	-
4	Course Name: Genetics	Course Code: BIO 353	Level: 9
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Study action steps slice illustrate the stages of Mitosis (The work of an aqueous decomposition of samples, dye chromosomes, sampling)	Compound Microscope Slides and Covers Dissecting Tools	Safranin stain
2	Study the Mitotic division by Electron microscope photos	Data Show Photos	-
3	Study the Meiosis division by Electron microscope photos	Data Show Photos	-
4	Study first Mendel's law Resolving problems on the first Mendel's Law	Models of some traits Data Show	-
5	Study second Mendel's law Resolving problems on the second Mendel's Law	Models of some traits Data Show	-
6	- Study the exceptions of the Mendel's laws Resolving problems on Incomplete dominance and co-dominance	Models of some traits Data Show	-

	- Study the exceptions of the Mendel's laws Resolving problems on lethal genes and selective pollination		
7	Resolving problems on Multiple Alleles	Photos Data Show	-
8	- Examination of Blood Group - Examination of Rh Factor	Anti – A kit Anti – B Kit Anti – D Kit Slides and Covers Lancets Gloves	-
9	- Resolving problems on Lethal genes and Sex dominance - Resolving problems on Family Pedigree	Photos Data Show	-
10	Study the types of chromosomes Based on the position of the centromere Study the Human karyotyping	Photos Data Show Dissecting Tools	-
11	Final Practical Exam	Photos Models of some traits Dissecting Tools	-

LEVEL 10

1	Course Name: Phycology	Course Code: BIO 433	Level: 10
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Methods of cultivation and isolation	* Autoclave * Stirrer hot plate * Five 250 ml conical flasks * Plastic Rap	● 20 grams agar-agar ● Bold medium ● GB11 medium

		* Aluminum foil * Medical cotton	● Dettol for sterilization - Ethanol sterilization
2	Methods of cultivation and isolation	* Isolation cabinet * Illumination growth chamber * Twenty-five plastic Petri dish	-
3	different shapes of Algae Blue-green algae	Examination of different shapes of algae * Microscopes * Cultivation the isolated algae obtained by students on cultural media * Three glass beakers (100 ml) * Plastic drinking straws * Examination slides of algae ready installed for each of: <i>Gloeocapsa</i> sp. <i>Chroococcus</i> sp. <i>Nostoc</i> sp. <i>Anabaena</i> sp. <i>Oscillatoria</i> sp. <i>Merismopedia</i> sp. Available (if applicable) * Glass slides * Glass covers for slides * Algae from water samples collected from farms in the region	-
4	Blue-green algae	* Microscopes * Glass slides * Glass covers for slides * Algae from water samples collected from farms in the region * Cultivation the isolated algae obtained by students on cultural media * Three glass beakers (100 ml) * Plastic drinking straws * Examination slides of algae	-

		ready installed for each of: <i>Gloeocapsa</i> sp. <i>Chroococcus</i> sp. <i>Nostoc</i> sp. <i>Anabaena</i> sp. <i>Oscillatoria</i> sp. <i>Merismopedia</i> sp. Available (if applicable)	
5	Green algae	* Microscopes * Glass slides * Glass covers for slides * Algae from water samples collected from farms in the region * Cultivation the isolated algae obtained by students on cultural media * Three glass beakers (100 ml) * Plastic drinking straws * Examination slides of algae ready installed for each of: <i>Chlamydomonas</i> sp. <i>Chlorococcum</i> sp. <i>Pandorina</i> + <i>Volvox</i> spp. <i>Spirogyra</i> + <i>Hydrodictyon</i> spp. <i>Oedogonium</i> + <i>Zygnema</i> spp. <i>Cosmarium</i> + <i>Scenedesmus</i> spp. <i>Pediastrum</i> + <i>Chlorella</i> spp Available (if applicable)	-
6	Green algae	* Microscopes * Glass slides * Glass covers for slides * Algae from water samples collected from farms in the region * Cultivation the isolated algae obtained by students on cultural media * Three glass beakers (100 ml) * Plastic drinking straws * Examination slides of algae	-

		ready installed for each of: <i>Chlamydomonas</i> sp. <i>Chlorococcum</i> sp. <i>Pandorina</i> + <i>Volvox</i> spp. <i>Spirogyra</i> + <i>Hydrodictyon</i> spp. <i>Oedogonium</i> + <i>Zygnema</i> spp. <i>Cosmarium</i> + <i>Scenedesmus</i> spp. <i>Pediastrum</i> + <i>Chlorella</i> spp. Available (if applicable)	
7	Euglenophyta and golden yellow algae	* Microscopes * Glass slides * Glass covers for slides * Algae from water samples collected from farms in the region * Cultivation the isolated algae obtained by students on cultural media * Three glass beakers (100 ml) * Plastic drinking straws * Examination slides of algae ready installed for each of: <i>Voucheria</i> , <i>Euglena</i>	-
8	Diatoms	* Microscopes * Glass slides * Glass covers for slides * Algae from water samples collected from farms in the region * Cultivation the isolated algae obtained by students on cultural media * Three glass beakers (100 ml) * Plastic drinking straws * Examination slides of algae ready installed for each of: <i>Different types of Diatoms</i>	-
9	Brown algae/ <i>Fucus</i>	* Microscopes * Glass slides * Glass covers for slides * Algae from water samples collected from farms in the	-

		region * Cultivation the isolated algae obtained by students on cultural media * Three glass beakers (100 ml) * Plastic drinking straws * Examination slides of algae ready installed for each of: <i>fucus</i>	
10	Red Algae / <i>Polysiphonia</i>	* Microscopes * Glass slides * Glass covers for slides * Algae from water samples collected from farms in the region * Cultivation the isolated algae obtained by students on cultural media * Examination slides of <i>Polysiphonia</i>	-
2	Course Name: Mycology	Course Code: BIO 434	Level: 10
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Preparation of cultural media for isolation and purification of fungi	* Autoclave * Stirrer hot plate * Magnets' rods * Laminar Flow * Incubator ● Five 250 ml conical flasks ● Plastic Rap ● Aluminum foil ● Medical cotton	● Distilled Water ● PDA medium 39gm ● Sabouraud medium, 40gm ● Czapek agar medium, 40gm ● 10 gm agar agar ● 20 gm glucose ● 250 mg rose-bengal ● Dettol for sterilization - Ethanol sterilization

