



# Bachelor of Pharmacy (Clinical Pharmacy)

## Program Report

(2018 – 2019)

Prepared by

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Assis. Prof. Manal ElMasry



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**Teaching Institution:** Faculty of Pharmacy, Zagazig University,  
Egypt

**Awarding Institution:** Zagazig University

**Degree Award :** Bachelor of Pharmacy (Clinical Pharmacy)

**Length and Mode :** 5 years, full- time, credit hour system

**Program Coordinator:** Prof. Amal El-Gendi

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## **A- Basic Information:**

**1- Program Title:** Bachelor of Pharmacy (clinical pharmacy)

**2- Program Type:** single, credit hour system

**3- Number of Courses: 74**

**4- Departments:**

### **a- Departments affiliated to faculty of pharmacy:**

- Department of Analytical Chemistry
- Department of Biochemistry
- Department of Pharmaceutics
- Department of Medicinal Chemistry
- Department of Microbiology & Immunology
- Department of Pharmaceutical Organic Chemistry
- Department of Pharmacognosy
- Department of Pharmacology & Toxicology
- Department of Pharmacy Practice

### **b- Departments not affiliated to faculty of pharmacy:**

- Histology, Anatomy Oncology, Pathology, Cardiology, Pediatrics, chest, dermatology and virology departments (Faculty of Medicine)
- Mathematics department (Faculty of Science)
- English Language department (Faculty of Education)
- Accounting & Administration department (Faculty of Commerce)

## **5- Co-coordinators:**

- Prof. Amal El-Gendi “Program coordinator”

**6- External evaluator:** Prof. Mahmoud Bakr Al-Ashmawi,  
Department of Pharmaceutical Chemistry, Mansoura University

## **B- Statistics:**

1. No. of students admitting the program (2014 - 2015): 207

2. No. of students admitting the program this year (2018 – 2019):264

Percentage increase: 27.53% (reflecting good program reputation)

3. No. of students completing the program and as a percentage of those who started:

No. of students admitted to the program (2014 – 2015)	No. of students completed the program (2018-2019)	% of students completed the program
207	187	90.3 %

4. Grades: no. and percentage of each grade:

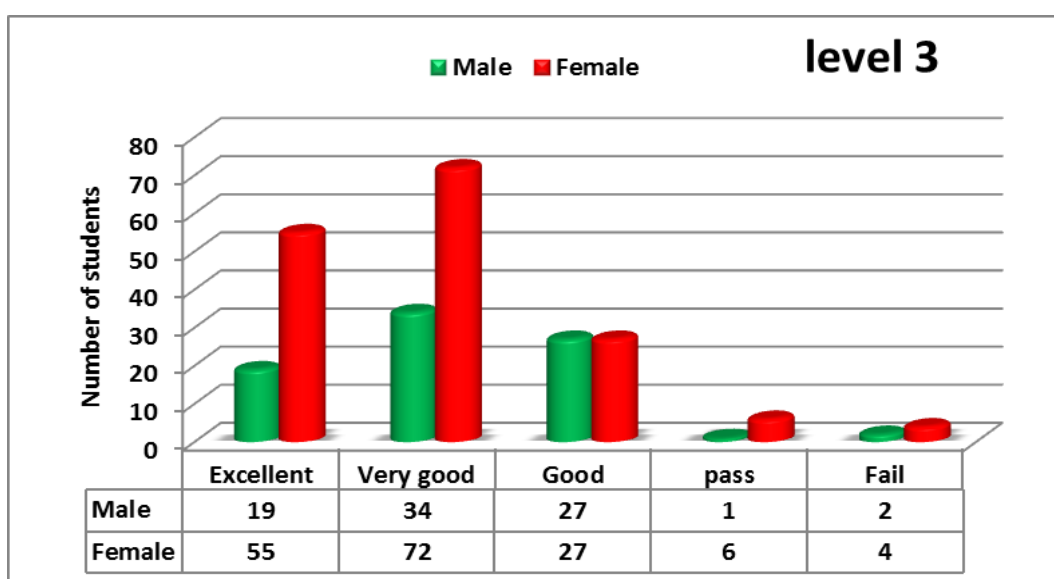
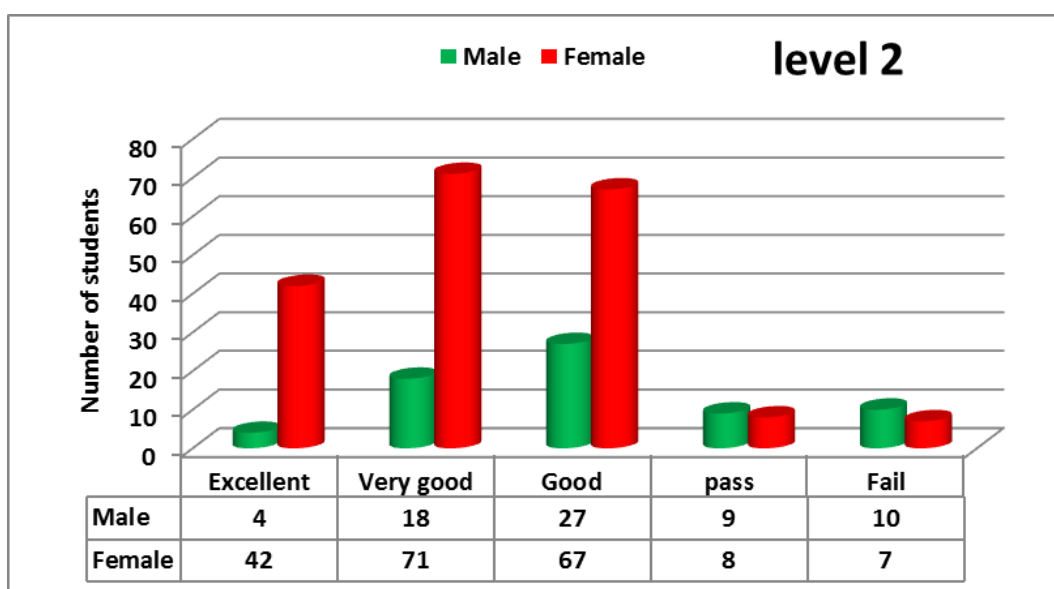
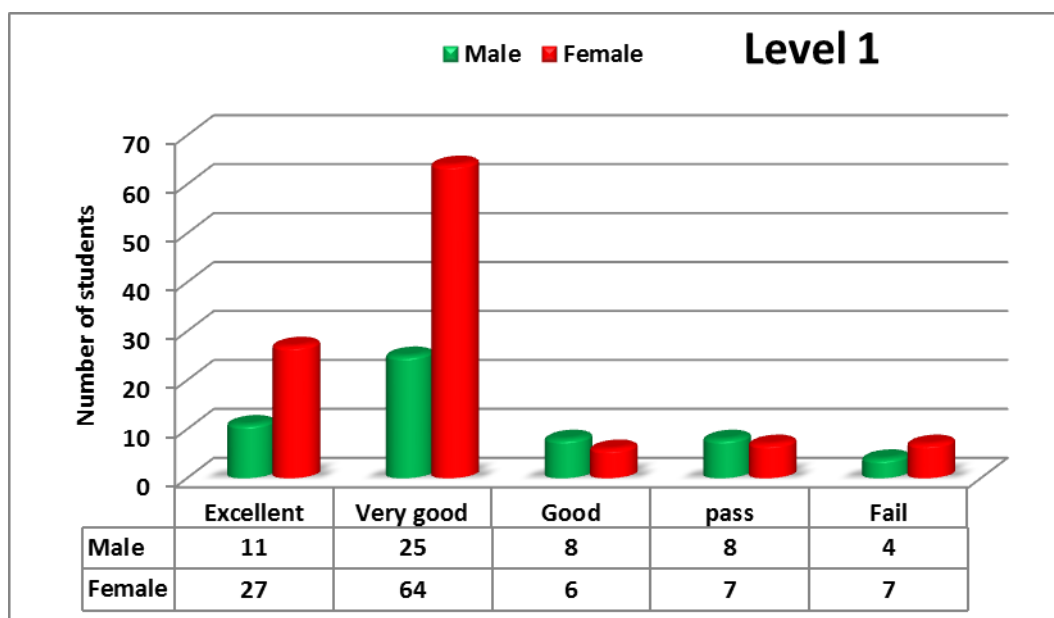
Year	Grade				
	Excellent	Very Good	Good	Pass	Fail
Level 1	38	89	14	15	11
	22.75%	53.3 %	8.4 %	8.98%	6.6%

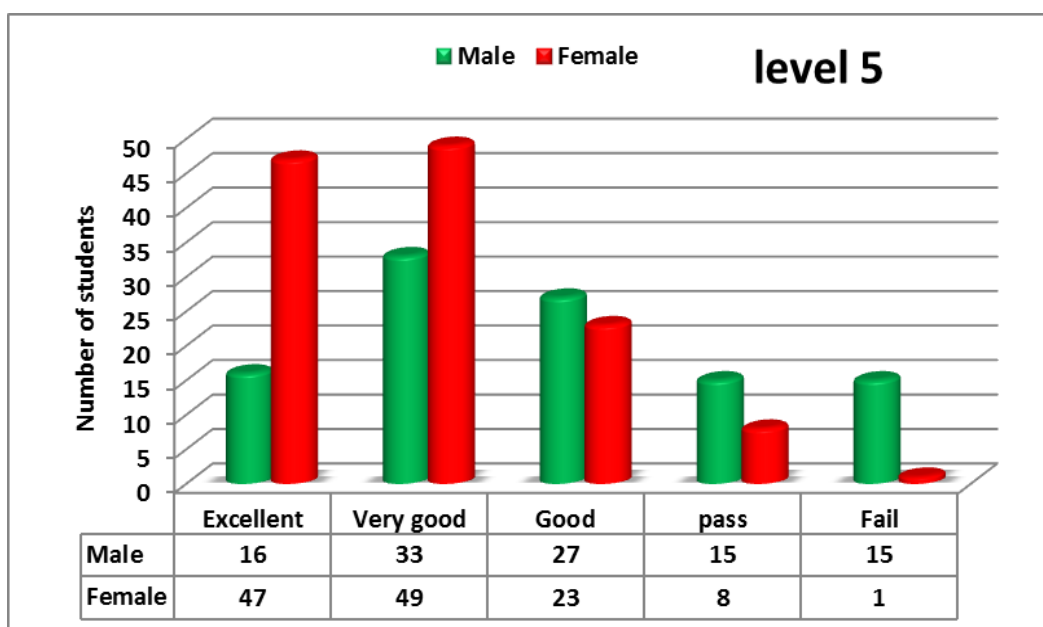
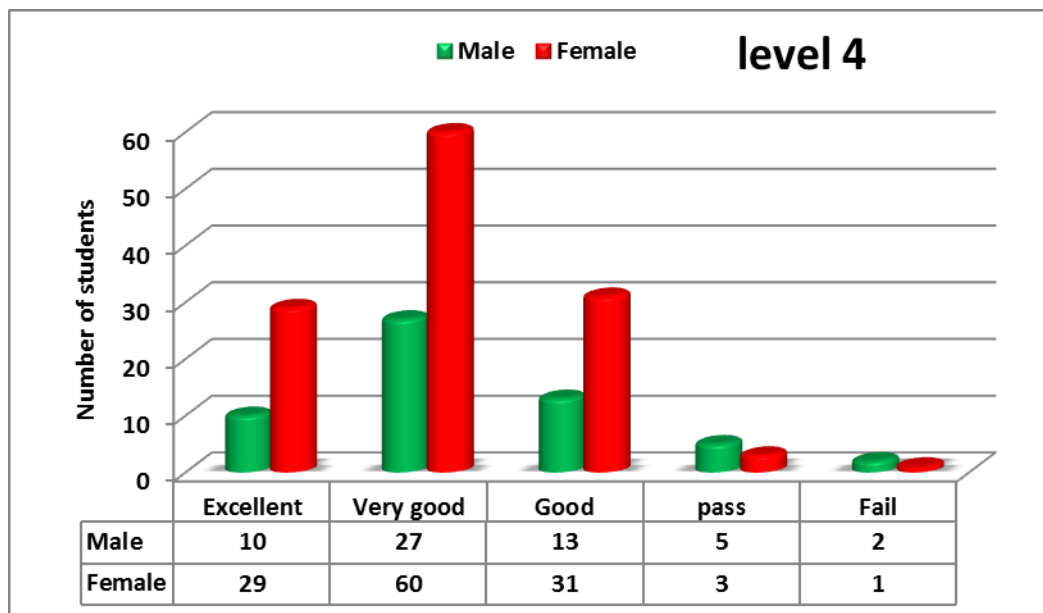
Year	Grade				
	Excellent	Very Good	Good	Pass	Fail
Level 2	46	89	94	17	17
	17.5%	33.8%	35.7%	6.5%	6.5%

