

# **COURSE SPECIFICATIONS**

## **Faculty of Pharmacy**

**Third Year – Second Term**

**2019-2020**

# CONTENTS:

| <b>Course</b>   | <b>Page No.</b> |
|---|-----------------|
| <b>1 Sterile Products and Controlled Drug Delivery Systems.....</b> | <b>3</b>        |
| <b>2 Phytochemistry-1.....</b>                                      | <b>17</b>       |
| <b>3 Pharmacology -2.....</b>                                       | <b>30</b>       |
| <b>4 Biochemistry -2.....</b>                                       | <b>40</b>       |
| <b>5 Parasitology and Pathology.....</b>                            | <b>57</b>       |
| <b>6 Medicinal Chemistry-2.....</b>                                 | <b>76</b>       |

**COURSE  
SPECIFICATIONS**

**Sterile Products and  
Controlled Drug  
Delivery Systems**

**Third year – secondTerm  
2019-2020**

# Course specification of Sterile Products and Controlled Drug Delivery Systems

---

University: Zagazig Faculty: Pharmacy

## A- Course specifications:

Program (s) on which the course is given: Bachelor of Pharmacy

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Pharmaceutics Department

Academic year Level: Third year/Second semester

Date of specification approval: 3 January 2020

## B- Basic information:

Title: Sterile Products and Controlled Drug Delivery Systems Code: PC325

Credit Hours: ---

Lectures: 2hrs/week

Practical: 2hrs/week

Tutorials: ---

Total: 3hrs/week

## C- Professional information:

### 1-Overall aim of the course

On completion of the course, the student will be able to illustrate Parenteral preparations (advantages, disadvantages, route of administration, incompatibilities, manufacturing processes of "ampoules-vials", sterilization, packaging, quality control), Ophthalmic preparations (solutions, suspensions, powders for reconstitution, ointment, ocusert, contact lenses, packaging, use), Pharmaceutical aerosols (advantages, components, preparation, aerosols, filling, packaging), Controlled release dosage forms for oral use (rational for extended release, controlled drug delivery systems: " coated beads, microencapsulation, complex formation, resinated drugs"), Colloidal drug delivery systems (liposomes, niosomes, nanoparticles).

## 2- Intended learning outcomes of Sterile Products and Controlled Drug Delivery Systems (ILOs)

| <b>A- Knowledge and Understanding</b>       |  |
|---|--|
| a1  | Describe formulation requirements and quality control tests of aerosols.   |
| a2  | illustrate the principles and properties of different controlled drug delivery systems as well as colloidal drug delivery systems  |
| a3  | Outline the requirements, formulation and quality control tests of parenterals and ophthalmic dosage forms   |
| a4  | Illustrate the basis of sterilization and packaging of parenterals and ophthalmic dosage forms   |
| <b>B- Professional and Practical skills</b> |  |
| b1  | perform different calculations related to compounding of parenterals including isotonicity adjustment, milliequivalent, osmolarity and rate of flow of intravenous infusions |
| <b>C- Intellectual skills</b>               |  |
| c1  | Select the appropriate drug delivery system according to drug properties and the intended site and rate of drug release  |
| c2  | Interpret results of quality control tests of parenterals and aerosols according to the pharmacopeial requirements   |
| <b>D- General and Transferable skills</b>   |  |
| d1  | Use information technology to collect and present data   |
| d2  | Develop critical thinking, decision-making and problem-solving skills.   |
| d3  | Work effectively as a member of a team   |

## D- Contents:

| Week No. | Lecture contents (2 hrs/week)  | Practical session (2 hrs/week)  |
|----------|--|---|
| 1        | Pharmaceutical aerosols:<br>- Advantages<br>- components   | Isotonic solutions  |
| 2        | - Quality control of aerosols.<br>- Filling of aerosols.   | Problem solving   |
| 3        | - Introduction to parenteral preparations<br>- Advantages & disadvantages of parenterals<br>- Requirements for parenteral preparations<br>- Routes of parenteral administration<br>- Classification of parenteral preparations | Electrolyte solutions:<br>Milliequivalents, Milimoles<br>and Milliosmoles         |
| 4        | - Sterilization techniques moist heat , dry heat, radiation, gas and filtration  | Problem solving   |
| 5        | Formulation of parenterals   | Intravenous Infusions,<br>Parenteral Admixtures, and<br>Rate-of-Flow Calculations |
| 6        | - Packaging of parenterals.<br>- Quality control tests of parenteral preparations  | Case study  |
| 7        | Midterm exam   |   |
| 8        | Ophthalmic dosage forms  | Parenteral admixtures   |
| 9        | - Introduction to drug delivery systems<br>- Advantages & disadvantages of delayed release dosage forms<br>- Enteric coating<br>- Colon specific drug delivery   | Parenteral Nutrition  |

|           |   |                                       |
|-----------|---|---------------------------------------|
| <b>10</b> | - Gastroretentive drug delivery systems<br>- Diffusion based sustained release dosage forms<br>- Bioerodible sustained release dosage forms<br>- Osmotic pressure activated controlled drug delivery<br>- Targeted release dosage forms | Case study                            |
| <b>11</b> | Colloidal drug delivery systems<br>Liposomes  | Revision<br>evidence-based assignment |
| <b>12</b> | Colloidal drug delivery systems<br>- Niosomes   | <b>Delivery of assignment report</b>  |
| <b>13</b> | Colloidal drug delivery systems<br>- Microemulsion  | <b>Practical exam</b>                 |
| <b>14</b> | - Revision&Open Discussion  |                                       |
| <b>15</b> | Final written exam  |                                       |

### **E- Teaching and Learning Methods:**

- Lectures
- Practical session (problem solving)
- Self learning (evidence based assignments about sterile marketed products containing different controlled delivery systems, case study)

### **F- Student Assessment methods:**

- 1- Written exams to assess: a1, a2, a3, a4, c1
- 2- Activity to assess: d1, d2, d3
- 3- Practical exams to assess: a3, b1 , c2, d1, d2, d3
- 4- Oral exam to assess: a1, a2, a3, a4, c1

### **Assessment schedule**

|   |         |
|---|---------|
| <b>Assessment (1):</b> midterm exam       | Week 7  |
| <b>Assessment (2):</b> final Written exam | Week 15 |
| <b>Assessment (3):</b> Assignment report  | Week 12 |
| <b>Assessment (4):</b> Practical exam     | Week 13 |
| <b>Assessment (5):</b> Oral exams         | Week 15 |

### **Weighting of Assessment**

| <b>Assessment method</b> | <b>Marks</b> | <b>Percentage</b> |
|--------------------------|--------------|-------------------|
| <b>Midterm exam</b>      | 10           | 10%               |
| <b>Written exam</b>      | 50           | 50%               |
| <b>Practical exam</b>    | 20           | 20%               |
| <b>activity</b>          | 5            | 5%                |
| <b>Oral exam</b>         | 15           | 15%               |
| <b>TOTAL</b>             | 100          | 100%              |

### **G- Facilities required for teaching and learning:**

Black ( white ) boards, data show

### **H- List of References:**

**1- Course Notes:** Student book of Sterile Products and Controlled Drug Delivery Systems approved by pharmaceuticals department (2019/2020).

#### **2- Essential Books:**

- Pharmaceutical dosage forms: Parenteral medications vol. 1, 2nd edn, Dekker, 1992.
- Sterile Dosage Forms: Their preparation and clinical application. Ed., Salvatore Turco, Publisher:Lippincott Williams and Wilkins.
- Good pharmaceutical manufacture practice, rational and compliance, Jhon Sharp, CRC press



- Ansel's Pharmaceutical Dosage Forms and Drug Delivery System. Ed., Allen, Popovich and Ansel (2005). Publisher: Lippincott Williams and Wilkins.

### **3- Recommended Books:**

- Martin's Physical Pharmacy and Pharmaceutical Sciences. Ed. Patrick J. Sinko (2006). Publisher: Lippincott Williams and Wilkins
- Pharmaceutics; the Science of Dosage Form Design. Ed., Michael E. Aulton (2006). Publisher: Thomson Learning.
- Remington; the Science and Practice of Pharmacy (21st edition). Publisher: Lippincott Williams and Wilkins.
- USP (797) Pharmaceutical Compounding—Sterile Preparations

### **4- Periodicals and websites:**

- [www.researchgate.net](http://www.researchgate.net)
- [www.speciation.net](http://www.speciation.net)
- [www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov)
- <http://www.lib.utexas.edu/etd/d/2003/codyk036/codyk036.pdf>
- <http://en.wikipedia.org/wiki/Code-switching>

---

**Course Coordinator: Dr. GehanFathyAttia**

- **Head of Department: Prof. Nagia Ahmed El-Megrab**

**Date:** تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 1 / 3 / 2020 م



## Matrix I of Sterile Products and Controlled Drug Delivery Systems course

| <b>Course Contents</b> |  | <b>ILOs of Sterile Products and Controlled Drug Delivery Systems course</b> |    |    |    |                                   |  |                     |    |                                 |    |    |
|------------------------|--|---|----|----|----|-----------------------------------|--|---------------------|----|---------------------------------|----|----|
|                        |  | Knowledge and understanding   |    |    |    | Professional and practical skills |  | Intellectual skills |    | Transferable and general skills |    |    |
|                        |  | a1  | a2 | a3 | a4 | b1                                |  | c1                  | c2 | d1                              | d2 | d3 |
| <b>Lectures</b>        |  |   |    |    |    |                                   |  |                     |    |                                 |    |    |
| <b>1</b>               | Pharmaceutical aerosols:<br>- Advantages<br>- components   | x   |    |    |    |                                   |  |                     |    |                                 |    |    |
| <b>2</b>               | - Quality control of aerosols.<br>- Filling of aerosols  | x   |    |    |    |                                   |  | x                   |    |                                 |    |    |
| <b>3</b>               | - Introduction to parenteral preparations<br>- Advantages & disadvantages of parenterals<br>- Requirements for parenteral preparations<br>- Routes of parenteral administration<br>- Classification of parenteral preparations | X   |    | x  |    |                                   |  |                     |    |                                 |    |    |
| <b>4</b>               | Sterilization techniques moist heat , dry heat, radiation, gas and filtration  | x   |    |    | x  |                                   |  |                     |    |                                 |    |    |
| <b>5</b>               | Formulation of parenterals   | X   |    | x  |    |                                   |  |                     |    |                                 |    |    |
| <b>6</b>               | - Packaging of parenterals.<br>- Quality control tests of parenteral preparations  | X   |    | x  | x  |                                   |  | x                   |    |                                 |    |    |
| <b>7</b>               | Ophthalmic dosage forms  | X   |    | x  |    |                                   |  |                     |    |                                 |    |    |
| <b>8</b>               | - Introduction to drug delivery systems<br>- Advantages & disadvantages of delayed release dosage forms<br>- Enteric coating<br>- Colon specific drug delivery   | X   | x  |    |    |                                   |  | x                   |    |                                 |    |    |
| <b>9</b>               | - Gastroretentive drug delivery systems<br>- Diffusion based sustained release dosage forms  | x   | x  |    |    |                                   |  | x                   |    |                                 |    |    |

|                           |  |   |   |  |  |   |   |   |   |   |
|---------------------------|--|---|---|--|--|---|---|---|---|---|
|                           | - Bioerodible sustained release dosage forms<br>- Osmotic pressure activated controlled drug delivery<br>- Targeted release dosage forms |   |   |  |  |   |   |   |   |   |
| <b>10</b>                 | Colloidal drug delivery systems ( Liposomes )  | X | x |  |  |   | x |   |   |   |
| <b>11</b>                 | Colloidal drug delivery systems ( Niosomes )   | X | x |  |  |   | x |   |   |   |
| <b>12</b>                 | Colloidal drug delivery systems (microemulsion)  | x | x |  |  |   | x |   |   |   |
| <b>Practical sessions</b> |  |   |   |  |  |   |   |   |   |   |
| <b>1</b>                  | Isotonic solutions   |   |   |  |  | x |   |   | x | x |
| <b>2</b>                  | Problem solving  |   |   |  |  | x |   |   | x | x |
| <b>3</b>                  | Electrolyte solutions: Milliequivalents, Milimoles and Milliosmoles  |   |   |  |  | x |   |   | x | x |
| <b>4</b>                  | Problem solving  |   |   |  |  | x |   |   | x | x |
| <b>5</b>                  | Intravenous Infusions, Parenteral Admixtures, and Rate-of-Flow Calculations  |   |   |  |  | x |   |   | x | x |
| <b>6</b>                  | Case study   |   |   |  |  | x |   | x | x | x |
| <b>7</b>                  | Parenteral admixtures  |   |   |  |  | x |   |   | x | x |
| <b>8</b>                  | Parenteral Nutrition   |   |   |  |  | x |   |   | x | x |
| <b>9</b>                  | Case study   |   |   |  |  | x |   | x | x | x |
| <b>10</b>                 | evidence-based assignment  |   |   |  |  |   | x |   | x | x |

## Matrix II of Sterile Products and Controlled Drug Delivery Systems course

| National Academic Reference Standards (NARS) |   | Program ILOs | Course ILOs          | Course contents   | Sources                         | Teaching and learning methods |                   |               | Method of assessment |                |           |
|--|---|--------------|----------------------|---|---------------------------------|-------------------------------|-------------------|---------------|----------------------|----------------|-----------|
|  |   |              |                      |   |                                 | Lecture                       | Practical session | Self learning | Written exam         | Practical exam | Oral exam |
| 2.1  | Mention the principles of pharmaceutical sciences (Pharmacy orientation; medical terminology; physical pharmacy; pharmaceuticals; industrial pharmacy; pharmaceutical technology; biopharmaceutics; pharmacokinetics; pharmaceutical chemistry; pharmacognosy; pharmaceutical microbiology; molecular biology and pharmaceutical biotechnology; quality assurance and quality control; instrumental analysis and biological drug assays). | A2           | a1<br>a2<br>a3<br>a4 | Pharmaceutical aerosols:<br>- Advantages<br>- components<br>- Quality control of aerosols.<br>- Filling of aerosols<br>- Introduction to parenteral preparations<br>- Advantages & disadvantages of parenterals<br>- Requirements for parenteral preparations<br>- Routes of parenteral administration<br>- Classification of parenteral preparations<br>Sterilization techniques moist heat , dry heat, radiation, gas and filtration<br>Formulation of parenterals<br>- Packaging of parenterals.<br>- Quality control tests of parenteral preparations<br>Ophthalmic dosage forms<br>- Introduction to drug delivery systems | Student book<br>Essential books | x                             |                   |               | x                    |                | x         |

|     |  |             |    |  |                                 |   |  |  |   |  |   |
|-----|--|-------------|----|--|---------------------------------|---|--|--|---|--|---|
|     |  |             |    | <ul style="list-style-type: none"> <li>- Advantages &amp; disadvantages of delayed release dosage forms</li> <li>- Enteric coating</li> <li>- Colon specific drug delivery</li> <li>- Gastroretentive drug delivery systems</li> <li>- Diffusion based sustained release dosage forms</li> <li>- Bioerodible sustained release dosage forms</li> <li>- Osmotic pressure activated controlled drug delivery</li> <li>- Targeted release dosage forms</li> </ul> <p>Colloidal drug delivery systems ( Liposomes )</p> <p>Colloidal drug delivery systems ( Niosomes )</p> <p>Colloidal drug delivery systems (microemulsion)</p> |                                 |   |  |  |   |  |   |
| 2.6 | Properties of different pharmaceutical dosage forms including novel drug delivery systems. | A.16<br>A17 | a1 | <p>Pharmaceutical aerosols (Advantages, components &amp; preparation).</p> <p>Packaging of pharmaceutical aerosols</p> <p>Filling of aerosols.</p>   | Student book<br>Essential books | x |  |  | x |  | x |

