Al-Azhar University (Girls branch)
Faculty of Science
Department of Chemistry

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم الكيمياء

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Chemistry
Academic year: 3rd **Level:** 1st
Date of specification approval **1/2016**

-Course data		
Code: Biochem 367	**Course Title: Biochemistry**	**Academic year: 3rd year**
Credit/ Taught Hours: Theoretical: Four Practical: Four		**Level: 1st**

1- Course aim	To enable the student to be oriented with the biochemical importance of macro- and micronutrients as well as the structure and functions of enzymes and vitamins
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: a1. Explain the basic scientific facts, concepts and principles in chemical processes found within the microbial cells.
2.B- Intellectual Skills:	By the end of the course, students must be able to: b1. Use integrated approaches to evaluate, analyze, interpret in various subjects in biochemistry.
2.C- Professional Skills:	By the end of the course, students must be able to: c1. Use techniques and tools considering the scientific ethics. c2. Record and analyze experimental data, interpret their validity, apply statistical analyses and suggest further investigations. c3. Take effective notes and record experimental procedures and laboratory protocols.
2.D- General Skills:	By the end of the course, students must be able to: d1. Work in a group and communicate with others positively. d2. Maintain good records of laboratory work and of results.

3- Course content: (theoretical and then practical)

Theoretical part content

Topic	No. Hours	Lecture	Tutorial/Practical
3.1. The chemical structure, properties and reactions of: Carbohydrates, lipids, proteins and amino acids, nucleotides and nucleic acids. 3.2. Enzymes: definition, chemical nature, mechanism of action, factors affecting the rate of enzyme action, enzyme activators and inhibitors, and enzyme classification. 3.3. Vitamins: definition, classi- fication, chemical structure, mechanism of action, biomedical importance and disturbances.	**8hrs/week**	**4hrs/week**	**4hrs/week**

4- Teaching and learning methods:

4.1. Lectures
4.2. Practical classes (small group teaching and practice of laboratory skills)
4.3. Biochemical laboratory report comments.
4.4. Small research project in certain topic to each group in lab. from the internet and available books in the library.
4.5. Discussion.

5- Students assessment:

5.A- Assessment methods:		5.1.1. **Written exam**	-To assess: Knowledge and Understanding - Intellectual Skills
		5.1.2. **Oral exam**	-To assess: Knowledge and Understanding - Intellectual Skills
		5.1.3. **Practical exam**	To assess: Professional and Practical Skills
		5.1.4. **Attendance of students.**	To assess: General and Transferable Skills

5.B- Assessment schedule		Assessment 1: **Quizzes** **Final written exam**	Week: every other week at the end of the term	
		Assessment 2: **Oral exam** **Final oral exam**	Week: weekly at the end of the term	
		Assessment 3: **Final practical exam**	Week: at the end of the term	

5.C- Assessments weights	Semester work %	14 %
	Oral Examination %	6 %
	Practical Examination %	30 %
	Final Examination%	50 %
	Total %	100 %

6- List of Books and references

6.A- Notes:	Course Notes
6.B- Essential books:	
6.C- Recommended books:	Harper's Biochemistry (Murray, R. K. *et al*., 2003) Biochemistry. An introduction (Mc Kee, T. and Mc Kee, J.,)
6.D- Scientific periodicals, websites ….etc	

7- Facilities required for teaching and learning:

-Providing class rooms with multimedia system.

- Laboratory facilities (chemicals, kits and instruments) to perform the required experiments.

Course coordinator: **Head of Department:**

Asss. Prof. Mona Abd El-Gelel **Prof. Dr. Amal Salah**

8- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
3.1. The chemical structure, properties and reactions Carbohydrates, lipids, proteins and amino acids, nucleotides and nucleic acids. 3.2. Enzymes:,. 3.3. Vitamins:	a1	A1	b1	B7	c1	C2	d1	D4	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
					c2	C6	d2	D13			
					c3	C7					

Al-Azhar University (Girls branch)
Faculty of Science
Department of Botany and Microbiology

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم النبات والميكروبيولوجى

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 1st
Date of specification approval **1/2016**

Course data		
Code: M301	**Course Title: Microbial Physiology**	**Academic year: 3rd year**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 1st**

1- Course aim	The aim is to provide students of main concepts of physiology of different microorganisms, their nutritional, isolation, preservation, growth as well as metabolic activities.
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1**. Describe the theories and methods applied for interpreting and analyzing biological data. **a2.** Explain main concepts of biological life forms complexity, diversity and physiological, in the community and their relation to the environment. **a3**. Explain knowledge about diversity and evolution in diverse aspects of the field of microbiology.
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Demonstrate independent logical thinking. **b2.** Solve problems, both individually and co-operatively.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Use techniques and tools considering the scientific ethics. **c2.** Apply the different methods used for preparing, processing, interpreting and presenting data for biological samples. **c3.** Carry out aseptic techniques such as isolate, culture, enumerate and identify a range of micro-organisms. **c4.** Record and analyze experimental data, interpret their validity, apply statistical analyses and suggest further investigations. **c5.** Take effective notes and record experimental procedures and

laboratory protocols.

2.D- General Skills:

By the end of the course, students must be able to:
d1. Meet deadlines and priorities workloads to achieve targets.
d2. Overcome problems.
d3. Maintain good records of laboratory work and of results.

3- Course content: (theoretical and then practical)

Theoretical part content

Topic	No. of Hours	Lecture(s)	Practical/ Tutorial
	4hrs/week	2hrs/week	2hrs/week
Introduction and identification of bacteria and relation of bacteria to the plant kingdom			
The structure of bacteria, spores, and end spores formation and germination			
Reproduction of bacteria			
Staining and mechanism of staining			
Nutrition of bacteria			
Immunity due to infection by pathogenic microbes in the form of natural and acquired immunity			
Growth of bacteria			
Factors affecting bacterial growth physical conditions required for bacterial growth			
The biotic factors which clarify the relation of microorganisms to each other in their nature habitats			
Chemical changes formed by bacteria- fermentation- respiration- dissimilation of proteins, carbohydrates and fats by microorganism.			
Role of microorganisms in carbon, sulfur and nitrogen cycles			

Practical part content

Topic
1- Divided the students into groups and give them instructions of work
2- Effect of light & dark on growth of a microorganisms
3- Effect of static & shaken condition on growth of a microorganism
4- Effect of different inoculum size condition on growth of a microorganism
5- Effect of temperature condition on growth of a microorganism
6- Effect of pH condition on growth of a microorganism
7- Effect of C-source condition on growth of a microorganism
8- Effect of N-source condition on growth of a microorganism
9- Effect of C/N ratio condition on growth of a microorganism
10- Effect of different minerals concentrations on growth of a microorganism
11- antagonism and association between microorganisms
12- Revision

4- Teaching and learning methods:

White Board and try to use data show in some lectures, if possible.
Motivate my students to use the internet to gathered some recent informations related to our course.
Encourage my students to participate in group discussion in some recent scientific information related to our course.

5- Students assessment:

5.A- Assessment methods:

- periodical exams in both lab and course.
- Oral exam to evaluate the performance of my students.