2	Isolation and purification of fungi from natural sources	* Laminar Flow (Isolation cabinet) * Incubator * Microwave * Refrigerator ● 100 plastic Petri dish (9 cm) ● glass test tubes (Pyrex) Number 200 ● 4 needles for isolation ● plastic bags, 1 roll - Rubber bands	● Prepared cultural media ● Dettol for sterilization ● Ethanol
3	Slime molds	* Glass slides + covers * Microscopes * Fixed slides of <i>Slime molds</i>	-
4	Zygomycotina / <i>Rhizopus</i>etc.	● Microscopes ● Glass slides ● Glass covers for slides ● Examination fixed slides of : ● <i>Rhizopus</i> sp. <i>Mucor</i> sp.	-
5	Oomycotina / different genera and species	● Microscopes ● Glass slides ● Glass covers for slides ● Drinking straw ● Examination of live <i>Saprolegnia</i> , <i>Achlyyam</i> <i>Pythium</i>, <i>Albugo</i> , <i>Perenospora</i>, <i>Plasmopara</i>	-
6	Ascomycotina / <i>Saccharomyces</i> , <i>Aspergillus</i> , <i>Penicillium</i> , <i>Peziza</i> , trufflesetc.	* Microscopes * Glass slides * Glass covers for slides * Examination of fixed slides of <i>Aspergillus</i> spp.	-
7	Ascomycotina / <i>Saccharomyces</i> , <i>Aspergillus</i> , <i>Penicillium</i> , <i>Peziza</i> , trufflesetc.	* Microscopes * Glass slides * Glass covers for slides * 500 gm Roquefort cheese * Examination of fixed slides of	-

		<i>Penicillium</i> spp. And <i>Saccharomyces</i> .	
8	Basidiomycotina / Mushroom, <i>Puccinia graminis</i>etc.	* Microscopes * Fixed slides of gill of agaricus	-
9	Basidiomycotina / Mushroom, <i>Puccinia graminis</i>etc.	* Microscopes Glass slides * Glass covers for slides Examination of Pycniosorus – uredosorus and Teleutosorus of <i>Puucinia graminis</i>	-
10	Deuteromycotina / different genera and species	* Microscopes * One kilo gram of mushroom * Glass slides * Glass covers for slides * Examination of Fuserium , Alternaria	-
11	Deuteromycotina / different genera and species	* Microscopes * One kilo gram of mushroom * Glass slides * Glass covers for slides * Examination of ulocladium , cladosporium, Trichoderma	-
3	Course Name: Molecular Biology	Course Code: BIO 454	Level: 10
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Equipments and tools used in molecular genetics laboratory. + Introduction (DNA structures, chromosomes)	1. Fixed micropipettes 2. Variable micropipettes 5- -80 C Refrigerators. 6- Incubators. 7- Hot plates. 8- Autoclaves 9- PCR machine 10-Electrophoresis unit	-

		11-Gel documentation system	
2	DNA extraction from different tissues (the manual method)	3 strawberries Measuring spoons Beakers Filter paper Plastic bags Laundry detergent (liquid or powdered) Ice- Big bowls –Timer - Salt	Isopropyl alcohol
3	DNA extraction from different tissues (the kit method) – a	Ice and Plastic bucket Autoclave. PH meter. Balance. Micro pipette Shaker Centrifuge Water bath Vortex Spectrophotometer Beakers Flasks Eppendorf tubes	Blood Sample. Proteinase K Lysis buffer (2X). SDS 10%. Salt/ EDTA. Chloroform Isoamyl alcohol. EDTA 0.5M. Ethanol 99-100%. Tris PH= 7.6 TE buffer Phenol.
4	DNA extraction from different tissues (the kit method) - b		
5	RNA extraction method	Liquid nitrogen tank Animal tissues Centrifuge 1.5ml Eppendorf tube	TRIZOL 10X DNase I Buffer DNase I Enzyme. 100% EtOH Agarose gel. DEPC H2O DNase I Enzyme.
6	PCR technique	PCR-machine	Target DNA 2 Primers (20-30 nts long) DNA polymerase Nucleotides (dNTPs) Mg+2 (co-factor for DNA polymerase)
7	DNA migration by Gel electrophoresis	Electrophoresis unit Power supply	Agarose Buffer solution. 6X Loading Buffer Bromophenol Blue Glycerol

			DNA ladder DNA samples Ethidium bromide TBE Buffer Ammonium persulfate (APS) TEMED
8	Southern blotting	- Electrophoresis - a nitrocellulose membrane - Autoradiography	restriction endonuclease DNA samples 0.5 M NaOH ssDNA X-ray film
9	Western blotting Northern blotting	Animal tissue Gel Electrophoresis Autoradiography	Antibody Probing Agarose Buffer solution. 6X Loading Buffer Polyvinylidene fluoride (PVDF) membrane DNA ladder DNA samples Ethidium bromide TBE Buffer Ammonium persulfate (APS) TEMED β-mercaptoethanol Bromophenol Blue A protein marker Tris buffer SDS Glycine Nitrocellulose membrane Isolate RNA agarose gel formaldehyde Ethidium bromide stain nitrocellulose or nylon membrane

			DNA or RNA probe X-ray film
10	Cloning	Autoclave Freezer (–20 degrees C) Reagent tubes labeled: pAmp pKan 2XRB" (Restriction Buffer) B/H" (BamHI and HindIII enzymes) Water bath Incubator	DNA - Vectors (Plasmid from E.Coli or Yeast) - DNA Ligase - Restriction Enzymes Glycerol
11	DNA sequencing	4 Test tubes (dGTP, dATP, dCTP, and dTTP) Agarose gel Gel Electrophoresis	DNA DdNTPs DNTPs Primer specific DNA polymerase

LEVEL 11

1	Course Name: Parasitology	Course Code: BIO 418	Level: 11
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Sarcodina: <i>Entamoeba histolytica</i> ,	- Microscopes - Permanent prepared slides of: <i>Entamoeba histolytica</i> (trophozoites and cysts)	-
2	Haemoflagelates: <i>Trypanosoma gambiense</i> and <i>T. cruzi</i>	- Microscopes - Permanent prepared slides of: <i>Trypanosoma gambiense</i> and <i>T. cruzi</i> - Tse Tse fly photos.	-
3	Haemoflagelates: <i>Leishmania tropica</i> & <i>L. donovani</i> .	- Microscopes - Permanent prepared slides of: <i>Leishmania tropica</i> & <i>L. donovani</i> - Sand fly photos.	-