|  |  |  |    |  |                                    |   |  |  |  |   |  |   |
|--|--|--|----|--|------------------------------------|---|--|--|--|---|--|---|
|  |  |  | a2 | Parenteral preparations<br>(Advantages, disadvantages, route of administration).<br>Controlled drug delivery systems<br>" coated beads, microencapsulation, complex formation, resinated drugs,.....etc" | Student book<br>Essential<br>books | x |  |  |  | x |  | x |
|  |  |  |    | Ophthalmic preparations<br>(Solutions, suspensions, powders for reconstitution, ointment, ocusert, contact lenses).<br>Packaging and use of ophthalmic preparations                                      | Student book<br>Essential<br>books | x |  |  |  | x |  | x |
|  |  |  |    | Pharmaceutical aerosols<br>(Advantages, components & preparation).   | Student book<br>Essential<br>books | x |  |  |  | x |  | x |
|  |  |  | a3 | Controlled release dosage forms for oral use<br>Rational for extended release  | Student book<br>Essential<br>books | x |  |  |  | x |  | x |
|  |  |  |    | Controlled drug delivery systems<br>" coated beads, microencapsulation, complex formation, resinated drugs,.....etc"   | Student book<br>Essential<br>books | x |  |  |  | x |  | x |

|                |   |      |   |  |                              |   |   |  |   |   |   |
|----------------|---|------|---|--|------------------------------|---|---|--|---|---|---|
| 2.10           | Principles of public health issues including sources and control of microbial contamination as well as sanitation, disinfection, sterilization methods and microbiological QC of pharmaceutical products. | A.23 | a4  | Colloidal drug delivery systems ( Liposomes, Niosomes and nanoparticles)   | Student book Essential books | x |   |  | x |   | x |
|                |   |      |   | Sterilization and packaging of parenteral products. Manufacturing processes of (ampoules-vials).   | Student book Essential books | x |   |  | x |   | x |
|                |   |      |   | Packaging of pharmaceutical aerosols   | Student book Essential books | x |   |  | x |   | x |
| Exceeding NARs | B21   | b1   | Isotonic solutions  | Practical notes  |                              |   | x |  |   | x |   |
|                |   |      | Electrolyte solutions: Milliequivalents, Milimoles and Milliosmoles         |  |                              |   | x |  |   | x |   |
|                |   |      | Intravenous Infusions, Parenteral Admixtures, and Rate-of-Flow Calculations |  |                              |   | x |  |   | x |   |
|                |   |      | Parenteral admixtures   |  |                              |   | x |  |   | x |   |
|                |   |      | Parenteral Nutrition  |  |                              |   | x |  |   | x |   |
| 4.10           | Apply pharmaceutical knowledge in the formulation of safe and effective medicines as well as in dealing with new drug delivery systems.   | C.2  | c1  | - Introduction to drug delivery systems<br>- Advantages & disadvantages of delayed release dosage forms<br>- Enteric coating<br>- Colon specific drug delivery<br>- Gastroretentive drug delivery systems<br>- Diffusion based sustained release | Student book Essential books | x |   |  | x |   | x |



|      |   |      |    |  |                              |  |  |  |   |  |   |  |   |  |   |
|------|---|------|----|--|------------------------------|--|--|--|---|--|---|--|---|--|---|
| 4.13 | Analyze and interpret experimental results as well as published literature.               | C18  | c2 | dosage forms<br>- Bioerodible sustained release dosage forms<br>- Osmotic pressure activated controlled drug delivery<br>- Targeted release dosage forms |                              |  |  |  |   |  |   |  |   |  |   |
|      |   |      |    | Colloidal drug delivery systems ( Liposomes )  |                              |  |  |  |   |  |   |  |   |  |   |
|      |   |      |    | Colloidal drug delivery systems ( Niosomes )   |                              |  |  |  |   |  |   |  |   |  |   |
|      |   |      |    | Colloidal drug delivery systems (microemulsion)  |                              |  |  |  |   |  |   |  |   |  |   |
|      |   |      |    | Quality control of aerosols.   |                              |  |  |  | x |  | x |  | x |  |   |
|      |   |      |    | Quality control tests of parenteral preparations   |                              |  |  |  | x |  | x |  | x |  |   |
| 5.3  | Work effectively in a team  | D3   | d3 | Isotonic solutions   | Practical notes              |  |  |  |   |  |   |  |   |  |   |
|      |   |      |    | Electrolyte solutions: Milliequivalents, Milimoles and Milliosmoles  |                              |  |  |  |   |  |   |  |   |  |   |
|      |   |      |    | Intravenous Infusions, Parenteral Admixtures, and Rate-of-Flow Calculations  |                              |  |  |  |   |  |   |  |   |  |   |
|      |   |      |    | Parenteral admixtures  |                              |  |  |  |   |  |   |  |   |  |   |
|      |   |      |    | Parenteral Nutrition   |                              |  |  |  |   |  |   |  |   |  |   |
| 5.4  | Use numeracy, calculation and statistical methods as well as information technology tools | D.5  | d1 | Case study   | Practical notes and Internet |  |  |  |   |  |   |  |   |  |   |
|      |   |      |    | evidence-based assignment  |                              |  |  |  |   |  |   |  |   |  |   |
| 5.10 | Implement writing and   | D.11 | d2 | Isotonic solutions   | Practical                    |  |  |  |   |  |   |  |   |  | x |

|  |  |  |  |   |       |  |  |  |  |  |  |
|--|--|--|--|---|-------|--|--|--|--|--|--|
|  | thinking, problem-solving and decision-making abilities. |  |  | Electrolyte solutions:<br>Milliequivalents, Milimoles and<br>Milliosmoles         | notes |  |  |  |  |  |  |
|  |  |  |  | Intravenous Infusions, Parenteral<br>Admixtures, and Rate-of-Flow<br>Calculations |       |  |  |  |  |  |  |
|  |  |  |  | Parenteral admixtures   |       |  |  |  |  |  |  |
|  |  |  |  | Parenteral Nutrition  |       |  |  |  |  |  |  |

---

---

**Course Coordinator: Dr. GehanFathyAttia**

- **Head of Department: Prof. Nagia Ahmed El-Megrab**

**Date: 2020 / 1 / 3 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ**

**COURSE  
SPECIFICATIONS**

**Phytochemistry-1**

**Third year – secondTerm  
2019-2020**

# Course Specification of Phytochemistry I

---

University: **Zagazig** Faculty: **Pharmacy**

## A- Course specifications:

Program(s) on which the course is given: Bachelor of Pharmacy

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Pharmacognosy

Academic year/Level: Third year / semester 6

Date of specification approval: 30/09/2019

## B- Basic information:

Title: Phytochemistry I Code: PG324

Credit Hours: ---

Lectures: 2 hrs

Practical: 2 hr

Tutorials: ---

Total: 3 hrs

## C- Professional information:

### 1-Overall Aims of the Course:

On completion of the course, the student will be able to:  
Demonstrate comprehensive knowledge, clear understanding and the competent skills in dealing with glycosides, tannins, carbohydrates, bitter principals, minerals, natural carotenoids, resins and resin combination and natural antioxidants.

## 2-Intended Learning Outcomes of Phytochemistry I

| <b>A- Knowledge and Understanding</b>       |   |
|---|---|
| a1  | Define, state and classify certain classes of natural products (glycosides, tannins, carbohydrates, bitter principals, minerals, natural carotenoids, resins and resin combination and natural antioxidants) and their physical properties. |
| a2  | Describe the chemistry of the above mentioned classes, their pharmacological properties (biological activities) and contra-indications.   |
| a3  | Identify different analytical techniques used in natural products determination for the above mentioned classes, their methods of isolation, purification and identification.   |
| a4  | Identify natural and pharmaceutical products containing glycosides, tannins, carbohydrates, bitter principals, minerals, natural carotenoids, resins and resin combination and natural antioxidants.  |
| <b>B- Professional and Practical skills</b> |   |
| b1  | Handle chemicals, solvents and equipment safely.  |
| b2  | Examine different glycosides, tannins, carbohydrates, resins and resin combination and natural antioxidants.  |
| b3  | Prepare lab research reports on glycosides, tannins, carbohydrates, bitter principals, minerals, natural carotenoids, resins and resin combination and natural antioxidants.  |
| <b>C- Intellectual skills</b>               |   |
| c1  | Choose the proper pharmaceutical terms and abbreviations for certain classes of natural (glycosides, tannins, carbohydrates, bitter principals, minerals, natural carotenoids, resins and resin combination and natural antioxidants).      |
| c2  | Estimate certain classes of naturally occurring products (glycosides, tannins, carbohydrates, bitter principals, minerals, natural carotenoids, resins and resin combination and natural antioxidants).                                     |
| c3  | Predict the appropriate method for isolation and purification of different glycosides, tannins, carbohydrates, bitter principals, minerals, natural carotenoids, resins and resin combination and natural antioxidants.                     |
| <b>D- General and Transferable skills</b>   |   |
| d1  | Work effectively as a member of a team.   |
| d2  | Manage time to achieve targets within deadlines.  |
| d3  | Write and present reports.  |

d4 Develop critical thinking and problem-solving skills.

## D- Contents:

| <b>Week No.</b> | <b>Lecture (2hrs/week)</b>  | <b>Practical session (2hrs/week)</b>   |
|-----------------|---|--|
| <b>1</b>        | <b>Glycosides</b><br>Classification, isolation and properties                   | General properties of glycosides and extraction methods  |
| <b>2</b>        | <b>Glycosides</b><br>Phenolic glycosides, cyanogenic glycosides, thioglycosides | Chemical tests for cardiac glycosides, flavonoids and coumarins.   |
| <b>3</b>        | <b>Glycosides</b><br>Cardiac glycosides   | (Activity)<br>Get a copy of pamphlets for pharmaceutical products containing glycosides<br>Application of chemical tests for glycosides in pharmaceutical products   |
| <b>4</b>        | <b>Glycosides</b><br>Flavonoids and coumarins                                   | Chemical tests for anthraquinones and saponins.  |
| <b>5</b>        | <b>Glycosides</b><br>Anthraquinones, saponins and miscellaneous glycosides      | Chemical tests for tannins and antioxidants.   |
| <b>6</b>        | <b>Tannins and antioxidants</b>   | (Activity)<br>Get a copy of pamphlets for pharmaceutical products containing glycosides, tannins and antioxidants<br>Application of chemical tests for glycosides, tannins and antioxidants in pharmaceutical products |
| <b>7</b>        | <b>Midterm written exam</b>   |  |
| <b>8</b>        | <b>Carbohydrates</b><br>Definition, classification,                             | <b>Practical exam 1</b>  |

|           |   |  |
|-----------|---|--|
|           | properties, evaluation, drugs containing carbohydrates                |  |
| <b>9</b>  | <b>Carbohydrates</b><br>Heteropolysaccharides and holopolysaccharides | General properties of carbohydrates<br>Chemical tests for monosaccharides  |
| <b>10</b> | <b>Bitter principals</b>  | Chemical tests for disaccharides and polysaccharides   |
| <b>11</b> | <b>Minerals</b>   | Chemical tests for resins and resin combination (Activity)<br>Get a copy of pamphlets for pharmaceutical products containing carbohydrates and resins and resin combination<br>Application of chemical tests for carbohydrates and resins and resin combination in pharmaceutical products<br>Lab research report on different studied classes in theoretical part |
| <b>12</b> | <b>Natural carotenoids</b>  | <b>Practical exam 2</b>  |
| <b>13</b> | <b>Resins and resin combination</b>                                   | <b>Practical exam 3</b>  |
| <b>14</b> | <b>Revision.</b>  |  |
| <b>15</b> | <b>Written exam</b>   |  |

### **E- Teaching and Learning Methods:**

- Lectures.



- Interactive lectures.
- Practical sessions.
- Videos.
- Self-learning (group discussion, net search).
- Visits to community pharmacy to get copy of pamphlets for pharmaceutical products containing studied natural products.

### **F- Student Assessment Methods:**

- 1- Written exam (midterm, final) to assess a1, a2, a3, a4, c1, c2, c3 and d4.
- 2- Activity to assess b3, c1, c2, c3, d1, d2, d3 and d4.
- 3- Practical exam to assess b1, b2, b3.
- 4- Oral exam to assess a1, a2, a3, a4, c1, c2, c3 and d4.

### **Assessment schedule:**

|   |                 |
|---|-----------------|
| <b>Assessment (1):</b> Midterm written exam | Week 7          |
| <b>Assessment (2):</b> Activity             | Weeks 3, 6, 11  |
| <b>Assessment (3):</b> Practical exam       | Weeks 8, 12, 13 |
| <b>Assessment (4):</b> Final written exam   | Week 15         |
| <b>Assessment (5):</b> Oral exams           | Week 15         |

### **Weighting of Assessment:**

| <b>Assessment method</b>    | <b>Marks</b> | <b>Percentage</b> |
|-----------------------------|--------------|-------------------|
| <b>Midterm written exam</b> | 10           | 10%               |
| <b>Activity</b>             | 5            | 5%                |
| <b>Practical exam</b>       | 20           | 20%               |
| <b>Final written exam</b>   | 50           | 50%               |
| <b>Oral exam</b>            | 15           | 15%               |
| <b>TOTAL</b>                | 100          | 100%              |

### **G- Facilities Required for Teaching and Learning:**

- Black (white) board, Data show, Laboratory equipment (water bath, polarimeter, melting point apparatus, digital balances and glassware) and Chemicals.

## H- List of References:

### 1- Course Notes:

Student book of Phytochemistry II approved by Pharmacognosy Department (2019).

### 2- Essential books:

Egbuna, C., Kumar, S., Ifemeje, J. C., & Kurhekar, J. V. (Eds.). (2018). *Phytochemistry: Volume 2: Pharmacognosy, Nanomedicine, and Contemporary Issues*. CRC Press.

Nakanishi, K., Goto, T., & Itô, S. (Eds.). (2013). *Natural products chemistry* (Vol. 1). Academic press.

Dewick, P. M. (2002). *Medicinal natural products: a biosynthetic approach*. John Wiley & Sons.

Colegate, S. M., & Molyneux, R. J. (Eds.). (2007). *Bioactive natural products: detection, isolation, and structural determination*. CRC press.

### 3- Recommended books:

Rahman, A. U. (2012). *Studies in natural products chemistry/edited by Atta-ur-Rahman*. Amsterdam; New York: Elsevier.

### 4- Periodicals and websites:

Fitoterapia, Die Pharmazie, Journal of Natural Products, Phytochemistry and Planta medica

[http:// www.elsevier.com/phytochem](http://www.elsevier.com/phytochem)

[http:// www.elsevier.com/phytomed](http://www.elsevier.com/phytomed)

[http:// www.wiley.co.uk](http://www.wiley.co.uk).