	• Distribute some individual or group assignments. • Practical exam • Mid-term exam • Final exam
5.B- Assessment schedule	Assessment 1 Practical examination 14th Week Assessment 2 Final-term examination Week according to faculty's exam schedule
5.C- Assessments weights	**Semester work 14% Oral exam 6%** **Final Practical exam 30%** **Final Exam 50%**

6- List of Books and references

6.A- Notes:	Notes in the course are provided to the students
6.B- Essential books:	**Bilgrami, K.S. and Verma R.N. ( ):** Physiologi of Fungi. **Cappuccino, J.G. and Sherman, Natalie (2001):** Microbiology, A Laboratory Manual. Pub. Benjamin Cummings. U.S.A. **Collins, C.H.; Lyne, Patricia M. and Grange, j.M. (1995):** Microbiological Methods.Pub. Butterworth-Heinemann Ltd. Great Britain. **Colome, J.S.; Cano, R.J.; Kubinski, A.M. and Grady, D.V. (1986):** Laboratory Exercises in Microbiology. Pub. West Publishing Company. U.S.A. **Moat, A.G. (1979):** Microbial Physiology. Pub. John Wiley & Sons. U.S.A. **Moat, A.G., Foster, J.W. and Spector, M.P. (2002):** Microbial Physiology. Pub. John Wiley & Sons. U.S.A. **Schlegel, H.G. (1995):** General Microbiology. Pub. Cambridge, Great Britain. **Smith, J.E. (1996):** Biotechnology. Pub. Cambridge, Great Britain.
6.C-Recommended books:	
6.D- Scientific periodicals, websites ….etc	

7- Facilities required for teaching and learning:

Glass Wears – Chemicals. Microorganisms.
-Oven – Refrigerator – Incubator. Autoclave.
-Electrical balance – Colorimeter.
-Chemicals.

Course coordinator: **Head of Department:**
Prof. Dr. **Prof. Azza Khafagi**

8- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Introduction and identification of bacteria and relation of bacteria to the plant kingdom The structure of bacteria, spores, and end spores formation and germination Reproduction of bacteria Staining and mechanism of staining Nutrition of bacteria Immunity due to infection by pathogenic microbes in the form of natural and acquired immunity Growth of bacteria Factors affecting bacterial growth physical conditions required for bacterial growth The biotic factors which clarify the relation of microorganisms to each other in their nature habitats Chemical changes formed by bacteria- fermentation- respiration- dissimilation of proteins, carbohydrates and fats by microorganism. Role of microorganisms in carbon, sulfur and nitrogen cycles	a1	A5	b1	B6	c1	C2	d1	D10	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Attendence Semester work	research project laboratory report comments written exam course portfolio
	a2	A7	b2	B8	c2	C4	d2	D11			
	a3	A9			c3	C5	d3	D13			
					c4	C6					
					c5	C7					

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Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 1st
Date of specification approval **1/2016**

Course data		
Code: M 302	**Course Title: Mycology& Plant Pathology**	**Academic year: 3rd year**
Credit/ Taught Hours: Theoretical: Four Practical: Four		**Level: 1st**

1- Course aim	Deliver students with a broad understanding of the fundamental principles of microbiology emphasizing Mycology.
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Define terminology, nomenclature and classification system in microbiology and related subjects in Botany. **a2.** Explain main concepts of biological life forms complexity, diversity, molecular, cytological, morphological, physiological, genetical from unicellular to complex organism in the community and their relation to the environment.
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Conduct a report on an independent project.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Use techniques and tools considering the scientific ethics. **c2.** Use the scientific literature correctly and effectively by collecting research topic in one field to write research reports and essay.
2.D- General Skills:	By the end of the course, students must be able to: **d1.** Overcome problems. **d2.** Locate information from a wide range of sources and extract, collect and present that information in an appropriate form and use IT effectively.

3- Course content: (theoretical and then practical)	**Practical part content**

Topic	No. of Hours	Lectures.	Practical
	8hrs/week	**4hrs/week**	**4hrs/week**
Division: Gymnomycota Genus: *Arcyria,Stemonitis,Dictydium,Ceratiomyxa.*			
Division: Mastigomycota Genus: *S.endobioticum, Allomyces macrogynus, Plasmodiophora brassica*			
Saprolegnia sp., Albugo candida, Plasmopara viticola, Peronospora parasitica, Bremia lactucae			
Division: Amastigomycota *Genus: Rizopus,Mucor, Cunninghamella* *Shizosaccharomyces, Saccharomyces cerevisiae*			
Taphrina deformans *Aspergillus* *Penicillium* *Ersiphe*			
Podosphera *Uncinula* *Sordaria*			
Claviceps purpuria *Peziza vesiclosa*			
Agaicus			
Loose smuts of creals *Ustilago tritici* *Ustilago nuda*			
Covered smut of cereals *Ustilago hordei* *Ustilago maydis* *Tilletia caries*			
Puccinia graminis			
Alternaria solani *Fusarium*			
Revision			

4- Teaching and learning methods:	Light microscopes Readymade slides for systematic fungi Infected Plant tissues with fungi Slides and Coverslips Projector

5- Students assessment:	
5.A- Assessment methods:	-Oral presentation to assess their understanding. - Projects to assess their abilities to obtain information. - Oral exams to assess their understanding. -Writing exam. - Practical exam
5.B- Assessment schedule	Assessment 1 Practical examination 14th Week Assessment 2 Final-term examination Week according to faculty's exam schedule
5.C- Assessments weights	**Semester work 14% Oral exam 6%** **Final Practical exam 30%** **Final Exam 50%**
6- List of Books and references	
6.A- Notes:	Mycology Notes
6.B- Essential books:	
6.C- Recommended books:	Webster, J. (1986). Introduction to Fungi. 2nd ed., Cambridge Univ. Press Alexopoulos, C.J.; Mims, C.W. and Blackwell, M. (1966). Introductory Mycology. Vashista, B.R. and Singa, A.K. (2005). Botany for degree students fungi/S.chand and company LTD Vidhyasekaran, P. (2006). Principles of plant pathology. 1st ed./ CBS Pub. & Distributers http:// hlios bto.ed.ac.uk.fungal biology
6.D- Scientific periodicals, websites ….etc	

Course coordinator: **Head of Department:**

Dr. Ebtisam Naeem **Prof. Azza Khafagi**

7- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Division: Gymnomycota Genus: Division: Mastigomycota Genus: *Division: Amastigomycota* Loose smuts of creals Covered smut of cereals *Alternaria solani* *Fusarium*	a1	A4	b1	B9	c1	C2	d1	D11	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A7			c2	C9	d2	D12			

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Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 1st
Date of specification approval **1/2016**

Course data		
Code: M 305	**Course Title:** Microbial Cytology	**Academic year: 3rd**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 1st**

1- Course aim	Study the diverse aspects of the field of microbiology cytology including, structures and functions of different cell components and how some compounds affect on cell (s) function and structure and cell organelles.
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Explain main concepts of biological life forms complexity, diversity, molecular, cytological, morphological, physiological, genetical from unicellular to complex organism in the community and their relation to the environment. **a2.** Discuss the essential facts, major concepts, principles, and theories in basic sciences (chemistry, physics, geology, zoology, botany, microbiology, mathematics, statistics, humanities, and computer science).
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Demonstrate independent logical thinking. **b2.** Use integrated approaches to evaluate, analyze, interpret in various subjects in Microbiology.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Take effective notes and record experimental procedures and laboratory protocols.

