Program Specification

Bachelor of Pharmacy

2018 - 2019

A. Basic Information:

1. Program Title: Bachelor of Pharmacy

2. Program Type: Single

3. Faculty / University: Faculty of Pharmacy, Zagazig University.

4. Department (s):

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 and Anatomy departments (Faculty of Medicine)
- Mathematics department (Faculty of Science)
- English Language department (Faculty of Education)
- Accounting & Administration department (Faculty of Commerce)
- Faculty of Law
- Psychology department (Faculty of Education)

5. Coordinator:

- Prof. Dr/ Ghada Shaker

"Vice dean for Education and Student affairs"

6. Date of Program specifications approval:

- Last date of Program specifications approval: 2011

N.B.: This program specification document was reviewed and updated according to NARS, 2009. The specification was approved by the Faculty council No. 718, 10/12/2018.

7. External Evaluator:

Prof. Mahmoud Bakr Al-Ashmawi, Department of Pharmaceutical Chemistry, Mansoura University

B. Professional Information

I- Programme Aims

The pharmacy program, Zagazig University is a five years pharmacy education offering a Bachelor's degree in pharmacy. This Program aims at providing undergraduate students with knowledge, skills and abilities needed to practice the pharmacy profession effectively in various settings including community pharmacies, hospitals, pharmaceutical industries and research centers, academic institutions, forensic, cosmetic industry and governmental health institutions. For that purpose, students receive basic practical training to make them eligible for licensure as pharmacists.

The educational aims are summarized as follows:

1. Provide the community with highly qualified and professional pharmacists with skills and ethical values based on National Academic Reference Standards (NARS).
2. Promote good understanding of the pharmacy profession and the role of pharmacist in multidisciplinary teams.
3. Apply criteria of good laboratory practice (GLP) and good pharmaceutical manufacturing practice (GPMP) to various qualitative and quantitative analytical techniques to assure quality of raw materials, procedures and pharmaceutical products.

4. Acquire the necessary knowledge and skills in areas related to the design, formulation, production, computation, management, promotion, and marketing of pharmaceutical products.

5. Comprehend the principles of pathophysiology of diseases and the rational use of medication to improve healthcare services using evidence-based data.

6. Provide information and awareness to the community and the patients concerning medication.

7. Develop communication skills, time management, critical thinking, problem solving, decision making, team working, using modern information technology, design and conduct research.

8. Implement the sense of self learning for continuous improvement of professional knowledge and skills.

Consistency of the program aims with the mission of Faculty of Pharmacy

Faculty mission	Program aims
The faculty of Pharmacy, Zagazig University aims to: •Provide the local and regional community highly qualified, multidisciplinary professional pharmacists with ethical values.	1. Provide the community with highly qual and professional pharmacists with skills ethical values based on National Acad Reference Standards (NARS) 2. Promote good understanding of the pharmacy profession and the role of pharmacist in multidisciplinary teams.
•participate in the development of drug industry and quality assurance	3. Apply criteria of good laboratory practice (GLP) and good pharmaceutical manufacturing practice (GPMP) in various qualitative and quantitative analytical techniques to assure quality of raw materials, procedures pharmaceutical products. 4. Acquire the necessary knowledge and skills in areas related to the design, formulation, production, computation, management, promotion, marketing of pharmaceutical products.

• contribute to a distinguished health service to the society	4. Comprehend the principles of pathophysiology of diseases and the rational use of medication to improve healthcare services using evidence-based data. 5. Provide information and awareness to the community and patients concerning medication. 6. Develop communication skills, management, critical thinking, problem sol decision making, team working, using mo information technology, design and cor research. 7. Implement the sense of self learning continuous improvement of profess knowledge and skills.

II- Attributes of the Graduates

Pharmacy graduates work in a multidisciplinary profession and must acquire the necessary attributes in various pharmacy aspects for pursuing their career. Graduate attributes are the qualities, skills and understandings a faculty community agrees its students should develop during their time with the institution, these attributes include the disciplinary expertise and technical knowledge in the core of the studied course as follows:

1. Handle chemicals and pharmaceutical materials, taking into account their physical and chemical properties including any specific hazards associated with their use.
2. Formulate and prepare of medicine by manufacture from different sources and extemporaneous dispensing
3. Store and distribute drug products according to good storage practice
4. Analyze quantitatively and qualitatively raw materials, pharmaceutical products and biological samples and applying principles of quality control and quality assurance for all natural and pharmaceutical products in concern of GLP and GPMP
5. Comprehend principles of pathophysiology of disease and develop an understanding of the pharmacist's role in improving healthcare services and illness prevention
6. Plan, design and conduct research using appropriate methodologies
7. Develop the ability in a range of key skills as presentation, promotion, marketing, business administration, numeric and computation skills.