[http:// www.sciencedirect.com](http://www.sciencedirect.com)

---

**Course Coordinator: Prof Dr. Mahmoud AbdAlaal**

**Head of Department: Prof Dr. Amal Al-Gendy**

**Date: 2019/09/30 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ**

## Matrix I of Phytochemistry I course

| Course Contents |  | ILOs of Phytochemistry I course |    |    |    |                                   |    |    |                     |    |    |                                 |    |    |    |
|-----------------|--|---------------------------------|----|----|----|-----------------------------------|----|----|---------------------|----|----|---------------------------------|----|----|----|
|                 |  | Knowledge and understanding     |    |    |    | Professional and practical skills |    |    | Intellectual skills |    |    | General and transferable skills |    |    |    |
| Lectures        |  | a1                              | a2 | a3 | a4 | b1                                | b2 | b3 | c1                  | c2 | c3 | d1                              | d2 | d3 | d4 |
| 1               | <b>Glycosides</b><br>Classification, isolation and properties  | x                               |    |    |    |                                   |    |    | x                   |    | x  |                                 |    |    |    |
| 2               | <b>Glycosides</b><br>Phenolic glycosides, cyanogenic glycosides, thioglycosides                            |                                 | x  | x  | x  |                                   |    |    | x                   | x  | x  |                                 |    |    |    |
| 3               | <b>Glycosides</b><br>Cardiac glycosides  |                                 | x  | x  | x  |                                   |    |    | x                   | x  | x  |                                 |    |    |    |
| 4               | <b>Glycosides</b><br>Flavonoids and coumarins  |                                 | x  | x  | x  |                                   |    |    | x                   | x  | x  |                                 |    |    |    |
| 5               | <b>Glycosides</b><br>Anthraquinones, saponins and miscellaneous glycosides                                 |                                 | x  | x  | x  |                                   |    |    | X                   | x  | x  |                                 |    |    |    |
| 6               | <b>Tannins and antioxidants</b>  | x                               | x  | x  | x  |                                   |    |    | x                   | x  | x  |                                 |    |    |    |
| 7               | <b>Carbohydrates</b><br>Definition, classification, properties, evaluation, drugs containing carbohydrates | x                               | x  | x  | x  |                                   |    |    | x                   | x  | x  |                                 |    |    |    |

|                           |  |   |   |   |   |  |  |   |   |   |   |   |  |   |   |   |   |
|---------------------------|--|---|---|---|---|--|--|---|---|---|---|---|--|---|---|---|---|
| <b>8</b>                  | <b>Carbohydrates</b><br>Heteropolysaccharides and holopolysaccharides  |   | x | x | x |  |  |   |   | x | x | x |  |   |   |   |   |
| <b>9</b>                  | <b>Bitter principals</b>   | x | x | x | x |  |  |   |   | x | x | x |  |   |   |   |   |
| <b>10</b>                 | <b>Minerals</b>  | x | x | x | x |  |  |   |   | x | x | x |  |   |   |   |   |
| <b>11</b>                 | <b>Natural carotenoids</b>   | x | x | x | x |  |  |   |   | x | x | x |  |   |   |   |   |
| <b>12</b>                 | <b>Resins and resin combination</b>  | x | x | x | x |  |  |   |   | x | x | x |  |   |   |   |   |
| <b>Practical sessions</b> |  |   |   |   |   |  |  |   |   |   |   |   |  |   |   |   |   |
| <b>13</b>                 | General properties of glycosides and extraction methods  |   |   |   |   |  |  | x |   | x |   |   |  | x |   | x |   |
| <b>14</b>                 | Chemical tests for cardiac glycosides, flavonoids and coumarins.   |   |   |   |   |  |  | x | x | x |   |   |  |   |   | x |   |
| <b>15</b>                 | Glycosides in pharmaceutical products (activity).  |   |   |   |   |  |  | x | x | x | x | x |  | x | x | x | x |
| <b>16</b>                 | Chemical tests for anthraquinones and saponins.  |   |   |   |   |  |  | x | x | x |   |   |  |   |   | x |   |
| <b>17</b>                 | Chemical tests for tannins and antioxidants.   |   |   |   |   |  |  | x | x | x |   |   |  |   |   | x |   |
| <b>18</b>                 | Glycosides, tannins and antioxidants in pharmaceutical products (activity).  |   |   |   |   |  |  | x | x | x | x | x |  | x | x | x | x |
| <b>19</b>                 | General properties of carbohydrates<br>Chemical tests for monosaccharides  |   |   |   |   |  |  | x | x | x |   |   |  | x |   | x |   |
| <b>20</b>                 | Chemical tests for disaccharides   |   |   |   |   |  |  | x | x | x |   |   |  |   |   | x |   |
| <b>21</b>                 | Chemical tests for polysaccharides   |   |   |   |   |  |  | x | x | x |   |   |  |   |   | x |   |
| <b>22</b>                 | Chemical tests for resins and resin combination<br>Carbohydrates and resins and resin combination in pharmaceutical products |   |   |   |   |  |  | x | x | x | x | x |  | x | x | x | x |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|  | Lab research report on different studied classes in theoretical part (activity). |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

## Matrix II of Phytochemistry I course

| National Academic Reference Standards (NARS) | Program ILOs  | Course ILOs        | Course contents                                   | Sources   | Teaching and learning methods               |                           |               | Method of assessment |                |           |          |  |
|--|---|--------------------|---|---|---|---------------------------|---------------|----------------------|----------------|-----------|----------|--|
|  |   |                    |   |   | Lecture/ interactive lecture/ videos        | Practical session/ videos | Self learning | Written exam         | Practical exam | Oral exam | Activity |  |
|  |   |                    | <b>Theoretical sessions</b>                       |   |   |                           |               |                      |                |           |          |  |
| 2.4<br>4.5                                   | Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.                   | <b>A12,<br/>C9</b> | <b>a1,<br/>c1,<br/>c3</b>                         | <b>Glycosides</b><br>Classification, isolation and properties                   | Student book<br>Essential books             | x                         |               |                      | x              |           | x        |  |
| 2.13,<br>4.5                                 | Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. | <b>A30,<br/>C9</b> | <b>a2,<br/>a3,<br/>a4,<br/>c1,<br/>c2,<br/>c3</b> | <b>Glycosides</b><br>Phenolic glycosides, cyanogenic glycosides, thioglycosides | Student book<br>Essential books<br>Internet | x                         |               |                      | x              |           | x        |  |
| 2.13,<br>4.5                                 | Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. | <b>A30,<br/>C9</b> | <b>a2,<br/>a3,<br/>a4,<br/>c1,<br/>c2,</b>        | <b>Glycosides</b><br>Cardiac glycosides   | Student book<br>Essential books<br>Internet | x                         |               |                      | x              |           | x        |  |

|  |   |   |   |  |   |   |  |  |  |   |  |   |
|--|---|---|---|--|---|---|--|--|--|---|--|---|
|  |   |   | <b>c3</b>   |  |   |   |  |  |  |   |  |   |
| <b>2.13,</b><br><b>4.5</b>               | Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.  | <b>A30,</b><br><b>C9</b>                | <b>a2,</b><br><b>a3,</b><br><b>a4,</b><br><b>c1,</b><br><b>c2,</b><br><b>c3</b>               | <b>Glycosides</b><br><b>Flavonoids and coumarins</b>   | Student book<br>Essentia<br>1 books<br>Internet | x |  |  |  | x |  | x |
| <b>2.13,</b><br><b>4.5</b>               | Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.  | <b>A30,</b><br><b>C9</b>                | <b>a2,</b><br><b>a3,</b><br><b>a4,</b><br><b>c1,</b><br><b>c2,</b><br><b>c3</b>               | <b>Glycosides</b><br><b>Antraquinones, saponins</b><br><b>and miscellaneous</b><br><b>glycosides</b> | Student book<br>Essentia<br>1 books<br>Internet | x |  |  |  | x |  | x |
| <b>2.4</b><br><b>2.13,</b><br><b>4.5</b> | Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. | <b>A12,</b><br><b>A30,</b><br><b>C9</b> | <b>a1,</b><br><b>a2,</b><br><b>a3,</b><br><b>a4,</b><br><b>c1,</b><br><b>c2,</b><br><b>c3</b> | <b>Tannins and antioxidants</b>  | Student book<br>Essentia<br>1 books<br>Internet | x |  |  |  | x |  | x |
| <b>2.4</b><br><b>2.13,</b><br><b>4.5</b> | Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs  | <b>A12,</b><br><b>A30,</b><br><b>C9</b> | <b>a1,</b><br><b>a2,</b><br><b>a3,</b>  | <b>Carbohydrates</b><br><b>Definition, classification,</b><br><b>properties, evaluation,</b>         | Student book<br>Essentia<br>1 books             | x |  |  |  | x |  | x |



|                              |  |                             |   |  |  |   |  |  |   |  |  |   |
|------------------------------|--|-----------------------------|---|--|--|---|--|--|---|--|--|---|
|                              | including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.  |                             | <b>a4,<br/>c1,<br/>c2,<br/>c3</b>                         | drugs containing carbohydrates   | Internet   |   |  |  |   |  |  |   |
| <b>2.13,<br/>4.5</b>         | Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.  | <b>A30,<br/>C9</b>          | <b>a2,<br/>a3,<br/>a4,<br/>c1,<br/>c2,<br/>c3</b>         | <b>Carbohydrates<br/>Heteropolysaccharides and<br/>holopolysaccharides</b> | Student<br>book<br>Essentia<br>l books<br>Internet | x |  |  | x |  |  | x |
| <b>2.4<br/>2.13,<br/>4.5</b> | Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. | <b>A12,<br/>A30,<br/>C9</b> | <b>a1,<br/>a2,<br/>a3,<br/>a4,<br/>c1,<br/>c2,<br/>c3</b> | <b>Bitter principals</b>   | Student<br>book<br>Essentia<br>l books<br>Internet | x |  |  | x |  |  | x |
| <b>2.4<br/>2.13,<br/>4.5</b> | Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. | <b>A12,<br/>A30,<br/>C9</b> | <b>a1,<br/>a2,<br/>a3,<br/>a4,<br/>c1,<br/>c2,<br/>c3</b> | <b>Minerals</b>  | Student<br>book<br>Essentia<br>l books<br>Internet | x |  |  | x |  |  | x |
| <b>2.4</b>                   | Principles of isolation, synthesis, purification, identification, and  | <b>A12,</b>                 | <b>a1,</b>  | <b>Natural carotenoids</b>   | Student<br>book                                    | x |  |  | x |  |  | x |

|                             |   |                           |  |  |                             |   |   |  |   |  |   |   |
|-----------------------------|---|---------------------------|--|--|-----------------------------|---|---|--|---|--|---|---|
| 2.13,<br>4.5                | standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.   | A30,<br>C9                | a2,<br>a3,<br>a4,<br>c1,<br>c2,<br>c3        |  | Essential books<br>Internet |   |   |  |   |  |   |   |
| 2.4<br>2.13,<br>4.5         | Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. | A12,<br>A30,<br>C9        | a1,<br>a2,<br>a3,<br>a4,<br>c1,<br>c2,<br>c3 | <b>Resins and resin combination</b>                              | Internet                    | x |   |  | x |  |   | x |
|                             |   |                           |  | <b>Practical sessions</b>  |                             |   |   |  |   |  |   |   |
| 3.2<br>3.11,<br>4.5<br>5.9, | Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Conduct research studies and analyze the results. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Implement writing and presentation skills.   | B2,<br>B19,<br>C9,<br>D10 | b1,<br>b3,<br>c3,<br>d3                      | General properties of glycosides and extraction methods          | Practical notes             |   | x |  |   |  | x |   |
| 3.2<br>3.4,<br>3.11,        | Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the  | B2,<br>B6,<br>B19,<br>D10 | b1,<br>b2,<br>b3,<br>d3                      | Chemical tests for cardiac glycosides, flavonoids and coumarins. | Practical notes             |   | x |  |   |  | x |   |

|  |   |  |  |   |   |  |   |   |  |   |  |   |
|--|---|--|--|---|---|--|---|---|--|---|--|---|
| 5.9,   | results<br>Implement writing and presentation skills.   |  |  |   |   |  |   |   |  |   |  |   |
| 3.2<br>3.4,<br>3.11,<br>4.2,<br>4.5,<br>5.2,<br>5.3,<br>5.4,<br>5.9,<br>5.10 | Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results<br>Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice.<br>Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Retrieve and evaluate information from different sources to improve professional competencies.<br>Work effectively in a team.<br>Use numeracy, calculation and statistical methods as well as information technology tools.<br>Implement writing and presentation skills.<br>Implement writing and thinking, problem-solving and decision- making abilities. | B2,<br>B6,<br>B19,<br>C3,<br>C9,<br>D2,<br>D3,<br>D4,<br>D10,<br>D11 | b1,<br>b2,<br>b3,<br>c1,<br>c2,<br>d1,<br>d2,<br>d3,<br>d4 | (Activity)<br>pharmaceutical products                 | Practica<br>l notes<br>Internet<br>Visits<br>for<br>commu<br>nity<br>pharma<br>cies |  | x | x |  | x |  | x |
| 3.2<br>3.4,<br>3.11,<br>5.9,   | Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results<br>Implement writing and presentation skills.  | B2,<br>B6,<br>B19,<br>D10  | b1,<br>b2,<br>b3,<br>d3                                    | Chemical tests for<br>anthraquinones and<br>saponins. | Practica<br>l notes   |  | x |   |  | x |  |   |

|  |  |  |   |   |   |  |   |   |  |  |   |  |   |
|--|--|--|---|---|---|--|---|---|--|--|---|--|---|
| 3.2<br>3.4,<br>3.11,<br>5.9,   | Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results<br>Implement writing and presentation skills.   | B2,<br>B6,<br>B19,<br>D10  | <b>b1,<br/>b2,<br/>b3,<br/>d3</b>   | Chemical tests for tannins and antioxidants.                              | Practical notes   |  | x |   |  |  | x |  |   |
| 3.2<br>3.4,<br>3.11,<br>4.2,<br>4.5,<br>5.2,<br>5.3,<br>5.4,<br>5.9,<br>5.10 | Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results<br>Comprehend and apply GLP, GMP, GSP and GCP guidelines in pharmacy practice.<br>Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Retrieve and evaluate information from different sources to improve professional competencies.<br>Work effectively in a team.<br>Use numeracy, calculation and statistical methods as well as information technology tools.<br>Implement writing and presentation skills.<br>Implement writing and thinking, problem-solving and decision- making abilities. | B2,<br>B6,<br>B19,<br>C3,<br>C9,<br>D2,<br>D3,<br>D4,<br>D10,<br>D11 | <b>b1,<br/>b2,<br/>b3,<br/>c1,<br/>c2,<br/>d1,<br/>d2,<br/>d3,<br/>d4</b> | (Activity)<br>pharmaceutical products                                     | Practical notes<br>Internet Visits for community pharmacies |  | x | x |  |  | x |  | x |
| 3.2<br>3.4,<br>3.11,<br>4.5<br>5.9,  | Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results<br>Select the appropriate methods of isolation, synthesis, purification,  | B2,<br>B6,<br>B19,<br>C9,<br>D10                                     | <b>b1,<br/>b2,<br/>b3,<br/>c3,<br/>d3</b>                                 | General properties of carbohydrates<br>Chemical tests for monosaccharides | Practical notes   |  | x |   |  |  | x |  |   |

|                              |  |                                     |                                   |   |                     |  |  |   |  |  |  |  |  |   |
|------------------------------|--|-------------------------------------|-----------------------------------|---|---------------------|--|--|---|--|--|--|--|--|---|
|                              | identification, and standardization of active substances from different origins. Implement writing and presentation skills.  |                                     |                                   |   |                     |  |  |   |  |  |  |  |  |   |
| 3.2<br>3.4,<br>3.11,<br>5.9, | Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results. Implement writing and presentation skills. | <b>B2,<br/>B6,<br/>B19,<br/>D10</b> | <b>b1,<br/>b2,<br/>b3,<br/>d3</b> | <b>Chemical tests for disaccharides and polysaccharides</b> | Practica<br>1 notes |  |  |   |  |  |  |  |  |   |
|                              |  |                                     |                                   |   |                     |  |  | x |  |  |  |  |  | x |

|   |  |  |  |  |   |  |  |  |  |          |          |
|---|--|--|--|--|---|--|--|--|--|----------|----------|
| <p>3.2<br/>3.4,<br/>3.11,<br/>4.2,<br/>4.5,<br/><br/>5.2,<br/>5.3,<br/>5.4,<br/>5.9,<br/>5.10</p> | <p>Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results<br/>Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice.<br/>Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Retrieve and evaluate information from different sources to improve professional competencies.<br/>Work effectively in a team. Use numeracy, calculation and statistical methods as well as information technology tools. Implement writing and presentation skills. Implement writing and thinking, problem-solving and decision- making abilities.</p> | <p><b>B2,</b><br/><b>B6,</b><br/><b>B19,</b><br/><b>C3,</b><br/><b>C9,</b><br/><b>D2,</b><br/><b>D3,</b><br/><b>D4,</b><br/><b>D10,</b><br/><b>D11</b></p> | <p><b>b1,</b><br/><b>b2,</b><br/><b>b3,</b><br/><b>c1,</b><br/><b>c2,</b><br/><b>d1,</b><br/><b>d2,</b><br/><b>d3,</b><br/><b>d4</b></p> | <p>Chemical tests for resins and resin combination (Activity)<br/>pharmaceutical products<br/>Lab research report on different studied classes in theoretical part</p> | <p>Internet Visits for community pharmacies</p> |  |  |  |  | <p>X</p> | <p>X</p> |
|---|--|--|--|--|---|--|--|--|--|----------|----------|

**Course Coordinator: Prof Dr. Mahmoud AbdAlaal**

**Head of Department: Prof Dr. Amal Al-Gendy**

**Date: 2019/09/30 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ**







**COURSE  
SPECIFICATIONS**

**Pharmacology -2**

**Third year – secondTerm  
2019-2020**

## Course Specification of Pharmacology -II

---

University: Zagazig Faculty: Pharmacy

### A- Course specifications:

Program(s) on which the course is given: **Bachelor of Pharmacy**

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: **Pharmacology and toxicology department**

Academic year / Level: **Third year / Second term**

Date of specification approval: February 2020

### B- Basic information:

Title: Pharmacology II Code: **PT323**

Credit Hours: -----

Lectures: 2hrs/week

Practical: 2hrs/week

Tutorials: ---

Total: 3hrs/week

### C- Professional information:

#### 1-Overall Aims of the Course

On completion of the course, students will be able to:

- Explain body functions as well as clinical features of different diseases that were not covered in Pharmacology (1) to determine appropriate pharmacological therapy.
- Build up comprehensive knowledge about essential bases of pharmacology and how to apply these bases in their professional life as pharmacists in community.