2.D- General Skills:	By the end of the course, students must be able to: **d1.** Meet deadlines and priorities workloads to achieve targets. **d2.** Locate information from a wide range of sources and extract, collect and present that information in an appropriate form and use IT effectively. **d3.** Maintain good records of laboratory work and of results.

3- Course content: (theoretical and then practical)

Theoretical part content

Topic	No. of Hours	Week(s) No.	No. of Lecture(s)
	4hrs/week	2hrs/week	2hrs/week
Basic groups of microbes Eukaryotic Versus Prokaryotic Cells			
The Three Domain System			
The cytoplasmic membrane.			
Bacterial and archaeal cell wall.			
Prokaryotic Cell Structure (Structures located inside the cell)			
Structures located outside the cell.			
Eukaryotic cell; cytoplasmic membrane.			
The cell wall (plant, algae and fungi).			
Endomembrane system(The cytoplasm, nucleus; endoplasmic reticulum; Mitochondria; Chloroplasts; Golgi complex; Ribosomes ;Lysosomes; Peroxisomes; Proteasomes; Flagella ;cilia and Centrioles ; cytoskeleton and Vacuoles and vesicles).			

Practical part content

Topic
1-THE SIZE, SHAPE, AND ARRANGEMENT OF BACTERIAL CELLS.
2-BACTERIAL CELL STRUCTURE: FLAGELLA, PILUS, CAPSULE, SLIM LAYER
3- BACTERIAL CELL WALL.
4- STRUCTURE OF AN ACID-FAST CELL WALL.
5- CYTOPLASMIC MEMBRANE (CELL MEMBRANE)(PLASMA MEMBRANE).
6- BACTERIAL CHROMOSOME.
7- BACTERIAL SPORE FORMATION (SPORULATION PROCESS).
8-PLANT CELL.
9-ANIMAL CELL.
10-FUNGI (YEAST CELL).
11-THE NUCLEUS STORES THE HEREDITARY MATERIAL OF THE CELL.
12- MITOCHONDRIA CHLOROPLAST.
13- CENTRAL VACUOLES LYSOSOME, PEROXISOMES.
14- REVISION

4- Teaching and learning methods:	**1-Presentation of literatures by projector.** **2-Discussion of subjects with students.** **3- Illustrations, photographs, and/or animations to help the visual learner.** **4-Studding some literatures on internet.**

5- Students assessment:

5.A- Assessment methods:	**1-Oral presentation to assess their understanding.** **2-Projects to assess their abilities to obtain information .** **3-Oral exams to assess their understanding.** **4-Written exams to assess their understanding**
5.B- Assessment schedule	**Assessment 1 from the second week** **Assessment 2 at the 10th week** **Assessment 3 at the end of the semester week .** **Assessment 4 at 6th week; 8th week and midterm.**

5.C- Assessments weights

Assessment	%
Semester work	14%
Term examination oral	6%
Term examination final	50%
Examination Practical	30%
Total	100%

6- List of Books and references

6.A- Notes:	Course notes
6.B- Essential books:	
6.C- Recommended books:	
6.D- Scientific periodicals, websites ….etc	web sites etc… http://www.cytochemistry.net/Cell-biology/rer1.htm http://www.cell-biology.org/

Course coordinator: **Head of Department:**

Asso. Prof. Rawhia Arafa **Prof. Azza Khafagi**

7- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Basic groups of microbes Eukaryotic Versus Prokaryotic Cells The Three Domain System The cytoplasmic membrane. Bacterial and archaeal cell wall. Prokaryotic Cell Structure (inside the cell) (outside the cell). Eukaryotic cell; cytoplasmic membrane, the cell wall (plant, algae and fungi). Endomembrane system	a1	A7	b1	B6	c1	C7	d1	D10	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A8	b2	B7			d2	D12			
							d3	D13			

Al-Azhar University (Girls branch)
Faculty of Science
Department of Botany and Microbiology

جامعة الأزهر (فرع البنات)
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Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 1st
Date of specification approval **1/2016**

Course data		
Code: M306	**Course Title: Environmental Pollution**	**Academic year: 3rd**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 1st**

1- Course aim	Deliver students with a broad understanding of the fundamental principles of microbial pollution and its role in our daily life.
2- Intended Learning Outcomes (ILOs): By the end of the course, students must be able to:	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Describe the theories and methods applied for interpreting and analyzing biological data. **a2.** Illustrate interaction of pollutants with soil, water and air.
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Conduct a report on an independent project. **b2.** Analyze published information in microbiology; and formulate hypotheses with the minimum of assistance.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Use techniques and tools considering the scientific ethics. **c2.** Apply the different methods used for preparing, processing, interpreting and presenting data for biological samples. **c3.** Take effective notes and record experimental procedures and laboratory protocols.
2.D- General Skills:	By the end of the course, students must be able to: **d1.** Use scientific models, systems, and tools effectively. **d2.** Meet deadlines and priorities workloads to achieve targets.

3- Course content: (theoretical and then practical)

Theoretical part content

Topic	No. of Hours	Lectures	Practical
	4hrs/week	2hrs/week	2hrs/week
Introduction. Air pollution, types of air pollution (source, effects): carbon monoxide, carbon dioxide, sulphure oxides, nitrogen oxides, particulate matters. Acid rains. Controlling air pollution.			
-Water pollution, major water pollutants, industrial wastewater, thermal pollution, oil spills, agricultural wastewater, sewage, wastewater treatment.			
-Soil pollution, classes of herbicides problems of herbicides, fungicides and insecticides. Control of soil pollution.			
-Noise pollution (source, effects) and pollution due radiation (source, effects).			
Microbial toxins in the environment			
Bacterial toxins			
Algal toxins			
Corrosion			
Acid main drainage			
Metals and toxins			
Bacterial disease			
Revision + Exam			

Practical part content

Topic
Microbial toxins in the environment
Bacterial toxins Algal toxins
Corrosion Acid main drainage
Multiple tube fermentation method for bacteria analysis of water Antibiotics
Effect of inhibitors on microbial growth
Phosphatase test
Rusting of iron
Mushrooms (Toxins)
Cyanobacteria + Algae (Toxins)
Pictures
Revision + exam

<table>
<tr><td>4- Teaching and learning methods:</td><td>1- Literatures.
2-Discussion of subjects with students.
3- Illustrations, and photographs.
4-Researches.</td></tr>
<tr><td colspan="2">5- Students assessment:</td></tr>
<tr><td>5.A- Assessment methods:</td><td>1-Oral presentation to assess their understanding.
2-Projects to assess their abilities to obtain information.
3-Oral exams to assess their understanding.
4-Written exams to assess their understanding</td></tr>
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Assessment 2 at the 10th week
Assessment 3 at the end of the semester week.
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<tr><td>6.C- Recommended books:</td><td></td></tr>
<tr><td>6.D- Scientific periodicals, websites ….etc</td><td>Environmental Pollution – Journal
Journal of Environment Pollution and Human Health
Web sites …</td></tr>
</table>

Course coordinator: **Head of Department:**

7- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Air pollution, -Water pollution, -Soil pollution, Noise pollution and pollution due radiation Microbial toxins Corrosion Acid main drainage Metals and toxins Bacterial disease	a1	A5	b1	B9	c1	C2	d1	D7	Lectures Discussion Practical training Research group Pictures	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A10	b2	B11	c2	C4	d2	D10			
					c3	C7					

Al-Azhar University (Girls branch)
Faculty of Science
Department of Mathematics

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم الرياضيات

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Mathematics
Academic year: 3rd **Level:** 1st
Date of specification approval **1/2016**

Course data		
Code: MA 381	**Course Title:** Applied Statistics	**Academic year:** 3rd
Credit/ Taught Hours: Theoretical: Two **Exercise: Two**		**Level: 1st**

1- Course aim	By the end of the course, the student will be able to: ●Build a background and basic knowledge in the field of applied statistics**.**
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: a1. Explain the concept of probability and how to handle using methods and theory of probability for calculating different probabilistic problems in biology. a2. Explain the relation between the studied topics and the environment.
2.B- Intellectual Skills:	By the end of the course, students must be able to: b1. Demonstrate independent logical thinking. b2. Use integrated approaches to evaluate, analyze, interpret in various subjects in Microbiology. b3. Solve problems, both individually and co-operatively.
2.C- Professional Skills:	By the end of the course, students must be able to: c1. Collect, analyze, and present data using appropriate formats and techniques.