4	Intestinal flagellates: <i>Giardia</i> & <i>Trichomonas</i>	- Microscopes - Permanent prepared slides of: <i>Giardia</i> (trophozoites and cysts), & <i>Trichomonas</i> (trophozoites)	-
5	Apicomplexa: <i>Plasmodium</i> <i>Balantidium coli</i>	- Microscopes - Permanent prepared slides of: <i>Plasmodium</i> - Female <i>Anopheles</i> mosquitoes, <i>Balantidium coli</i> (trophozoites and cysts)	-
6	Phylum: Platyhelminthes Liver flukes (<i>Fasciola</i>), morphology, internal structure, life cycle and their different hosts.	- Microscopes - Permanent prepared slides of: W.M. of <i>Fasciola</i> and their stages of life cycle (eggs, sporocyst, redia cercaria, and metacercaria) -Specimens of freshwater snail hosts (<i>Lymnaea</i>)	-
7	Blood flukes (<i>Schistosoma</i>): morphology, internal structure, life cycle and their different hosts.	- Microscopes - Permanent prepared slides of: W.M. of male and female <i>Schistosoma</i> , and their stages of life cycle (eggs, sporocyst, cercaria) -Specimens of freshwater snail hosts (<i>Bulinus</i> , and <i>Biomphalaria</i>)	-
8	Intestine flukes (<i>Heterophyes</i>): morphology, internal structure, life cycle and their different hosts. Tapeworms (<i>Taenia solium</i> & <i>Taenia saginata</i>): morphology, internal structure, life cycle and their different final and intermediate hosts	- Microscopes - Permanent prepared slides of: W.M. of <i>Heterophyes</i> , and their stages of life cycle (eggs, sporocyst, redia, cercaria, and metacercaria) -Specimens of snail hosts (<i>Pirenella</i>) - Permanent prepared slides of: W.M. of scolex, mature and gravid proglottides of both <i>Taenia</i> sp. -Specimens of bladder worms.	-
9	Phylum Nematoda. studying parasitic species of medical importance (<i>Ascaris</i>),	Microscopes - Permanent prepared slides of: T.S. of male and female <i>Ascaris</i>	-

	<i>Ancylostoma</i> : external and internal features and life cycles	- Specimens of male and female <i>Ascaris</i> , - Permanent prepared slides of: W.M. of male and female <i>Ancylostoma</i>	
10	Phylum: Arthropoda Ectoparasitic Insects (body lice, fleas, bedbugs) , Ectoparasitic Crustacea (<i>Argulus</i>) and Arachnids (<i>Argas</i> and <i>Ixodes</i>). General Revision	- Microscopes - Permanent prepared slides of: W.M. of body louse, flea, bedbug, - Permanent prepared slides of: W.M. of <i>Argulus</i> , <i>Argas</i> and <i>Ixodes</i>	-
11	Final Practical Exam	Microscopes Permanent prepared slides	-
LEVEL 12			
	Course Name: Comparative Anatomy	Course Code: BIO 419	Level: 12
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Examination slides for <i>Amphioxus sp.</i> and <i>Petromyzon sp</i> skin	-Microscopic slides for skin -Microscopes	-
2	Examination slides for Chondrichthyes and Osteichthyes skin	- Microscopic slides for skin -Microscopes	-
3	Examination slides for Amphibia and Reptilia skin	-Microscopic slides for skin -Microscopes	-
4	Examination slides for Aves and Mammalia skin	-Microscopic slides for skin -Microscopes	-
5	Examination of Chondrichthyes and Osteichthyes and amphibian skulls	-Chondrichthyes skull Osteichthyes skull Amphibian skull	-

6	Examination of reptilian and aves skulls	-Amphibian skull -Aves skull	-
7	Examination of mammalian skull	-Mammalian skull	-
8	Examination of appendicular skeleton of Chondrichthyes and Osteichthyes, Amphibia and Reptilia	-Appendicular skeleton of Shark and Tilapia, Frog and <i>Uromastix</i>	-
9	Examination of appendicular skeleton of Aves, Mammalia	-Appendicular skeleton of <i>Columba livia domestica</i> , <i>Oryctolagus cuniculus</i>	-
10	Examination types of vertebral columns, Examination types of digestive system in all vertebrates	* Vertebrae of (Shark , Tilapia, Frog, <i>Columba</i> , rabbit), Models, pictures and dissection of some vertebrates	Formalin and diethyl ether
11	Final Practical Exam	Microscopes Permanent prepared slides	-

II- Elective Courses

GROUP (A)

1	Course Name: Archegoniates	Course Code: BIO 362	Group: A (Level 7)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Division: Bryophyta Class: Hepatiaceae Order: Marchantiales: Riccia	-V.S. in sporophyte of Riccia - V.S. in gametophyte of Riccia -V.S. in sporophyte of Marchantia -V.S in Archegoniophore of Marchantia	-

	Marchantia Order: Jungermanniales - Pellia	V.S in Antheridiophore of Marchantia -V.S. in Gemma Cup of Marchantia -Sporophyte of Marchantia - Pellia sporophyte	
2	ClassII: Anthocerotae Order: Anthocerotales Anthoceros ClassIII: Musci (Mosses) Order: Sphagnales Sphagnum	V.S. in Sporangiphore of Anthoceros V.S. in gametophyte of Anthoceros V.S. in sporophyte of Sphagnum Gametophyte of Sphagnum T.S in stem of Sphagnum V.S. in leaf of Sphagnum T.S. in Antheridium on male branch of Sphagnum	-
3	Subclass: Eubery Order1: Funariales Funaria	Sporophyte of Funaria Protonema of Funaria	-
4	Order2: Polytrichales Polytrichum	V.S. in Capsule of Polytrichum	-
5	Division: Pteridophyta Class1: Psilotopsida Psilotum	L.S. in sporangium of Psilotum T.S. in stem of Psilotum L.S. in cone of Psilotum	-
6	Class2: Lycopsidea Lycopodium	L.S. in cone of Lycopodium T.S. in stem of Lycopodium clavatum	-
7	Selaginella	T.S. in cone of Selaginella T.S. in stem of Selaginella	-
8	Class3: Sphenopsida	T.S. in stem of Equisetum	-