## 2-Intended Learning Outcomes of (ILOS)

| <b>A- Knowledge and Understanding</b>       |  |
|---|--|
| a1  | Illustrate disorders in body functions associated with various disease states.                         |
| a2  | Demonstrate etiology, epidemiology and clinical features of different diseases.                        |
| a3  | Describe pharmacological properties of drugs.  |
| <b>B- Professional and Practical Skills</b> |  |
| b1  | Apply lab safety measures.   |
| b2  | Practice the basics handling of experimental animals & routes of drugs administration.                 |
| b3  | Perform in vivo experiments to determine pharmacological properties of drugs in a professional manner. |
| <b>C- Intellectual Skills</b>               |  |
| c1  | Select the proper drug in various disease conditions based on drug-related information.                |
| c2  | Assess information from different sources in the field of pharmacology.                                |
| <b>D- General and Transferable Skills</b>   |  |
| d1  | Work effectively as a member of a team.  |
| d2  | Develop calculation skills   |
| d3  | Present information as a written report  |

## D- Contents:

| Week No. | Lecture (2hrs/week)  | Practical Session (2hrs/week)   |
|----------|--|---|
| 1        | <ul style="list-style-type: none"> <li>Degenerative disorders and spasticity.</li> </ul>   | <ul style="list-style-type: none"> <li>Lab safety measures</li> <li>Handling of experimental animals and routes of drugs administration (mice) (1)</li> </ul> |
| 2        | <ul style="list-style-type: none"> <li>Drugs used for treatment of anxiety and sleep disorders.</li> <li>Treatment of depression and mania.</li> <li>Drugs used for treatment of mania and bipolar disorder</li> </ul> | <ul style="list-style-type: none"> <li>Lab safety measures</li> <li>Handling of experimental animals and routes of drugs administration (mice) (2)</li> </ul> |
| 3        | <ul style="list-style-type: none"> <li>Drugs used for treatment of psychosis and anxiety.</li> </ul>   | <ul style="list-style-type: none"> <li>Handling of experimental animals and routes of drugs administration (frogs) (1)</li> </ul>                             |
| 4        | <ul style="list-style-type: none"> <li>Antiepileptic drugs.</li> </ul>   | <ul style="list-style-type: none"> <li>Handling of experimental animals and routes of drugs administration (frogs) (2)</li> </ul>                             |
| 5        | <ul style="list-style-type: none"> <li>Pain control with general and local anaesthetics.</li> </ul>  | <ul style="list-style-type: none"> <li>CNS stimulants (1)</li> </ul>  |
| 6        | <ul style="list-style-type: none"> <li>Central nervous system stimulants.</li> </ul>   | <ul style="list-style-type: none"> <li>CNS stimulants (2)</li> </ul>  |
| 7        | <ul style="list-style-type: none"> <li>Mid-term</li> </ul>   |   |
| 8        | <ul style="list-style-type: none"> <li>Anti hyperlipidemic drugs</li> </ul>  | <ul style="list-style-type: none"> <li>CNS depressants (1)</li> </ul>   |
| 9        | <ul style="list-style-type: none"> <li>Drugs used in coagulation and bleeding disorders.</li> </ul>  | <ul style="list-style-type: none"> <li>CNS depressants (2)</li> </ul>   |
| 10       | <ul style="list-style-type: none"> <li>Autacoids</li> </ul>  | <ul style="list-style-type: none"> <li>Analgesics (1)</li> <li>Activity (reports)</li> </ul>  |
| 11       | <ul style="list-style-type: none"> <li>Anti-inflammatory, antipyretic and analgesic agents.</li> </ul>   | <ul style="list-style-type: none"> <li>Analgesics (2)</li> <li>Activity (reports)</li> </ul>  |
| 12       | <ul style="list-style-type: none"> <li>Respiratory system pharmacology.</li> </ul>   | <ul style="list-style-type: none"> <li>Practical exam</li> </ul>  |
| 13       | <ul style="list-style-type: none"> <li>Gastrointestinal pharmacology.</li> </ul>   | <ul style="list-style-type: none"> <li>Practical exam</li> </ul>  |
| 14       | <ul style="list-style-type: none"> <li>Drugs used for treatment of anemia</li> <li>Hematopoietic growth factors.</li> </ul>  |   |
| 15       | <ul style="list-style-type: none"> <li>Final written exam</li> </ul>   |   |

## **E- Teaching and Learning Methods:**

- Lectures
- Practical sessions
- Open discussion, self-learning.

## **F- Student Assessment Methods:**

- 1- Written exam (midterm and final) to assess: a1, a2, a3, c1, c2
- 2- Activity (report) to assess d1, d3
- 3- Practical exam to assess: b1, b2, b3, d1, d2, d3
- 4- Oral exam to assess: a1, a2, a3, c1, c2

## **Assessment Schedule:**

|   |             |
|---|-------------|
| <b>Assessment (1):</b> Final written exam | Week 15     |
| <b>Assessment (2):</b> Practical exam     | Weeks12, 13 |
| <b>Assessment (3):</b> Oral exam          | Week 15     |
| <b>Assessment (4):</b> Midterm exam       | Week 7      |
| <b>Assessment (5):</b> Activity (report)  | Weeks 10,11 |

## **Weighting of Assessment:**

| <b>Assessment method</b>  | <b>Marks</b> | <b>Percentage</b> |
|---------------------------|--------------|-------------------|
| <b>Midterm exam</b>       | <b>10</b>    | <b>10%</b>        |
| <b>Final written exam</b> | <b>50</b>    | <b>50%</b>        |
| <b>Activity (Report)</b>  | <b>5</b>     | <b>5%</b>         |
| <b>Practical exam</b>     | <b>20</b>    | <b>20%</b>        |
| <b>Oral exam</b>          | <b>15</b>    | <b>15%</b>        |
| <b>TOTAL</b>              | <b>100</b>   | <b>100%</b>       |

## **F- Facilities required for teaching and learning:**

- Black (white) board, Data show, Laboratory equipment, laboratory animals and Chemicals.

## **H- List of References:**

**1- Course Notes:** Student book of Pharmacology (2) approved by the Pharmacology and toxicology department (2019)

- Practical notes of Pharmacology (2) approved by the Pharmacology and

toxicology department (2019)

## **2- Essential Books:**

i- Rang & Dale pharmacology (eighth edition); Churchill Livingstone (2015).

ii- Katzung basic and clinical pharmacology (fourteenth edition); McGraw Hill Lang. (2017).

## **3- Recommended Books**

i- Lippincott illustrated reviews-pharmacology (seventh edition) (2018).

ii- Tripathi Essentials of Medical Pharmacology (eighth edition) (2018)

## **4- Periodicals and websites:**

- Aquilina A. The extemporaneous compounding of paediatric medicines at Mater Dei Hospital. Journal of the Malta College of Pharmacy Practice. Issue 19, 28 – 30, 2013.

<http://canadianpharmacistsletter.therapeuticresearch.com/ce/ceCourse.asp>

---

**Course Coordinator: Prof. Dr. Atef Saad**

**Head of Department: Prof. Dr. Mona Fouad Mahmoud**

**Date:** تم مناقشة واعتماد توصيف المقرر من مجلس القسم بتاريخ فبراير 2020

| <b>Matrix I</b>        |  |                                    |           |           |                         |           |           |                            |           |  |           |           |
|------------------------|--|------------------------------------|-----------|-----------|-------------------------|-----------|-----------|----------------------------|-----------|--|-----------|-----------|
| <b>Course Contents</b> |  | <b>ILOs of the course</b>          |           |           |                         |           |           |                            |           |  |           |           |
|                        |  | <b>Knowledge and understanding</b> |           |           | <b>Practical skills</b> |           |           | <b>Intellectual skills</b> |           | <b>General and transferable and skills</b> |           |           |
|                        |  | <b>a1</b>                          | <b>a2</b> | <b>a3</b> | <b>b1</b>               | <b>b2</b> | <b>b3</b> | <b>c1</b>                  | <b>c2</b> | <b>d1</b>                                  | <b>d2</b> | <b>d3</b> |
| <b>Lectures</b>        |  |                                    |           |           |                         |           |           |                            |           |  |           |           |
| <b>1</b>               | Degenerative disorders and spasticity.   | x                                  | x         | x         |                         |           |           | x                          | x         |  |           |           |
| <b>2</b>               | Drugs used for treatment of anxiety and sleep disorders.<br>Treatment of depression and mania.<br>Drugs used for treatment of mania and bipolar disorder | X                                  | x         | x         |                         |           |           | x                          | x         |  |           |           |
| <b>3</b>               | Drugs used for treatment of psychosis and anxiety.   | X                                  | x         | x         |                         |           |           | x                          | x         |  |           |           |
| <b>4</b>               | Antiepileptic drugs.   | X                                  | x         | x         |                         |           |           | x                          | x         |  |           |           |
| <b>5</b>               | Pain control with general and local anaesthetics.  | X                                  | x         | x         |                         |           |           | x                          | x         |  |           |           |
| <b>6</b>               | Central nervous system stimulants.   | X                                  | x         | x         |                         |           |           | x                          | x         |  |           |           |
| <b>7</b>               | Mid-term   | X                                  | x         | x         |                         |           |           | x                          | x         |  |           |           |
| <b>8</b>               | Anti hyperlipidemic drugs  | X                                  | x         | x         |                         |           |           | x                          | x         |  |           |           |
| <b>9</b>               | Drugs used in coagulation and bleeding disorders.  | X                                  | x         | x         |                         |           |           | x                          | x         |  |           |           |

|                           |   |   |   |   |   |   |   |   |   |  |  |   |
|---------------------------|---|---|---|---|---|---|---|---|---|--|--|---|
| <b>10</b>                 | Autacoids   | X | x | x |   |   |   | x | x |  |  |   |
| <b>11</b>                 | Anti-inflammatory, antipyretic and analgesic agents.  | X | x | x |   |   |   | x | x |  |  |   |
| <b>12</b>                 | Respiratory system pharmacology.  | X | x | x |   |   |   | x | x |  |  |   |
| <b>13</b>                 | Gastrointestinal pharmacology.  | X | x | x |   |   |   | x | x |  |  |   |
| <b>14</b>                 | Drugs used for treatment of anemia<br>Hematopoietic growth factors.                                       | X | x | x |   |   |   | x | x |  |  |   |
| <b>15</b>                 | Revision and open discussion  | X | x | x |   |   |   | x | x |  |  |   |
| <b>Practical sessions</b> |   |   |   |   |   |   |   |   |   |  |  |   |
| <b>1</b>                  | - Lab safety measures<br>- Handling of experimental animals and routes of drugs administration (mice) (1) |   |   |   | x | x | x |   |   |  |  | x |
| <b>2</b>                  | - Lab safety measures<br>- Handling of experimental animals and routes of drugs administration (mice) (2) |   |   |   | x | x | x |   |   |  |  | x |
| <b>3</b>                  | - Handling of experimental animals and routes of drugs administration (frogs) (1)                         |   |   |   | x | x | x |   |   |  |  | x |
| <b>4</b>                  | - Handling of experimental animals and routes of drugs administration (frogs) (2)                         |   |   |   | x | x | x |   |   |  |  | x |



|           |  |  |  |  |   |   |   |  |  |   |   |   |
|-----------|--|--|--|--|---|---|---|--|--|---|---|---|
| <b>5</b>  | - CNS stimulants (1)                     |  |  |  | x | x | x |  |  |   | x |   |
| <b>6</b>  | - CNS stimulants (2)                     |  |  |  | x | x | x |  |  |   | x |   |
| <b>7</b>  | - CNS depressants (1)                    |  |  |  | x | x | x |  |  |   | x |   |
| <b>8</b>  | - CNS depressants (2)                    |  |  |  | x | x | x |  |  |   | x |   |
| <b>9</b>  | - Analgesics (1)<br>- Activity (reports) |  |  |  | x | x | x |  |  | x | x | x |
| <b>10</b> | - Analgesics (2)<br>- Activity (reports) |  |  |  | x | x | x |  |  | x | x | x |
| <b>11</b> | - Practical exam                         |  |  |  | x | x | x |  |  | x | x | x |



## Matrix II of Pharmacology II course

| National Academic Reference Standards (NARS) |  | Program ILOs | Course ILOs | Course contents            | Sources                         | Teaching and learning methods |                   |               | Method of assessment |                |              |           |
|--|--|--------------|-------------|----------------------------|---------------------------------|-------------------------------|-------------------|---------------|----------------------|----------------|--------------|-----------|
|  |  |              |             |                            |                                 | Lecture                       | Practical session | Self-learning | Written exam         | Practical exam | Midterm exam | Oral exam |
| 2.12   | Etiology, epidemiology, laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches.           | A27          | a1<br>a2    | All topics                 | Student book, Essential books   | x                             |                   |               | x                    |                | x            | x         |
|  |  | A29          | a3          |                            |                                 |                               |                   |               |                      |                |              |           |
| 2.13   | Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. | A30          | a3          | All topics                 | Student book<br>Essential books | x                             |                   |               | x                    |                | x            | x         |
|  | Exceeding NARS   | B3           | b1<br>b2    | Laboratory safety measures | Practical notes                 |                               | x                 |               |                      | x              |              |           |

|      |   |     |    |                                |  |   |   |   |   |   |  |   |
|------|---|-----|----|--------------------------------|--|---|---|---|---|---|--|---|
| 3.4  | Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins.             | B6  | b3 | All topics                     | Practical notes                                  |   | x |   |   | x |  |   |
| 4.9  | Utilize the pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions. | C14 | c1 | All topics                     | Student book<br>Essential books                  | x |   |   | x |   |  | x |
| 4.13 | Analyze and interpret experimental results as well as published literature  | C18 | c2 | All topics                     | Student book<br>Essential books                  | x |   |   | x |   |  | x |
| 5.3  | Work effectively in a team  | D3  | d1 | Activity and practical session | Practical notes<br>Recommended books<br>Internet |   | X | x |   | x |  |   |
| 5.4  | Use numeracy, calculation and statistical methods as well as information technology tools.                                | D4  | d2 | Practical session              | Practical notes<br>Recommended books<br>Internet |   |   | x |   | X |  |   |
| 5.9  | Implement writing and presentation skills.  | D10 | d3 | Activity                       | Recommended books<br>Internet                    |   |   | x |   | x |  |   |

**Course Coordinator: Prof. Dr. Atef Saad**

**Head of Department: Prof. Dr. Mona Fouad Mahmoud**

**Date:** تم مناقشة واعتماد توصيف المقرر من مجلس القسم بتاريخ فبراير 2020



**COURSE  
SPECIFICATIONS**

**Biochemistry -2**

**Third year – secondTerm  
2019-2020**

## Course Specification of Biochemistry (2)

---

**University:** Zagazig **Faculty:** Pharmacy

### A- Course specifications:

Program(s) on which the course is given: Bachelor of Pharmacy  
Major or Minor element of programs: Major  
Department offering the program: -----  
Department offering the course: Biochemistry Department  
Academic year/ Level: 2019/2020 Third year /second term  
Date of specification approval: /9/2019

### B- Basic information:

Title: Biochemistry (2) Code: BC321  
Credit Hours: ---  
Lectures: 3 hrs/week  
Practical: 2 hrs/week  
Tutorials: ---  
Total: 4 hrs/week

### C- Professional information:

#### 1-Overall Aims of the Course:

On completion of the course, students will be able to:

- Illustrate the different metabolic pathways of carbohydrates, lipids, proteins and integration of metabolism.
- Analyze and interpret experimental results.