<table>
<tr><td>2.D- General Skills:</td><td>By the end of the course, students must be able to:
d1. Overcome problems.
d2. Locate information from a wide range of sources and extract, collect and present that information in an appropriate form and use IT effectively.
d3. Assess the relevance and importance of ideas of others.</td></tr>
<tr><td>3- Course content: (theoretical)</td><td>
Theoretical part content
<table>
<tr><td>Topics</td><td>No. of Hours</td><td>Lectures.</td><td>Exercise</td></tr>
<tr><td>Collection and organization of data- Frequency tables - histogram – Polygon and curves.</td><td rowspan="11">4hrs/ week</td><td rowspan="11">2hrs/week</td><td rowspan="11">2hrs/week</td></tr>
<tr><td>Measures of central tendency such as , mean, median and mode in both grouped or ungrouped data</td></tr>
<tr><td>Measures of dispersion such as rang range –variance, standard deviation and coefficient of variation.</td></tr>
<tr><td>Sample space,event, the probability of the event –axioms of probabilities some simple results of probabilities</td></tr>
<tr><td>Conditional and total probabilities – Bayes theorem</td></tr>
<tr><td>Random variables and their types-cumulative distribution-expected values – variance</td></tr>
<tr><td>Some discrete distributions as Bernoulli binomial and Poisson and their properties.</td></tr>
<tr><td>Some continuous distributions
Such as normal, F,T, and σ and their properties.</td></tr>
<tr><td>Regression and correlation coefficient.</td></tr>
</table>
</td></tr>
<tr><td>4- Teaching and learning methods:</td><td>(4)1- Lectures
(4)2- discussion sessions
(4)3-Tutorial Sections for solving exercises and applications.</td></tr>
</table>

5- Students assessment:	
5.A- Assessment methods:	**(5)1-** Mid-Term exam to assess the ability of understanding and thinking of course material **(5)2-** Oral exam to assess their confidence and understanding the scientific materials **(5)3-** Discussions during the lectures to assess their ability of understanding **(5)4-** Final comprehensive Exam to asses knowledge of course material
5.B- Assessment schedule	Assessment 1 Practical examination 14th Week Assessment 2 Final-term examination Week according to faculty's exam schedule
5.C- Assessments weights	● **Semester work 14% (14/100)** ● **Oral Exam 6% (6/100)** ● **Final-Term Exam. 80% (80/100)** ● **Total 100% (100/100)**
6- List of Books and references	
6.A- Notes:	To be taken in class
6.B- Essential books:	-------
6.C- Recommended books:	● **Statistical Methods' Snedecor and Cochran 7th edition.1982.** ● **Probability and statistics for engineering and scientists 2nd edition Walpole and Myers (1978)**
6.D- Scientific periodicals, websites ….etc	● http://en.wikopedia.org/wiki/bio-Statistics ● http://math.fullerton.edu/mathews/n2003/Probability UndergradMod

Course coordinator: **Head of Department:**

7- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Collection and organization of data- Measures of central tendency Measures of dispersion Sample space,event, the probability of the event Conditional and total probabilities Random variables and their types- values – variance Some discrete distributions Some continuous distributions Regression and correlation	a1	A1	b1	B6	c1	C6	d1	D11	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A7	b2	B7			d2	D12			
			b3	B8			d3	D14			

Al-Azhar University (Girls branch)
Faculty of Science
Department of Mathematics

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم الرياضيات

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Mathematics
Academic year: 3rd **Level:** 1st
Date of specification approval **1/2016**

Course data		
Code: CS 300	**Course Title: Introduction to Computer Science**	**Academic year: 3rd**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 1st**

1- Course aim	**the aims are to:** • The main objective of the course is to make the student familiar to the computer system (hardware and software). • The course aims to develop skilled computer users with the technical background, knowledge. • The course provides students to basic concepts of computer system and their applications.
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Explain the essential concepts of computer science **a2.** Define the computer system and its components.
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Use integrated approaches to evaluate, analyze, interpret in various subjects in computer science. **b2.** Solve problems, both individually and co-operatively.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Record and analyze experimental data, interpret their validity, apply statistical analyses and suggest further investigations.
2.D- General Skills:	By the end of the course, students must be able to: **d1.** Overcome problems. **d2.** Locate information from a wide range of sources and extract, collect and present that information in an appropriate form and

	use IT effectively.
3- Course content: (theoretical and then practical)	**Theoretical part content** 1. Computer Fundamentals: Basic definitions, name the four basic operations that a computer performs. Describe the two main components of a computer system: hardware and software. 2. Provide examples of hardware devices that handle input, processing, output, and storage tasks. Give an example of the information processing cycle in action. 3. Discuss the two major categories and the various types of computers. 4. Explain the advantages and disadvantages of computer use, the risks involved in using hardware and software, ethical and societal impacts of computer use. Discuss how computers affect employment and List ways to be a responsible computer user. 5. Understand how computers represent data and the measurements used to describe data transfer rates and data storage capacity. 6. List the components found inside the system unit , explain their use, the components found on the computer's motherboard and explain their role in the computer system 7. Discuss (in general terms) how a CPU processes data and explain the factors that determine a microprocessor's performance. 8. List the various types of memory found in a computer system and explain the purpose of each. 9. Discuss network types , LAN topologies and LAN communication technologies
4- Teaching and learning methods:	1- Lectures 2 -discussion sessions 3-Lab sessions.
5- Students assessment:	
5.A- Assessment methods:	1- Oral Exam. to assess a1-a4, b1-b2, d1-d2 2- Final Exam to assess a1-a4, b1-b2, c1,d1 3- Semester work to assess a1-a4, b1-b2, c1
5.B- Assessment schedule	1- Oral Exam week 16 2- Final Exam week 16 3- Semester work Along the term
5.C- Assessments weights	- Semester work 21 - Final-Term Examination 50 - Oral Examination 9 - Practical Examination 20 Total 100%
6- List of Books and references	
6.A- Notes:	
6.B- Essential books:	• "Computers Are Your Future" 11th Edition by Catherine Laberta "Discovering Computers" 2012 by Gary B. Shelly & Misty E. Vermaat
6.C-	