Year	Grade				
	Excellent	Very Good	Good	Pass	Fail
Level 3	74	106	54	7	6
	29.9%	42.9%	21.8%	2.8%	2.4%

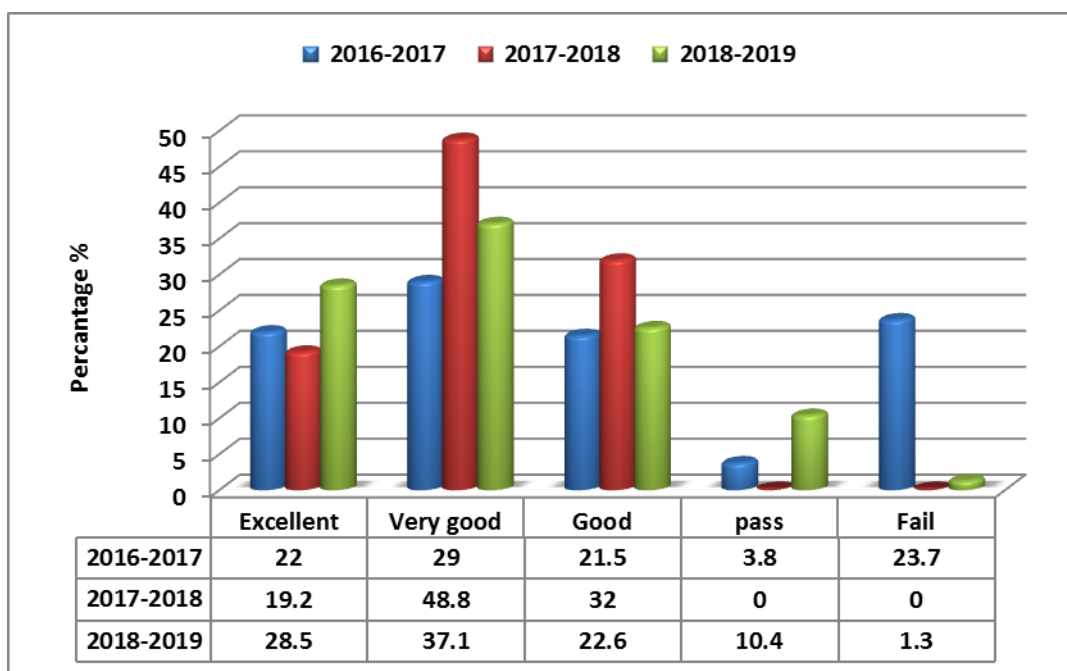
Year	Grade				
	Excellent	Very Good	Good	Pass	Fail
Level 4	39	87	44	8	3
	21.5%	48.1%	24.3%	4.4%	1.6

Year	Grade				
	Excellent	Very Good	Good	Pass	Fail
Level 5	63	82	50	23	3
	28.5%	37.1%	22.6%	10.4	1.3





**Fig. 1: Follow up of students' progress along the five years of the program.**



**Fig. 2: Grades of 2018-2019 graduates compared with last two years graduates.**

This figure shows significant improvement in graduates' grades, 2017-2019 when compared to the academic year 2016-2017 with more normal distribution of grades in 2018-2019. This may be due to the faculty council decision of the necessity of presence of at least 25% of short essay questions in the final written exam (faculty council No:728,8/4/2019).

## **C- Professional Information:**

### **Academic Standards:**

#### **1. Achievement of Program Intended learning Outcomes.**

The following table presents the courses taught in Bachelor of Pharmacy, clinical pharmacy program and the covered ILOs through the courses`:

<b>National Academic Reference Standards (NARS, 2009)</b>	<b>Program ILOS</b>	<b>Course (s) covering ILOs`</b>
2-1 Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	[A1] Illustrate the principles of organic chemistry, analytical chemistry, biophysics, biology, and mathematical sciences.	<ul style="list-style-type: none"><li>• Physical and Inorganic Chemistry</li><li>• Pharmaceutical Organic Chemistry-1</li><li>• Biophysics</li><li>• Cell Biology</li><li>• Mathematic and Statistics</li><li>• English Language</li><li>• Histology</li><li>• Pharmaceutical Organic Chemistry-2</li><li>• Human Rights</li><li>• Pharmaceutical Analytical chemistry-1</li><li>• Pharmaceutical Organic Chemistry-3</li><li>• Pharmaceutical Analytical chemistry-2</li><li>• Instrumental Analysis</li><li>• General Microbiology and Immunology</li></ul>
	[A2] Mention the principles of pharmaceutical sciences.	<ul style="list-style-type: none"><li>• Botany and Medicinal Plants</li><li>• Mathematic and Statistics</li><li>• Pharmacognosy-1</li><li>• Physical Pharmacy</li><li>• Pharmacy Orientation</li><li>• Pharmaceutical Dosage Form-1</li><li>• Pharmaceutical Dosage Form-2</li><li>• Medicinal chemistry-1</li><li>• Biopharmaceutics &amp; pharmacokinetics</li><li>• Cosmetic</li><li>• Medicinal chemistry-2</li><li>• Controlled drug delivery</li><li>• Hospital pharmacy</li><li>• Pharmaceutical microbiology</li><li>• Public health</li><li>• Radiopharmaceuticals</li><li>• Drug marketing</li><li>• Phytotherapy</li></ul>



	<p>[A3] Explain the principles of medical sciences including: physiology, histology, anatomy, biochemistry, pharmacology, therapeutics, parasitology, pathology medical microbiology, immunology and virology.</p>	<ul style="list-style-type: none"> <li>• Anatomy</li> <li>• Physiology</li> <li>• Medical terminology</li> <li>• Biochemistry-1</li> <li>• Parasitology</li> <li>• Biochemistry-2</li> <li>• Clinical Microbiology</li> <li>• Pathophysiology</li> <li>• Pathology</li> <li>• Clinical Nutrition</li> <li>• Therapeutics-1</li> <li>• Therapeutics-2</li> <li>• Pharmacology I</li> <li>• General Microbiology and Immunology</li> </ul>
	<p>[A4] Outline the fundamentals of management, financial and human resources, drug promotion, sales and marketing, business administration, accounting, and pharmacoeconomic as well as the field of social, behavioral and environmental sciences and health policy relevant to pharmacy.</p>	<ul style="list-style-type: none"> <li>• Psychology</li> <li>• Business administration</li> <li>• Pharmacology II</li> <li>• Sociology</li> <li>• Toxicology and forensic chemistry</li> <li>• Drug information</li> </ul>
2.2 Physical-chemical properties of various substances used in preparation of medicines including inactive and active ingredients as well as biotechnology and radio- labeled products.	<p>[A5] Describe the physical and chemical properties of active and inactive chemicals (synthetic or natural) and their effect on the design and formulation of pharmaceutical compounds.</p>	<ul style="list-style-type: none"> <li>• Physical and Inorganic Chemistry</li> <li>• Pharmaceutical Organic Chemistry-3</li> <li>• Pharmacognosy-2</li> <li>• Phytochemistry-1</li> <li>• Pharmaceutical Dosage Form-2</li> </ul>

	<p>[A6] Summarize physico-chemical properties of medicines, biological products and radio-pharmaceuticals focusing on thermodynamics, chemical kinetics and assessment of their chemical and physical stabilities.</p>	<ul style="list-style-type: none"> <li>• Physical and Inorganic Chemistry</li> <li>• Pharmacognosy-2</li> <li>• Pharmaceutical Dosage Form-2</li> </ul>
2.3 Principles of different analytical techniques using GLP guidelines and validation procedures	<p>[A7] List the fundamentals of different analytical techniques and its application in pharmaceutical chemistry, including good laboratory practice (GLP).</p>	<ul style="list-style-type: none"> <li>• Pharmaceutical Analytical chemistry-1</li> <li>• Pharmaceutical Analytical chemistry-2</li> <li>• Instrumental Analysis</li> <li>• Quality control of herbal drugs</li> </ul>
2.4 Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds.	<p>[A8] Illustrate the basics of separation, synthesis, purification, identification and standardization methods of biologically active compounds.</p>	<ul style="list-style-type: none"> <li>• Botany and Medicinal Plants</li> <li>• Pharmacognosy-1</li> <li>• Pharmaceutical Analytical chemistry-2</li> <li>• Phytochemistry-1</li> <li>• Pharmaceutical Dosage Form-1</li> <li>• Medicinal chemistry-1</li> <li>• Phytochemistry-2</li> <li>• Medicinal chemistry-2</li> <li>• Quality control of herbal drugs</li> </ul>
2.5 Principles of drug design, development and synthesis.	<p>[A9] Outline the concepts of pharmaceutical chemistry including structures and reactions of biologically active molecules, and the design of new drugs using computer-aided drug design.</p>	<ul style="list-style-type: none"> <li>• Pharmaceutical Organic Chemistry-1</li> <li>• Pharmaceutical Organic Chemistry-2</li> <li>• Medicinal chemistry-1</li> <li>• Medicinal chemistry-2</li> </ul>

2.6 Properties of different pharmaceutical dosage forms including novel drug delivery systems.	[A10] Describe the characters and the formulation of different dosage forms, including controlled, targeted and advanced drug delivery systems.	<ul style="list-style-type: none"> <li>• Pharmaceutical Dosage Form-1</li> <li>• Pharmaceutical Dosage Form-2</li> <li>• Cosmetic</li> <li>• Radiopharmaceuticals</li> <li>• Controlled drug delivery systems</li> <li>• Summer training</li> </ul>
2.7 Principles of various instruments and techniques including sampling, manufacturing, packaging, labeling, storing and distribution processes in pharmaceutical industry.	[A11] Identify good pharmaceutical manufacturing practice (GMP) and quality assurance in different pharmaceutical processes (production, packaging, labeling and distribution)	<ul style="list-style-type: none"> <li>• Pharmaceutical technology</li> <li>• Instrumental Analysis</li> <li>• Quality control of herbal drugs</li> <li>• Summer training</li> </ul>
2.8 Principles of pharmacokinetics and biopharmaceutics with applications in therapeutic drug monitoring, dose modification and bioequivalence studies.	[A12] Explain pharmacokinetics models and pharmacokinetic routes of different administration, bioavailability and bioequivalence.	<ul style="list-style-type: none"> <li>• Biopharmaceutics &amp; pharmacokinetics</li> <li>• Clinical pharmacokinetics</li> </ul>
2-9 Principles of hospital pharmacy including I.V. admixtures, TPN and drug distribution system	[A13] Outline the principles of hospital pharmacy, including dispensing, hospital formulary, radiopharmaceuticals, total parenteral nutrition, I.V. admixtures, drug monitoring, adverse effects and dose adjustment.	<ul style="list-style-type: none"> <li>• Therapeutics- 1</li> <li>• Hospital pharmacy</li> <li>• Clinical pharmacy-1</li> <li>• Pharmaceutical microbiology</li> <li>• Clinical pharmacy-2</li> <li>• Community pharmacy practice</li> <li>• Summer training</li> </ul>