	- Equisetum	L.S. in cone of Equisetum	
9	Subclass: Leptosporangiateae Adiantum	Gametophyte of Adiantum T.S. in Sporophyte of Adiantum L.S. in Rhizome Stem of Adiantum	-
10	Division: Gymnospermae Pinus	L.S. in female cone of Pinus L.S. in male cone of Pinus T.S. in stem of Pinus	-
11	Final Practical Exam	Microscopes Slides	-
2	Course Name: Immunology	Course Code: BIO 363	Group: A (Level 7)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Introduction and biosafety instructions Identification of the laboratory ware, instruments and how to use them in the immunology classes	Centrifuges pH- meter distillatory digital balance spectrophotometer automatic pipettes glass pipettes all the tools which used in the immunology classes	-
2	Identification of the kind of the experimental animals that used and how to inject, how to get blood samples. Concentrations and dilutions	Experimental albino mice Dissecting tools Petri dishes Centrifuge tubes	Heparin Sodium chloride Isontonic saline EDTA

		Centrifuges Syringes Automatic pipettes Digital balances	
3	Identification of the immune organs in the experimental mice. Histology of immune organs (Spleen, Lymph nodes, Thymus gland)	Experimental albino mice Dissecting tools Petri dishes Centrifuge tubes Centrifuges Syringes Automatic pipettes Digital balances Prepared sections in immune organs (Spleen, Lymph nodes, Thymus gland)	Heparin Sodium chloride Isotonic saline
4	Preparation and staining blood smear, leucocytes differential for experimental animal and human	Experimental albino mice Dissecting tools Petri dishes Centrifuge tubes Centrifuges Syringes Automatic pipettes Microscopes Glass slides	Gentian stain Methanol Methylene blue Leishman stain EDTA Distilled water Immersion oil for microscope
5	White blood cell count test in spleen, and lymph nodes	Experimental albino mice Syringes Microscopes Glass slides	

6	Counting the macrophages in the peritoneal cavity of the experimental mice	Experimental albino mice Dissecting tools Petri dishes Centrifuge tubes Centrifuges Syringes Automatic pipettes Microscopes Glass slides Hemocytometer	Gentian stain Methanol Methylene blue Leishman stain Sodium chloride EDTA Buffers PBS with 3% fetal calf serum (FCS) (Pre chilled and kept on ice) PBS for counting.
7	Determination of blood grouping Rhesus factor determination	- glass slides - plastic rods - cotton balls Sterile lancet	- Blood grouping Kits - Kit for Rh-Factor ethanol 70%
8	Agglutination assay (Pregnancy test by latex, ASOT, CRP, RF)	- plastic rods glass slides	Kits for (Pregnancy test by latex, ASOT, CRP, RF)
9	Principles of some immunological ELISA (Indirect ELISA /Sandwich ELISA) tests;, RIA.	Experimental albino mice Dissecting tools Petri dishes Centrifuge tubes Centrifuges Syringes Automatic pipettes Incubator Elisa reader-	ELISA KITS

10	Antibody production protocol Humoral and cellular mediated immune –response	-	-
11	Final Practical Exam	Required tools	Required chemicals
GROUP (B)			
1	Course Name: Medical and Economic Arthropods	Course Code: BIO 471	Group: B (Level 10& 11)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Mouth parts modification	*Dissecting and examination Microscopes.	General Note: No Chemicals are needed in this practical course. Just examination of prepared specimens (Slides and whole mount) by eye or under light microscopes.
2	Order Dictoptera	*Dissecting and examination Microscopes	-
3	Order: Hemiptera	Dissecting and examination Microscopes	-
4	Order: Siphunculata and Order: Mallophaga	Dissecting and examination Microscopes	-
5	e Order: Diptera Suborder: Nematocera	Dissecting and examination Microscopes	-
6	Order: Diptera	Dissecting and examination Microscopes	-

	Suborder: Brachycera and Suborder: Cyclorrhapha		
7	Order: Siphonaptera	Dissecting and examination Microscopes	-
8	Insects of economic importance Order: Lepidoptera	Dissecting and examination Microscopes	-
9	Order :Hymenoptera Order: Coleoptera	Dissecting and examination Microscopes	-
10	Ticks and Mites	Dissecting and examination Microscopes	-
11	Final Exam	Final Exam	-
2	Course Name: Histochemistry	Course Code: BIO 472	Group: B (Level 10& 11)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Introductory Session and Lab. Safety. Equipments and tools used in histochemical laboratory.	1- Flasks and beakers. 2- Staining jars. 3- Glass pipettes. 4- Filter papers. 5- Refrigerators. 6- Incubators. 7- Hot plates. 8- Water bath. 9- Glass wares.	-

		10- Microscopes. 11- Microtomes. 12- Ovens. 13- Digital balances. 14- Cryostat. 15- Water distillators. 16- Automatic tissue processor. 17- Thermometers. 18- PH meters. 19- Slides and covers.	
2	Fixation methods and Fixatives	1- Balances. 2- Flasks and beakers. 3- Glass pipettes. 4- Filter papers. 5- Funnel	1- HgCl ₂ , 2- Formalin, 3- Ethanol, 4- CaCl ₂ . 5- Acetic acid 6- Picric Acid 7- Glutaraldehyde 8- Monosodium phosphate 9- Disodium phosphate 10- Absolute ethyl alcohol 11- Potassium dichromate 12- Sodium sulphate
3	Preparation of wax blocks and tissue sections Prepare the snowy sections and	1- Microscopes. 2- Microtome.	1- Ethanol, 2- Acetone.