Recommended books:	
6.D- Scientific periodicals, websites ….etc	

7- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
1. Computer Fundamentals: 2. Provide examples of hardware devices 3. Discuss the two major categories and the various types of computers. 3. Explain the advantages and disadvantages of computer use 4. Understand how computers represent data 5. List the components found inside the system unit 6. Discuss (in general terms) how a CPU processes data 7. List the various types of memory found in a computer system 8. Discuss network types	a1	A1	b1	B7	c1	C6	d1	D11	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A4	b2	B8			d2	D12			

Course coordinator: **Head of Department:**

Al-Azhar University (Girls branch)
Faculty of Science
Department of Botany and Microbiology

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم النبات والميكروبيولوجى

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 2nd
Date of specification approval **1/2016**

Course data		
Code: M 317	**Course Title: Applied Microbiology**	**Academic year: 3rd**
Credit/ Taught Hours: Theoretical: Four Practical: Four		**Level: 2nd**

1- Course aim	The course aims to deliver students with a broad understanding of the fundamental principles of applied microbiology.
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Explain main concepts of biological life forms complexity, diversity, and physiological, from unicellular to complex organism in the community and their relation to the environment. **a2.** Explain knowledge about applied microbiology **a3.** Illustrate interaction of microbes with soil, water, air, food…..etc.
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Demonstrate independent logical thinking. **b2.** Asses the moral, social and ethical issues of investigations and the need for ethical standards and professional codes of practice. **b3.** Analyze published information in microbiology; and formulate hypotheses with the minimum of assistance.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Use techniques and tools considering the scientific ethics. **c2.** Carry out aseptic techniques such as isolate, culture, enumerate and identify a range of micro-organisms. **c3.** Take effective notes and record experimental procedures and laboratory protocols.

2.D- General Skills:	By the end of the course, students must be able to: **d1.** Locate information from a wide range of sources and extract, collect and present that information in an appropriate form. **d2**. Maintain good records of laboratory work and of results.

3- Course content: (theoretical and then practical)

Theoretical part content

Topic	No. of Hours	Lectures (s) No.	Practical
	8hrs/week	4hrs/week	4hrs/week
Soil Bacteriology			
Decomposition of Carbohydrates			
Action of bacteria on organic nitrogenous compounds			
Action of bacteria on organic nitrogenous compounds and its relation to nitrogen cycle			
Symbiotic nitrogen fixation			
Non-Symbiotic nitrogen fixation			
Sulphur bacteria			

Practical part content

Topic	No. of Hours	Week(s) No.	Practical
Soil constituents, microorganisms in soil, Ecology of bacteria in soil	**8hrs/week**	**4hrs/week**	**4hrs/week**
Bacteria adaptation to environment, grouping of bacteria according to their existence in soil. Importance of bacteria in soil.			
Bacterial decomposition of non-nitrogenous organic compounds: Decomposition of Carbohydrates> Hydrolysis of starch Decomposition of cellulose Decomposition of hemi-cellulose Decomposition of lignine			
Action of bacteria on organic nitrogenous compounds Decomposition of protein			
Action of bacteria on proteins & amino acids results in formation of various indols. Action of bacteria on organic nitrogenous compounds and its relation to nitrogen cycle			
Symbiotic nitrogen fixation Non-Symbiotic nitrogen fixation			

	Sulphur bacteria			
	Microbiology of air			
	Microbiology of milk			
	Microbiology of food			
	Revision			

4- Teaching and learning methods:	**Theoretical explanation** **Practical experiments** **Microscopic examination** **Discussions**
5- Students assessment:	
5.A- Assessment methods:	1. Theoretical examination to assess their understanding each lecture 2. Oral examination to assess the level of student understanding. 3. Practical exam to assess their ability to pure microbial preparation under sterile conditions.
5.B- Assessment schedule	Assessment 1 Practical examination 14th Week Assessment 2 Final-term examination Week according to faculty's exam schedule
5.C- Assessments weights	**Semester work 14% Oral exam 6%** **Final Practical exam 30%** **Final Exam 50%**
6- List of Books and references	
6.A- Notes:	**Course note**
6.B- Essential books:	
6.C- Recommended books:	Soil and air microbiology. Applied Microbiology books, Wite, D. 2000. The Physiology and Biochemistry of Prokaryotes. Oxford University Press, New York, NY. Microbial Physiology and Biochemistry A quanitative approach. Oxford University Press, New York, NY.Fossing H., et al. 1995. Concentration and transport of nitrate by the mal-forming sulfur bacterium. Thioploca. Nature, Vol. 374:713-715
6.D- Scientific periodicals, websites ….etc	

7- Facilities required for teaching and learning:

Glass Wears – Chemicals. Microorganisms.
-Oven – Refrigerator – Incubator. Autoclave.
-Electrical balance – Colorimeter.
-Chemicals.

Course coordinator: **Head of Department:**

Prof. Dr. Enayat M. Desouky **Prof. Dr. Azza Khafagi**

8- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Soil Bacteriology Decomposition of Carbohydrates Action of bacteria on organic nitrogenous compounds Action of bacteria on organic nitrogenous compounds and its relation to nitrogen cycle Symbiotic nitrogen fixation Non-Symbiotic nitrogen fixation Sulphur bacteria	a1	A7	b1	B6	c1	C2	d1	D12	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A9	b2	B10	c2	C5	d2	D13			
	a3	A10	b3	B11	c3	C7					

Al-Azhar University (Girls branch)
Faculty of Science
Department of Botany and Microbiology

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم النبات والميكروبيولوجى

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 2nd
Date of specification approval **1/2016**

Course data		
Code: M309	**Course Title:** Parasitology	**Academic year: 3rd year**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 2nd**

1- Course aim	Deliver students with a broad understanding of the fundamental principles of Parasitology
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Explain main concepts of biological life forms complexity, diversity, cytological, morphological, physiological, from unicellular to complex organism in the community and their relation to the environment. **a2.** Define terminology, nomenclature and classification system in Parasitology
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Demonstrate independent logical thinking.
2.C- Professional Skills:	By the end of the course, students must be able to: **c4.** Take effective notes and record experimental procedures and laboratory protocols.
2.D- General Skills:	By the end of the course, students must be able to: **d1.** Maintain good records of laboratory work and of results. **d2.** Assess the relevance and importance of ideas of others.

<table>
<tr><td rowspan="2">3- Course content: (theoretical and then practical)</td><td colspan="4">Theoretical part content</td></tr>
<tr><td>
<table>
<tr><th>Topic</th><th>No. of Hours</th><th>Lectures</th><th>Practical</th></tr>
<tr><td>Introduction of general parasitology</td><td rowspan="12">4hrs/week</td><td rowspan="12">2hrs/week</td><td rowspan="12">2hrs/week</td></tr>
<tr><td>Phylunm:Platyhelminthes
1-Class:Trematoda
Family:Fasciolidae
e.g.:Fasciola gigantica
e.g.:Fasciola hepatica
e.g.:Clonorchis sinensis.</td></tr>
<tr><td>Family:Heterophyidae
e.g.: Heterophyes heterophyes .
Family:Schistosomatidae
e.g.:Schistosoma haematobium
e.g.:Schistosoma mansoni</td></tr>
<tr><td>2-Class:Cestoda
Family:Taeniidae
e.g.:Diphyllobotrium latum.
e.g.:Taenia saginata and solium</td></tr>
<tr><td>Family:Taeniidae
e.g.:Echinococcus granulosus.
Family:Hymenolepididae
e.g.:Hymenolepis nana and diminuta.</td></tr>
<tr><td>Introduction to protozoology: Definitions, structure, nutrition, reproduction, excretion and encystations.
General classification: a-Phylum: Sarcomastigophora. Examples of protozoa of medical importance.
b-Phylum: Ciliophora
c-Phylum :Apicomplexa. Examples of protozoa of medical importance</td></tr>
<tr><td>Study examples for each phylum:
1-entamoeba histolytica.
2-Leishmania donovani.</td></tr>
<tr><td>3-Trypanosoma sp.
4-Trichomonas vaginalis.</td></tr>
<tr><td>5-Giardia lamblia.
6-Balantidium coli</td></tr>
<tr><td>REVISION OF PARASITOLOGY AND PROTOZOOLOGY</td></tr>
</table>
</td></tr>
<tr><td>4- Teaching and learning methods:</td><td colspan="4">Classroom literatures.
Discussion of subjects with students.
Practical procedures.
Studying some literatures on the internet.</td></tr>
</table>