## 2-Intended Learning Outcomes of Biochemistry (2) (ILOs):

| <b>A- Knowledge and Understanding</b>       |  |
|---|--|
| a1  | Outline the principles of food staff, absorption and digestion.                                      |
| a2  | Illustrate different metabolic pathways of carbohydrates, lipids and proteins.                       |
| a3  | Discuss regulatory factors affecting different metabolic pathways.                                   |
| <b>B- Professional and Practical skills</b> |  |
| b1  | Handle biological samples safely.  |
| b2  | Perform laboratory tests for biological samples to detect different types of lipids and metabolites. |
| b3  | Interpret laboratory results in suitable form.   |
| <b>C- Intellectual skills</b>               |  |
| c1  | Apply different biological methods used to assay different metabolites and biological samples.       |
| c2  | Correlate between different metabolic pathways   |
| <b>D- General and Transferable skills</b>   |  |
| d1  | Work effectively as a member of a team.  |
| d2  | Write and present reports effectively.   |
| d3  | Develop self-learning skills.  |



## D-Contents:

| <b>Week No.</b> | <b>Lecture (3 hrs/ week)</b>   | <b>Practical session (2 hr/week)</b>   |
|-----------------|--|--|
| <b>1</b>        | <ul style="list-style-type: none"> <li>- Carbohydrates digestion and absorption</li> <li>- Metabolism of mono and disaccharides</li> <li>- Glycolysis (Reactions, steps and regulation)</li> </ul>   | - Laboratory safety measures   |
| <b>2</b>        | <ul style="list-style-type: none"> <li>- Gluconeogenesis (Reactions and regulation)</li> <li>- Tricarboxylic acid cycle (Reactions, regulation and calculation of energy produced)</li> </ul>        | <ul style="list-style-type: none"> <li>-Lipid metabolism</li> <li>-Lipid profile</li> <li>-Determination of triglycerides</li> </ul> |
| <b>3</b>        | <ul style="list-style-type: none"> <li>- HMP shunt (Reactions and functions)</li> <li>- Uronic acid pathway (Reactions)</li> </ul>   | -Determination of cholesterol  |
| <b>4</b>        | <ul style="list-style-type: none"> <li>- Glycogen metabolism</li> <li>- Glycogenesis regulation</li> <li>- Glycogenolysis regulation</li> </ul>  | -Methods of determination of HDL-c and LDL-c   |
| <b>5</b>        | <ul style="list-style-type: none"> <li>- Digestion and absorption of lipids</li> <li>Plasma lipids</li> <li>- Oxidation of fatty acids</li> </ul>  | -Lipid metabolism abnormalities case.  |
| <b>6</b>        | <ul style="list-style-type: none"> <li>- Lipogenesis</li> <li>- Lipolysis in adipose tissues.</li> <li>- Phospholipid metabolism</li> </ul>  | <ul style="list-style-type: none"> <li>-Protein metabolism.</li> <li>-Determination of serum urea level.</li> </ul>                  |
| <b>7</b>        | Midterm exam   |  |
| <b>8</b>        | <ul style="list-style-type: none"> <li>- Ketone bodies metabolism</li> <li>- <b>Self-learning activities (Diabetes – glycogen storage disease)</b></li> </ul>  | -Determination of serum uric acid level.   |
| <b>9</b>        | <ul style="list-style-type: none"> <li>- Cholesterol metabolism</li> <li>- Lipoproteins metabolism</li> <li>- <b>Self-learning activities (fatty liver)</b></li> </ul>                               | -Protein metabolism abnormalities case.  |
| <b>10</b>       | <ul style="list-style-type: none"> <li>- Protein turnover</li> <li>- Digestion and absorption of dietary proteins.</li> <li>- Nitrogen metabolism</li> <li>- Transamination</li> </ul>               | - Revision / Quiz  |
| <b>11</b>       | <ul style="list-style-type: none"> <li>- Deamination</li> <li>-Transdeamination</li> <li>- Metabolism of ammonia</li> <li>- Urea cycle</li> <li>- <b>Self-learning activities (Growth</b></li> </ul> | - Activity presentation.   |

|           |   |                 |
|-----------|---|-----------------|
|           | formula, benefits and hazards)  |                 |
| <b>12</b> | - Conversion of amino acids to specialized products   | -Practical exam |
| <b>13</b> | - Conversion of amino acids to specialized products (continue)<br>- Metabolic correlation associated with some diseases |                 |
| <b>14</b> | - Revision  |                 |
| <b>15</b> | -Final exam   |                 |

## E- Teaching and Learning Methods:

- Interactive lectures
- Practical sessions
- Case study
- Self-learning (activity: reports and presentations)

## F- Student Assessment Methods:

|                    |           |                |
|--------------------|-----------|----------------|
| 1- Written exam    | to assess | a1, a2, a3, c2 |
| 2- Practical exams | to assess | b1, b2, b3, c1 |
| 3- Activities      | to assess | d1, d2, d3     |
| 4- Oral exam       | to assess | a1, a2, a3, c2 |
| 5- Midterm exam    | to assess | a1, a2, a3, c2 |

## Assessment schedule:

|  |             |
|--|-------------|
| <b>Assessment (1):</b> Written exam    | Week 15     |
| <b>Assessment (2):</b> Activity        | Week 8,9,11 |
| <b>Assessment (3):</b> Practical exams | Week 12     |
| <b>Assessment (4):</b> Oral exams      | Week 15     |
| <b>Assessment (5):</b> Midterm exam    | Week 7      |

### Weighting of Assessment:

| Assessment method | Marks      | Percentage  |
|-------------------|------------|-------------|
| Written exam      | 75         | 50%         |
| Midterm exam      | 15         | 10%         |
| Activity          | 10         | 7 %         |
| Practical exam    | 30         | 20%         |
| Oral exam         | 20         | 13%         |
| <b>TOTAL</b>      | <b>150</b> | <b>100%</b> |

### G- Facilities Required for Teaching and Learning:

- Black/white board, screens, Laboratory equipment (glassware, spectrophotometer, centrifuge, digital balances) and Chemicals.

### H- List of References:

#### 1- Course Notes:

- Student book of Biochemistry (2) approved by biochemistry department 2019.
- Practical notes of Biochemistry (2) approved by biochemistry department 2019.

#### 2- Essential books:

- Marks' basic medical biochemistry: a clinical approach (fifth edition); Lieberman M., Marks A.D., Peet MD, Alisa. (2017).
- Lehninger principles of biochemistry (seventh edition); Nelson D.L.; Cox M.M. (2017).
- Basic concepts in biochemistry; Gilbert H.F.; The Mc Graw Hill companies Inc. (2000).
- Lippincott's Illustrated Reviews: Biochemistry (Seventh edition) ; Ferrier D.R. (2017)

### 3- Recommended books:

- Biochemistry (sixth edition); Garrett R.H. and Grisham C.M.; Thomson learning, Inc (2016).
- Harper's Illustrated Biochemistry (31<sup>st</sup> edition); [Rodwell](#) V.W., [Bender](#) D., [Botham](#) K.M., [Kennelly](#) P.J., [Weil](#) P. A. (2018).
- Clinical Biochemistry made ridiculously simple (third edition); Stephen Goldberg. M.D.; Med Master Inc. (2010).

### 4- Periodicals and websites:

- Egyptian J. of biochem. and molecular biology.
- Egyptian J. of Pharmaceutical sciences.
- Arab J. of Laboratory Medicine.
- www.Pubmed.Com
- www.sciencedirect.com

---

**Course Coordinator: Prof. Dr. Sahar Elswefy**

**Head of Department: Prof. Dr. Sahar Elswefy**

## Matrix I of Biochemistry-2 course

| Course Contents |   | ILOs of Biochemistry-2 course |    |    |                                   |    |    |                     |    |                                 |    |    |
|-----------------|---|-------------------------------|----|----|-----------------------------------|----|----|---------------------|----|---------------------------------|----|----|
|                 |   | Knowledge and understanding   |    |    | Professional and practical skills |    |    | Intellectual skills |    | General and transferable skills |    |    |
|                 |   | a1                            | a2 | a3 | b1                                | b2 | b3 | c1                  | c2 | d1                              | d2 | d3 |
| Lectures        |   |                               |    |    |                                   |    |    |                     |    |                                 |    |    |
| 1               | - Carbohydrates digestion and absorption<br>- Metabolism of mono and disaccharides<br>- Glycolysis (Reactions, steps and regulation)  | x                             | x  | x  |                                   |    |    |                     | x  |                                 |    |    |
| 2               | - Gluconeogenesis (Reactions and regulation)<br>- Tricarboxylic acid cycle (Reactions, regulation and calculation of energy produced) |                               | x  | x  |                                   |    |    |                     | x  |                                 |    |    |
| 3               | - HMP shunt (Reactions and functions)<br>- Uronic acid pathway (Reactions)  |                               | x  |    |                                   |    |    |                     | x  |                                 |    |    |
| 4               | - Glycogen metabolism<br>- Glycogenesis regulation<br>- Glycogenolysis regulation   |                               | x  | x  |                                   |    |    |                     | x  |                                 |    |    |
| 5               | - Digestion and absorption of lipids<br>Plasma lipids<br>- Oxidation of fatty acids   | x                             | x  |    |                                   |    |    |                     |    |                                 |    |    |
| 6               | -Midterm exam   | x                             | x  | x  |                                   |    |    |                     | x  |                                 |    |    |
| 7               | - Lipogenesis<br>- Lipolysis in adipose tissues.<br>- Phospholipid metabolism   |                               | x  |    |                                   |    |    |                     | x  |                                 |    |    |
| 8               | - Ketone bodies metabolism<br>- Self-learning activities (Diabetes – Glycogen storage diseases)                                       |                               | x  |    |                                   |    |    |                     |    | x                               | x  | x  |
| 9               | -Lipoproteins metabolism<br>- Cholesterol metabolism<br>- Self-learning activities (fatty liver)                                      |                               | x  |    |                                   |    |    | x                   |    | x                               | x  | x  |

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10                        | - Protein turnover<br>- Digestion and absorption of dietary proteins.<br>- Nitrogen metabolism<br>- Transamination                                  | x | x |   |   |   |   |   |   |   |   |   |   |
| 11                        | - Deamination<br>- Transdeamination<br>- Metabolism of ammonia<br>- Urea cycle<br>- Self-learning activities (Growth formula, benefits and hazards) |   |   |   |   |   |   | x |   | x | x | x |   |
| 12                        | - Conversion of amino acids to specialized products   |   |   |   |   |   |   | x |   |   |   |   |   |
| 13                        | - Conversion of amino acids to specialized products (continue)<br>- Metabolic correlation associated with some diseases                             |   |   |   |   |   |   | x |   |   |   |   |   |
| 14                        | -Revision   | x | x | x |   |   |   | x | x |   |   |   |   |
| 15                        | -Final exam   | x | x | x |   |   |   |   | x |   |   |   |   |
| <b>Practical sessions</b> |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1                         | - Laboratory safety measures  |   |   |   | x |   |   |   |   |   |   |   |   |
| 2                         | -Lipid metabolism<br>-Lipid profile<br>-Determination of triglycerides  |   |   |   |   | x | x |   | x |   |   |   |   |
| 3                         | -Determination of cholesterol   |   |   |   |   | x | x |   | x |   |   |   |   |
| 4                         | -Methods of determination of HDL-c and LDL-c  |   |   |   |   | x | x |   | x |   |   |   |   |
| 5                         | -Lipid metabolism abnormalities case.   |   |   |   |   |   | x |   | x |   |   |   |   |
| 6                         | -Midterm exam   | x | x | x |   |   |   |   |   | x |   |   |   |
| 7                         | -Protein metabolism.<br>-Determination of serum urea level.   |   |   |   |   | x | x |   | x |   |   |   |   |
| 8                         | -Determination of serum uric acid level.  |   |   |   |   | x | x |   |   | x |   |   |   |
| 9                         | -Protein metabolism abnormalities case.   |   |   |   |   |   | x |   | x |   |   |   |   |
| 10                        | - Revision / Quiz   |   |   |   |   |   | x |   | x |   |   |   |   |
| 11                        |   |   |   |   |   |   |   |   |   |   | x | x | x |

|    |                        |  |  |  |   |   |  |   |  |  |  |
|----|------------------------|--|--|--|---|---|--|---|--|--|--|
|    | -Activity presentation |  |  |  |   |   |  |   |  |  |  |
| 12 | -Practical exam        |  |  |  | x | x |  | x |  |  |  |

### Matrix II of Biochemistry-2 course

| National Academic Reference Standards<br>NARS | Program ILOs  | Course ILOs | Course contents | Sources  | Teaching and learning methods   |                   |               | Weighting of assessment |                |           |                 |   |
|---|---|-------------|-----------------|--|---------------------------------|-------------------|---------------|-------------------------|----------------|-----------|-----------------|---|
|   |   |             |                 |  | Lecture                         | Practical session | Self learning | Written exam            | Practical exam | Oral exam | Periodical exam |   |
| 2.1   | Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice. | A4          | a1              | - Carbohydrates digestion and absorption<br>- Metabolism of mono and disaccharides<br>- Glycolysis (Reactions, steps and regulation) | Student book<br>Essential books | x                 |               |                         | x              |           | X               | X |
|   |   |             |                 | - Digestion and absorption of lipids<br>Plasma lipids<br>- Fat oxidation of fatty acids  | Student book<br>Essential books | x                 |               |                         | x              |           | X               | X |
|   |   |             |                 | - Protein turnover<br>- Digestion and absorption of dietary proteins.<br>- Self-learning activities                                  | Student book<br>Essential books | x                 |               |                         | x              |           | X               |   |
|   |   |             |                 | Revision   | Student book<br>Essential books | x                 |               |                         | x              |           | x               |   |



|      |  |     |    |   |  |   |  |   |  |   |  |   |   |   |
|------|--|-----|----|---|--|---|--|---|--|---|--|---|---|---|
| 2.11 | Principles of body function in health and disease states as well as basis of genomic and different biochemical pathways regarding their correlation with different diseases. | A25 | a2 | - Carbohydrates digestion and absorption<br>- Metabolism of mono and disaccharides<br>- Glycolysis (Reactions, steps and regulation)  | Student book<br>Essential books                                  | x |  |   |  | x |  |   | X | X |
|      |  |     |    | - Gluconeogenesis (Reactions and regulation)<br>- Tricarboxylic acid cycle (Reactions, regulation and calculation of energy produced) | Student book<br>Essential books                                  | x |  |   |  | x |  | X | X |   |
|      |  |     |    | - HMP shunt (Reactions and functions)<br>- Uronic acid pathway (Reactions)  | Student book<br>Essential books<br>Recommended books<br>Internet | x |  | x |  | x |  | X | X |   |
|      |  |     |    | - Glycogen metabolism (Structure and functions)<br>- Glycogenesis regulation<br>- Glycogenolysis regulation                           | notebook   | x |  |   |  | x |  | X | X |   |
|      |  |     | a3 | - Digestion and absorption of lipids<br>Plasma lipids<br>- Fat oxidation  | Student book<br>Essential books                                  | x |  |   |  | x |  | X | X |   |

|  |  |   |  |   |  |   |   |  |   |   |
|--|--|---|--|---|--|---|---|--|---|---|
|  |  | of fatty acids  |  |   |  |   |   |  |   |   |
|  |  | - Lipogenesis<br>- Lipolysis in adipose tissues.<br>- Phospholipid metabolism                       | Student book<br>Essential books                                  | x |  |   | x |  | X | X |
|  |  | - Ketone bodies metabolism<br>- Self-learning activities<br>- Periodical exam                       | Student book<br>Essential books                                  | x |  |   | x |  | X |   |
|  |  | - Cholesterol metabolism and lipoproteins   | Student book<br>Essential books                                  | x |  |   | x |  | X |   |
|  |  | - Protein turnover<br>- Digestion and absorption of dietary proteins.<br>- Self-learning activities | Student book<br>Essential books                                  | x |  |   | x |  | X |   |
|  |  | - Nitrogen metabolism<br>- Transamination<br>- Deamination<br>- Trasdeamination                     | Student book<br>Essential books<br>Recommended books<br>Internet | x |  | x | x |  | X |   |
|  |  | - Metabolism of ammonia<br>- Urea cycle<br>- Self learning activities                               | Student book<br>Essential books                                  | x |  |   | x |  | X |   |