8. Demonstrate oral, written and effective listening skills as well as time management, critical thinking, problem solving, decision-making and team-working
9. Ask the right questions to clarify patient concerns.
10. Adjust to new conditions inherent in a rapidly changing professional discipline
11. Raise awareness and advice patients and community on the safe and effective use of medication as well as risks of drug abuse
12. Maximize patients' safety and manage medicine error.
13. Provide patients with information about the proper use of medical devices
14. Be aware of current legal and ethical requirements related to pharmacy practice.
15. Apply equity values, and has a sense of social responsibility and sensitivity to other people, cultures and the environment.
16. Provide a supportive, structured environment in which encourage to develop and train other pharmacists
17. Improve his knowledge and skills through continuous self learning.

Consistency of the program aims with the intended attributes of graduates

Program aims	Attributes of the graduates (Bachelor of Pharmacy)
1. Provide the community with highly qualified and professional pharmacists with skills and ethical values based on National Academic Reference Standards (NARS).	2.Formulate medicine by manufacture from different sources and extemporaneous dispensing 3. Store and distribute drug products according to good storage practice 14. Be aware of current legal and ethical requirements related to pharmacy practice. 15. Apply equity values, and has a sense of social responsibility and sensitivity to other people, cultures and the environment.
2. Promote good understanding of the pharmacy profession and the role of pharmacist in multidisciplinary teams.	16. Provide a supportive, structured environment in which encourage to develop and train other pharmacists
2. Apply criteria of good laboratory practice (GLP) and good pharmaceutical manufacturing practice (GPMP) in various qualitative and quantitative analytical techniques to assure quality of raw materials, procedures and pharmaceutical products.	1. Handle chemicals and pharmaceutical materials, taking into account their physical and chemical properties including any specific hazards associated with their use. 5. Analyze quantitatively and qualitatively raw materials, pharmaceutical products and

	biological samples and applying principles of quality control and quality assurance for all natural and pharmaceutical products in concern of GLP and GPMP
3. Comprehend the principles of pathophysiology of diseases and the rational use of medication to improve healthcare services using evidence-based data.	6. Comprehend principles of pathophysiology of disease and develop an understanding of the pharmacist's role in improving healthcare services and illness prevention
4. Provide information and awareness to the community and patients concerning medication.	11. Raise awareness and advice patients and community on the safe and effective use of medication as well as risks of drug abuse 12. Maximize patients' safety and manage medicine error. 13. Provide patients with information about the proper use of medical devices
5. Develop communication skills, management, critical thinking, problem solving, decision making, team working, using modern information technology, design and conduct research	6. Plan, design and conduct research using appropriate methodologies 7. Develop the ability in a range of key skills as presentation, promotion, marketing, business administration, numeric and computation skills. 8.Demonstrate oral, written and effective listening skills as well as time management, critical thinking, problem solving, decision-

	making and team-working 9. Ask the right questions to clarify patient concerns
6. Implement the sense of self learning for continuous improvement of professional knowledge and skills.	10. Adjust to new conditions inherent in a rapidly changing professional discipline 17. Improve his knowledge and skills through continuous self learning

III. Intended Learning Outcomes (ILO's):

A- Knowledge and Understanding

By the end of the programme, graduates should demonstrate knowledge and understanding of the following outcomes:

A1 Illustrate the principles of basic sciences (Physical, organic and analytical chemistry; biology; biophysics; computer sciences and mathematics).

A2 Mention the principles of pharmaceutical sciences (Pharmacy orientation; medical terminology; physical pharmacy; pharmaceutics; 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).

A3 Outline the basics of macro and microscopical characters of different medicinal plant organs, detection of adulteration as well as, their proper collection, storage and marketing in addition to chemo taxonomical classification of medicinal plants.

A4 Explain the principles of medical sciences (Anatomy; histology; physiology and pathology; biochemistry; parasitology; pharmacology; clinical pharmacology; therapeutics; medical microbiology; immunology and virology).

A5 State the basics of social and behavioral sciences (Psychology; communication; social& administrative pharmacy and pharmacy ethics).

A6 Outline the fundamentals of pharmacy management (Sales, marketing and drug promotion; pharmaceutical business administration and pharmacoeconomics).

A7 List the principles of health and environmental sciences (Public health; Egyptian health system and its policies; biostatistics; healthy lifestyle; toxicology and forensic medicine; first aid and emergency medicine).