5- Students assessment:	
5.A- Assessment methods:	• Assessment 1 from the second week. Assessment 2 at the 6th, 8th weeks and the midterm. • Assessment 3 at the 10th week Assessment 4 at the end of the semester.
5.B- Assessment schedule	Assessment 1 Practical examination 14th Week Assessment 2 Final-term examination Week according to faculty's exam schedule
5.C- Assessments weights	**Semester work 14% Oral exam 6%** **Final Practical exam 30%** **Final Exam 50%**
6- List of Books and references	
6.A- Notes:	**Available**
6.B- Essential books:	
6.C- Recommended books:	
6.D- Scientific periodicals, websites ….etc	**Internet Web Sites** **Journal of Parasitology**

Course coordinator: **Head of Department:**

Dr. Basma Aboulnor

7-Matrix between course specification ILOs and ILOs of chemistry program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Introduction of general parasitology Phylunm:Platyhelminthes 1-Class:Trematoda 2-Class:Cestoda Introduction to protozoology: Definitions, structure, nutrition, reproduction, excretion and encystations. General classification: a-Phylum: Sarcomastigophora. Examples of protozoa of medical importance. b-Phylum: Ciliophora c-Phylum :Apicomplexa. Examples of protozoa of medical importance Study examples for each phylum*:* *1-entamoeba histolytica.* *2-Leishmania donovani.* *3-Trypanosoma sp.* *4-Trichomonas vaginalis.* *5-Giardia lamblia.* *6-Balantidium coli* REVISION OF PARASITOLOGY AND PROTOZOOLOGY	a2	A4	b1	B6	c1	C7	d1	D13	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a1	A7					d2	D14			

Al-Azhar University (Girls branch)
Faculty of Science
Department of Botany and Microbiology

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم النبات والميكروبيولوجى

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 2nd
Date of specification approval **1/2016**

-Course data		
Code: M 303	**Course Title: Systematic bacteriology**	**Academic year: 3rd**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 2nd**

1- Course aim	Provide students with the main concepts of systematic bacteriology.
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Define terminology, nomenclature and classification system in microbiology and related subjects in Botany. **a2**. Discuss essential facts, major concepts and fundamental principles in Microbiology emphasizing Fungi, Bacteriology, Archea, and Virology.
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Use integrated approaches to evaluate, analyze, interpret in various subjects in Microbiology. **b2.** Solve problems, both individually and co-operatively.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Use techniques and tools considering the scientific ethics. **c2.** Carry out aseptic techniques such as isolate, culture, enumerate and identify a range of micro-organisms. **c3.** Take effective notes and record experimental procedures and laboratory protocols.
2.D- General Skills:	By the end of the course, students must be able to: **d1.** Meet deadlines and priorities workloads to achieve targets. **d2.** Locate information from a wide range of sources and extract, collect and present that information in an appropriate form and use IT effectively.

3- Course content: (theoretical and then practical)

Theoretical part content

Topic	No. of Hours	Lecture(s)	Practical
	4hrs/week	2hrs/week	2hrs/week
Introdiuction			
Classification of Prokaryotes			
History of bacterial taxonomy			
Bactetrial division (parts & sections)			

Practical part content

Topic
Isolation of bacteria from air
Relation between total bacterial count and time of exposure both in door and out door Indoor air (from air) Outdoor air (the atmosphere)
Studying the morphological characters of bacterial colonies
Studying the purity of bacterial colonies by simple stain technique
* Examination and differentiation between bacterial species by Gram stain
*Negative stain *Spore stain
*flagella stain *Capsule stain
Physiological test Decomposition of carbohydrates Hydrolysis of starch Decomposition of cellulose.
Carbohydrate fermentation by bacteria. Decomposition of lipid Decomposition of protein (Gelatin and casein)
Decomposition of uric acid by uricolytic bacteria - Decomposition of urea . Citrate utilization - Indole production from Tryptophane
Nitrate reduction test - Bacterial nodules
Hydrogen sulphide production- Catalase enzyme test

4- Teaching and learning methods:

Theoretical explanation
Practical experiments
Microscopic examination
Discussions

5- Students assessment:

5.A- Assessment methods:

1. Theoretical examination to assess their understanding each lecture
2. Oral examination to assess the level of student understanding.
3. Practical exam to assess their ability to pure microbial preparation under sterile conditions.

5.B- Assessment schedule

Assessment 1 Practical examination 14th Week
Assessment 2 Final-term examination Week according to faculty's exam schedule

5.C- Assessments weights	**Semester work 14% Oral exam 6%** **Final Practical exam 30%** **Final Exam 50%**
6- List of Books and references	
6.A- Notes:	
6.B- Essential books:	
6.C- Recommended books:	Bergy's manual of determinative bacteriology different volumes and editions. Practical and theoretical.
6.D- Scientific periodicals, websites ….etc	**Periodicals, web sites…..etc.** **http://www.rpiedu/@hotmail.** **http://www.ag.ohiostate.eau@hotmail.**

7- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Introduction Classification of Prokaryotes History of bacterial taxonomy Bactetrial division (parts & sections)	a1	A4	b1	B7	c1	C2	d1	D10	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A8	b2	B8	c2	C5	d2	D12			
					c3	C7					

Course coordinator:
Dr. Rawhia Arafa

Head of Department:
Prof. Azza Khafagi

Al-Azhar University (Girls branch)
Faculty of Science
Department of Botany and Microbiology

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم النبات والميكروبيولوجى

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 2nd
Date of specification approval **1/2016**

-Course data		
Code: M304	**Course Title: Virology**	**Academic year: 3rd**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 2nd**

1- Course aim	To deliver students with a broad understanding of the fundamental principles Virology and its role in our daily life
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Define terminology, nomenclature and classification system in microbiology and related subjects in Botany. **a2.** Explain main concepts of biological life forms complexity, diversity, molecular, cytological, morphological, physiological, genetical from unicellular to complex organism in the community and their relation to the environment. **a3.** Discuss essential facts, major concepts and fundamental principles in Microbiology emphasizing Fungi, Bacteriology, Archea, and Virology.
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Demonstrate independent logical thinking. **b2.** Solve problems, both individually and co-operatively.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Use techniques and tools considering the scientific ethics. **c2.** Carry out aseptic techniques such as isolate, culture, enumerate and identify a range of micro-organisms. **c3.** Record and analyze experimental data, interpret their validity, apply statistical analyses and suggest further investigations.
2.D- General Skills:	By the end of the course, students must be able to: **d1.** Meet deadlines and priorities workloads to achieve targets. **d2.** Overcome problems.

	d3. Maintain good records of laboratory work and of results.
3- Course content: (theoretical and then practical)	**Theoretical part content**

Topic	No. of Hours	Lectures	Practical
	4hrs/week	2hrs/week	2hrs/week
1-History of virology. 2-Morphology of viruses.			
3-Biochemistry of viruses.			
4-Classification and nomenclature of viruses.			
5-Replication of bacterial viruses. 6-Replication of animal viruses. 7-Replication of plant viruses.			
8-Transmission of viruses. 9-Virus like agent.			
10 -Control of viral diseases. 11-Use of viruses as biological control.			