|  |  |     |   |                                 |   |  |  |  |   |  |   |  |
|--|--|-----|---|---------------------------------|---|--|--|--|---|--|---|--|
|  |  |     | - Conversion of amino acids to specialized products                           | Student book<br>Essential books | x |  |  |  | x |  | X |  |
|  |  | A25 | - Conversion of amino acids to specialized products (continue)                | Student book<br>Essential books | x |  |  |  | x |  | X |  |
|  |  |     | - Ketone bodies metabolism<br>- Self-learning activities<br>- Periodical exam | Student book<br>Essential books | x |  |  |  | x |  | X |  |
|  |  |     | - Cholesterol metabolism and lipoproteins                                     | Student book<br>Essential books | x |  |  |  | x |  | X |  |
|  |  |     | - Metabolic correlation associated with some diseases                         | Student book<br>Essential books | x |  |  |  | x |  | X |  |

|     |  |    |    |  |                 |  |   |  |  |   |  |  |
|-----|--|----|----|--|-----------------|--|---|--|--|---|--|--|
| 3.2 | Handle and dispose chemicals and pharmaceutical preparations safely. | B2 | b1 | <ul style="list-style-type: none"> <li>-Laboratory safety measures</li> <li>-lipid profile determination (triacylglycerol determination)</li> <li>- lipid profile determination (total cholesterol determination)</li> <li>- lipid profile determination (HDL-c and LDL-c determination)</li> <li>- Case study related to lipid metabolism abnormalities</li> <li>-Activity (Report and presentations)</li> <li>- Determination of urea</li> <li>- determination of creatinine-</li> <li>- Case study related to protein metabolism abnormalities</li> </ul> | Practical notes |  | x |  |  | x |  |  |
|-----|--|----|----|--|-----------------|--|---|--|--|---|--|--|

|      |  |     |        |  |                                 |   |  |  |   |   |   |  |
|------|--|-----|--------|--|---------------------------------|---|--|--|---|---|---|--|
| 3.6  | Monitor and control microbial growth and carry out laboratory tests for identification of infectious and non-infectious diseases in biological specimens | B11 | b2, b3 | <ul style="list-style-type: none"> <li>-Laboratory safety measures</li> <li>-lipid profile determination (triacylglycerol determination)</li> <li>- lipid profile determination (total cholesterol determination)</li> <li>- lipid profile determination (HDL-c and LDL-c determination)</li> <li>- Case study related to lipid metabolism abnormalities</li> <li>-Activity (Report and presentations)</li> <li>- Determination of urea</li> <li>- determination of creatinine-</li> <li>- Case study related to protein metabolism abnormalities</li> </ul> | Practical notes                 | x |  |  |   | x |   |  |
| 4.13 | Analyze and interpret experimental results as well as published literature   | C18 | c1, c2 | <ul style="list-style-type: none"> <li>- Glycogen metabolism (Structure and functions)</li> <li>- Glycogenesis regulation</li> <li>- Glycogenolysis regulation-</li> <li>- Digestion and</li> </ul>  | Student book<br>Essential books | x |  |  | x |   | x |  |

|     |   |     |    |  |                               |  |  |   |  |   |  |  |
|-----|---|-----|----|--|-------------------------------|--|--|---|--|---|--|--|
|     |   |     |    | absorption of lipids<br>Plasma lipids<br>- Fat oxidation of fatty acids- - |                               |  |  |   |  |   |  |  |
| 5.3 | Work effectively in a team  | D3  | d1 | Activity (report and presentations)  | Recommended books<br>Internet |  |  | x |  | x |  |  |
| 5.5 | Practice independent learning needed for continuous professional development. | D6  | d3 | Activity (report and presentations)  | Recommended books<br>Internet |  |  | x |  | x |  |  |
| 5.9 | Implement writing and presentation skills                                     | D10 | d2 | Activity (report and presentations)  | Recommended books<br>Internet |  |  | x |  | x |  |  |





**COURSE  
SPECIFICATIONS**

**Parasitology and  
Pathology**

**Third year – secondTerm  
2019-2020**



## **Course Specification of Parasitology and Pathology**

---

**University:** Zagazig **Faculty:** Pharmacy

### **A- Course specifications:**

Programme(s) on which the course is given: Bachelor of Pharmacy

Major or Minor element of programmes: Major

Department offering the program: -----

Department offering the course: Microbiology Department

Academic year/level: third year/ Second term

Date of specification approval: September 2019

### **B- Basic information:**

Title: Parasitology and Pathology Code: **MI322**

Credit Hours: ---

Lectures: 2 hrs/week

Practical: 1 hr/week

Tutorials: ---

Total: 2.5 hrs/week

### **C- Professional information:**

#### **1-Overall Aims of the Course:**

#### **On completion of the course, students will be able to:**

Underline the basic concepts of parasitology, entomology and pathology. Examine of different parasites as well as different pathological diseases under microscope. Specify the appropriate methods for treatment, prevention and control of different diseases caused by parasites and insects. Develop critical thinking and effective communication skills with patients and other health care professionals.

## 2-Intended Learning Outcomes of Parasitology and Pathology Course (ILOs):

| <b>A- Knowledge and Understanding</b>       |   |
|---|---|
| a1  | Illustrate the basic concepts of parasitology.  |
| a2  | Summarize the principles of entomology and diseases caused by insects.  |
| a3  | Identify the basic fundamentals of pathology.   |
| a4  | Recognize etiology, epidemiology and clinical features of different diseases caused by parasites and insects.                   |
| a5  | Determine the etiology of disease and response of cells to various injurious agents.  |
| a6  | Outline the laboratory diagnosis of diseases caused by different parasites.   |
| <b>B- Professional and Practical skills</b> |   |
| b1  | Use the proper terms of parasitology, entomology and pathology.   |
| b2  | Select drugs for treatment of different diseases caused by parasites.   |
| b3  | Perform microscopical examination of different parasitic stages and insects from different specimens.                           |
| b4  | Identify pathological slides for different diseases.  |
| <b>C- Intellectual skills</b>               |   |
| c1  | Suggest the appropriate methods for treatment, prevention and control of different parasites and insects.                       |
| c2  | Analyze and interpret experimental results for identification of parasites, insects and pathological diseases in suitable form. |
| <b>D- General and Transferable skills</b>   |   |
| d1  | Communicate efficiently in oral and written manner.   |
| d2  | Develop internet search and computer skills.  |
| d3  | Demonstrate critical thinking, decision-making and problem-solving in dealing with case study.                                  |

## D- Contents:

| Week No. | Lectures (2 hrs/week)   | Practical session (1hr/week)   |
|----------|---|--|
| <b>1</b> | - General Introduction  | - General Introduction – General terms of parasitology   |
| <b>2</b> | - Helminthology<br>2a-Trematodes:<br>- General characters<br>- Fasciola species<br>- Short essay questions  | - Parasitological laboratory examination:<br>- Sample collection<br>- Evaluation of different techniques used in the diagnosis of parasitic infections:<br><br>- Microscopical<br>- Serology<br>- Modern molecular techniques (e.g. PCR) |
| <b>3</b> | - Heterophyes species<br>- Schistosoma species<br>- Case report   | - Demonstration of microscopic slides of morphologic stages of:<br>- Fasciola species<br>- Heterophyes species<br>- Schistosoma species<br>- Demonstration of Snails hosts   |
| <b>4</b> | Cestodes:<br>- General characters<br>- Taenia saginata<br>- Taenia solium<br>- Cysticercosis<br>Case report   | - Demonstration of microscopic slides of morphologic stages of:<br>Taenia saginata<br>Taenia solium  |
| <b>5</b> | - Echinococcus sp.<br>- Hymenolepis sp.<br>- Diphyllbothrium sp.<br>Nematodes:<br>- General characters<br>- Ascaris lumbricoides<br>- Hook worm sp. | Demonstration of microscopic slides of morphologic stages of :<br>- Echinococcus sp.<br>- Ascaris lumbricoides<br>- Hook worm sp.<br>- <b>Activity (poster preparation)</b>  |
| <b>6</b> | - Enterobius & Trichuris<br>- Trichinella spiralis<br>- Wuchereria species<br>- Case report   | Demonstration of microscopic slides of morphologic stages of:<br>- Enterobius & Trichuris<br>- Trichinella spiralis<br>- Wuchereria species  |
| <b>7</b> | Midterm exam  |  |
| <b>8</b> | Protozoology<br>- Amoebae species<br>- Balantidium coli   | Demonstration of microscopic slides of morphologic stages of:<br>- Amoebae species   |

|           |   |   |
|-----------|---|---|
|           | <ul style="list-style-type: none"> <li>- Giardia lamblia</li> <li>- Trichomonas vaginalis</li> <li>- Case report</li> </ul>   | <ul style="list-style-type: none"> <li>- Balantidium coli</li> <li>- Giardia lamblia</li> <li>- Trichomonas vaginalis</li> </ul>  |
| <b>9</b>  | <ul style="list-style-type: none"> <li>- Leishmania species</li> <li>- Trypanosoma species.</li> <li>Case report</li> </ul>   | <ul style="list-style-type: none"> <li>- Leishmania species</li> <li>- Trypanosoma species.</li> </ul>  |
| <b>10</b> | <ul style="list-style-type: none"> <li>- Plasmodium species</li> <li>- Toxoplasma gondii</li> <li>Case study</li> </ul>   | <ul style="list-style-type: none"> <li>- Plasmodium species</li> <li>- Toxoplasma gondii</li> <li>- Lab. Diagnosis of parasitic infections</li> </ul>   |
| <b>11</b> | <p>Entomology</p> <ul style="list-style-type: none"> <li>- General characters</li> <li>- Mosquito species</li> <li>- Lice, Fleas, Bugs</li> <li>- Ticks, Mites &amp; Cyclops</li> </ul> <p>Parasitic Infections:<br/>Clinical Manifestations, Diagnosis and Treatment</p> | <p>Demonstration of microscopic slides of:</p> <ul style="list-style-type: none"> <li>- Mosquito species</li> <li>- Lice, Fleas, Bugs</li> <li>- Ticks, Mites &amp; Cyclops</li> </ul>  |
| <b>12</b> | <p>General Pathology</p> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Inflammation</li> <li>- Healing and regeneration</li> <li>- Repair</li> <li>- Cell injury &amp; cell death</li> <li>- Blood pressure &amp; Diabetes</li> </ul>                  | <ul style="list-style-type: none"> <li>- Demonstration of computer Slide of: some pathological slides</li> <li>- signs of inflammation.</li> <li>- Chronic Non specific inflammation</li> <li>- Acute localized suppurative inflammation</li> <li>- Acute diffuse suppurative inflammation</li> <li>- Tuberculous granuloma</li> <li>- Serous Inflammation (effusion)</li> <li>- Edema</li> <li>- Coagulative necrosis</li> <li>Liquefactive necrosis</li> <li>Granulation tissue</li> <li>Fatty degeneration in liver</li> </ul> |
| <b>13</b> | <ul style="list-style-type: none"> <li>- Thrombosis &amp; Embolism</li> <li>- Ischemia &amp; Infarction</li> <li>- Sclerosis &amp; Heart failure</li> <li>- Blood disorders</li> <li>- Apoptosis</li> <li>- Necrosis</li> </ul>   | <b>Practical exam</b>   |

|           |  |  |
|-----------|--|--|
| <b>14</b> | <ul style="list-style-type: none"> <li>- Growth Disorders: Neoplastic and non-neoplastic growth</li> <li>- Genetic Disorders: Degenerative Disorders</li> <li>- Hepatic &amp; Pulmonary Disorders</li> <li>- Diseases of nervous system</li> </ul> |  |
| <b>15</b> | Written exam   |  |

### **E- Teaching and Learning Methods:**

- Lectures
- Practical sessions
- Self learning (Activity, Internet search, case report, poster preparation)
- Case study

### **F- Student Assessment Methods:**

- 1- Written exam to assess a1, a2, a3, a4, a5, a6, c1, d3
- 2- Activity to assess d2, d3
- 3- Practical exam to assess b1, b2, b3, b4, c2, d1,
- 4-oral exam to asses: ....a1, a2, a3, a4, a5, a6, c1, d1, d2

### **Assessment schedule:**

|                                       |         |
|---------------------------------------|---------|
| <b>Assessment (1):</b> Written exams  | Week 15 |
| <b>Assessment (2):</b> Activity       | Week 5  |
| <b>Assessment (3):</b> Midterm exam   | Week 7  |
| <b>Assessment (4):</b> Practical exam | Week 13 |
| <b>Assessment (4):</b> oral exam      | Week 15 |

### **Weighting of Assessment:**

| Assessment method     | Marks | Percentage |
|-----------------------|-------|------------|
| <b>Written exam</b>   | 50    | 50%        |
| <b>Activity</b>       | 5     | 5%         |
| <b>Practical exam</b> | 20    | 20%        |
| <b>Mid-term exam</b>  | 10    | 10%        |
| <b>Oral exam</b>      | 15    | 15%        |
| <b>TOTAL</b>          | 100   | 100%       |

## **G- Facilities Required for Teaching and Learning:**

- Black (white) board, data show, microscopes.

## **H- List of References:**

### **A- Parasitology:**

1- Student book of Parasitology and pathology-Lecture approved by Microbiology department & practical notes by staff of the department 2019.

### **2- Essential Books:**

i- Medical Parasitology (9<sup>th</sup> edition); Markell and Voge's, W.B. Saunders Company (2006).

ii- District Laboratory practice in Tropical countries.

iii- MONICA CHEESBROUGH, Printed in Great Britain at University press, Cambridge (2005).

iv- Clinical Parasitology (ninth Edition); Beaver, P.C.; Jung, R.C. and Cupp, E.W. Lea & Febiger; Philadelphia (2019).

### **3- Recommended Books**

Manson's Tropical Diseases (23<sup>rd</sup> edition), Cook GC (ed), London: WB Saunders (2013).