<p>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.</p>	<p>[A14] Specify the basics of public health, the art of preventing disease, promoting health, raising public awareness for the safe use and disposal of medicine.</p>	<ul style="list-style-type: none"> <li>• Public health &amp; preventative medicine</li> </ul>
	<p>[A15] List the different methods of sterilization, sterility testing and their application in microbiological quality control of pharmaceutical products.</p>	<ul style="list-style-type: none"> <li>• General Microbiology and Immunology</li> </ul>
<p>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</p>	<p>[A16] Demonstrate the principles of normal body and abnormal body functions in healthy and diseased states</p>	<ul style="list-style-type: none"> <li>• Histology</li> <li>• Biochemistry-1</li> <li>• Biochemistry-2</li> <li>• Pathophysiology</li> <li>• Pathology</li> <li>• Clinical biochemistry</li> <li>• Clinical Nutrition</li> <li>• Oncology</li> <li>• Gastroenterology</li> <li>• Treatment of dermatological and reproductive diseases</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> </ul>
	<p>[A17] Illustrate genomics and different biochemical pathways their correlation with different diseases.</p>	
	<p>[A18] Describe the structure of the human body and its component organs and cells. Causes, development, and consequences of diseases.</p>	

<p>2.12 Etiology, epidemiology, laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches.</p>	<p>[A19] List the etiology, epidemiology, treatment and control of microbial and parasitic infection and host immune response to such infections.</p>	<ul style="list-style-type: none"> <li>• Histology</li> <li>• Parasitology</li> <li>• Clinical Microbiology</li> <li>• Pathophysiology</li> <li>• Pathology</li> <li>• Clinical Nutrition</li> <li>• Clinical Pharmacology</li> <li>• Clinical biochemistry</li> <li>• Oncology</li> <li>• Gastroenterology</li> <li>• Treatment of dermatological and reproductive diseases</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> </ul>
	<p>[A20] Specify laboratory diagnosis of different diseases.</p>	<ul style="list-style-type: none"> <li>• Biochemistry-1</li> <li>• Clinical Microbiology</li> <li>• Pathophysiology</li> <li>• Community pharmacy</li> <li>• Pathology</li> <li>• Clinical pharmacy-1</li> <li>• Clinical biochemistry</li> <li>• Public health</li> <li>• Clinical Pharmacology</li> <li>• Oncology</li> <li>• Clinical pharmacy-2</li> </ul>
	<p>[A21] Determine pharmacotherapeutic approaches.</p>	<ul style="list-style-type: none"> <li>• Clinical Microbiology</li> <li>• Pathophysiology</li> <li>• Clinical Pharmacology</li> <li>• Oncology</li> <li>• Therapeutics-1</li> <li>• Therapeutics-2</li> <li>• Treatment of respiratory system diseases</li> </ul>
<p>2-13 Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions.</p>	<p>[A22] Illustrate the mechanisms of drug action, and the therapeutic uses, adverse reactions and contraindications</p>	<ul style="list-style-type: none"> <li>• Medicinal chemistry-1</li> <li>• Community</li> <li>• Medicinal chemistry-2</li> <li>• Drug interaction</li> <li>• Therapeutics-1</li> <li>• Toxicology and forensic chemistry</li> <li>• Therapeutics-2</li> </ul>

2-14 Principles of clinical pharmacology, pharmacovigilance and the rational use of drugs.	[A23] Determine the principles of clinical pharmacology, impact of drug interactions on pharmacotherapy for various diseases, and pharmacovigilance	<ul style="list-style-type: none"> <li>• Clinical Pharmacology</li> </ul>
2-15 Basis of complementary and alternative medicine	[A24] Categorize the herbal preparations and the nutritional supplements with emphasis on disease prevention and health promotion	<ul style="list-style-type: none"> <li>• Phytochemistry-I</li> <li>• Quality control of herbal drugs</li> <li>• Pharmaceutical biotechnology</li> <li>• Pharmacology I</li> <li>• Pharmacology II</li> <li>• Quality control and drug analysis</li> <li>• Clinical Nutrition</li> </ul>
2-16 Toxic profile of drugs and other xenobiotics including sources, identification, symptoms, management control and first aid measures	[A25] Identify the teratogenicity, toxicity and poisoning of common drugs, chemicals, radioactive materials, natural toxins, including: sources, identification, handling, symptoms, management and treatment.	<ul style="list-style-type: none"> <li>• Pharmaceutical biotechnology</li> <li>• Toxicology and forensic chemistry</li> </ul>
	[A26] Outline the fundamentals of first aid, including basic life support, shock, medical emergency, rescue and transportation.	<ul style="list-style-type: none"> <li>• First aid</li> </ul>

2-17 Methods of biostatistical analysis and pharmaceutical calculations	[A27] Demonstrate the basic understanding of pharmaceutical calculations, biostatistical analysis and biological standardization	<ul style="list-style-type: none"> <li>• Biopharmaceutics &amp; pharmacokinetics</li> <li>• Pharmaceutical biotechnology</li> <li>• Public health</li> <li>• Pharmacology II</li> <li>• Quality control and drug analysis</li> </ul>
2-18 Principles of management including financial and human resources.	[A28] Mention the principles of management, capital requirement, financial and human resources, purchasing and financing new pharmacy.	<ul style="list-style-type: none"> <li>• Business administration</li> <li>• Summer training</li> </ul>
2-19 Principles of drug promotion, sales and marketing, business administration, accounting and pharmacoeconomics.	[A29] Describe drug marketing, advertising, interpersonal communication, business promotions, business administration, accounting and pharmacoeconomics	<ul style="list-style-type: none"> <li>• Business administration</li> <li>• Drug information</li> <li>• Drug marketing</li> </ul>
2-20 Principles of proper documentation and drug filing systems.	[A30] Define the concepts and the principles of clinical pharmacy practice, including maintenance of patient profiles, proper documentation and drug filing	<ul style="list-style-type: none"> <li>• Summer training</li> <li>• Hospital pharmacy</li> </ul>
2-21 Regulatory affairs, pharmacy laws and ethics of health care and pharmacy profession	[A31] State the laws that govern and affect pharmacy practice, ethical principles and moral rules of pharmacy profession	<ul style="list-style-type: none"> <li>• Human Rights</li> <li>• Pharmacy Legislation</li> <li>• Quality control and drug analysis</li> <li>• Summer training</li> </ul>

3-1 Use the proper pharmaceutical and medical terms and abbreviations and symbols in pharmacy practice.	<b>[B1]</b> Use effectively the medical and pharmaceutical terminologies, medical abbreviations, idioms, suffixes and prefixes.	<ul style="list-style-type: none"> <li>• Biophysics</li> <li>• Cell Biology</li> <li>• English Language</li> <li>• Histology</li> <li>• Physiology</li> <li>• General Microbiology and Immunology</li> <li>• Clinical Microbiology</li> <li>• Pathophysiology</li> <li>• Community</li> <li>• Public health</li> <li>• Radiopharmaceuticals</li> <li>• Pharmacology II</li> <li>• Gastroenterology</li> <li>• Treatment of dermatological and reproductive diseases</li> <li>• Summer training</li> </ul>
3-2 Handle and dispose chemicals and pharmaceutical preparations safely	<b>[B2]</b> Handle and dispose chemical and pharmaceutical materials safely with application of good laboratory practice (GLP) principles	<ul style="list-style-type: none"> <li>• Physical and Inorganic Chemistry</li> <li>• Pharmacognosy-1</li> <li>• Pharmaceutical Analytical chemistry-1</li> <li>• Pharmaceutical Organic Chemistry-3</li> <li>• Pharmaceutical Analytical chemistry-2</li> <li>• Pharmacognosy-2</li> <li>• Biochemistry-1</li> <li>• Phytochemistry-1</li> <li>• Instrumental Analysis</li> <li>• General Microbiology and Immunology</li> <li>• Medicinal chemistry-1</li> <li>• Phytochemistry-2</li> <li>• Medicinal chemistry-2</li> <li>• Clinical pharmacy-1</li> <li>• Hospital pharmacy</li> <li>• Pharmaceutical biotechnology</li> <li>• Pharmaceutical microbiology</li> <li>• Radiopharmaceuticals</li> <li>• Phytotherapy</li> <li>• Quality control and drug analysis</li> <li>• Toxicology and forensic chemistry</li> <li>• Summer training</li> </ul>



3-3 Compound, dispense, label, store and distribute medicines effectively and safely	<b>[B3]</b> Use the chemical and the pharmaceutical materials properly either in drug manufacture, formulation, design, labeling, storing and distribution of medicinal agents with application of good manufacturing practice (GMP) principles.	<ul style="list-style-type: none"> <li>• Pharmaceutical Organic Chemistry-3</li> <li>• Pharmaceutical Dosage Form-2</li> <li>• Pharmaceutical technology</li> <li>• Hospital pharmacy</li> </ul>
3-4 Extract, isolate, synthesize, purify, identify, and/or standardize active substances from different origins.	<b>[B4]</b> Assess herbal drugs for the determination of drug adulteration, controlling the quality of produced medicinal agents, and discovering new drug entities.	<ul style="list-style-type: none"> <li>• Botany and Plant Taxonomy</li> <li>• Pharmacognosy-1</li> <li>• Pharmacognosy-2</li> <li>• Quality control of herbal drug</li> </ul>
	<b>[B5]</b> Apply different methods of analysis of raw materials, inorganic substances and medicinal.	<ul style="list-style-type: none"> <li>• Physical and Inorganic Chemistry</li> <li>• Pharmaceutical Analytical chemistry-1</li> <li>• Pharmaceutical Analytical chemistry-2</li> <li>• Instrumental Analysis</li> <li>• Quality control of herbal drugs</li> </ul>
	<b>[B6]</b> Detect, isolate, purify, and predict the method of synthesis of any chemical entity belonging to certain drug class	<ul style="list-style-type: none"> <li>• Pharmaceutical Organic Chemistry-1</li> <li>• Pharmaceutical Organic Chemistry-2</li> <li>• Biochemistry-1</li> <li>• Phytochemistry-1</li> <li>• Phytochemistry-2</li> </ul>

3-5 Select medicines based on understanding of etiology and pathophysiology of diseases	[B7] Select medicine in accordance with understanding of disease etiology and pathophysiology.	<ul style="list-style-type: none"> <li>• General Microbiology and Immunology</li> <li>• Pathophysiology</li> <li>• Public health</li> <li>• Pharmacology II</li> <li>• Clinical Nutrition</li> <li>• Clinical Pharmacology</li> <li>• Oncology</li> <li>• Therapeutics-1</li> <li>• Therapeutics-2</li> <li>• Treatment of cardiovascular diseases</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> <li>• Summer training</li> </ul>
3-6 Monitor and control microbial growth and carry out laboratory tests for identification of infectious and non-infectious diseases.	[B8] Monitor, safe handling of biological specimens and diagnosis of microbial and parasitic infections microscopically, biochemically and serologically.	<ul style="list-style-type: none"> <li>• Biochemistry-1</li> <li>• Parasitology</li> <li>• Biochemistry-2</li> <li>• Pathology</li> <li>• Clinical Nutrition</li> <li>• Oncology</li> <li>• Gastroenterology</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> <li>• Clinical pharmacy-2</li> <li>• Summer training</li> </ul>
3-7 Assess toxicity profiles of different xenobiotics and detect poisons in biological specimens	[B9] Assess toxicity profile , including diagnostic testing and poison detection in biological samples	<ul style="list-style-type: none"> <li>• Pharmaceutical biotechnology</li> <li>• Pharmacology II</li> <li>• Toxicology and forensic chemistry</li> </ul>
3-8 Apply techniques used in operating pharmaceutical equipment and instruments	[B10] Perform standard and/or industrial pharmaceutical instrumentation and laboratory procedures in quality control of pharmaceuticals.	<ul style="list-style-type: none"> <li>• Physical Pharmacy</li> <li>• Pharmaceutical technology</li> <li>• Summer training</li> </ul>