	applications	3- Balance. 4- Staining jars. 5- Flasks and beakers. 6- Glass pipettes. 7- Filter papers. 8- Oven. 9- Cryostat.	3- Xylene. 4- Paraffin wax. 5- Toluene. 6- CH ₃ Cl 7- Cal. Formol.
4	Decalcification	1- Microscopes. 2- Microtome. 3- Balance. 4- Staining jars. 5- Flasks and beakers. 6- Glass pipettes. 7- Filter papers. 8- Oven.	1- HCl. 2- HCOOH. 3- CH ₃ COOH. 4- HCOONa 5- Formalin. 6- Cal. Oxalate. 7- EDTA. 8- HNO ₃ 9- Absolute ethyl alcohol 10- Ammonium oxalate 11- Sodium sulphate 12- Ammonia
5	Carbohydrate detection	1- Microscopes. 2- Microtome. 3- Balance. 4- Staining jars. 5- Flasks and beakers. 6- Glass pipettes.	1- Carmic acid. 2- Alcian blue. 3- Periodic acid (HIO ₄) 4- Leucofuschine [Fu(SO ₂ H) ₂]

		7- Filter papers. 8- Oven.	
6	Protein detection	1- Microscopes. 2- Microtome. 3- Balance. 4- Staining jars. 5- Flasks and beakers. 6- Glass pipettes. 7- Filter papers. 8- Oven.	1- Ninhydrin. 2- Bromophenol blue. 3- HgCl ₂ 4-Tertiary butyl alcohol 5- Schiff's reagent
7	Detection of enzymes	1- Microscopes. 2- Microtome. 3- Balance. 4- Staining jars. 5- Flasks and beakers. 6- Glass pipettes. 7- Filter papers. 8- Oven.	1- Cal. Phosphate. 2- Sod. Glycerophosphate. 3- Lead nitrate 4-B-glycerophosphate 5-Na B-glycerophosphate 6- CaCl ₂ 7-MgSO ₄ 8- Cobalt Nitrate
8	Detection of amino acids	1- Microscopes. 2- Microtome. 3- Balance. 4- Staining jars. 5- Flasks and beakers. 6- Glass pipettes. 7- Filter papers.	1-Millon reagent (dissolving metallic mercury in nitric acid) 2- Ferric Cyanide. 3- Fe ₂ (SO ₄) ₃

		8- Oven.	
9	Detection of nucleic acids Detection of lipid	1- Microscopes. 2- Microtome. 3- Balance. 4- Staining jars. 5- Flasks and beakers. 6- Glass pipettes. 7- Filter papers. 8- Oven.	1- Methyl Green. 2- Pyronin. 3- Hcl 4- Schiff's reagent. 5- Sudan Black B.
10	Detection of pigments and minerals	1- Microscopes. 2- Microtome. 3- Balance. 4- Staining jars. 5- Flasks and beakers. 6- Glass pipettes. 7- Filter papers. 8- Oven.	1- Hemosiderin. 2- - Ferrous Cyanide. 3- Silver Sulfide.
11	Final Practical Exam		
3	Course Name: Plant Tissue Cultures	Course Code: BIO 473	Group: B (Level 10& 11)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Plant tissue culture Laboratory design, equipments and safety	Oven Water bath	-

		Electric heater Digital balance Autoclave Centrifuges Cold-hot Incubators Refrigerators UV cabinets Microscopes Laminar flows Fume hoods Distillators Water deionizers Balances Ultra-Low Freezers pH-meters Luxe-meters Variable Pipettes Autoclavable pipettes Fixed Pipettes Plastic and glass wares	
2	Sterilization methods	Autoclave Oven Benzene flame UV cabinets Laminar flows Millipore filters	Clorox -Ethanol Triton-x100 Tween -80 Formalin

3	Culture media preparation	Plastic and glass wares Autoclave Variable Pipettes Variable, autoclavable Pipettes Fixed Pipettes	MS media NA media LB Media Root media Shoot media phytohormones
4	Plant root culture	Dissecting sets Laminar flows Gloves Masks Pipettes	MS media NA media LB Media Root media Clorox -Ethanol
5	Plant stem culture	Dissecting sets Laminar flows Gloves Masks Pipettes Incubators	MS media NA media Shoot media Clorox -Ethanol
6	Plant leaf culture	Dissecting sets Laminar flows Gloves Masks Pipettes Incubators Flasks and cylinders Petri dishes	MS media NA media Clorox -Ethanol
7	Plant buds culture	Gloves Masks	MS media NA media

		Pipettes Incubators Flasks and cylinders Petri dishes Dissecting sets	Clorox -Ethanol Distilled water
8	Culture media preparation	Incubators Gloves Masks Pipettes Plastic and glass wares Flasks and cylinders Petri dishes	Culture media preparation
9	Plant seed culture	Incubators Gloves Masks Pipettes Petri dishes Beakers Dissecting sets	MS media NA media Clorox -Ethanol Distilled water
10	Plant petals culture	Incubators Gloves Masks Pipettes Petri dishes Beakers Dissecting sets	MS media NA media Clorox -Ethanol Distilled water
11	Final Practical Exam		

4	Course Name: Stress Physiology	Course Code: BIO 474	Group: B (Level 10& 11)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	- Effect of salinity on plant cell (Plasmolysis) - Effect of salinity on chromosomal aberration	- Microscopes - Glass slides - Glass covers - Petri dishes - Spirogyra - Forceps - Onions - Distillator - Beakers - Water bath - Benzene's flame	- Sodium chloride - Distilled water - Methylene blue - Safranin - Acetocarmine - Hydrochloric acid - Sodium chloride
2	- Effect of salinity on seeds germination and seedlings growth - Effect of salinity on carbohydrates content in plant tissues	- Petri dishes - Plastic pots (different sizes) - Filter papers - Ruler - Forceps - Seeds of some crops such as wheat and seeds of plant weed - Soil - Growth chamber - Pipettes	- Sodium chloride - Distilled water - Sodium hypochlorite - Ethanol - Methanol - glucose - Hydrochloric acid - Anthrone - Sulfuric acid

		Distillator Hot air oven Automatic pipettes (different volumes) Tips (blue-yellow-white) for automatic Test tubes cuvettes Spectrophotometer Water bath Sonicator Centrifuge Refrigerator Digital balance vortex	
3	Effect of salinity on phenolics content in plant tissues	Petri dishes Plastic pots different sizes Filter papers Forceps Seeds of some crops such as wheat and seeds of plant weed Soil Growth chamber Pipettes Test tubes Distillator Hot air oven Spectrophotometer	Sodium chloride Sodium hypochlorite Ethanol Methanol Distilled water Gallic acid Ascorbic acid Sodium carbonates Folin Ciocalteau reagent

