<table>
<tr><td>Module name:</td><td>Cytogenetic</td></tr>
<tr><td>Module level, if applicable</td><td>5th</td></tr>
<tr><td>Code, if applicable</td><td>BOT 315</td></tr>
<tr><td>Subtitle, if applicable</td><td>NONE</td></tr>
<tr><td>Courses, if applicable</td><td>none</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>2nd</td></tr>
<tr><td>Person responsible for the module</td><td>Dr. Amira Elmaghawry</td></tr>
<tr><td>Lecturer</td><td>Dr. Amira Elmaghawry</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>compulsory</td></tr>
<tr><td>Type of teaching, contact hours</td><td>Total Contact hours/semester:44 hrs.
Lecture:14
Practical :30
Class size:25 students</td></tr>
<tr><td>Workload</td><td><table><tr><td>Total-contact hours</td><td>Self-study</td><td>Discussion</td><td>Total workload</td></tr><tr><td>44</td><td>48</td><td>10</td><td>102</td></tr></table></td></tr>
<tr><td>Credit points</td><td>3.5 ECTs-2 KSA.</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>Absence not exceed 25% (attendance at least 75%)</td></tr>
<tr><td>Recommended prerequisites</td><td>BIO 223</td></tr>
</table>

Module objectives/intended learning outcomes	- *Knowledge:* - *On completing this course, students will be able to:* - *Describe morphology features of the chromosome.* - *Explain the human genome and how to draw the genetic map* - *Cognitive Skills* - *Devised the reasons for the differences in chromosomal structural and numerical* - *Control on mutagenesis and their relationship to cancer* - *Interpersonal Skills & Responsibility* - *Show interest to respond with colleagues while doing the research and laboratory experiments* - *Know well self-learning skills and her responsibilities.* - *Communication, Information Technology, Numerical* - *Select the appropriate presentation* - *Psychomotor* - *Prepare microscopic slides for examining and counting the normal and abnormal chromosomes*

<table>
<tr><td>Content</td><td>
<table>
<tr><th>List of Topics</th><th>No. of Weeks</th><th>Contact Hours</th><th>%of content</th></tr>
<tr><td>A general review for the structure of the cell.
Relationship between genetic material and the inherited characters .
The morphology of the chromosome.</td><td>2</td><td>6</td><td>13.63</td></tr>
<tr><td>Forms and types of chromosomes in eukaryotic organisms.
Chromosomes behavior during Meiosis</td><td>2</td><td>6</td><td>13.63</td></tr>
<tr><td>Structural chromosomal aberrations.</td><td>2</td><td>6</td><td>13.63</td></tr>
<tr><td>Mid- term exam1+Feedback</td><td>1</td><td>2</td><td>4.55</td></tr>
<tr><td>Numerical chromosomal aberrations</td><td>1</td><td>3</td><td>6.83</td></tr>
<tr><td>Changes in chromosome morphology
Organization of the DNA and chromosome forming
Differentiation DNA of the chromosome component.</td><td>2</td><td>6</td><td>13.63</td></tr>
<tr><td>Mid- term exam2+Feedback</td><td>1</td><td>2</td><td>4.55</td></tr>
<tr><td>Human genome and the genetic map drawing
Identify the locations of genes on human chromosomes</td><td>2</td><td>6</td><td>13.6</td></tr>
<tr><td>Genetic mutations, definition, kinds, mutagenesis and their applications, and their relationship to cancer.</td><td>2</td><td>7</td><td>15.91</td></tr>
</table>
</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>1st mid-term Exam 10 marks
2nd mid-term Exam 10 marks
Reports+ assignments+ oral questions + e-learning 10 marks
Final practical 20 marks
Final theoretical 50 marks</td></tr>
<tr><td>Media employed</td><td>http://global.britannica.com/science/taxonomy</td></tr>
</table>

Reading list	•*Cytogenetics, Adel El-Masry, 2009, Dar El Ketab El hadith, Alex., Egypt.* •*General Genetics, Abdel-Hussein Elfeaisl, 1999, El-Ahlia for publishing and distribution, Amman, Jordan.* •*Principles of Physiological Genetics, Medhat Hussein M. Khalil, 2004, Dar El Ketab Elgamegy, UAE.* •*Genetic Engineering,Abdel- Mohsen Elfeaisl, 1998, Dar El Sharq, for publishing and distribution, Amman, Jordan.*