3-9 Maintain public awareness on rational use of drugs and social health hazards of drug abuse and misuse.	<b>[B11]</b> Apply the relevant knowledge to health care professionals and patients concerning awareness on rational use of drugs and social health hazards of drug abuse and misuse.	<ul style="list-style-type: none"> <li>• Clinical Microbiology</li> <li>• Pharmacology I</li> <li>• Quality control and drug analysis</li> <li>• Clinical pharmacy-2</li> <li>• Clinical Pharmacology</li> <li>• Treatment of respiratory system diseases</li> <li>• Summer training</li> </ul>
3-10 Advise patients and other health care professionals about safe and proper use of medicines	<b>[B12]</b> Apply the relevant knowledge to health care, social care professionals and patients for the safe and effective use of medicine.	<ul style="list-style-type: none"> <li>• Clinical Microbiology</li> <li>• Community</li> <li>• Pharmacology I</li> <li>• Clinical Nutrition</li> <li>• Gastroenterology</li> <li>• Treatment of cardiovascular diseases</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> </ul>
3-11 Conduct research studies and analyze the results	<b>[B13]</b> Construct research studies and analyze the results.	<ul style="list-style-type: none"> <li>• Histology</li> <li>• Phytochemistry-1</li> <li>• Medicinal chemistry-1</li> <li>• Pathophysiology</li> <li>• Phytochemistry-2</li> <li>• Medicinal chemistry-2</li> <li>• Pharmaceutical microbiology</li> <li>• Phytotherapy</li> <li>• Clinical pharmacokinetics</li> <li>• Therapeutics-1</li> <li>• Toxicology and forensic chemistry</li> <li>• Therapeutics-2</li> <li>• Treatment of dermatological and reproductive diseases</li> <li>• Treatment of respiratory system diseases</li> </ul>
3-12 Employ proper documentation and drug filing systems	<b>[B14]</b> Utilize excellent management of medicines focusing on clinical pharmacy, drug information, uses, adverse reactions, toxicity profiles, maximal and clinical effectiveness and clinical laboratory data.	<ul style="list-style-type: none"> <li>• Clinical pharmacy-2</li> <li>• Hospital pharmacy</li> <li>• Summer training</li> </ul>

Extra NARS	<b>[B15]</b> Handle experimental animals in laboratory settings for the purpose of using such skills in drug research and/or approval.	<ul style="list-style-type: none"> <li>• Pharmacology I</li> <li>• Pharmacology II</li> </ul>
	<b>[B16]</b> Perform different analytical tests for blood and body fluids to determine the functional state of different body organs	<ul style="list-style-type: none"> <li>• Clinical biochemistry</li> <li>• Dermatological and reproductive diseases</li> </ul>
4-1 Apply pharmaceutical knowledge in the formulation of safe and effective medicines as well as in dealing with new drug delivery systems.	<b>[C1]</b> Apply the knowledge of pharmaceutical sciences (safe and effective medicine, new drug delivery system), in practice settings.	<ul style="list-style-type: none"> <li>• Pharmaceutical Dosage Form-1</li> <li>• Pharmacy Legislation</li> <li>• Clinical Microbiology</li> <li>• Pharmaceutical Dosage Form-2</li> <li>• Clinical pharmacy-1</li> <li>• Hospital pharmacy</li> <li>• Cosmetic</li> <li>• Community pharmacy</li> <li>• Drug marketing</li> <li>• Clinical Nutrition</li> <li>• Treatment of pediatrics diseases</li> <li>• Summer training</li> </ul>
4-2 Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice	<b>[C2]</b> Comprehend and apply good laboratory practice (GLP), good storing practice (GPMP), and good clinical practice (GSP) and good clinical practice (GCP) guidelines in pharmacy practice.	<ul style="list-style-type: none"> <li>• Botany and Medicinal Plants</li> <li>• Pharmacognosy-1</li> <li>• Clinical Microbiology</li> <li>• Quality control of herbal drugs</li> <li>• Clinical biochemistry</li> <li>• Clinical pharmacy 2</li> <li>• Summer training</li> </ul>

4-3 Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations	[C3] Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations.	<ul style="list-style-type: none"> <li>• Physical and Inorganic Chemistry</li> <li>• Pharmaceutical Analytical chemistry-1</li> <li>• Pharmaceutical Analytical chemistry-2</li> <li>• Pharmacognosy-2</li> <li>• Biochemistry-1</li> <li>• Phytochemistry-1</li> <li>• Instrumental Analysis</li> <li>• Biochemistry-2</li> <li>• Medicinal chemistry-1</li> <li>• Phytochemistry-2</li> <li>• Medicinal chemistry-2</li> <li>• Pharmaceutical technology</li> <li>• Quality control of herbal drugs</li> <li>• Pharmaceutical biotechnology</li> <li>• Clinical biochemistry</li> <li>• Clinical Pharmacology</li> </ul>
4-4 Recognize and control possible physical and/or chemical incompatibilities that may occur during drug dispensing	[C4] Solve problems concerning incompatibilities during drug dispensing	<ul style="list-style-type: none"> <li>• Pharmaceutical Dosage Form-1</li> <li>• Community pharmacy</li> <li>• Controlled drug delivery</li> <li>• Hospital pharmacy</li> <li>• Clinical pharmacy 2</li> <li>• Clinical Pharmacology</li> </ul>
4-5 Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	[C5] apply the proper analytical procedures for the standardization of any chemical entity.	<ul style="list-style-type: none"> <li>• Instrumental Analysis</li> <li>• Quality control of herbal drugs</li> </ul>
	[C6] Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins	<ul style="list-style-type: none"> <li>• Pharmaceutical Organic Chemistry-1</li> <li>• Botany and Medicinal Plants</li> <li>• Pharmaceutical Organic Chemistry-2</li> <li>• Pharmacognosy-1</li> <li>• Physical Pharmacy</li> <li>• Pharmaceutical Analytical chemistry-1</li> <li>• Pharmaceutical Organic Chemistry-3</li> <li>• Biochemistry-1</li> <li>• Phytochemistry-1</li> <li>• Phytochemistry-2</li> </ul>

4-6 Apply the principles of bio-informatics and computer-aided tools in drug design	[C7] Apply the principles of bio-informatics and computer-aided tools in drug design.	<ul style="list-style-type: none"> <li>• Medicinal chemistry 1</li> <li>• Medicinal chemistry 2</li> </ul>
4-7 Apply various principles to determine the characteristics of biopharmaceutical products	[C8] Apply different genetic molecular techniques to produce and improve biopharmaceutical products from living organisms.	<ul style="list-style-type: none"> <li>• Pharmaceutical microbiology</li> <li>• Phytotherapy</li> </ul>
4-8 Select and assess appropriate methods of infection control to prevent infections and promote public health.	[C9] Assess and select the most appropriate method for infection control.  [C10] Employ the knowledge concerning different microbial and parasitic diseases for promotion of community health.	<ul style="list-style-type: none"> <li>• Parasitology</li> <li>• Clinical Microbiology</li> <li>• Summer training</li> </ul>
4-9 Utilize the pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	[C11] Integrate and link the knowledge of physiology, pharmacology, and toxicology in the proper selection and use of drug in various disease conditions.	<ul style="list-style-type: none"> <li>• Biophysics</li> <li>• Pathophysiology</li> <li>• Drug interaction</li> <li>• Pharmacology II</li> <li>• Clinical Nutrition</li> <li>• Clinical Pharmacology</li> <li>• Therapeutics-1</li> <li>• Therapeutics-2</li> <li>• Summer training</li> </ul>

4-10 Calculate and adjust dosage and dose regimen of medications	[C12] Calculate and adjust dosage and dose regimen of medications as well as interpretation, compounding and dispensing of prescriptions	<ul style="list-style-type: none"> <li>• Biopharmaceutics &amp; pharmacokinetics</li> <li>• Community pharmacy practice</li> <li>• Pharmaceutical dosage forms 1</li> <li>• Pharmaceutical dosage forms 2</li> <li>• Summer training</li> </ul>
4-11 Assess drug interactions, ADRs and pharmacovigilance.	[C13] Apply and utilize the knowledge of, pharmacology, and toxicology in the assessment of drug-drug, drug-food, drug-smoking and drug-environment interaction, and in the proper selection and use of drug in various disease conditions.	<ul style="list-style-type: none"> <li>• Drug interaction</li> <li>• Clinical Pharmacology</li> <li>• Therapeutics-1</li> <li>• Toxicology and forensic chemistry</li> <li>• Therapeutics-2</li> <li>• Summer training</li> </ul>
4-12 Apply the principles of pharmacoeconomics in promoting cost/effective pharmacotherapy	[C14] Use principles of pharmacoeconomics and marketing information for promoting cost/effective pharmacotherapy.	<ul style="list-style-type: none"> <li>• Business administration</li> <li>• Pharmaceutical analysis and Quality control</li> <li>• Drug information</li> <li>• Summer training</li> </ul>

<p>4-13 Analyze and interpret experimental results as well as published literature</p>	<p><b>[C15]</b> Analyze and interpret information needed in pharmacy practice supporting the decision making concerning health promotion, disease prevention and encouraging self-care.</p>	<ul style="list-style-type: none"> <li>• Anatomy</li> <li>• Biochemistry-1</li> <li>• Phytochemistry-1</li> <li>• General Microbiology and Immunology</li> <li>• Biochemistry-2</li> <li>• Clinical Microbiology</li> <li>• Pathology</li> <li>• Clinical biochemistry</li> <li>• Clinical pharmacy 2</li> <li>• Clinical Pharmacology</li> <li>• Oncology</li> <li>• Gastroenterology</li> <li>• Treatment of cardiovascular diseases</li> <li>• Dermatological and reproductive diseases</li> <li>• Treatment of respiratory system diseases</li> <li>• Summer training</li> </ul>
<p>4-14 Analyze and evaluate evidence-based information needed in pharmacy practice.</p>	<p><b>[C16]</b> Use the information needed in pharmacy practice, giving clear advice and critical decisions about patient's state, in co-operation with other health team professionals.</p>	<ul style="list-style-type: none"> <li>• Cell Biology</li> <li>• Histology</li> <li>• Biochemistry-1</li> <li>• General Microbiology and Immunology</li> <li>• Pathophysiology</li> <li>• Pathology</li> <li>• First aids</li> <li>• Pharmaceutical biotechnology</li> <li>• Public health</li> <li>• Clinical biochemistry</li> <li>• Clinical pharmacy 2</li> <li>• Pharmacology II</li> <li>• Phytotherapy</li> <li>• Oncology</li> <li>• Clinical pharmacokinetics</li> <li>• Toxicology and forensic chemistry</li> <li>• Gastroenterology</li> <li>• Treatment of cardiovascular diseases</li> <li>• Dermatological and reproductive diseases</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> <li>• Summer training</li> </ul>



5-1 Communicate clearly by verbal and written means	[D1] Interact effectively with patients, the public and health care professionals, either by writing or orally.	<ul style="list-style-type: none"> <li>• English Language</li> <li>• Phytochemistry-1</li> <li>• Instrumental Analysis</li> <li>• General Microbiology and Immunology</li> <li>• Clinical Microbiology</li> <li>• Pathophysiology</li> <li>• Community</li> <li>• Pathology</li> <li>• Pharmaceutical biotechnology</li> <li>• Public health</li> <li>• Clinical biochemistry</li> <li>• Clinical pharmacy 2</li> <li>• Pharmacology II</li> <li>• Clinical Nutrition</li> <li>• Clinical Pharmacology</li> <li>• Sociology</li> <li>• Therapeutics-1</li> <li>• Drug information</li> <li>• Therapeutics-2</li> <li>• Treatment of cardiovascular diseases</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> <li>• Summer training</li> </ul>
5-2 Retrieve and evaluate information from different sources to improve professional competencies	[D2] Perform online computer search to develop information technology skills and knowing how to retrieve information from a variety of sources.	<ul style="list-style-type: none"> <li>• Mathematic and Statistics</li> <li>• Biochemistry-1</li> <li>• General Microbiology and Immunology</li> <li>• Clinical Microbiology</li> <li>• Pathophysiology</li> <li>• Pathology</li> <li>• Quality control of herbal drugs</li> <li>• Trauma &amp; first aids</li> <li>• Clinical biochemistry</li> <li>• Toxicology and forensic chemistry</li> <li>• Dermatological and reproductive diseases</li> <li>• Treatment of respiratory system diseases</li> <li>• Summer training</li> </ul>