### **4- Periodicals, Web Sites**

<http://medicaleducationonline.org/>

<http://www.parasitesonline.net>

<http://pathmicro.med.sc.edu/book/parasit-sta.htm>

[http://www.dpd.cdc.gov/dpdx/HTML/Para\\_Health.htm](http://www.dpd.cdc.gov/dpdx/HTML/Para_Health.htm)

---

**Course Coordinator:** Prof. Dr. Ghada Hamed Shaker

**Head of Department:** Prof. Dr. Nehal Elsayed Youssif

**Date:** تم مناقشة وإعتماد توصيف المقرر من مجلس القسم بتاريخ 2019/ 9 / 30 م

|                       |   | <b>Matrix1 of Parasitology &amp; Pathology</b> |           |           |           |           |  |           |           |           |                            |           |  |           |           |           |
|-----------------------|---|--|-----------|-----------|-----------|-----------|--|-----------|-----------|-----------|----------------------------|-----------|--|-----------|-----------|-----------|
| <b>Course content</b> |   | <b>ILOs</b>                                    |           |           |           |           |  |           |           |           |                            |           |  |           |           |           |
|                       |   | <b>Knowledge and Understanding</b>             |           |           |           |           | <b>Professional &amp; Practical skills</b> |           |           |           | <b>Intellectual skills</b> |           | <b>Transferable &amp; general skills</b> |           |           |           |
|                       |   | <b>a1</b>                                      | <b>a2</b> | <b>a3</b> | <b>a4</b> | <b>a5</b> | <b>d6</b>                                  | <b>b1</b> | <b>b2</b> | <b>b3</b> | <b>b4</b>                  | <b>c1</b> | <b>c2</b>                                | <b>d1</b> | <b>d2</b> | <b>d3</b> |
| <b>1</b>              | <u>General Introduction</u><br><b>Practical</b><br>General terms of parasitology  | x  |           |           |           |           |  | x         |           |           |                            |           |  |           |           |           |
| <b>2</b>              | <u>-Helminthology</u><br><u>a-Trematodes</u><br><u>-General characters</u><br><u>-Fasciola species</u><br><b>- Practical</b><br>Parasitological laboratory examination:<br>Sample collection<br>Evaluation of different techniques used in the diagnosis of parasitic infections: | x  |           | x         | x         | x         | x  |           | x         | x         |                            | x         | x  |           |           |           |
| <b>3</b>              | <u>Heterophyes</u> -<br><u>Schistosoma</u><br><u>Case report</u><br><b>Practical</b><br>-Demonstration of microscopic slides of<br>-Fasciola species<br>-Heterophyes species  | x  |           | x         | x         | x         |  | x         | x         |           | x                          | x         |  |           |           |           |



|   |   |   |  |   |   |   |   |  |   |   |  |  |  |  |   |
|---|---|---|--|---|---|---|---|--|---|---|--|--|--|--|---|
|   | -Schistosoma species<br>-Demonstration of Snails hosts  |   |  |   |   |   |   |  |   |   |  |  |  |  |   |
| 4 | <b>Cestodes:</b> <ul style="list-style-type: none"> <li>• General characters</li> <li>• Taenia saginata</li> <li>• Taenia solium</li> <li>• Cysticercosis</li> </ul> Case report<br><b>Practical</b><br>Demonstration of microscopic slides of: <ul style="list-style-type: none"> <li>• Taenia saginata</li> <li>• Taenia solium</li> </ul>                                      |   |  | x | x | x | x |  | x | x |  |  |  |  | x |
| 5 | Echinococcus sp.<br>Hymenolepis sp.<br>Diphyllobothrium sp.<br><b>Nematodes:</b> <ul style="list-style-type: none"> <li>• General characters</li> <li>• Ascaris lumbricoides</li> <li>• Hook worm sp</li> </ul> <b>Practical</b><br>Demonstration of microscopic slides of : <ul style="list-style-type: none"> <li>• Echinococcus sp.</li> <li>• Ascaris lumbricoides</li> </ul> | x |  | x | x |   | x |  | x | x |  |  |  |  | x |

|   |  |   |   |   |   |  |   |  |   |   |  |  |  |  |  |  |   |
|---|--|---|---|---|---|--|---|--|---|---|--|--|--|--|--|--|---|
|   | <ul style="list-style-type: none"> <li>• Hook worm sp.</li> <li>• Activity (report)</li> </ul>   |   |   |   |   |  |   |  |   |   |  |  |  |  |  |  |   |
| 6 | <ul style="list-style-type: none"> <li>• Enterobius &amp; Trichuris</li> <li>• Trichinella spiralis</li> <li>• Wuchereria species</li> <li>• Case report</li> </ul> <p><b>Practical</b></p> <p>Demonstration of microscopic slides of</p> <ul style="list-style-type: none"> <li>• Enterobius &amp; Trichuris</li> <li>• Trichinella spiralis</li> <li>• Wuchereria species</li> </ul> | x | x | x | x |  | x |  | x | x |  |  |  |  |  |  | x |
| 7 | <ul style="list-style-type: none"> <li>• <b>Midterm exam</b></li> </ul>  |   |   |   |   |  |   |  |   |   |  |  |  |  |  |  |   |
| 8 | <p>Leishmania species<br/>Protozoology<br/>Amoebae species<br/>Balantidium coli<br/>Giardia lamblia<br/>Trichomonas vaginalis<br/>Case report</p> <p>Trypanosoma species</p> <p><b>Practical</b></p> <p>Leishmania species<br/>Trypanosoma species.<br/>morphologic stages of:<br/>Amoebae species<br/><u>Balantidium coli</u><br/><u>Giardia lamblia</u></p>                          | x | x |   |   |  | x |  | x | x |  |  |  |  |  |  |   |

|    |   |   |   |   |   |   |  |  |  |  |  |  |   |   |
|----|---|---|---|---|---|---|--|--|--|--|--|--|---|---|
|    | <u>Trichomonas vaginalis</u>  |   |   |   |   |   |  |  |  |  |  |  |   |   |
| 9  | Plasmodium species<br>Toxoplasma gondii<br>Case study<br><b>Practical</b><br>Plasmodium species<br>Toxoplasma gondii<br>Lab. Diagnosis of<br>parasitic infections   | x |   | x | x | x |  |  |  |  |  |  | x |   |
| 10 | Mosquito species<br>Lice, Fleas, Bugs<br>-Ticks, Mites & Cyclops<br><br><b>Practical</b><br>Demonstration of<br>microscopic slides of:<br>Mosquito species<br>Lice, Fleas, Bugs<br>Ticks, Mites & Cyclops   |   | x | x |   |   |  |  |  |  |  |  | x | x |
| 11 | General Pathology<br>- Introduction<br>- Inflammation<br>- Healing and regeneration<br>- Repair<br>- Cell injury & cell death<br>- Blood pressure & Diabetes<br><b>Practical</b><br>Demonstration of computer<br>Slide of<br>signs of inflammation.<br>Chronic Non specific |   | x |   | x |   |  |  |  |  |  |  | x | x |

|           |   |  |  |  |          |          |          |          |  |          |  |  |          |          |          |
|-----------|---|--|--|--|----------|----------|----------|----------|--|----------|--|--|----------|----------|----------|
|           | inflammation<br>Acute localized suppurative<br>inflammation<br>Acute diffuse suppurative<br>inflammation<br>Tuberculous granuloma<br>Serous Inflammation<br>(effusion)<br>Edema<br>Coagulative necrosis<br>Liquefactive necrosis<br>Granulation tissue<br>Fatty degeneration in liver |  |  |  |          |          |          |          |  |          |  |  |          |          |          |
| <b>12</b> | -Thrombosis & Embolism<br>Ischemia & Infarction<br>Sclerosis & Heart failur<br>Blood disorders<br>Apoptosis & Necrosis  |  |  |  | <b>x</b> | <b>x</b> | <b>x</b> | <b>x</b> |  | <b>x</b> |  |  |          |          |          |
| <b>13</b> | Growth Disorders<br>Neoplastic and non-<br>neoplastic growth<br>Genetic Disorders:<br>Degenerative Disorders<br>Hepatic & Pulmonary<br>Disorders<br>Diseases of nervous system  |  |  |  | <b>x</b> | <b>x</b> | <b>x</b> | <b>x</b> |  |          |  |  | <b>x</b> | <b>x</b> | <b>x</b> |

## Matrix II of Parasitology & Pathology

| NARS |   | Program ILOs | Course ILOs | Course contents   | Sources                         | Teaching and learning methods |                   |          | Method of assessment |                |           |              |
|------|---|--------------|-------------|---|---------------------------------|-------------------------------|-------------------|----------|----------------------|----------------|-----------|--------------|
|      |   |              |             |   |                                 | lecture                       | practical session | Activity | written exam         | practical exam | oral exam | Midterm exam |
| 2.1  | Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice. | A4           | a1          | - General Introduction<br>-Helminthology<br>2a-Trematodes:<br>-General characters<br>-Fasciola species<br>-Short essay questions<br>Heterophyes species<br>Schistosoma species  | Student book<br>Essential books | x                             |                   |          | x                    |                | x         | x            |
|      |   |              | a2          | Cestodes:<br>General characters<br>Taenia saginata<br>Taenia solium<br>Cysticercosis<br>- Echinococcus sp.<br>- Hymenolepis sp.<br>- Diphyllbothrium sp.<br>Nematodes:<br>- General characters<br>- Ascaris lumbricoides<br>Hook worm sp. | Student book<br>Essential books | x                             |                   |          | x                    |                | x         | x            |

|      |  |     |                |   |                                 |   |  |  |   |   |   |   |  |  |  |  |  |
|------|--|-----|----------------|---|---------------------------------|---|--|--|---|---|---|---|--|--|--|--|--|
| 2.12 | Etiology, epidemiology, laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches. | A27 | a4<br>a5<br>a6 | -Enterobius & Trichuris<br>-Trichinella spiralis<br>-Wuchereria species<br>-Case report<br>Protozoology<br>-Amoebae species<br>-Balantidium coli<br>-Giardia lamblia<br>-Trichomonas vaginalis<br>-Case report<br>-Leishmania species<br>-Trypanosoma species.<br>Case report<br>-Plasmodium species<br>-Toxoplasma gondii<br>Case study<br>Entomology<br>-General characters<br>-Mosquito species<br>-Lice, Fleas, Bugs<br>-Ticks, Mites & Cyclops<br>Parasitic Infections: Clinical Manifestations, Diagnosis and Treatment<br>-Parasitological laboratory examination:<br>-Sample collection | Student book<br>Essential books | x |  |  | x | x | x | x |  |  |  |  |  |
|      |  | A28 |                | Student Notes<br>Essential books  |                                 |   |  |  |   |   |   |   |  |  |  |  |  |
|      |  | A29 |                |   |                                 |   |  |  |   |   |   |   |  |  |  |  |  |

|     |   |            |           |   |                                  |  |   |   |  |   |  |  |  |
|-----|---|------------|-----------|---|----------------------------------|--|---|---|--|---|--|--|--|
|     |   |            |           | -Evaluation of different techniques used in the diagnosis of parasitic infections:<br>-Microscopical Serology<br>Modern molecular techniques (e.g. PCR)<br>General Pathology  | Practical notes                  |  |   |   |  |   |  |  |  |
|     |   |            |           | -Introduction   | Student notes                    |  | x | x |  | X |  |  |  |
| 3.5 | Select medicines based on understanding etiology and path physiology of diseases.   | B8         | b2        | -Inflammation<br>-Healing and regeneration<br>-Repair<br>-Cell injury & cell death  | Student notes and practical note |  | x | x |  | x |  |  |  |
| 3.6 | Monitor and control microbial growth and carry out laboratory tests for identification of Infectious and non- infections in biological specimens. | B10<br>B11 | b 3<br>b4 | -Blood pressure & Diabetes<br>Demonstration of computer Slide of: some pathological slides<br>Cardinal signs of inflammation<br>Neutrophile margination<br>Dilated congested capillaries.<br>Chronic Non specific inflammation<br>Acute localized suppurative inflammation (acute lung abscess) | Student notes and practical note |  | x | x |  | X |  |  |  |

|  |    |    |   |               |  |   |   |  |   |  |
|--|----|----|---|---------------|--|---|---|--|---|--|
|  |    |    | <p>Acute diffuse<br/>suppurative<br/>inflammation<br/>(Cellulitis)<br/>Tuberculous<br/>granuloma<br/>foreign body giant<br/>cell granuloma<br/>Serous Inflammation<br/>(effusion)<br/>Edema<br/>Demonstration of<br/>computer Slide of:<br/>other pathological<br/>slides<br/>Coagulative necrosis<br/>Liquefactive necrosis<br/>Granulation tissue<br/>Fatty degeneration in<br/>liver<br/>Apoptosis in liver<br/>Adenoma liver<br/>Meningioma</p> |               |  |   |   |  |   |  |
| 3.1 Use the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice. | B1 | b1 | <ul style="list-style-type: none"> <li>-Thrombosis&amp; Embolism</li> <li>-Ischemia&amp; Infarction</li> <li>-Sclerosis&amp;Heart failure</li> <li>-Blood disorders</li> <li>-Apoptosis</li> <li>-Necrosis</li> </ul>   | Student notes |  | x | x |  | X |  |



|      |   |     |     |   |                              |  |   |  |   |  |   |   |
|------|---|-----|-----|---|------------------------------|--|---|--|---|--|---|---|
| 4.9  | Utilize the pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions. | C14 | c1  | Growth Disorders<br>Neoplastic and non-neoplastic growth<br>Genetic Disorders:<br>Degenerative Disorders<br>Hepatic & Pulmonary Disorders<br>Diseases of nervous system   | Student book practical notes |  | x |  | x |  | x | x |
| 4.13 | Analyze and interpret experimental results as well as published literature.   | C18 | C 2 | -Demonstration of microscopic slides of morphologic stages of:<br>-Fasciola species<br>-Heterophyes species<br>-Schistosoma species<br>-Demonstration of Snails hosts<br>Taenia saginata<br>Taenia solium<br>-Echinococcus sp.<br>-Ascaris lumbricoides<br>-Hook worm sp<br>-Enterobius & Trichuris<br>-Trichinella spiralis<br>-Wuchereria species<br>-Amoebae species | Practical note               |  | x |  | x |  | x | x |

|             |   |     |     |   |                 |  |   |   |   |   |   |   |
|-------------|---|-----|-----|---|-----------------|--|---|---|---|---|---|---|
|             |   |     |     | -Balantidium coli<br>-Giardia lamblia<br>-Trichomonas vaginalis |                 |  |   |   |   |   |   |   |
| <b>5.1</b>  | Communicate clearly by verbal and means   | D1  | d 1 |   |                 |  |   |   |   |   |   |   |
| <b>5.2</b>  | Retrieve and evaluate information from different sources to improve professional competencies | D2  | d2  | activity  | Internet search |  |   | x |   |   | x |   |
| <b>5.10</b> | Demonstrate critical thinking, problem-solving and decision-making abilities                  | D11 | d 3 | Activity  | Internet search |  | x | x | x | x | x | x |



**COURSE  
SPECIFICATIONS**

**Medicinal Chemistry-2**

**Third year – secondTerm  
2019-2020**

## Course specification of Medicinal Chemistry (2)

---

**University:** Zagazig **Faculty:** Pharmacy

### A- Course specifications:

Programme(s) on which the course is given: Bachelor of Pharmacy  
Major or Minor element of programmes: Major  
Department offering the program: -----  
Department offering the course: Medicinal chemistry department  
Academic year/level: third year/ Second term  
Date of specification approval: 24/2/2020

### B- Basic information:

Title: MC321 Code: MC321  
Credit Hours: ---  
Lectures: 2 hrs/week  
Practical: 2 hr/week  
Tutorials: ---  
Total: 3 hrs/week

### C- Professional information:

#### 1-Overall Aims of the Course:

**On completion of the course, students will be able to:**

On completion of the course, the student will be able to enumerate the therapeutic drugs of different uses with their mode of action and synthetic pathways (antimycobacterium, antineoplastic, antiviral, oral hypoglycemic, diagnostic agents, cardiovascular acting drugs and diuretics).

## 2- Intended Learning Outcomes (ILOs):

| <b>A- Knowledge and Understanding:</b>       |   |
|--|---|
| a1   | Describe basics of chemistry of different drug classes (antimycobacterium, antineoplastic, antiviral, oral hypoglycemic, diagnostic agents, cardiovascular acting drugs and diuretics). |
| a2   | Outline synthetic pathways of the aforementioned drugs.   |
| a3   | Recognize mode of action & SAR of the aforementioned drugs.   |
| <b>B- Professional and Practical skills:</b> |   |
| b1   | Handle basic laboratory equipments and chemicals effectively and safely.  |
| b2   | Identify the active substances (sulfa drugs, aliphatic & aromatic acids & sodium salts).  |
| b3   | Establish a research study for assay and analysis of commercial drugs (boric acid and compare results with the pharmacopeia).   |
| <b>C- Intellectual skills:</b>               |   |
| c1   | Develop GLP guide lines in pharmacy practice through learning different analytical techniques.  |
| c2   | Predict quantitative and qualitative methodology of raw materials (boric acid, hexamine, hydrogen peroxide) and pharmaceutical preparations.  |
| <b>D-General and Transferable skills:</b>    |   |
| d1   | Work effectively as a member of a team with other students.   |
| d2   | Write reports and present it.   |
| d3   | Develop problem solving and decision making skills.   |

## D- Contents:

| <b>Week No.</b> | <b>Lecture contents<br/>(2 hrs/lec.)</b>   | <b>Practical session<br/>(2hrs/lab)</b>  |
|-----------------|--|--|
| 1               | Antimycobacterium agents.  | Laboratory safety measures.  |
| 2               | Antineoplastic agents<br>(Alkylating agents).  | Quantitative estimation of boric acid.   |
| 3               | Antineoplastic agents<br>(Alkylating agents, antimetabolites).   | Quantitative estimation of hexamine.   |
| 4               | Antineoplastic agents<br>(antimetabolites, hormones)   | Quantitative estimation of tolbutamide.  |
| 5               | Antiviral agents<br>(host cell penetration inhibitors and nucleic acid inhibitors).  | General Scheme<br>Activity 1 (Reports).  |
| 6               | Antiviral agents<br>(protein inhibitors).  | - Identification of boric acid, borax, urea and hexamine.  |
| 7               | Midterm exam   |  |
| 8               | Oral hypoglycemic agents (sulfonylurea derivatives)  | -Identification of sulpha drugs.   |
| 9               | Oral hypoglycemic agents (biguanide derivatives)<br>Diagnostic agents  | -Identification of organic acids and its salts of pharmaceutical use.                              |
| 10              | Antianginal agents & antiarrhythmic drugs  | -Identification of iron, zinc and magnesium salts of pharmaceutical use.<br>-Activity 2 (Reports). |
| 11              | Antihypertensive agents  | Revision scheme 1.   |
| 12              | Anticoagulants & Antihyperlipidemic agents.  | Revision scheme 2.   |
| 13              | Diuretics (water and osmotic agents, acidifying salts, mercurials, $\alpha,\beta$ unsaturated ketones, purines, pyrimidines) | Practical exam.  |
| 14              | Diuretics (sulfonamide derivatives and endocrine antagonists)  | Practical exam.  |
| 15              | Final written exam   |  |

## E- Schedule of Assessment Tasks for Students During the Semester:

- 1- Written exam to assess a1, a2, a3, c1, c2  
 2- Activity to assess d1, d2, d3  
 3- Practical exam to assess b1, b2,b3, c1, c2, d1, d2, d3  
 4- Oral exam to assess a1, a1, a3, c1, c2

|       | Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.) | Week Due    | Proportion of Total Assessment |
|-------|---|-------------|--------------------------------|
| 1     | midterm exam  | Week 7      | 10 %                           |
| 2     | Activity (Reports)  | Weeks 5, 10 | 5 %                            |
| 3     | Practical exam  | Weeks 13,14 | 20 %                           |
| 4     | Written exam  | Week 15     | 50 %                           |
| 5     | Oral exam   | Week 15     | 15 %                           |
| Total |   |             | 100 %                          |

### **F- Facilities required for teaching and learning:**

1. Black (white) board.
2. Data show Presentation.
3. Explanatory videos.
4. Laboratory equipment (test tubes, piurettes and conical flasks).
5. Chemicals.