		Water bath Sonicator Centrifuge Refrigerator Digital balance Vortex Tips (blue-yellow-white) for automatic cuvettes Filter papers	
4	- Effect of drought on seeds germination and seedlings growth - Effect of drought on proline content in plant tissues	Petri dishes Plastic pots (different sizes) Filter papers Ruler Forceps Seeds of some crops such as wheat and seeds of plant weed Soil Growth chamber Pipettes Distillator Hot air oven Test tubes Spectrophotometer Water bath Sonicator	Distilled water Sodium hypochlorite Ethanol Proline Toluene 5-sulfosalicylic acid Ninhydrin

		Centrifuge Refrigerator Digital balance cuvettes Vortex Tips (blue-yellow-white) for automatic Filter papers Ice	
5	Effect of drought on Saponins content in plant tissues	Petri dishes Plastic pots different sizes Filter papers Forceps Seeds of some crops such as wheat and seeds of plant weed Soil Growth chamber Pipettes Test tubes Distillator Hot air oven Spectrophotometer Water bath Sonicator Centrifuge Refrigerator Digital balance	Distilled water Sodium hypochlorite Ethanol Sulfuric acid Vanillin Saponins

		Vortex Tips (blue-yellow-white) for automatic cuvettes Filter papers Ice	
6	Effect of temperature on seeds germination and seedlings growth	Petri dishes Plastic pots (different sizes) Filter papers Ruler Forceps Seeds of some crops such as wheat and seeds of plant weed Soil Growth chamber Pipettes Distillator Hot air oven	Distilled water Sodium hypochlorite Ethanol
7	Effect of temperature on protein content in plant tissues	Petri dishes Plastic pots different sizes Filter papers Forceps Seeds of some crops such as wheat and seeds of plant weed Soil Growth chamber Pipettes	Distilled water Sodium hypochlorite Ethanol Sodium carbonates Copper sulphate (hydrated) Sodium hydroxide Sodium potassium tartrate

		Distillator Hot air oven Spectrophotometer Water bath Sonicator Centrifuge Refrigerator Digital balance Vortex Cuvettes Tips (blue-yellow-white) for automatic Test tubes Filter papers	Egg albumin Folin Ciocalteau reagent
8	Effect of allelochemicals on seeds germination and seedlings growth	Petri dishes Plastic pots (different sizes) Filter papers Ruler Forceps Seeds of some crops such as wheat and seeds of plant weed Soil Growth chamber Pipettes Distillator Hot air oven	Distilled water Sodium hypochlorite Ethanol
9	Effect of allelochemicals on chlorophyll content in plant	Petri dishes Plastic pots different sizes	Distilled water Sodium hypochlorite

	tissues	Filter papers Forceps Seeds of some crops such as wheat and seeds of plant weed Soil Growth chamber Pipettes Tips (blue-yellow-white) for automatic Distillator Hot air oven Spectrophotometer Water bath Sonicator Centrifuge Refrigerator Digital balance Vortex cuvettes Falcon tubes Test tubes Homogenizer Torloux Filter papers	Ethanol Methanol Acetone
10	Effect of allelochemicals on flavonoids content in plant tissues	Petri dishes Plastic pots different sizes Filter papers	Distilled water Sodium hypochlorite Ethanol

		Forceps Seeds of some crops such as wheat and seeds of plant weed Soil Growth chamber Pipettes Distillator Hot air oven Spectrophotometer Water bath Sonicator Centrifuge Refrigerator Digital balance Vortex Tips (blue-yellow-white) for automatic cuvettes Test tubes Filter papers	Methanol Sodium nitrite Aluminum chloride Quertcetin Sodium hydroxide
11	Effect of different biotic and abiotic stresses on morphological features of plants	Petri dishes Plastic pots different sizes Filter papers Forceps Seeds of some crops such as tomato, cucumber Soil Growth chamber	Ethanol Distillated water Sodium hypochlorite Methanol Tween Barium chloride Sulfuric acid

		Incubator Spectrophotometer Pipettes Conical flasks Tips (blue-yellow-white) for automatic Distillator Sonicator Centrifuge Refrigerator Digital balance Vortex Falcon tubes Test tubes Filter papers	
5	Course Name: Plant Diseases	Course Code: BIO 475	Group: B (Level 10& 11)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	- Recognition instruments and materials used in Lab. of Microbiology - Biosafety in Lab. of Microbiology - Sterilization (physical - chemical mechanical) methods	Incubators- Autoclave Oven- Refrigerator Lyophilizer-Shaker- Balance- Water- bath-pH meter - Thermometers- Water Distillator- Spectrophotometer- Centrifuges - Compound Microscopes- Oil Immersion Lens-Eyepiece	-

		micrometer- Isolation Cabinet- Colonies counter- Bunsenburner - Automatic pipettes Conical Flasks- Beakers- Volumetric Flasks- Measuring Cylinders -Burettes- Bel jars- Desiccators- - Test tubes-Pipettes Petri dishes- Slides Glass cover- Cavity slides Bent glass rod Inoculation needles-Inoculation loop needles- Cork borers - Forceps--Scissors Filter paper discs Bacterial filters	
2, 3	Viral Plant diseases	Scientific films	-
4, 5	Bacterial Plant diseases	Some of above –mentioned materials	-
6, 7	Fungal Plant diseases	Some of above –mentioned materials	Culture Media
8	Plant-parasitic Nematodes	Baermann funnel, sieves	Culture Media
9, 10	Control, biocontrol of plant diseases	Scientific films	-
11	Final Practical Exam		

6	Course Name: Biotechnology	Course Code: BIO 476	Group: B (Level 10& 11)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	- Introduction on biotechnology Laboratory design and safety - Equipment and tools used in biotechnology Laboratory	Ovens Incubators Water baths Electric heaters Digital balances Autoclaves Centrifuges Cold-Box Incubators Refrigerators -80° C Refrigerator UV cabinets Microscopes Laminar flows Fume hoods Distillators Water deionizers Balances Ultra-Low Freezers pH-meters Luxe-meters Fixed micropipettes Variable micropipettes	