<table>
<tr><td>Module name:</td><td>Entomology I</td></tr>
<tr><td>Module level, if applicable</td><td>5th</td></tr>
<tr><td>Code, if applicable</td><td>ZOO 311</td></tr>
<tr><td>Subtitle, if applicable</td><td>None</td></tr>
<tr><td>Courses, if applicable</td><td>ZOO 221</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>First semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr. Zeinab Eltahir Bakheet Eltahir</td></tr>
<tr><td>Lecturer</td><td>Dr. Zeinab Eltahir Bakheet Eltahir</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Not applicable</td></tr>
<tr><td>Type of teaching, contact hours</td><td>Total Contact hours/semester:58 hrs.
Lecture:28
Laboratory :30
class size separately 18</td></tr>
<tr><td>Workload</td><td><table><tr><td>Total-contact hours</td><td>Self-study</td><td>Discussion</td><td>Total workload</td></tr><tr><td>58</td><td>66</td><td>10</td><td>134</td></tr></table></td></tr>
<tr><td>Credit points</td><td>4.6 ECTs-3KSA.</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>To attend more than 75% of lecture and practical studuy.</td></tr>
<tr><td>Recommended prerequisites</td><td>ZOO 221</td></tr>
</table>

Module objectives/intended learning outcomes	***1.0 Knowledge:*** 1.1.1 Classified the insects into many kinds according to the presence or the absence of the wings and the kind of transforming and kinds of mouth parts, categorized the insects which have economic importance and the ways of using them usefully and the pest and ways to exterminate them: naturally and practically.. ***2.0 Cognitive Skills****:* 2.1.1 Explain the affecting conditions on nutrition and flying mechanisms in different insects *2.3.1* Compare between Appendages body of the insect and the various mutations of these appendages. ***3.0 Interpersonal Skills & Responsibility*** *3.4.1* Perfects the skill of self-learning and responsibility. *4.0* ***Communication, Information Technology, Numerical*** *4.2.1* Perfects the skill of using technology and the modern techniques for research. ***5.0 Psychomotor*** *5.2.1* Examine microscopic samples with a detailed drawing of them.
Content	*The description should clearly indicate the weighting of the content and the level*

List of Topics	No. of Weeks	Contact Hours	%
1- Insects in animal kingdom- the general features and the reasons behind spreading the insects The head: head capasule- antenna	1	4	*6.9%*
2- Antenna - body wall - its structure- Projections - its features or properties	1	4	*6.9%*
3- Metamorphosis	1	4	*6.9%*
4- Mouth parts – chest structure, wings shape, wings machine	3	12	*20.7%*
5- Mid- term Exam1+ feedback	1	3	*5.2%*
6- The mechanisms of flying and the factors affecting it, the movement and the legs	2	8	*13.8%*
7- Abdomen: the reproductive and non reproductive appendages.,	2	8	*13.8*
8- Mid- term Exam2+ feedback	1	3	*5.1%*
9- Classification of insects: studying the general properties of every order of the insects with wings and insects with no wings- presenting examples for every order and its shape, life cycle and economical importance briefly. And to concentrate on the economical importance insects and the ways to fight harmful insects both types : Natural and Applied.	3	12	*20.7%*

Study and examination requirements and forms of examination	*First mid term exam* — 7th week — *10 %* *Second mid term exam* — 12th week — *10 %* *Different activities (domestic assignments and research projects) nonstop evaluation* During the semester — *10 %* *The final practical exam* — 16th week — *20 %* *The final written exam* — 17-19th week — *50 %*
Media employed	• *Accommodation* • *Computing resources* • *Data show, a computer and one monitor.* • *Other resources* • *Completion the devices and the models of animal laboratory.*
Reading list	*1. List Required Textbooks* • *الحشرات الزراعية شكلها الظاهري وتشريحها الداخلي ،د. بدوي، على إبراهيم وعلي بن محمد السحيباني جامعة الملك سعود- الرياض(١٤١٧ هـ).* *الجزء العملي* *بيولوجية الحيوان العملية(الجزء الثاني و الثالث)__د. الحسيني، أحمد حماد و أميل شنودة دميان أخر طبعة دار المعارف_ القاهرة (١٩٩٧م)* *2. List Essential References Materials :* • *الحشرات الزراعية شكلها الظاهري وتشريحها الداخلي ،د. بدوي، على إبراهيم وعلي بن محمد السحيباني جامعة الملك سعود- الرياض(١٤١٧ هـ).* *الجزء العملي* *بيولوجية الحيوان العملية(الجزء الثاني و الثالث)__د. الحسيني، أحمد حماد و أميل شنودة دميان أخر طبعة دار المعارف_ القاهرة (١٩٩٧م)* *3. List Recommended Textbooks and Reference Material :* *-علم بيولوجيا اللافقاريات- د. محمد حسن الحمود ،الأهلية للنشر والتوزيع العلوم البيولوجية،٢٠٠٥.* • *- الأسس العملية في علم الحشرات العام- د. مكي بن عبدالله العمودي الرياض-الزهراء ٢٠٠٧،* *- مجلة الجمعية المصرية لعلم الحشرات* *4. List Electronic Materials :* • *http://en.wikipedia.org/wikiEntomology* *http://en.wikipedia.org/wiki Arthropoda* *الحشرات –الموسوعة العربية* *5. Other learning material :* • *Using the internet.* • *The ability to use the computer and programs such as Word, Excel, Power point .*