Practical part content

Topic
1-Viral lab precautions.
2-Symptomatology
3-Transmission of viruses 3-1-Mechanical transmission
3-2-Inscect transmission
4-Physical properties of the viruses: 4-1-Dilution end point.
4-2-Thermal inactivation point.
4-3-Longivity
5-Cultivation of animal viruses
6-Purification of viruse
7-Morphology of bacterial, animal, and plant viruses.
8-Ebola virus
Revision

4- Teaching and learning methods:	1-Classroom lectures. 2-Practical lessons. 3-Seminars.

	4- challenges
-Teaching and learning methods for limited capability students:	1-Simplifid applications.
5- Students assessment:	
5.A- Assessment methods:	
5.B- Assessment schedule	Assessment 1 Practical examination & Oral examination 14th Week Assessment 2 Final-term examination Week according to faculty's exam schedule
5.C- Assessments weights	**Semester work 14% Oral exam 6%** **Final Practical exam 30%** **Final Exam 50%**
6- List of Books and references	
6.A- Notes:	
6.B- Essential books:	
6.C- Recommended books:	Virology. J. Gen. Microbiology. J. Gen. Virology.
6.D- Scientific periodicals, websites ….etc	

Course coordinator: **Head of Department:**

Dr. **Prof. Azza Khafagi**

7- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
1-History of virology. 2-Morphology of viruses. 3-Biochemistry of viruses. 4-Classification and nomenclature of viruses. 5-Replication of viruses. 8-Transmission of viruses. 9-Virus like agent. 10 -Control of viral diseases. 11-Use of viruses as biological control.	a1	A4	b1	B1	c1	C2	d1	D10	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A7	b2	B2	c2	C5	d2	D11			
	a3	A8			c3	C6	d3	D13			

Al-Azhar University (Girls branch)
Faculty of Science
Department of Botany and Microbiology

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم النبات والميكروبيولوجى

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 2nd
Date of specification approval **1/2016**

Course data		
Code: (M307)	**Course Title: Actinomycetes**	**Academic year: 3rd year**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 2nd**

1- Course aim	• Learning the importance and harms of filamentous bacteria (actinomycetes)…… • Developing student's information about actinomycetes classification, shape and reproduction.
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Define terminology, nomenclature and classification system in Actinomycetes **a2.** Discuss essential facts, major concepts and fundamental principles in Microbiology emphasizing actinomycetes
2.B- Intellectual Skills:	**b1.** Demonstrate independent logical thinking. By the end of the course, students must be able to:
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Use techniques and tools considering the scientific ethics. **c2.** Carry out aseptic techniques such as isolate, culture, enumerate and identify a range of micro-organisms. **c3.** Take effective notes and record experimental procedures and laboratory protocols.
2.D- General Skills:	By the end of the course, students must be able to: **d1.** Overcome problems. **d2.** Maintain good records of laboratory work and of results.

3- Course content: (theoretical and then practical)

Theoretical part content

Topic	No. of Hours	Lectures	Practical
-What Are Actinomycetes? -Relation of Actinomycetes to Bacteria and Fungi.	4hrs/ week	2hrs/week	2hrs/week
- Distribution of Actinomycetes. - Actinomycetes colonial morphologies.			
-Identification of actinomycetes: a) Molecular Approach. b)Chemotaxonomical Approach.			
c) Classical Approach. d) Numerical Taxonomic Approach. - Preservation.			
- Generic groups of actinomycetes: - Nocardioform actinomycetes.			
- Actinomycetes with Multilocular Sporangia. - Actinoplanetes			
Streptomyces and Related Genera. - Maduromycetes			
Thermonospora and Related Genera. Thermoactinomycetes**.** - Other Genera.			
- Practical Significance. - Human infection of actinomycetes			
Revision			

Practical part content

Topic
-Screening and isolation of actinomycete colonies from diferrent sources.
-Morphological studies by using cover slip technique.
-culture characteristics of the actinomycete isolates on ISP media.
-melanin production by ISP NO. 6
-melanin production by ISP NO. 7
-melanin production by ISP NO.1
-Utilization of carbon sources.
-Tolerance to different conc, of NaCL.
-Effect of different PH values and incubation temperatures.
-Antibiotics resistance and revision.

4- Teaching and learning methods:

- Classroom literatures.
- Discussion of subjects with students.
- Illustrations, photographs, and/or animation to help visual learner
- Studying some literatures on the internet.

5- Students assessment:	
5.A- Assessment methods:	• Classroom literatures. • Oral exams to assess their understanding. Written exam to assess their understanding.
5.B- Assessment schedule	Assessment 1 Practical examination 14th Week Assessment 2 Final-term examination Week according to faculty's exam schedule
5.C- Assessments weights	**Semester work 14% Oral exam 6%** **Final Practical exam 30%** **Final Exam 50%**
6- List of Books and references	
6.A- Notes:	Avilable
6.B- Essential books:	Bergeys manual of bacteriology
6.C- Recommended books:	
6.D- Scientific periodicals, websites ….etc	Internet Web Sites

Course coordinator: **Head of Department:**

Prof. Dr. Zeinab Khaled Abdul Aziz **Prof. Azza Khafagi**

7- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
-Relation of Actinomycetes to Bacteria and Fungi. - Distribution of Actinomycetes. - Actinomycetes colonial morphologies. -Identification of actinomycetes: - Preservation. - Generic groups of actinomycetes: - Nocardioform actinomycetes. *Streptomyces* and Related Genera. *Thermonospora* and Related Genera. Thermoactinomycetes. - Other Genera. - Practical Significance. - Human infection of actinomycetes	a1	A4	b1	B6	c1	C2	d1	D11	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A8			c2	C5	d2	D13			
					c3	C7					

Al-Azhar University (Girls branch)
Faculty of Science
Department of Botany and Microbiology

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم النبات والميكروبيولوجى

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Botany and Microbiology
Academic year: 3rd **Level:** 2nd
Date of specification approval **1/2016**

-Course data		
Code: M308	**Course Title: Controlling the growth of Microorganisms**	**Academic year: 3rd**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 2nd**

1- Course aim	- Provide students with the main concepts of controlling microorganisms - Study different methods for controls - Prepare students for a career as a microbiologist
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Describe the theories and methods applied for interpreting and analyzing biological data. **a2.** Illustrate interaction of microbes with soil, water and air.
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Demonstrate independent logical thinking **b2.** Analyze published information in microbiology; and formulate hypothesis with the minimum of assistance.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Apply the different methods used for preparing, processing, interpreting and presenting data for biological samples. **c2.** Carry out aseptic techniques such as isolate, culture, enumerate and identify a range of microorganisms **c3.** Record and analyze experimental data, interpret their validity, apply statistical analyses and suggest further investigations
2.D- General Skills:	By the end of the course, students must be able to: **d1.** Meet deadlines and priorities workloads to achieve targets. **d2.** Maintain good records of laboratory work and of results.