		Hot plates Sonicators Vortex PCR machines Plastic and glass wares	
2	- Industrial dye degrading bacteria isolation -1 (media preparation) - Industrial dye degrading bacteria isolation -2 (bacteria isolation)	Laminar flow Autoclave Incubator Refrigerators Hot plates Vortex Distillator Balances pH-meter Plastic and glass wares Incubator Microscope Slides and covers	NS solution NA media LB Media Congo red Clorox – Methylene bleu stain Safranin stain Lugol solution Ethanol Cedar wood oil Distilled water
3	- Rhizobia isolation and examination-1 (media preparation) - Rhizobia isolation and examination-2(bacteria isolation and examination)	Laminar flow Autoclave Incubator Refrigerators Hot plates Vortex Distillator Balances	NS solution NA media YEM Media Clorox –Ethanol Methylene bleu stain Safranin stain Lugol solution Ethanol

		pH-meter Plastic and glass wares Microscope Slides and covers	Cedar wood oil Distilled water
4	Probiotic bacteria isolation and examination-1 (media preparation)	Laminar flow Autoclave Incubator Refrigerators Hot plates Vortex Distillator Balances pH meter Plastic and glass wares	NS solution NA media MRS /M17 media -Yogurt or olive
5	Probiotic bacteria isolation and examination-2 (bacteria isolation and examination)	Incubator Microscope Slides and covers	Methylene bleu stain Safranin stain Lugol solution Ethanol Cedar wood oil Distilled water
6	Amylase producing bacteria isolation	Laminar flow Autoclave Incubator Refrigerators Hot plates Vortex Distillator	NS solution NA media Starch agar Media Iodine (I2)

		Balances pH-meter Plastic and glass wares	
7	Pectinase producing bacteria isolation and jus clarification-1 (media preparation)	Laminar flow Autoclave Incubator Refrigerators Hot plates Vortex Distillator Balances pH-meter Plastic and glass wares	NS solution NA media Apple or citrus pectin Retinium red stain Distilled water
8	Pectinase producing bacteria isolation and jus clarification-2 (bacteria isolation and jus clarification)	Incubator Microscope Slides and covers	Natural turbid jus
9	Exopolysaccharides (dextran) producing bacteria isolation	Laminar flow Autoclave Incubator Refrigerators Hot plates Vortex Distillator Balances pH-meter	NS solution NA media MSE Media

		Plastic and glass wares	
10	- Antibiotic producing bacteria isolation-1 (media preparation) - Antibiotic producing bacteria isolation-2 (bacteria isolation and examination)	Laminar flow Autoclave Incubator Refrigerator Hot plates Vortex Distillator Balances pH-meter Plastic and glass wares Microscope Slides and covers	NS solution NA media Methylene bleu stain Safranin stain Lugol solution Ethanol Cedar wood oil Distilled water
11	Final Practical Exam		

GROUP (C)

1	Course Name: Bioinformatics	Course Code: BIO 482	Group: C (Level 11& 12)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	Introduction to Bioinformatic and computational biology	Nothing	-
2	DNA Sequencing methods and instruments	Computer lab. + internet connection	-
3	National Center for Biotechnology Information	Computer lab. + internet connection	-

	(NCBI)		
4	Genomic Sequence Databases -1 GenBank	Computer lab. + internet connection	-
5	Genomic Sequence Databases -2 EMBL	Computer lab. + internet connection	-
6	Genomic Sequence Databases -3 DDBJ	Computer lab. + internet connection	-
7	Protein Sequence Databases-1 Protein Information Resource (PIR)	Computer lab. + internet connection	-
8	Protein Sequence Databases-2 SWISS-PROT	Computer lab. + internet connection	-
9	Protein Sequence Databases-3 Protein DataBank (PDB)- Munich Information Center for Proteins (MIPS)	Computer lab. + internet connection	-
10	Secondary Databases SEQUENCE ALIGNMENT AND DATABASE SEARCHING	Computer lab. + internet connection - Computer lab. + internet connection BLAST	-
11	Final Practical Exam		
2	Course Name: Economic Plants of KSA	Course Code: BIO 483	Group: C
Weeks	Experiments	Materials	
		Tools	Chemicals
1	- Collection and identification of the morphological	1. Portable refrigerator	1. Distilled water 2. Dettol for

	characteristics and economic importance of medicinal plants spread in the Kingdom of Saudi Arabia - Collection and identification of morphological characteristics and economic importance of plants of cereals and leguminous spread in the Kingdom of Saudi Arabia	2. Sterilized plastic bags 3. Absorbent paper to absorb sap of collected plants 4. Sterile chemicals (Dettol-Naphthalene-Sprayer)	sterilization 3. Ethyl alcohol for sterilization 4. Naphthalene 5. Plastic Rap 6. Aluminum paper 7. Absorbent paper
2	Collection and identification of the morphological characteristics and economic importance of plants of oils and aromatic plants scattered in the Kingdom of Saudi Arabia	1. Portable refrigerator 2. Sterilized plastic bags 3. Absorbent paper to absorb sap of collected plants 4. Sterile chemicals (Dettol-Naphthalene-Sprayer)	1. Distilled water 2. Dettol for sterilization 3. Ethyl alcohol for sterilization 4. Naphthalene 5. Plastic Rap 6. Aluminum paper 7. Absorbent paper
3	Collection of samples of various natural fibers species + pieces of tissues of those fibers and cords	1. Cotton fibers 2. Linen fibers 3. Piece of twill 4. A piece of linen fabric 5. Models of different types of paper 6. Rough fibers of palm plants and some gramines	1. Chitac sheets for fixing and preserving samples 2. Cardboard paper and cork 3. Aluminum paper 4. Naphthalene for conservation
4	Collection of samples of various natural fibers species + pieces of tissues of those fibers and cords	1. Cotton fibers 2. Linen fibers 3. Piece of twill 4. A piece of linen fabric	1. Chitac sheets for fixing and preserving samples 2. Cardboard paper and cork