<table>
<tr><td>Module name:</td><td>Animal physiology I</td></tr>
<tr><td>Module level, if applicable</td><td>5th</td></tr>
<tr><td>Code, if applicable</td><td>ZOO 313</td></tr>
<tr><td>Subtitle, if applicable</td><td>NA</td></tr>
<tr><td>Courses, if applicable</td><td>NA</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>1st and 2nd semesters</td></tr>
<tr><td>Person responsible for the module</td><td>Prof Dr: Zeinab Abd Elmohdy Abd Elhaleem</td></tr>
<tr><td>Lecturer</td><td>Prof Dr: Zeinab Abd Elmohdy Abd Elhaleem</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course for biology program</td></tr>
<tr><td>Type of teaching, contact hours</td><td>Total Contact hours/semester: 58 hrs.
Lecture:28
Laboratory:30
Class size:24 students</td></tr>
<tr><td>Workload</td><td><table><tr><th>Total-contact hours</th><th>Self-study</th><th>Discussion</th><th>Total workload</th></tr><tr><td>58</td><td>59</td><td>22</td><td>139</td></tr></table></td></tr>
<tr><td>Credit points</td><td>4.7 ECTs-3KSA.</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>To attend at least 75% of lecture and practical study</td></tr>
<tr><td>Recommended prerequisites</td><td>Cytology BIO 123</td></tr>
</table>

Module objectives/intended learning outcomes	***Knowledge: the students are able to*** *1- Recognize the structure of Digestive, Muscular, and Nervous Systems.* *2- Determine the function of Digestive, Muscular, and Nervous Systems.* ***Cognitive Skills: the students are able to*** *1- Explain the mechanism of action of Digestive, Muscular, and Nervous Systems.* *2- Analyze the phenomena and problems related to the functions of Digestive , Muscular, and Nervous systems* ***Interpersonal Skills & Responsibility: the students are able to*** *participate effectively with colleagues in researches, presentations and laboratory work.* ***Communication, Information Technology, Numerical:*** *The students use advanced technology in collection and interpretation of data.* ***Psychomotor: the students are able** to use properly laboratory devices and equipment in carrying out experiments of the course*

<table>
<tr><td>Content</td><td>
<table>
<tr><th>List of Topics</th><th>No. of Wks</th><th>Cont-act Hrs</th><th>%</th></tr>
<tr><td colspan="4">Theoretical part</td></tr>
<tr><td>Transport across the cell membrane</td><td>1</td><td>2</td><td>7.1</td></tr>
<tr><td>Digestive system:
- Nutrition and the digestive system
- Structure and function of the stomach
- Structure and function of small and large intestine
- Structure and function of the liver
- Components of bile juice and its function
- Structure and function of pancreas
- Digestion and absorption
- The control of digestive enzymes</td><td>5</td><td>10</td><td>35.7</td></tr>
<tr><td>Midterm 1+ feedback about exam</td><td>1</td><td>1</td><td>3.6</td></tr>
<tr><td>Nervous system:
- Nerve cell (types- structure and function)
-Nerve impulse and neurotransmitters
-Structure and function of central nervous system
-Structure and function of peripheral nervous system</td><td>4</td><td>8</td><td>28.6</td></tr>
<tr><td>Midterm 2+ feedback about exam</td><td>1</td><td>1</td><td>3.6</td></tr>
<tr><td>Muscular system :
-Characters and types of muscle
- Ultrastructure of muscle fiber
-Mechanism of muscle contraction and muscle metabolism</td><td>3</td><td>6</td><td>21.4</td></tr>
<tr><td colspan="4">Practical part:</td></tr>
<tr><td>Detection of carbohydrates, proteins and fat</td><td>2</td><td>4</td><td>13.3</td></tr>
<tr><td>Detection of amylase enzyme in saliva , its characters ,its action on starch and optimum conditions for its action</td><td>4</td><td>8</td><td>26.7</td></tr>
<tr><td>Detection of myosin and nitrate in saliva</td><td>1</td><td>2</td><td>6.7</td></tr>
<tr><td>Detection of pepsin enzyme, its character and optimum conditions for its action
Detection of renin enzymes and its character</td><td>2</td><td>4</td><td>13.3</td></tr>
<tr><td>Detection of pancreatic enzymes and their characters</td><td>2</td><td>4</td><td>13.3</td></tr>
<tr><td>Detection of biliary juice and its character</td><td>2</td><td>4</td><td>13.3</td></tr>
<tr><td>Recognition of brain structure in a model</td><td>1</td><td>2</td><td>6.7</td></tr>
<tr><td>Revision</td><td>1</td><td>2</td><td>6.7</td></tr>
</table>
The description should clearly indicate the weighting of the content and the level.
</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>20 degrees for two Midterm exams
10 degrees for Lab manual report , research paper, presentation and homework
20 degrees for final practical Exam
50 degrees for final theoretical Exam</td></tr>
<tr><td>Media employed</td><td>Classroom provided with smartboard , computer , internet connection and enough seats
Lab provided with the required devices, instruments and models for application of the practical part of the course
Email (z.madkor@mu.edu.sa)</td></tr>
</table>