5-3 Work effectively in a team	[D3] Implement tasks as a member of a team.	<ul style="list-style-type: none"> <li>• Physical and Inorganic Chemistry</li> <li>• Botany and Medicinal Plants</li> <li>• Pharmacognosy-1</li> <li>• Pharmaceutical Analytical chemistry-1</li> <li>• Pharmaceutical Organic Chemistry-3</li> <li>• Pharmaceutical Analytical chemistry-2</li> <li>• Pharmacognosy-2</li> <li>• Physiology</li> <li>• Medical terminology</li> <li>• Psychology</li> <li>• Biochemistry-1</li> <li>• Phytochemistry-1</li> <li>• General Microbiology and Immunology</li> <li>• Parasitology</li> <li>• Biochemistry-2</li> <li>• Clinical Microbiology</li> <li>• Pharmaceutical Dosage Form-2</li> <li>• Pathophysiology</li> <li>• Phytochemistry-2</li> <li>• Quality control of herbal drugs</li> <li>• Pharmaceutical biotechnology</li> <li>• Clinical biochemistry</li> <li>• Clinical Nutrition</li> <li>• Clinical Pharmacology</li> <li>• Oncology</li> <li>• Sociology</li> <li>• Toxicology and forensic chemistry</li> <li>• Gastroenterology</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> <li>• Summer training</li> </ul>
5-4 Use numeracy, calculation and statistical methods as well as information technology tools	[D4] Apply biological statistics in different fields of pharmacy, also use math and statistics methods including differentiation, exponential, logarithmic, and trigonometric functions and integration in pharmacy practice.	<ul style="list-style-type: none"> <li>• Biopharmaceutics &amp; pharmacokinetics</li> <li>• Hospital pharmacy</li> <li>• Mathematics</li> <li>• Radiopharmaceuticals</li> <li>• Drug marketing</li> <li>• Summer training</li> </ul>

	<b>[D5]</b> Practice major applications of software, such as; word, spreadsheets, database, presentations, graphics and internet.	<ul style="list-style-type: none"> <li>Physical Pharmacy</li> <li>Pharmacognosy-2</li> <li>Biochemistry-1</li> <li>Clinical Pharmacology</li> <li>Toxicology and forensic chemistry</li> </ul>
5-5 Practice independent learning needed for continuous professional development	<b>[D6]</b> Stay up-to-date with the recent pharmaceutical findings and development in pharmacy profession through independent lifelong continuing education.	<ul style="list-style-type: none"> <li>Physical and Inorganic Chemistry</li> <li>Pathophysiology</li> <li>Clinical pharmacy 2</li> <li>Cosmetic</li> <li>Pharmacology II</li> <li>Clinical Nutrition</li> <li>Clinical Pharmacology</li> <li>Oncology</li> <li>Gastroenterology</li> <li>Treatment of pediatrics diseases</li> <li>Treatment of respiratory system diseases</li> <li>Summer training</li> </ul>
5-6 Adopt ethical, legal and safety guidelines	<b>[D7]</b> Adopt ethical, legal and safety guidelines	<ul style="list-style-type: none"> <li>Pharmaceutical Analytical chemistry-1</li> <li>Instrumental Analysis</li> <li>General Microbiology and Immunology</li> <li>Clinical Microbiology</li> <li>Clinical pharmacy-1</li> <li>Sociology</li> <li>Treatment of respiratory system diseases</li> <li>Summer training</li> </ul>
5-7 Develop financial, sales and market management skills	<b>[D8]</b> Develop management skills including financial sales and marketing.	<ul style="list-style-type: none"> <li>Drug marketing</li> <li>Business administration</li> <li>Summer training</li> </ul>
5-8 Demonstrate creativity and time management abilities	<b>[D9]</b> Manage time as evidenced by the ability to plan and implement efficient mode of working.	<ul style="list-style-type: none"> <li>Physical and Inorganic Chemistry</li> <li>Pharmaceutical Organic Chemistry-1</li> <li>Botany and Medicinal Plants</li> <li>Pharmaceutical Organic Chemistry-2</li> <li>Pharmacognosy-1</li> <li>Pharmaceutical Analytical chemistry-1</li> <li>Pharmaceutical Analytical chemistry-2</li> <li>Pharmacognosy-2</li> <li>Physiology</li> <li>Biochemistry-1</li> <li>Instrumental Analysis</li> <li>Summer training</li> </ul>

<p>5-9 Implement writing and presentation skills</p>	<p>[D10] Present various information and arguments clearly and correctly either by writing or orally.</p>	<ul style="list-style-type: none"> <li>• Botany and Medicinal Plants</li> <li>• Cell Biology</li> <li>• Histology</li> <li>• Pharmacognosy-1</li> <li>• Anatomy</li> <li>• Physiology</li> <li>• Biochemistry-1</li> <li>• Phytochemistry-1</li> <li>• Instrumental Analysis</li> <li>• General Microbiology and Immunology</li> <li>• Biochemistry-2</li> <li>• Clinical Microbiology</li> <li>• Medicinal chemistry-1</li> <li>• Pathophysiology</li> <li>• Phytochemistry-2</li> <li>• Medicinal chemistry-2</li> <li>• Pathology</li> <li>• Trauma &amp; first aids</li> <li>• Clinical biochemistry</li> <li>• Clinical Nutrition</li> <li>• Clinical Pharmacology</li> <li>• Oncology</li> <li>• Therapeutics-1</li> <li>• Toxicology and forensic chemistry</li> <li>• Drug information</li> <li>• Gastroenterology</li> <li>• Therapeutics-2</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> <li>• Summer training</li> </ul>
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<p>5-10 Demonstrate critical thinking, problem-solving and decision-making abilities</p>	<p>[D11] Develop critical thinking, problem solving and decision making skills.</p>	<ul style="list-style-type: none"> <li>• Pharmaceutical Organic Chemistry-1</li> <li>• Biophysics</li> <li>• Cell Biology</li> <li>• Histology</li> <li>• Pharmaceutical Organic Chemistry-2</li> <li>• Pharmaceutical Organic Chemistry-3</li> <li>• Physiology</li> <li>• Biochemistry-1</li> <li>• Phytochemistry-1</li> <li>• Parasitology</li> <li>• Pharmaceutical Dosage Form-1</li> <li>• Pharmacy Legislation</li> <li>• Pharmaceutical Dosage Form-2</li> <li>• Pathophysiology</li> <li>• Business administration</li> <li>• Phytochemistry-2</li> <li>• Biopharmaceutics &amp; pharmacokinetics</li> <li>• Community</li> <li>• Pathology</li> <li>• Pharmaceutical technology</li> <li>• Quality control of herbal drugs</li> <li>• Hospital pharmacy</li> <li>• Pharmaceutical biotechnology</li> <li>• Clinical biochemistry</li> <li>• Clinical pharmacy 2</li> <li>• Drug interaction</li> <li>• Drug marketing</li> <li>• Pharmacology II</li> <li>• Clinical Nutrition</li> <li>• Oncology</li> <li>• Clinical pharmacokinetics</li> <li>• Sociology</li> <li>• Toxicology and forensic chemistry</li> <li>• Gastroenterology</li> <li>• Treatment of cardiovascular diseases</li> <li>• Dermatological and reproductive diseases</li> <li>• Treatment of pediatrics diseases</li> <li>• Treatment of respiratory system diseases</li> <li>• Summer training</li> </ul>
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- A : Knowledge and understanding.  
 B : Intellectual skills.  
 C : Professional and practical skills.  
 D : General and transferable skills.

• **Strong points:**

1. All National Academic References Standards (NARS/2009) are covered by the courses
2. Presence of qualified staff members of different specialties

3. Continuous students assessment is conducted through midterm exam in the 7th week of the semester
4. The courses contents are regularly reviewed by the course instructors and updated according to the latest updates in pharmacy and external reviewers comments
5. Different teaching methods are used e.g. lectures, demonstration within labs, practical experiments, demonstrative videos and case studies
6. Some skills are developed through the courses activities such as problem-solving, presentation skills, time management, team work and others
7. Presence of 300 hours dedicated for summer training which is divided into two phases, phase 1 (200 contact hours in any pharmacy setting) and phase 2 (100 contact hours of clinical rotations in University Hospital)