A8 Define the principles of pharmacy practice (Pharmaceutical care and professional pharmacy (clinical, hospital, community... etc); complementary and alternative medicines; drug and poison information; pharmacy laws and regulations).

A9 Describe physico-chemical properties of active and inactive ingredients, radio-labeled materials used in preparation of medicine.

A10 Mention biotechnology concepts, techniques and applications.

A11 Demonstrate fundamentals of various analytical techniques and their applications in pharmaceutical chemistry including GLP and validation procedures.

A12 Illustrate the principles of isolation, purification and identification of pharmaceutical compounds and other active compounds.

A13 Outline fundamentals of standardization methods of biologically active compounds.

A14 Underline the basis of drug design and development.

A15 Determine the principles of pharmaceutical compounds synthesis.

A16 Describe the properties of different dosage forms.

A17 specify the properties of targeted and advanced drug delivery systems.

A18 Mention various instruments and techniques for GPMP and quality assurance of sampling, manufacturing, packaging, labeling, storing and distribution processes in pharmaceutical industry.

A19 Explain the principles of pharmacokinetics and bio-pharmaceutics and their applications in therapeutic drug monitoring and dose modification.

A20 Verify the basis of hospital pharmacy and drug distribution system.

A21 Outline the fundamentals of public health and raising awareness for safe use and disposal of medicine.

A22 Identify sources and control of microbial contamination.

A23 List the different methods of sterilization, sterility testing and their application in microbiological quality control of pharmaceutical products.

A24 Illustrate the body functions in health and disease states.

A25 Categorize different biochemical pathways and their correlation with different diseases.

A26 Outline basis of molecular biology.

A27 Illustrate etiology, epidemiology and clinical features of different diseases.

A28 Specify the laboratory diagnosis of different diseases.

A29 Determine pharmaco-therapeutic approaches for various diseases.

A30 Identify pharmacological properties of drugs, adverse reactions, contraindications and drug-drug interactions.

A31 Specify the principles of clinical pharmacology, impact of drug interactions on pharmacotherapy for various diseases, and pharmacovigilance.

A32 Underline the basis of complementary and alternative medicine.

A33 Verify toxic profile of drugs and other xenobiotics and their control.

A34 Illustrate first aid measures regarding drug toxicity and emergency conditions.

A35 Explain methods of biostatistical analysis and biological standardization.

A36 Describe methods of pharmaceutical calculations.

A37 Outline the principles of financial management and human resources.

A38 List the fundamentals of drug promotion, marketing, business administration, accounting and pharmaco-economics.

A39 Illustrate the principles of clinical pharmacy practice, including patient profiles, proper documentation and drug filing system.

A40 State the laws that govern and affect pharmacy practice, ethics of health care and pharmacy profession.

A41 Outline the principles of plant biotechnology and molecular biology used for production of new and increasing the amount of pharmaceutical natural product.

B- Professional and Practical Skills

At the end of the programme, the students will be able to:

B1 Use the proper pharmaceutical and medical terms and abbreviations and symbols in pharmacy practice.

B2 Handle and dispose chemicals and pharmaceutical preparations in a safe way according to GLP principles.

B3 Handle experimental animals in laboratory settings for the purpose of using such skills in drug research and/or approval.

B4 Compound, dispense and label pharmaceutical dosage forms safely and effectively with application of good manufacturing practice (GMP) principles.

B5 Extract, isolate, purify & identify active substances from different origins.

B6 Synthesize, purify, identify & standardize active substances from different origins.

B7 Select medicines in accordance with understanding of disease etiology and pathophysiology.

B8 Monitor & control microbial growth & handle biological specimens safely.

B9 Perform microscopical, biochemical and serological laboratory tests to diagnose infectious and non infectious disease.

B10 Perform different analytical tests for blood and body fluids to determine the functional state of different body organs

B11 Assess toxicity profiles of different xenobiotics.

B12 Detect poisons in different biological samples.

B13 Apply techniques used in operating pharmaceutical equipment & instrument.

B14 Apply the relevant knowledge to health care professionals & patients concerning awareness on rational use of drugs & social health hazards of drug abuse & misuse.

B15 Underpin a role in advising patients and other health care professionals about medicines and their proper use.

B16 Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.

B17 Construct a research study and analyze the results.

B18 Apply proper documentation & drug filling system focusing on clinical pharmacy practice.

C- Intellectual Skills

At the end of the programme, students will be able to:

C1 Reconstruct pharmaceutical knowledge in formulation of safe and effective medicines.

C2 Use information in dealing with new drug delivery system in practice settings.