### **G-Teaching and learning methods:**

- Lectures.
- Practical sessions.
- Activity (Reports).
- Self learning

### **H- List of References:**

1- Course Notes:

- Practical notes of Medicinal chemistry (2) approved by medicinal chemistry department 2019-2020.

2- Essential Books:

- Foye's Principles of Medicinal Chemistry; Williams, David A., William O. Foye, and Thomas L. Lemke; Lippincott Williams and Wilkins (2016).
- B.p. &U.S Pharmacopia (1988-2017)
- An Introduction to Medicinal Chemistry; Patrick, Graham L, Oxford (2017)

3- Periodicals, Web Sites, etc

- <http://www.ncbi.nlm.nih.gov/sites/entrez>
- <http://www.ekb.eg>
- <http://journals.tubitak.gov.tr/chem/index.php>
- <http://www.pharmacopoeia.co.uk/>
- [www.Pubmed.Com](http://www.Pubmed.Com)
- [www.sciencedirect.com](http://www.sciencedirect.com)

---

**Course Coordinator: Prof. Dr./ Sobhy M. El-Adl**

**Head of Department: Prof. Dr./ Kamel A. Metwally.**

**Date: 24/2/2020** تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ



| <b>Matrix I of Medicinal chemistry 2 course</b> |   |   |           |           |  |           |           |                            |           |  |           |           |
|---|---|---|-----------|-----------|--|-----------|-----------|----------------------------|-----------|--|-----------|-----------|
| <b>Course Contents</b>                          |   | <b>ILOs of Medicinal chemistry 2 course</b> |           |           |  |           |           |                            |           |  |           |           |
|   |   | <b>Knowledge and understanding</b>          |           |           | <b>Professional and practical skills</b> |           |           | <b>Intellectual skills</b> |           | <b>General and transferable skills</b> |           |           |
| <b>Lectures</b>                                 |   | <b>a1</b>                                   | <b>a2</b> | <b>a3</b> | <b>b1</b>                                | <b>b2</b> | <b>b3</b> | <b>c1</b>                  | <b>c2</b> | <b>d1</b>                              | <b>d2</b> | <b>d3</b> |
| <b>1</b>  | Antimycobacterium agents  | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>2</b>  | Antineoplastic agents(Alkylating agents)  | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>3</b>  | Antineoplastic agents(Alkylating agents, antimetabolites)   | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>4</b>  | Antineoplastic agents( antimetabolites, hormones)   | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>5</b>  | Antiviral agents ( host cell penetration inhibitors and nucleic acid inhibitors)<br><br>( host cell penetration inhibitors and nucleic acid inhibitors) | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>6</b>  | Antiviral agents( protein inhibitors)   | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>7</b>  | Oral hypoglycemic ( sulfonyleurea derivatives)<br><br>( sulfonyleurea derivatives)<br><br>( sulfonyleurea derivatives)                                  | x   | x         | x         |  |           |           |                            | x         |  |           |           |
| <b>8</b>  | Oral hypoglycemic ( biguanide derivatives) & diagnostic agents  | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>9</b>  | Antianginal agents & antiarrhythmic drugs   | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>10</b>                                       | Antihypertensive agents   | x   | x         | x         |  |           |           |                            | x         |  |           |           |
| <b>11</b>                                       | Anticoagulants & antihyperlipidemic agents  | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>12</b>                                       | Diuretics (water and osmotic agents, acidifying salts, mercurials , $\alpha,\beta$ unsaturated ketones, purines , pyrimidines)                          | x   | x         | x         |  |           |           |                            |           |  |           |           |
| <b>13</b>                                       | Diuretics (sulfonamide derivatives and endocrine antagonists)   | x   | x         | x         |  |           |           |                            | x         |  |           |           |
| <b>Practical sessions</b>                       |   |   |           |           |  |           |           |                            |           |  |           |           |

|          |   |  |  |  |   |   |   |   |   |   |   |   |
|----------|---|--|--|--|---|---|---|---|---|---|---|---|
| <b>1</b> | Laboratory safety measures  |  |  |  | x |   |   |   |   |   |   |   |
| <b>2</b> | Quantitative estimation of boric acid, hexamine, hydrogen peroxide & tolbutamide  |  |  |  | x |   | x | x | x | x | x |   |
| <b>3</b> | Identification of organic acids / salts, iron, zinc and magnesium salts, sulphur, boric acid, urea and hexamine of pharmaceutical use |  |  |  | x | x |   | x | x | x |   |   |
| <b>4</b> | Activities  |  |  |  |   |   |   |   |   | x | x | x |

## Matrix II of Medicinal Chemistry 2 course

| National Academic Reference Standards (NARS) | Program ILOs  | Course ILOs | Course contents | Sources  | Teaching and learning methods   |                   |                    | Methods of assessment |                |           |   |
|--|---|-------------|-----------------|--|---------------------------------|-------------------|--------------------|-----------------------|----------------|-----------|---|
|  |   |             |                 |  | lecture                         | practical session | Activity (Reports) | written exam          | practical exam | oral exam |   |
| <b>2.1</b>                                   | Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice. | A2          | a1              | Antimycobacterium agents   | Student book                    | x                 |                    |                       | x              |           | x |
|  |   |             |                 | Antineoplastic agents(Alkylating agents)   | Student book                    | x                 |                    |                       | x              |           | x |
|  |   |             |                 | Antineoplastic agents(Alkylating agents, antimetabolites)                        | Student book                    | x                 |                    |                       | x              |           | x |
|  |   |             |                 | Antineoplastic agents( antimetabolites, hormones)                                | Student book<br>Essential books | x                 |                    | X                     | x              |           | x |
|  |   |             |                 | Antiviral agents ( host cell penetration inhibitors and nucleic acid inhibitors) | Student book                    | x                 |                    |                       | x              |           | x |
|  |   |             |                 | Antiviral agents( protein inhibitors)  | Student book                    | x                 |                    |                       | x              |           | x |
|  |   |             |                 | Oral hypoglycemic ( sulfonylurea derivatives)<br><br>( sulfonylurea derivatives) | Student book                    | x                 |                    |                       | x              |           | x |

|     |   |     |    |   |   |   |  |   |   |  |   |
|-----|---|-----|----|---|---|---|--|---|---|--|---|
|     |   |     |    | ( sulfonyleurea derivatives)  |   |   |  |   |   |  |   |
|     |   |     |    | Oral hypoglycemic ( biguanide derivatives) & diagnostic agents  | Student book<br>Essential books               | x |  |   | x |  | x |
|     |   |     |    | Antianginal agents & antiarrhythmic drugs   | Student book                                  | x |  |   | x |  | x |
|     |   |     |    | Antihypertensive agents   | Student book                                  | x |  |   | x |  | x |
|     |   |     |    | Anticoagulants & antihyperlipidemic agents  | Student book<br>Internet<br>Recommended books | x |  | X | x |  | x |
|     |   |     |    | Diuretics ( water and osmotic agents, acidifying salts, mercurials , $\alpha,\beta$ unsaturated ketones, purines , pyrimidines) | Student book<br>Essential books               | x |  |   | x |  | x |
|     |   |     |    | Diuretics ( sulfonamide derivatives and endocrine antagonists)  | Student book                                  | x |  |   | x |  | x |
| 2.5 | Principles of drug design, development and synthesis. | A15 | a2 | Antimycobacterium agents  | Student book                                  | x |  |   | x |  | x |
|     |   |     |    | Antineoplastic agents(Alkylating agents)  | Student book                                  | x |  |   | x |  | x |
|     |   |     |    | Antineoplastic agents(Alkylating agents, antimetabolites)   | Student book<br>Internet<br>Recommended books | x |  | X | x |  | x |

|  |  |  |  |  |   |   |  |   |   |  |   |
|--|--|--|--|--|---|---|--|---|---|--|---|
|  |  |  |  | Antineoplastic agents( antimetabolites, hormones)  | Student book                                  | x |  |   | x |  | x |
|  |  |  |  | Antiviral agents ( host cell penetration inhibitors and nucleic acid inhibitors)                                   | Student book                                  | x |  |   | x |  | x |
|  |  |  |  | Antiviral agents( protein inhibitors)  | Student book                                  | x |  |   | x |  | x |
|  |  |  |  | Oral hypoglycemic ( sulfonylurea derivatives)  | Student book                                  | x |  |   | x |  | x |
|  |  |  |  | Oral hypoglycemic ( biguanide derivatives) & diagnostic agents   | Student book                                  | x |  |   | x |  | x |
|  |  |  |  | Antianginal agents & antiarrhythmic drugs  | Student book                                  | x |  |   | x |  | x |
|  |  |  |  | Antihypertensive agents  | Student book<br>Internet<br>Recommended books | x |  | X | x |  | x |
|  |  |  |  | Anticoagulants & antihyperlipidemic agents   | Student book                                  | x |  |   | x |  | x |
|  |  |  |  | Diuretics ( water and osmotic agents, acidifying salts, mercurials , $\alpha,\beta$ unsaturated ketones, purines , | Student book                                  | x |  |   | x |  | x |

|  |   |     |    |  |  |   |   |   |   |  |   |
|--|---|-----|----|--|--|---|---|---|---|--|---|
|  |   |     |    | pyrimidines)   |  |   |   |   |   |  |   |
|  |   |     |    | Diuretics ( sulfonamide derivatives and endocrine antagonists)                   | Student book                                     | x |   |   | x |  | x |
| <b>2.13</b>  | Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. | A30 | a3 | Antimycobacterium agents   | Student book                                     | x |   |   | x |  | x |
|  |   |     |    | Antineoplastic agents(Alkylating agents)   | Student book                                     | x |   |   | x |  | x |
|  |   |     |    | Antineoplastic agents(Alkylating agents, antimetabolites)                        | Student book                                     | x |   |   | x |  | x |
|  |   |     |    | Antineoplastic agents( antimetabolites, hormones)                                | Student book<br>Internet<br>Recommended<br>books | x |   | X | x |  | x |
|  |   |     |    | Antiviral agents ( host cell penetration inhibitors and nucleic acid inhibitors) | Student book                                     | x |   |   | x |  | x |
|  |   |     |    | Antiviral agents( protein inhibitors)  | Student book                                     | x |   |   | x |  | x |
|  |   |     |    | Oral hypoglycemic ( sulfonylurea derivatives)                                    | Student book                                     | x |   |   | x |  | x |
| Oral hypoglycemic ( biguanide derivatives) & diagnostic agents | Student book  | x   |    |  | x  |   | x |   |   |  |   |

|            |   |    |    |   |   |   |  |   |   |  |   |
|------------|---|----|----|---|---|---|--|---|---|--|---|
|            |   |    |    | Antianginal agents & antiarrhythmic drugs   | Student book                                  | x |  |   | x |  | x |
|            |   |    |    | Antihypertensive agents   | Student book                                  | x |  |   | x |  | x |
|            |   |    |    | Anticoagulants & antihyperlipidemic agents  | Student book<br>Internet<br>Recommended books | x |  | X | x |  | x |
|            |   |    |    | Diuretics ( water and osmotic agents, acidifying salts, mercurials , $\alpha$ , $\beta$ unsaturated ketones, purines , pyrimidines) | Student book                                  | x |  |   | x |  | x |
|            |   |    |    | Diuretics ( sulfonamide derivatives and endocrine antagonists)  | Student book                                  | x |  |   | x |  | x |
| <b>3.2</b> | Handle and dispose chemicals and pharmaceutical preparations safely | B2 | b1 | Laboratory safety measures  | Practical notes                               |   |  | X |   |  | x |

|      |  |     |    |   |                    |  |   |  |  |   |  |
|------|--|-----|----|---|--------------------|--|---|--|--|---|--|
| 3.4  | Extract, isolate, synthesize, purify, identify, and/or standardize active substances from different origins. | B6  | b2 | Identification of organic acids / salts, iron, zinc and magnesium salts, sulphur, boric acid, urea and hexamine of pharmaceutical use | Practical notes    |  | X |  |  | x |  |
| 3.11 | Conduct research studies and analyze the results   | B19 | b3 | Quantitative estimation of boric acid, hexamine, hydrogen peroxide & tolbutamide  | Practical notes    |  | X |  |  | x |  |
| 4.2  | Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice                                  | C3  | c1 | Quantitative estimation of boric acid, hexamine, hydrogen peroxide & tolbutamide  | Practical notes    |  | X |  |  | x |  |
|      |  |     |    | Identification of organic acids / salts, iron, zinc and magnesium salts, sulphur, boric acid, urea and hexamine of pharmaceutical use | practical notebook |  | X |  |  | x |  |



|     |   |     |    |  |   |   |   |   |   |   |   |
|-----|---|-----|----|--|---|---|---|---|---|---|---|
| 4.3 | Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations | C7  | c2 | Oral hypoglycemic ( sulfonylurea derivatives)  | Student book<br>Internet<br>Recommended books | x |   | x | x |   | X |
|     |   |     |    | Quantitative estimation of boric acid, hexamine, hydrogen peroxide & tolbutamide   | Practical notes                               |   | X |   |   | x |   |
|     |   |     |    | Identification of organic acids / salts, iron , zinc and magnesium salts, sulphur, boric acid, urea and hexamine of pharmaceutical use | Practical notes                               |   | X |   |   | x |   |
| 5.3 | Work effectively in a team  | D3  | d1 | Quantitative estimation of boric acid, hexamine, hydrogen peroxide & tolbutamide   | Practical notes                               |   | X |   |   | x |   |
| 5.9 | Implement writing and presentation  | D10 | d2 | Activity   | Internet<br>Recommended books                 |   | X | x |   | x |   |

|      |  |     |    |  |                            |  |   |   |  |   |  |
|------|--|-----|----|--|----------------------------|--|---|---|--|---|--|
|      | skills   |     |    | Quantitative estimation of boric acid, hexamine, hydrogen peroxide & tolbutamide, Activity | Practical notes            |  | X |   |  | x |  |
| 5.10 | Implement writing and thinking, problem solving and decision making skills | D11 | D3 | Activity   | Internet Recommended books |  | x | x |  | x |  |

**Course Coordinator: Prof. Dr./ Sobhy M. El-Adl**

**Head of Department: Prof. Dr./ Kamel A. Metwally.**

**Date: 24/2/2020** تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