Reading list	- ***Science of Physiology, 1433 H. Shetawi Alabd Alaah , Al Msiraa Publishing House.*** - ***Science of Organ Physiology, 1424 H. Nabil Ahmed Abu Elnile, International Publishing House.*** - ***https://emergencypedia.files.wordpress.com/2013/04/ganong-pdf.pdf***

<table>
<tr><td>Module name:</td><td>Plant physiology I</td></tr>
<tr><td>Module level, if applicable</td><td>Fifth</td></tr>
<tr><td>Code, if applicable</td><td>BOT 314</td></tr>
<tr><td>Subtitle, if applicable</td><td>none</td></tr>
<tr><td>Courses, if applicable</td><td>none</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>All semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr Enas Shaban Ahmed</td></tr>
<tr><td>Lecturer</td><td>Dr Enas Shaban Ahmed</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>compulsory,</td></tr>
<tr><td>Type of teaching, contact hours</td><td>Total Contact hours/semester:58 hrs.
Lecture:28
Laboratory :30
Class size:25 students</td></tr>
<tr><td>Workload</td><td><table><tr><td>Total-contact hours</td><td>Self-study</td><td>Discussion</td><td>Total workload</td></tr><tr><td>58</td><td>68</td><td>12</td><td>138</td></tr></table></td></tr>
<tr><td>Credit points</td><td>4.7 ECTs-3KSA.</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>Attendance 75%</td></tr>
<tr><td>Recommended prerequisites</td><td>BIO 123</td></tr>
</table>

Module objectives/intended learning outcomes	***Knowledge*** 1- *Explain the ability of plants to obtain both water and mineral nutrients from the soil* 2- *To describe and explain metabolism of plant cell and basic physiological processes in plants.* ***Cognitive Skills*** 1- *Distinguish water potential components and different transport processes that take place in the plant.* 2- *Differentiated the action of enzymes on metabolic process.* *Interpersonal Skills & Responsibility* 1- *Show interest to respond with colleagues while doing research projects.* ***Communication, Information Technology, Numerica*** 1- *World Wide Web used to fulfill the tasks required of them after each lecture* ***Psychomotor*** 1- *Apply different experiments related to the course and present a short report.*

Content	

List of Topics	No. of Weeks	Contact Hours	%
1- Water potential and its component.	2	8	13.7
2- Movement and translocation of H2O in plant tissues.	1	4	6.7
3- Transpiration.	2	8	13.3
Mid-term Exam1+Feedback	1	3	2
4- Cell membrane and permeability.	2	8	13.3
5- Major and minor mineral elements and their sources, and physiological roles, and the effects of lack of it.	3	12	20
Mid-term Exam2+Feedback	1	3	2
6- Hydro-culture, sand culture and methods for preparation of nutrient solutions	1	4	6.7
7- Photosynthesis, light, carbon path is installed in high-end plants and the factors affecting them.	1	4	6.7
8- Respiration 9- Physiological response to environmental stresses.	1	4	6.7

Study and examination requirements and forms of examination	*First term exam ..... 10%* *Second term exam .....10%* *Homework activities During semester 10%* *Practical exam At the end of semester 20%* *Final exam At the end of semester 50%*
Media employed	*Class room provide with smart board, computer, internet connection, and enough seats .* *Lab provide with to required devices, light microscopes and slides for demonstration* *D2l and email es.ahmed@mu.edu.sa*

Reading list	*Basics of Plant Physiology d / Mohammed Jamal al-Din Dar Hassouna new publications 2003.* *2- El Arosy and El Monofy 2000 general botany . Modern Elmaarf library.* *3. Plant Physiology process, Hisham Abdel Gawad, Mohammed Hamad Al Wahaibi, Deanship of Library Affairs, King Saud University, Riyadh 1409 H.* *4- Abd Elgaud and Elwahiby (1997). general practical plant physiology*