**Measures done to ensure achievement of program aims:**

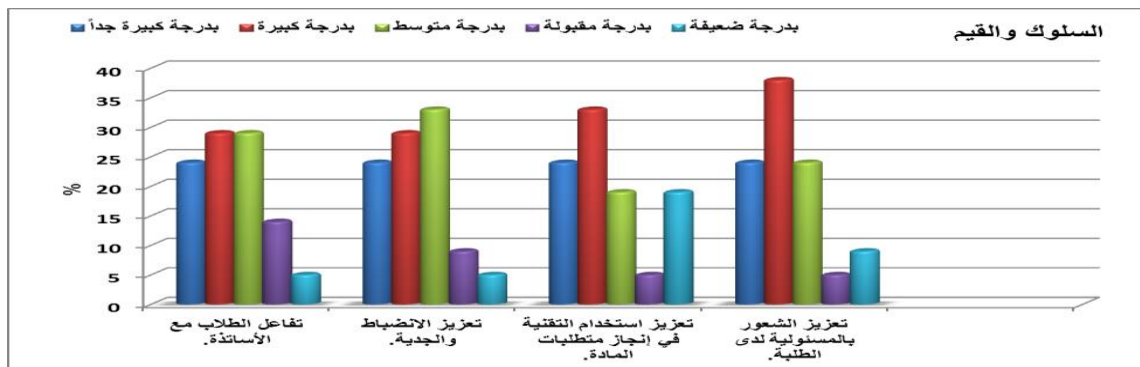
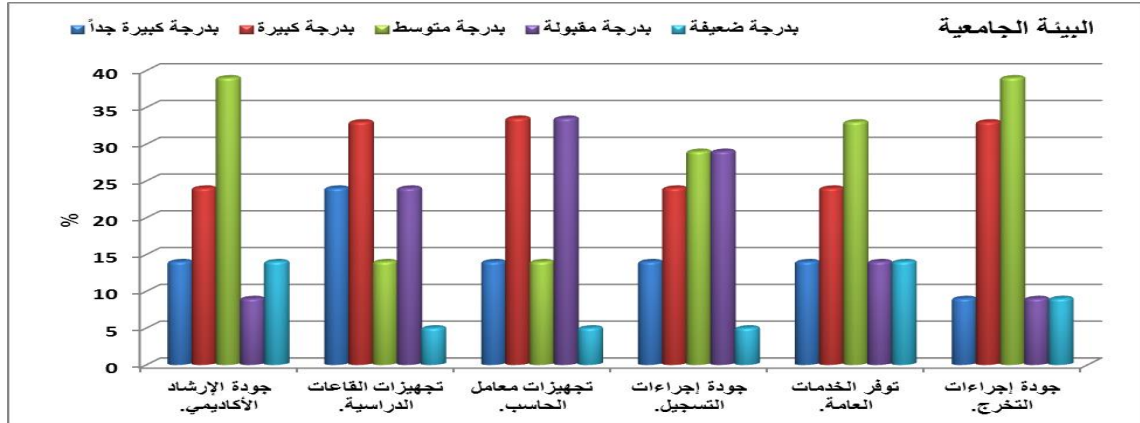
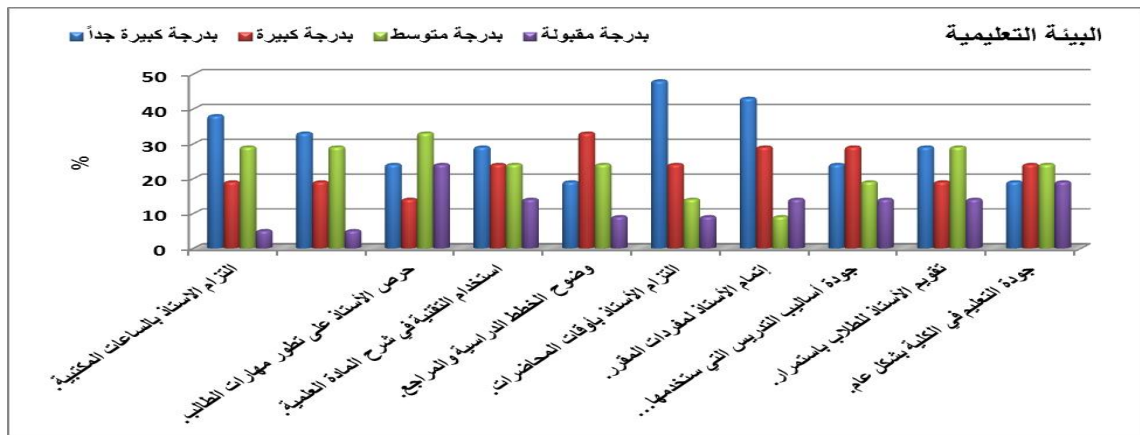
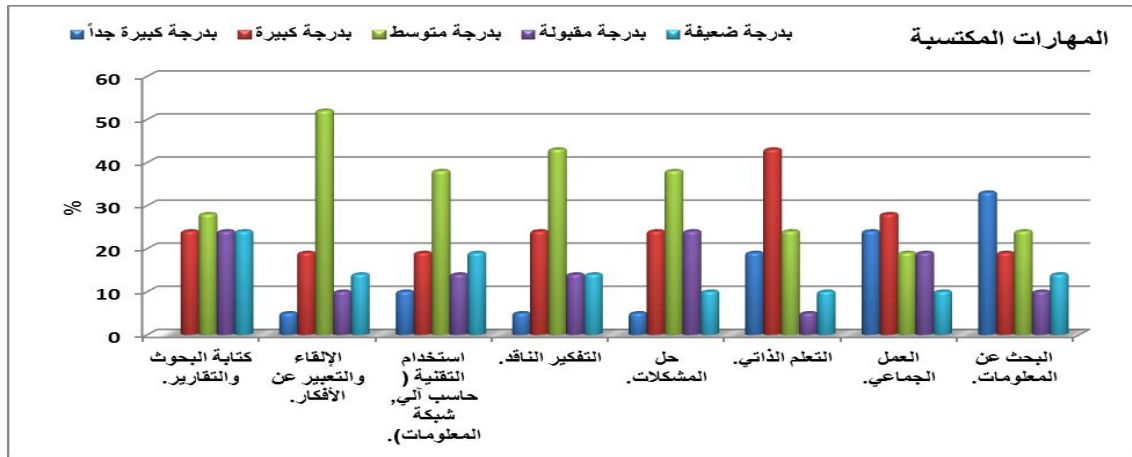
Achievement of program aim and objectives is assured through:

**A.** Analysis of students results (course reports, statistics in section B of program report) which showed reasonable distribution of marks in individual courses as well as high program completion rate and pass rates (> 90%).

<b>Academic year</b>	<b>pass No</b>	<b>Fail No</b>	<b>Pass rates</b>
<b>2018-2019</b>	185	3	99%
<b>2017 - 2018</b>	125	0	100 %
<b>2016 - 2017</b>	146	39	79 %

**B. Graduates Satisfaction about the program:**

- **Regarding university environment:** Students were unsatisfied about computer and class facilities as well as registration process.



**Fig. 3: Graduates satisfaction about the quality of clinical pharmacy program**

### **C. Employer satisfaction about the quality of graduates: (6 responses)**

Stakeholders were surveyed about the quality of the graduates, generally they were satisfied about the different items of the survey but they recommended to give more interest on Therapeutic and pharmacy practice courses.

## **2. Students evaluation to measure extent of ILOs achievement**

### *Student Assessment Methods*

<b>ILOs</b>	<b>Method of achievement and assessment</b>
Knowledge and Understanding Intellectual Skills	Written and oral Exam
Professional and practical Skills Intellectual Skills	Practical Exam Summer Training
Intellectual Skills	Oral Exam
General and Transferable Skills	Team Work Assignment

## **3. Quality of learning opportunities**

### **A-Quality of Teaching and Learning:**

The impellers of the faculty teaching and learning strategy are based on:

1. Availability of appropriate learning environment through presence of good seated, air conditioned classrooms and equipped with the required audio-visual aids. Laboratories are sufficiently equipped with the required instruments and chemicals necessary for conduction of the practical lessons.
2. The students are divided into small groups (60 students/ group) to facilitate active & interactive learning
3. Availability of learning resources through the preparation of course notes by staff members. In addition to, availability of the faculty library with a tremendous and diverse text books and references.



4. Flexibility of the lecture and exams schedules which are based on students' opinion
5. Availability of the staff members through office hours which are known to the students.
6. Development of staff members' skills regarding teaching and assessment through arranging different training programs
7. Continuous updating and reviewing courses.
8. Development of different skills necessary for the future career such as problem solving, presentation, team work and time management through different course activities.
9. Encouraging outstanding students: Faculty offers free or discount from tuition fees for the highest cGPA students (the first three students). The highest score graduate is employed as a demonstrator in the faculty. In addition, the faculty arranges a ceremony to appreciate the outstanding students in different levels of the program.
10. Field training: There is an agreement with Zagazig university hospital for student training (100 hours divided into different eight clinical rotations) after Level 4. In addition to, 200 hours in any pharmacy setting after 3<sup>rd</sup> Level.
11. Use interactive teaching methods such as: case study, problem solving, demonstrative videos followed by group discussion.

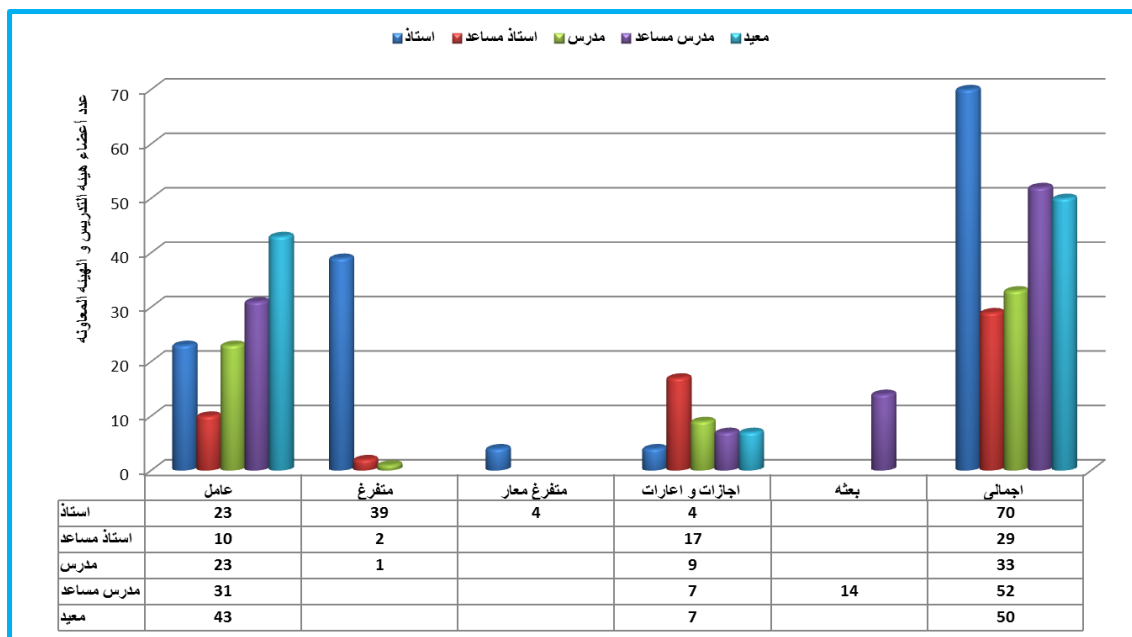
#### **B- Effectiveness of Student Support Systems:**

- The faculty implements the academic mentoring system. In which students are divided into groups (25 – 30 students) guided by one teaching staff who advises the students about the selection of courses during the registration , guarantee effective communication, identify student weakness points and help them to overcome obstacles they face during their learning journey. In addition they encourage distinguished students to maintain superiority.

- Each staff member has assigned 4 office hours/ week for effective communication with the students. Office hours are announced at the beginning of each semester to the students.
- Arrangement of an orientation day for the newly admitted students in addition to availability of the student handbook.
- The main student support is offered by the Youth Welfare Office, in collaboration with the Vice-Dean of Educational and Students' Affairs. Several social, sports, scientific, artistic & cultural activities are conducted every year.
- Students' Union is selected by elections/nominations program. Its activity is mainly social, cultural, scientific, sports and recreational. They act as a strong link between students and faculty administration. This union also works to defend students' rights and find solutions for student problems.
- All students are covered by health insurance in the different university hospitals with unlimited coverage
- Students relocation from and to the faculty depends on the geographical distribution and the student level. Students relocation is forbidden if the student had finished studying more than 50% of the program credit hours.

### **C. Learning Resources:**

#### **I. Number and ratio of Faculty members and their assistants to students:**



**Fig. 6: Total number of teaching staff members and assistants (2018-2019).**

Teaching staff/assistants	No. of faculty members and Teaching assistants	No. of Students	Staff / students ratio
Pharmacy teaching staff	98	1199	1:12
Pharmacy+ external teaching staff	123		1:10
Assistants	74		1:16

## **II. Adequacy of the specialties of the faculty members to the requirements of the program:**

The specialties of the faculty members of all departments are adequate for the requirements of the program. Each department teaches courses relevant to its own specialty. In addition to presence of staff members from the Faculty of Medicine, Commerce, Science, Law and Education to teach medical, social and behavioral courses.

Since pharmacy practice department is a newly established department and it has 3 assistant lecturers + 5 demonstrators, staff members from faculty of medicine are selected to teach pharmacy practice courses. In addition, departments of pharmacology and pharmaceuticals participate in

teaching some courses such as: hospital pharmacy, community pharmacy, clinical pharmacokinetics, drug information, clinical pharmacy 1,2.

### **III. Availability and adequacy of program handbook.**

In fact, an electronic program handbook is available for students (all levels) containing courses intended learning outcomes and assessment methods as well. Likewise, a student guide was available in the students affairs and youth care office, describing the infra structure of the college, structure and location of each department, faculty members, faculty utilities, admission policies, student support system as well as the different faculty activities and achievements.

### **IV. Adequacy of library facilities.**

#### **The Library Facilities;**

##### **Library Halls**

A-The Library is located at the third floor in the administration building.

The space is around 283 m<sup>2</sup>, divided into 4 halls:

- i- The largest hall (96 m<sup>2</sup>) is allocated for undergraduate students
- ii- The faculty and staff hall (periodical and thesis)
- iii- One room for photocopying.
- iv- One room for internet service (electronic library).

#### **The Library Facilities:**

Library is provided with:

- i-12 tables and 139 seats with adequate illumination and air conditions.
- ii- Two photocopying machines, one scanner.
- iii- 30 computers with 11 printers.

**Working hours:** The library opens from 9 a.m. to 4 p.m. daily during semester's time and from 9 a.m. to 2 p.m. on Saturday.

**Library collection:** The library contains:

- i- Almost 6355 English and 2264 Arabic textbooks in different specialties of pharmacy.

ii- 68 periodicals, 5666 English volumes and 400 Arabic issues.

iii- 1081 Master and PhD thesis

### **Library services**

#### **1-Photocopying**

There is a photocopying unit available for all the students.