		5. Models of different types of paper 6. Rough fibers of palm plants and some gramines	3. Aluminum paper 4. Naphthalene for conservation
5	Measuring the oil content of plants producing oils	1. Ceramic mortar and pestle 2. Filter gauze cloth 3. conical flasks (100 - 250 - 500 ms) and cones 4. Centrifuge 5. Test tubes 6. pH meter	1. phenol phthalene 2. Sodium hydroxide 3. Hydrochloric acid
6	- Measuring the oil content of plants producing oils - Oil-producing plants - Quality measurement of olive oil	1. Ceramic mortar and pestle 2. Filter gauze cloth 3. conical flasks (100 - 250 - 500 ms) and cones 4. Centrifuge 5. Test tubes 6. pH meter 7. Olive oil from various commercial sources	1. phenol phthalene 2. Sodium hydroxide 3. Hydrochloric acid
7	Measuring the level of sugars in some sugar producing plants	1. Hot air oven 2. Mixer and Crushing Mixer 3. Spectrophotometer	Chemicals for measuring reducing sugars
8	Measuring percentage of nutritional differences in different date varieties	1. Microscopes- Hot air oven 2. Mixer and Crushing Mixer 3. Spectrophotometer	Chemicals for measuring reducing sugars + Chemicals for measuring protein
9	Methods of separating and extracting active substances	1. Rotary Evaporator 2. Funnels, conical flasks and	1. Distilled water

	from medicinal plants	glass funnels (different sizes) 3. Drying oven 4. Centrifuge 5. Hot plate 6. Gauze 7. Aluminum paper 8. Parafilm 9. Filter paper	2. Organic solvents 3. Ethyl alcohol 4. Methyl alcohol
10	- Chromatography (Chlorophyll extraction from plants) - Chromatography (Color separation)	1. Glass column 2. Dropper 3. Cotton 4. Injector 5. Glass beakers (different sizes) 6. Test tubes 7. Plant leaves 8. White chalk 9. Pencil 10. Pens in different colors 11. Beaker size 100 ml	1. Sodium carbonate 2. Acetone 3. Hexane 4. Sulfuric acid 2M 5. Ethanol
11	Final Practical Exam		
3	Course Name: Plant Communities	Course Code: BIO 484	Group: C (Level 11& 12)
Weeks	Experiments	Materials	
		Tools	Chemicals

1	Methods of vegetation sampling (random, systematic and stratified sampling)	-	-
2	- Determination of the minimal area for community sampling - Determination of the minimal area for community sampling using field data	Field trip	-
3	Measuring quantitative characters of vegetation (density, cover, frequency) by quadrat method	-	-
4	- Determination of quantitative characters of vegetation by quadrat method using field data - Determination of quantitative characters of vegetation by quadrat method using field data	Field trip, quadrats of different sizes	-
5	Measuring quantitative characters of vegetation (density, cover, frequency) by transect method	-	-
6	Measuring quantitative characters of vegetation by transect method using field data	Field trip	-
7	Measuring quantitative characters of vegetation by point centered quarter method	-	-
8	Measuring quantitative characters of vegetation by point centered quarter method using field data	Field trip	-
9	Methods of classifying and analyzing vegetation data.	TWINSPAN software, DECORANA software	-

10	- Measuring species diversity (species richness, species evenness, Shannon Index) - Determination of species diversity using field data	-	-
11	Final Practical Exam		
4	Course Name: Microbial Environment	Course Code: BIO 486	Group: C (Level 11& 12)
Weeks	Experiments	Materials	
		Tools	Chemicals
1	- Recognition instruments and materials used in Lab. of Microbiology - Physico-chemical characteristics of different habitats	Incubators- Autoclave Oven- Refrigerator Lyophilizer-Shaker- Balance- Water- bath-pH meter - Thermometers- Water Distillator- Spectrophotometer- Centrifuges - Compound Microscopes- Oil Immersion Lens-Eyepiece micrometer- Isolation Cabinet- Colonies counter- Bunsen burner - Automatic pipettes Conical Flasks- Beakers- Volumetric Flasks- Measuring Cylinders -Burettes- Bel jars- Desiccators- - Test tubes-Pipettes Petri dishes- Slides	Manganese sulfate alkali-iodide-azide concentrated sulfuric acid starch solution Sodium thiosulfate - Beef extract - Peptone Yeast extract- Agar agar Gelatin- Indian ink – Silica - Methylene blue-Nigrosin Crystal violet-Ethyl alcohol Safranin—Malachite green-Disinfectants- Cedar oil- Dehydrated and

		Glass cover- Cavity slides Bent glass rod Inoculation needles-Inoculation loop needles- Cork borers – Forceps-Scissors ,Filter paper discs Bacterial filters, Sieve	prepared media- Iodine- Vaseline- Antibiotics API 20E
2	Studying bacteria in air , water and soil habitats	Petri dishes -Incubator-Isolation cabinet- Inoculation loop needles- Test tubes-Durham tubes Water bath-	Dehydrated and prepared media
3	Winogradsky Column	Plastic bottle Scissors, large rubber band plastic wrap, mud shovel and bucket (to dig and carry the mud) water (from the tap or mud source),pitcher or small plastic bottle (to carry the water),spoon and 2 mixing bowls (1 large, 1 medium) a page of newspaper, shredded, an egg yolk (raw or hard-boiled),gloves	Calcium or magnesium Calcium Carbonate Sodium Sulfide
4	Studying fungi in air, water and soil habitats	-Petri dishes -Incubator-Isolation cabinet- Inoculation loop needles-	Dehydrated and prepared media

5	Studying algae in air, water and soil habitats	ultrasonic water bath -Petri dishes -Incubator- Test tubes Isolation cabinet- Inoculation loop needles	Dehydrated and prepared media
6	Biological sewage treatment	Field trip to Biological Sewage Treatment Plant	-
7	Effect of environmental factors on microbial growth	Petri dishes -Incubator-Isolation cabinet- Test tubes Inoculation loop needles	Dehydrated and prepared media
8	Antagonistic between microbes	-Petri dishes -Incubator-Isolation cabinet- Test tubes Inoculation loop needles-	Dehydrated and prepared media
9	Biogeochemical cycles	-Petri dishes -Incubator-Isolation cabinet- Test tubes Inoculation loop needles-	Dehydrated and prepared media
10	- Bioremediation Olive mill wastewater (OMW) from Aljouf - Bioremediation of hydrocarbons	-Petri dishes -Incubator-Isolation cabinet- Test tubes Inoculation loop needles-	Dehydrated and prepared media- phenols- hydrocarbons
11	Final Practical Exam		