C3 Comprehend GLP, (GPMP), good storing practice (GSP) and good clinical practice (GCP) guidelines in pharmacy practice.

C4 Adopt quantitative and qualitative methodology for quality control (QC) and assay of raw materials and other substances.

C5 Suggest different methods for QC and assay of various pharmaceutical preparations.

C6 Solve problems concerning physical and chemical incompatibilities that may occur during drug dispensing.

C7 Select appropriate methods of isolation, purification, identification of active substances from different origins.

C8 Choose the appropriate methods of synthesis, identification and standardization of active substances from different origins.

C9 Apply principles of bioinformatics & computer-aided tools in drug design.

C10 Employ analytical technology fundamentals to determine characteristics of biopharmaceutical products.

C11 Suggest the appropriate methods to prevent infections & promote health care.

C12 Integrate the knowledge of physiology, pharmacology and toxic profile for proper selection of drugs in various disease conditions.

C13 Calculate and adjust dosage and dose regimen of medications and prescription dispensing.

C14 Choose the proper drug in various disease conditions based on knowledge of drug-drug interaction and adverse drug reactions.

C15 Use principles of pharmacoeconomics in promoting cost/effective pharmacotherapy.

C16 Evaluate and interpret experimental results and published literature.

C17 Analyze a wide range of information including both scientific and library based material in pharmacy practice.

C18 Assess public attitude and determine communication tools in various situations.

D- General and Transferable Skills

At the end of the programme, students will be able to:

D1 Interact effectively with patients, the public and health care professional, including both written and oral communication.

D2 Ask the right questions to clarify patient concerns.

D3 Reprocess and evaluate information from different sources to improve professional abilities.

D4 Implement tasks as a member of a team.

D5 Use numeracy, computation and statistical methods.

D6 Practise computer skills including word, spreadsheet, database use and internet communications.

D7 Update pharmaceutical knowledge for development of pharmacy profession through independent lifelong continuous education.

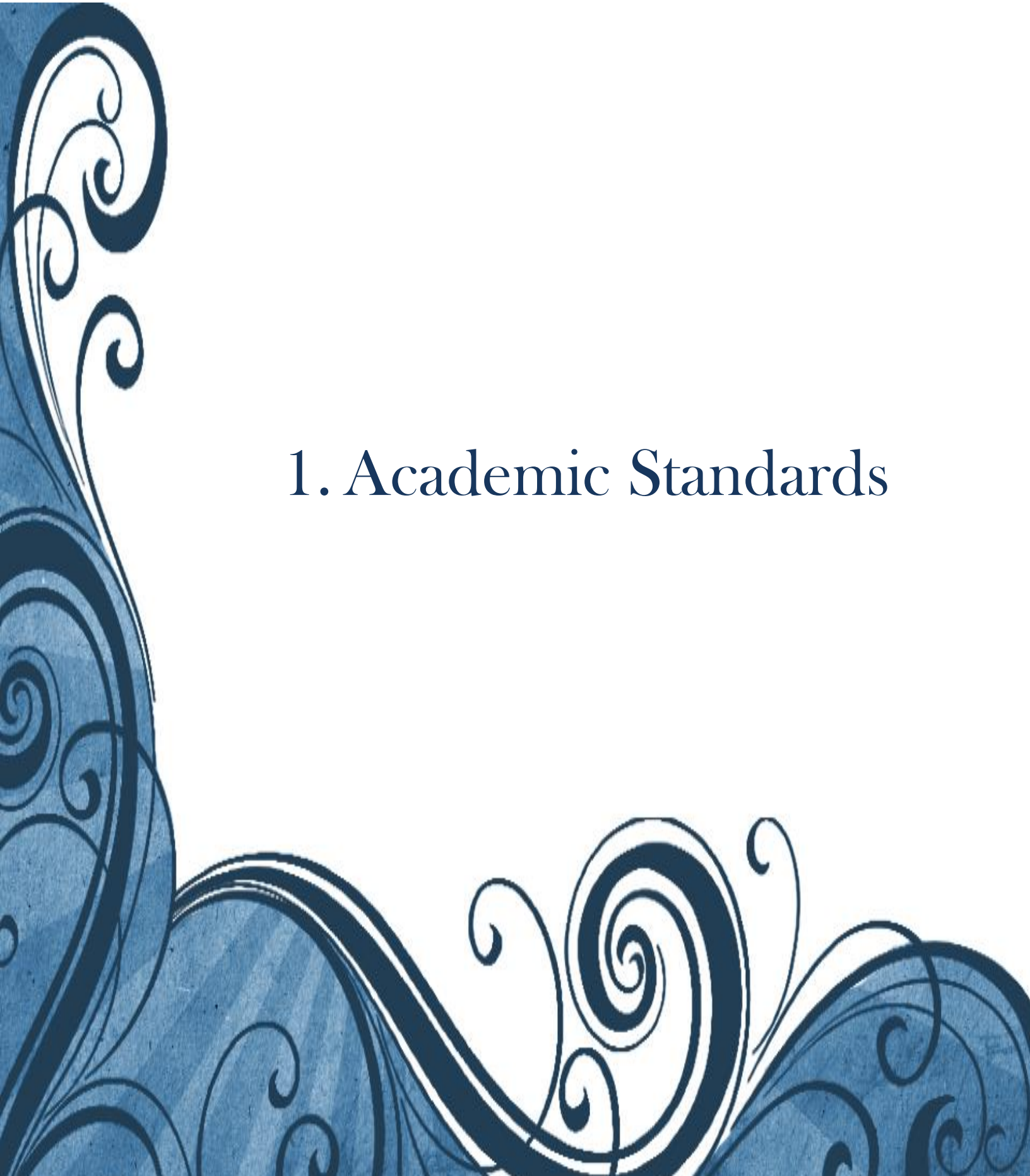
D8 Adopt ethical, legal and safety guidelines.