#### **2-Internet services**

The internet facility is introduced and available for students. E-library is connected to Zagazig university library, other Egyptian libraries and international scientific research engines e.g. research gate.

Evaluation of library services by both staff members and students revealed about 80 – 100% satisfaction

### **The library budget**

	2016-2017	2017-2018	2018-2019
<b>Budget in Egyptian pounds</b>	18,000	26,000	16.000

### **V. Laboratories and teaching halls:**

- i- Each department has a number of laboratories (Total = 25) that are equipped with the necessary equipment, glassware and chemicals suitable for conducting the practical sessions of each department.
- ii- The infrastructure of each laboratory is suitable, the area capacity about 126 square meters; each lab. is provided with 4 - 7 working benches; six large windows; 3 - 5 vacuum ventilation fans; two sets of fire extinguisher and first aid kit.
- iii- The average number of students per lab is 30-40.
- iv- The faculty has 8 air-conditioned classrooms, well seated, lighted and aeriated. They are equipped with data shows and sound systems.

### **VI. Educational Pharmacy:**

- The faculty has one educational pharmacy of 25 students capacity, equipped with a refrigerator, white board and a data show. The pharmacy

has samples of all groups of medicines, supplies and large volume parenterals. It is used in teaching community pharmacy course.

#### **VII. Adequacy of computer facilities:**

- The faculty has an e-library containing 30 computers with 13 printers.
- The faculty is about to establish a drug design lab
- The faculty is planning to establish a computer lab to be used for the practical sessions of Information Technology course.

#### **VIII. Adequacy of Field / Practical Training Resources.**

As mentioned before, the structure of the program includes mandatory 300 hours summer training divided into two phases. Phase 1: After 3rd Level, the student spends 200 hour in any pharmacy setting. Phase 2: After 4th Level, the student spends 100 hours divided into 8 clinical rotations.

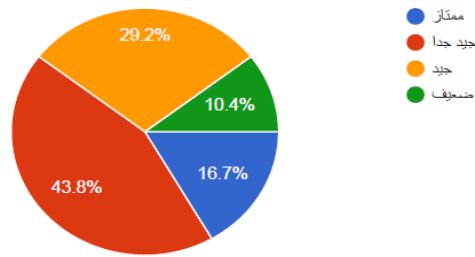
The faculty had an agreement with Zagazig University Hospital to facilitate the training process. The training is conducted under the faculty supervision and there are measures taken to insure its value and effectiveness such as attendance regulations, daily activities within the hospital , evaluation of student performance and student feedback about the training process.

Student survey about the efficiency of summer training: 48 responses

- Generally, they are satisfied about the training process in the hospital
- They are highly satisfied about: oncology, cardiology, ICU, Pediatric rotations
- They are unsatisfied about: dermatology, gastroenterology rotations
- They recommended increase the number of cases discussed, extend the training duration, decrease the number of students in each rotation

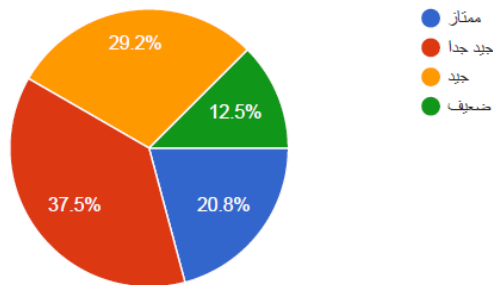
مدى الاستفادة من التدريب في المستشفيات الجامعية بشكل عام

48 رداً



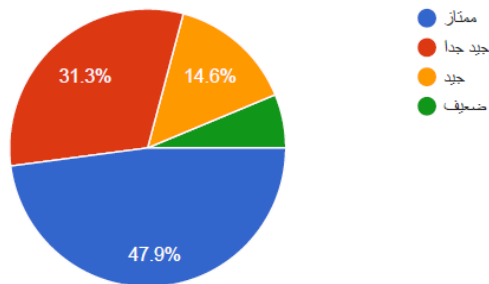
مدى الاستفادة من التدريب في المستشفيات الجامعية في اكتساب مهارات مهنية مستقبلية

48 رداً



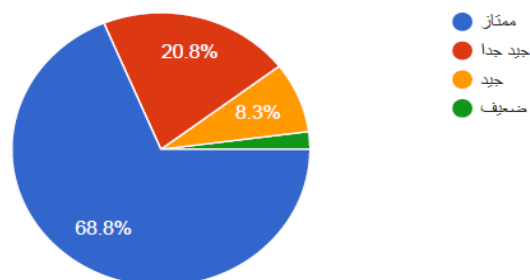
مدى تعاون أعضاء هيئة التدريس في التدريب

48 رداً



مدى تعاون الصيادلة الاكلينكيين في مستشفيات جامعة الزقازيق في التدريب

48 رداً



### **3. Quality Management.**

#### **a. Availability of regular evaluation and revision system for the program:**

Program evaluation systems include the following:

- 1-External evaluation for program
- 2-Internal evaluation for program

<b>Comment of internal evaluator</b>	<b>Comment of external evaluator</b>
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<ul style="list-style-type: none"> <li>• The program is in compliance with the faculty's mission and NARS.</li> <li>• The program goals are compatible with the graduate attributes and the job market needs.</li> <li>• Program and course specifications are in accordance with available job opportunities locally and regionally.</li> <li>• The absolute necessity of increasing pharmacy practice courses at the expense of pharmacognosy, medicinal plants and organic chemistry courses that are overrepresented in comparison with many International universities.</li> <li>• There is no practical specification of the research project.</li> </ul>	<ul style="list-style-type: none"> <li>• The program aims are defined and are in compliance with the faculty mission</li> <li>• The program ILOs are in compliance with the program aims and are covered through the courses</li> <li>• A4, A29 should be rephrased as they express higher level than knowledge</li> <li>• B16 expresses only knowledge, B20 is related to general skills not professional skills</li> <li>• The % of pharmaceutical sciences is less than required by NAQAAE</li> <li>• Application of modern teaching methods to achieve the required competencies 2017. As well as modern assessment such as OSCE and student portfolio</li> <li>• Addition of new courses such as entrepreneurship, bioinformatics to fulfil NARs 2017</li> </ul>
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3- Curriculum committee headed by the Vice-Dean for education and students affairs, and includes different departments' representatives in addition to the director of quality unit.

The committee demonstrated the following achievements:

- Revision of the program specification, according to the newly published NARs, 2017 for pharmacy education and preparation of a gap analysis study.

4- Evaluation by stakeholders: graduates and employers (results of surveys are mentioned earlier)

5-Evaluation by customers (students)

- **Program was evaluated by 5<sup>th</sup> year students, they recommended:** revision and update of the program and remove any repetition in courses, put strategies to overcome student absence in lectures, clinical rotations after 5<sup>th</sup> year
- **Courses were evaluated by the students, they complained from:** the unavailability of microscopes in pharmacognosy and microbiology labs, large content of some courses such as Medicinal chemistry 2, pharmaceuticals 4. **They were highly satisfied about:** Medicinal chemistry 4 as it encourage self learning **They recommended:** use simulation labs in pharmacology instead of animal handling.

#### **b- Effectiveness of the system.**

*Measures done to sustain the effectiveness of the system:*

- Training sessions are regularly held to enhance the faculty potentials to apply new teaching and assessment strategies that would encourage developing higher skills and maintain life long education.
- Development and maintenance of the infrastructure of the faculty to meet the steadily increasing number of students.

#### **c-Effectiveness of Faculty and University Laws and Regulations for Progression and Completion.**

- The faculty has clear laws and regulations for progression and completion stated in the Bylaws and Regulations for Undergraduate Students, which conforms to the university regulations. Any changes in structure of the program contents should be approved by the Clinical Pharmacy Program Committee, then approved by the

Faculty Council then approved by the University Council and get final approval by the Higher Committee of Pharmacy Education.

- The system effectively supports the students in every year and levels in a manner that fairly facilitates the progression and completion of the degree.
- Administrative and academic leader members apply the rules regarding student attendance percentage and staff member performance (course specification, and report).

#### **d. Faculty Response to Students and External Evaluations|:**

- The faculty is continuously enhancing and developing the teaching aids by introducing and installing several data shows, computers, maintenance of microscopes and ordered more microscopes (under processing).
- The faculty has already connected the internet to the different departments and the library to facilitate using search engines during the practical and theoretical sessions.
- The faculty is preparing a new program (Bachelor of pharmacy, PharmD, clinical pharmacy) that will be implemented by 2019-2020.
- Pharmacology department established a simulation lab.

#### **4. Proposals for Programme Development.**

Responding to:

- a. external reviewer comments
- b. Study of a gap analysis between academic standards 2017 for pharmacy education issued by NAQAAE and the program outcomes
- c. Employer comments regarding students clinical knowledge and skills as well as students and graduates surveys.

The faculty administration decided to shift to Pharm D (Clinical pharmacy) credit hours program that will include:

- Study duration = 5 + 1 (one year of training)
- add 4 elective courses instead of two courses

- The program will have 5 non- professional courses (7credit hours) to enhance student skills: Information Technology, Mathematics, Scientific Writing and Communication Skills, Scientific Writing and Communication Skills, Marketing & Pharmacoeconomics
- Add some new courses: Professional Practice, Clinical Research and Pharmacovigilance, Bioinformatics
- Add graduation research project in the 6<sup>th</sup> year to develop students research skills.

## **5. Staff development requirements**

### ***1- Studying Staff training needs results in the followings:***

- Writing Learning outcomes
- Strategic planning
- Interactive teaching methods
- Communication skills
- Management and leader skills
- Critical Thinking skills
- Preparation of Course specification and report

### ***2- List of attended workshops by the staff members and assistants during 2018 – 2019:***

<b>Workshop</b>	<b>Number of attendees</b>
Time and Meetings management	5
International Publishing of Scientific Researches	25
Using Technology in Education	7
Strategic planning	7
Credit hours	5
How to launch a research project	5
Quality management in healthcare	1
Communication skills in teaching	10
Exam systems and students evaluation	6

Creative Thinking skills	2
Decision making and problem solving	2
Management and organization of scientific conferences	1
Crisis management	2
Effective academic writing by nature research academics, <b>National training institute, Cairo</b>	1
Clinical pharmacogenomics research internship, Aquilante lab, <b>Skaggs school of pharmacy and pharmaceutical sciences, university of Colorado, Denver, Anschutz medical campus, USA</b>	2
Quality in research: from research topic identification to publishing, <b>National training institute, Cairo</b>	1
Statistical analysis (SPSS)	10
Critical appraisal	3
Scientific Writing and Reference Management by " Endnote"	19
MI-CIT, Online ( E-learning ) by MKCL	8
Basics of bioinformatics	6
Ethics of scientific research	9
Manage a research team	2
Effective presentation skills	8
financial and law aspects in university	1

## **6. Action plan:**

<b>Action</b>	<b>Person responsible</b>	<b>Completion date</b>
Revision and update of the program	<ul style="list-style-type: none"> <li>• Vice dean for education and students affairs</li> <li>• Quality unit</li> <li>• Staff members</li> </ul>	beginning of the academic year 2019-2020
Professional training for staff members	<ul style="list-style-type: none"> <li>• Quality unit</li> </ul>	Annual

	• FLDP center in Zagazig university	
Revision of course specifications and course reports	• Quality unit	Annual
Program evaluation by different stakeholders: graduates & employers	• Quality unit	Annual
Development of soft skills required for future career in students through Organization of the first career guidance	Faculty administration	2019-2020
increase the number of microscopes in pharmacognosy and microbiology laboratories	Faculty administration	2019-2020
Establishment of simulation lab in pharmacology department	Faculty administration Pharmacology department	2019-2020

## **Appendix 1**

The following is the programme structure, previously described and submitted in the programme specification.