3- Course content: (theoretical and then practical)

Theoretical part content

Topic	No. of Hours	Lecture	Practical
	4hrs/week	2hrs/week	2hrs/week
Control of Microorganisms			
Physical methods			
Chemical methods			
Mode of action			
Removal of Microorganisms			
Answer some exam models +Exam			
Revision			

Practical part content

Topic
Inhibition of Microbial growth by dyes
The oligodynamic action of metals
Effect of some inhibitors on fungal growth
Effect of sulfonamides on bacterial growth
Effect of sodium benzoate on growth of *Aspergillus niger*
Thermal death point
Effect of desiccations on bacterial count
Phenol- coefficient technique
The rate of microbial death
Common antimicrobial agents and their uses Some commonly used disinfectants and antiseptics
Revision

4- Teaching and learning methods:

Lectures
Discussion
- Explaining lectures

5- Students assessment:

5.A- Assessment methods:

- Researches
- Team work
- Practical work

5.B- Assessment schedule

Assessment 1 Practical examination 14th Week
Assessment 2 Final-term examination Week according to faculty's exam schedule

5.C- Assessments weights	**Semester work 14% Oral exam 6%** **Final Practical exam 30%** **Final Exam 50%**
6- List of Books and references	
6.A- Notes:	Course note
6.B- Essential books:	
6.C- Recommended books:	- Microbiology concepts and applications
6.D- Scientific periodicals, websites ….etc	Websites of control of microorganisms

7- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Control of Microorganisms Physical methods Chemical methods Mode of action Removal of Microorganisms	a1	A5	b1	B6	c1	C4	d1	D10	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
	a2	A10	b2	B11	c2	C5	d2	D13			
					c3	C6					

Course coordinator:
Dr. Sanaa Aly

Head of Department:
Prof. Azza Khafagi

Al-Azhar University (Girls branch)
Faculty of Science
Department of Physics

جامعة الأزهر (فرع البنات)
كلية العلوم
قسم الفيزياء

Course Specification

Program on which the course is given: Microbiology
Department offering the program: Botany & Microbiology
Department offering the course: Physics
Academic year: 3rd **Level:** 2nd
Date of specification approval **1/2016**

Course data		
Code: Ph 370	**Course Title:** Nuclear Physics	**Academic year: 3rd year**
Credit/ Taught Hours: Theoretical: Two Practical: Two		**Level: 2nd**

1- Course aim	Concept fundamental ideas about the nuclear physics. Demonstrate a basic knowledge of nuclear radiation, radioactive decay, nuclear energy sources and artificial radioactivity.
2- Intended Learning Outcomes (ILOs):	
2.A- Knowledge and understandings:	By the end of the course, students must be able to: **a1.** Explain the basic scientific facts, concepts, principles and theories in the field of nuclear physics and other related branches
2.B- Intellectual Skills:	By the end of the course, students must be able to: **b1.** Demonstrate independent logical thinking. **b2.** Analyze published information and formulate hypotheses with the minimum of assistance.
2.C- Professional Skills:	By the end of the course, students must be able to: **c1.** Apply the different methods used for preparing, processing, interpreting and presenting data for biological samples. **c2.** Prepare scientific reports by using the scientific literature correctly and effectively in the chosen areas of nuclear physics.
2.D- General Skills:	By the end of the course, students must be able to: **d1.** Overcome problems **d2.** Assess the relevance and importance of ideas of others.

<table>
<tr><td></td><td></td></tr>
<tr><td rowspan="2">3- Course content: (theoretical and then practical)</td><td colspan="4">Theoretical part content</td></tr>
<tr><td>Topic</td><td>No. Hours Hrs./week</td><td>Lecture</td><td>Tutorial/practic</td></tr>
<tr><td></td><td></td><td>4hrs/we</td><td>2hrs/wee</td><td>2hrs/week</td></tr>
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	Nucleus and nuclear radiation Nuclear Structure nuclear Binding Energies alpha Decay beta Decay (β^-) gamma-ray Emission Internal Conversion Orbital Electron Capture Positron Decay (β^+) Suggested Reading Problems **Radioactive decay** **2.1.** Activity **2.2.**Exponential Decay **2.3.**Specific Activity **2.4.**Serial Radioactive Decay **2.5.**Natural Radioactivity **2.6.**Radon And Radon Daughter **2.7.**Suggested Reading **2.8.**Problems **Artificial radioactivity** **3.1.** The Discovery of Artificial Radioactivity **3.2.** The ArtificialRadionuclides. Electron andPositron Emission. Orbital Electron Capture **3.3.**The Transuranium Elements **3.4.**The Artificial Radionuclides: Alpha particles **3.5.**Isotopes Tables and Nuclide Charts |**Nuclear energy sources** **4.1.**The Velocity and Energy of Alpha particles **4.2.**The Absorption of Alpha-particles :range, ionization, and stopping power **4.3.**Range-energy curves **4.4.**Alpha-particles spectra. Long-range Particles and fine structure **4.5.**Nuclear Energy levels **4.6.**The Theory of Alpha-Decay	ek	k	
4- Teaching and learning methods:	4.1 Lectures & discussions 4.2. Physical reports. 4.3. Solve problems			
5- Students assessment:				

5.A- Assessment methods:	5.1.1. Writen exam	To assess: Knowledge and Understanding
	5.1.2 Oral exam	To assess: Knowledge and Understanding
	5.1.3. Practical exam	_____
	5.1.4. Taken the presence of students.	To assess: General and Transferable Skills
5.B- Assessment schedule	Assessement 1:	Week:3rd
	Assessement 2:	Week: 8th
	Assessement 3:	Week:12th
5.C- Assessments weights	Semester work	14%
	Oral Examination	6%
	Practical Examination	30%
	Final Examination	50%
	Other Type of Examination	
	Total%	100 %

6- List of Books and references	
6.A- Notes:	Available
6.B- Essential books:	
6.C- Recommended books:	1- James E.Turner, Atomic radiation and radiation protection, 1995 2- Irving Kaplan, Nuclear Physics, second edition, Oxford& IBH Publishing CO. 1962
6.D- Scientific periodicals, websites ….etc	

7- Facilities required for teaching and learning

1- The English language must be taught annually during third academic years, including scientific subjects. Lecturers of the Faculty of Science with good English language can help.
2- The library must open door to later times

Course coordinator: **Head of Department:**

8- Matrix between course specification ILOs and ILOs of microbiology program

Course content	ILO'S								Teaching and learning methods	Assessment tools	Criteria
	Knowledge & understanding (a)		Intellectual skills (b)		Professional and practical skills (c)		General and Transferable skills (d)				
	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program	Course ILO's	ILOs of Program			
Nucleus and nuclear radiation **Radioactive decay** **Artificial radioactivity** **Nuclear energy sources**	a1	A1	b1	B6	c1	C4	d1	D11	Lectures Discussion Practical training Research group	Written exam Oral exam Practical exam Semester work	research project laboratory report comments written exam course portfolio
			b2	B11	c2	C8	d2	D14			