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PC 101	Physical & Inorganic Chemistry	15	2	1	3	A1, A5, A6, B2, B5, C3, D3, D7, D8, D10
PC 102	Pharmaceutical Organic chemistry -1	15	2	1	3	A1, A8, B2, B6, C6, D3, D4, D7, D8, D10
MD 101	Biophysics	15	1	1	2	A18, A20, A16, C11, D2, D3, D10, D11
PG 101	Botany and medicinal plants	15	2	1	3	A2, A8, B5, B4, C3, C6, D3, D8, D7, D10, D11
MD 102	Cell Biology	15	1	1	2	A1, A18, B1, D10, D11
MS 101	Mathematics and statistics	15	2	--	2	A1, D4, D5, D11
EN 101	English language	15	2	--	2	A1, B1, D1, D10
<b>Total</b>			<b>12</b>	<b>5</b>	<b>17</b>	

### **Semester 1:**

### **Semester 2:**

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PC 203	Pharmaceutical Organic chemistry-2	15	2	1	3	A1, A8, B2, B6, C3, C6, D3, D6, D7, D8, D10, D11
PC 205	Pharmaceutical Analytical chemistry- 1	15	2	1	3	A1, B2, B3, C6, D3, D7, D8
PG 202	Pharmacognosy-1	15	2	1	3	A2, A8, B2, B4, C2, C6, D3, D8, D11, D10
MD 203	Histology	15	1	1	2	A3, A18, B1, D10, D11
PT 201	Physical pharmacy	15	2	1	3	A3, B3, C4, D4
PT 202	Pharmacy orientation	15	1	--	1	A2, D2, D3, D4
HU201	Human rights & fighting corruption	15	2	--	2	A4, A31, C16, D2, D8, D11
<b>Total</b>			<b>12</b>	<b>5</b>	<b>17</b>	

**Semester 3:**

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PC 304	Pharmaceutical Organic Chemistry-3	15	2	1	3	A1, A8, B2, B6, C6, D3, D4, D7, D8, D10
PC 306	Pharmaceutical Analytical Chemistry-2	15	2	1	3	A2, A7, B2, B5, C3, C5, D2, D7, D10
PG 303	Pharmacognosy -2	15	2	1	3	A2, B2, B5, C3, D3, D5, D9, D10
MD 304	Anatomy	15	1	-	1	A3, A18, B1, D10, D11
MD 305	Physiology	15	2	1	3	A3, A18, A26, B1, D2, D11
MD 311	Medical Terminology	15	2	--	2	A3, A16, A18, B1, D2, D7, D10
HU 302	Psychology	15	1	--	1	A4, D3, D11
<b>Total</b>			<b>12</b>	<b>4</b>	<b>16</b>	

**Semester 4:**

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PB 401	Biochemistry-1	15	2	1	3	A3, A16, A17, A20, B2, B6, B8, C3, C6, C15, C16, D2, D3, D5, D9, D10, D11
PG 404	Phytochemistry-1	15	2	1	3	A2, A5, A8, A22, B2, B13, C15, D3, D10, D11
PC 407	Instrumental Analysis	15	1	1	2	A1, A7, A11, B2, C3, C5, D3, D7, D8, D10
PM 401	General Microbiology and Immunology	15	3	1	4	A2, A3, A15, A16, A17, A20, B1, B2, B8, C15, C16, D1, D2, D3, D7, D10
MD 406	Parasitology	15	1	1	2	A3, A16, A19, A20, B1, B7, B8, B12, C10, C15, C16, D1, D2, D10, D11
PT 403	Pharmaceutical dosage forms-1	15	2	1	3	A2, A5, A6, B2, B3, C1, D2, D3, D4, D11
PT 404	Pharmacy legislation	15	1	--	1	A31, D3, D7, D4, D11
<b>Total</b>			<b>12</b>	<b>6</b>	<b>18</b>	



**Semester 5:**

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PO 501	Pharmacology- 1	15	2	1	3	A3, A22, B13, C11, D3, D10
PM 502	Pharmaceutical microbiology	15	2	1	3	A2, A3, A22, B2, B8, C9, C10, C15, C16, D1, D2, D7, D10, D11
PT 505	Pharmaceutical dosage forms-2	15	2	1	3	A2, A5, A6, A10, B2, B3, C1, D3, D11
PB 502	Biochemistry-2	15	2	1	3	A3, A16, A17, B8, C3, C15, D3, D10
PG 505	Phytochemistry-2	15	2	1	3	A2, A8, A24, B2, B6, C5, C6, D3, D11
MD507	Pathophysiology	15	2	--	2	A3, A16, A18, A19, A20, A21, B1, B7, B13, C11, C16, D1, D2, D3, D6, D10, D11
PT 506	Pharmacy Administration	15	1	--	1	A4, A28, A29, C14, D9
<b>Total</b>			<b>13</b>	<b>5</b>	<b>18</b>	

**Semester 6:**

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PO 602	Pharmacology-2	15	2	1	3	A2, A8, A22, B2, B13, C3, D3, D10
PT 607	Pharmaceutical technology	15	2	1	3	A11, B3, C3, D11
PP 601	Community pharmacy practice	15	2	1	3	A13, A20, A22, B1, B12, C4, C12, D1, D11
PC 608	Pharmaceutical analysis & quality control	15	2	1	3	A2, A12, A19, A20, A27, B3, C12, D4, D11
PG 606	Quality Control of Herbal Drugs	15	2	1	3	A2, A8, A11, A24, B2, B4, B10, C2, C6, D3, D8, D9, D10
MD 608	Pathology	15	2	1	3	A3, A16, A19, A20, B1, B8, C10, C15, C16, D1, D2, D10, D11
MD 609	First Aid	15	2	--	2	A26, C16, D2, D10
<b>Total</b>			<b>14</b>	<b>6</b>	<b>20</b>	

**Semester 7:**

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PO 703	Pharmacology-III	15	2	1	3	A3, A22, B15, C11, C13, D3, D11, D10
PP 701	Radio-pharmaceuticals	15	1	–	1	A2, A6, A11, C1, D3, D6
PP 702	Clinical pharmacy-1	15	2	1	3	A2, A13, A30, B14, C2, D3
PP 703	Hospital pharmacy	15	2	1	3	A2, A13, B1, B11, B14, B15, B19, B20, C12, C16, D1, D2, D3, D6, D7
PT 710	Controlled drug delivery systems	15	2	–	2	A10, C1, D6
PC 709	Medicinal chemistry-1	15	2	1	3	A9, B10, C7, D2
PM 703	Pharmaceutical biotechnology	15	2	1	3	A6, A8, C8, D7
PM 704	Clinical microbiology	15	2	1	3	A3, A15, B8, C10, D11
<b>Total</b>			<b>15</b>	<b>6</b>	<b>21</b>	

**Semester 8:**

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PP 805	Management of oncological diseases	15	2	1	3	A19, A20, A21, A22, B15, B19, B20, C3, C11, C13, D3, D10, D11
PP 804	Clinical pharmacy-2	15	2	1	3	A13, A30, B14, B16, C2, D3
PT 809	Biopharmaceutics & pharmacokinetics	15	2	1	3	A2, A12, B1, D7, D10, D11
PC 810	Medicinal chemistry-2	15	2	1	3	A2, A9, B8, C3, C5, C6, D1, D11
PB 803	Clinical biochemistry	15	2	1	3	A3, A20, B16, C2, D2, D3, D4
PP 806	Drug marketing	15	1	–	1	A4, A29, C14, D1, D3, D9
MD 810	Public health & preventative medicine	15	2	–	2	A14, D1, D11
PE	Elective course	15	1	1	2	
<b>Total</b>			<b>14</b>	<b>6</b>	<b>20</b>	

### Semester 9:

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PO 904	Toxicology and forensic chemistry	15	2	1	3	A25, B2, B9, B11, B18, C1, C11, C13, D1, D2, D3, D10, D11
PO 905	Therapeutics- 1	15	2	1	3	A3, A13, A21, A22, A23, B1, B7, B17, C11, D1, D3, D6, D7, D10, D11
PP 907	Clinical pharmacokinetics	15	2	1	3	A2, A12, B1, B12, B13, B15, B17, C1, C11, C12, D1, D2, D3, D6, D10, D11
PG 907	Phytotherapy	15	2	1	3	A2, A24, A25, B1, B7, B8, B12, B13, C15, C16, D1, D2, D3, D6, D10, D11
PP 904	Clinical nutrition	15	1	1	2	A3, B13, C15, D1, D2, D3, D6, D10, D11
PO 906	Drug interactions	15	2	--	2	A3, A23, B7, B11, B12, B13, C11, C13, D1, D2, D3, D6, D10, D11
HU 903	Sociology	15	1	--	1	A4, C16, D1, D3, D7, D10
PE	Elective course	15	1	1	2	
<b>Total</b>			<b>13</b>	<b>6</b>	<b>19</b>	

### Semester 10:

COURSE CODE	COURSE TITLE	NO. OF UNITS	CREDIT HOURS/ WEEK			PROGRAM ILO'S COVERED
			Lec	Lab	Total	
PO 007	Therapeutics-2	15	2	1	3	A3, A21, A22, B1, B7, B15, B17, C11, D1, D3, D6, D7, D10, D11
PP008	Treatment of dermatological and reproductive tissue	15	1	1	2	A16, A18, A19, A21, B1, B7, B12, B13, B15, B17, C1, C11, C15, C16, D1, D2, D3, D6, D10, D11
PP009	Treatment of pediatrics diseases	15	2	1	3	A16, A18, A19, A21, B1, B7, B12, B13, B15, B17, C1, C11, C15, C16, D1, D2, D3, D6, D10, D11
PP010	Treatment of cardiovascular diseases	15	2	1	3	A16, A18, A19, A21, B1, B7, B12, B13, B15, B17, C1, C11, C15, C16, D1, D2, D3, D6, D10, D11
PP011	Gastroenterology	15	2	1	3	A16, A18, A19, A21, B1, B7, B12, B13, B15, B17, C1, C11, C15, C16, D1, D2, D3, D6, D10, D11
PP012	Treatment of respiratory system diseases	15	2	1	3	A16, A18, A19, A21, B1, B7, B12, B13, B15, B17, C1, C11, C15, C16, D1, D2, D3, D6, D10, D11
PP013	Drug information	15	1	--	1	A4, B11, B12, B13, C14, C15, C16, C17, D1, D2, D3, D6, D10, D11
PE	Elective course	15	1	1	2	
<b>Total</b>			<b>13</b>	<b>7</b>	<b>20</b>	

## Elective courses:

Code No.	Course title	PROGRAM ILO'S COVERED
PC E11	Drug design	A2, A9, C7, D2, D4, D6, D11
PC E12	Advanced pharmaceutical analysis spectroscopy	A2, B5, C5, D1, D2, D4, D11
PG E8	Alternative medicinal therapies	A2, A24, C1, D1, D3, D7
PG E9	Production & manufacture of medicinal plants	A12, B2, B5, C6, D6, D7
PG E10	Chromatography and separation techniques	A2, A8, D10, D8, D11
PT E10	Quality assurances and GMP	A2, A7, A8, A11, B2, B5, B10, D4, D8
PT E11	Applied industrial pharmacy	A2, B3, B10, D1, D4
PT E12	Good manufacturing practices	A1, A11, A18, B1, B2, B3, B16, C3, D3, D6, D7
PT E13	Cosmetic preparations	A10, C4, D1, D4
PM E5	Biological standardization	A2, A6, A8, D7, D8, D11
PM E6	Antimicrobial agents	A3, B8, D1, D7, D8, D11
PO E9	Veterinary pharmacology	A3, A22, D4, D11

	Total contact hours	PROGRAM ILO'S COVERED
<b>Summer training</b>	300 hr	A3, A4, A5, A6, A10, A13, A14, A21, A22, A23, A24, A26, A28, A29, A30, A31 B1, B2, B3, B7, B8, B9, B12, B15, B16, B18 C1, C4, C11, C12, C13, C16 D1, D4, D6, D7, D8, D10, D11, D12

## **Appendix 2**

### **Course reports of 2018/2019**