D9 Develop management skills including financial, sales and marketing.

D10 Manage time as evidenced by the ability to plan and implement efficient mode of working.

D11 Implement writing and presentation skills.

D12 Develop critical thinking, problem solving and decision making skills.



1. Academic Standards

External References for standards

Faculty is adapting with the National Academic References Standards (NARS/2009).

Matrix1: Comparisons of Faculty Program with the National Academic Reference Standard {NARS}

Attributes of the graduates (NARS)	Attributes of the graduates
1.1. Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations	1-Handle chemicals and pharmaceutical materials, taking into account their physical and chemical properties including any specific hazards associated with their use.
1.2. Capable of formulating, preparing pharmaceutical products from different sources and participating in systems for dispensing, storage and distribution of medications	2-Formulate medicine by manufacture from different sources and extemporaneous dispensing 3-Store and distribute drug products according to good storage practice
1.3. Perform various qualitative and quantitative analytical techniques and fulfill criteria of GLP and GPMP to assure the quality of raw materials, procedures and pharmaceutical products.	4-Analyze quantitatively and qualitatively raw materials, pharmaceutical products and biological samples and applying principles of quality control and quality assurance for all natural and pharmaceutical products. in concern of GLP and GPMP
1.4. Provide information and	11-Raise awareness and advice

education services to community and patients about rational use of medications and medical devices.	patients and community on the safe and effective use of medication as well as risks of drug abuse 12-Maximize patients' safety and manage medicine error. 13- Provide patients with information about the proper use of medical devices.
1.5. Comprehend principles of pathophysiology of diseases and participate with other health care professionals in improving health care services using evidence-based data	5-Comprehend principles of pathophysiology of disease and develop an understanding of the pharmacist's role in improving healthcare services and illness prevention.
1.6. Plan, design and conduct research using appropriate methodologies	6-Plan, design and conduct research using appropriate methodologies .
1.7. Develop presentation, promotion, marketing, business administration, numeric and computation skills.	7-Develop the ability in a range of key skills as presentation, promotion, marketing, business administration, numeric and computation skills.
1.8. Demonstrate capability of communication skills, time management, critical thinking, problem solving,decision-making and team-working.	8-Demonstrate oral, written and effective listening skills as well as time management, critical thinking, problem solving, decision-making and team-working. 9-Ask the right questions to clarify patient concerns. 10-Adjust to new conditions inherent in a rapidly changing professional

	discipline.
1.9. Perform responsibilities in compliance with legal, ethical and professional rules.	14-Be aware of current legal and ethical requirements related to pharmacy practice. 15-Apply equity values, and has a sense of social responsibility and sensitivity to other people, cultures and the environment. 16-Provide a supportive, structured environment in which encourage to develop and train other pharmacists
1.10. Able to be a life-long learner for continuous Improvement of professional knowledge and skills.	17-Improve his knowledge and skills through continuous self learning.

Matrix 2: Comparison between the Educational Program Intended Learning Outcomes ILOs and NARS, 2009

NARS	*Educational Program ILOs*
Knowledge and Understanding	
2.1 Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	**[A1]** Illustrate the principles of basic sciences (Physical, organic and analytical chemistry; biology; biophysics; computer sciences and mathematics). **[A2]** Mention the principles of pharmaceutical sciences (Pharmacy orientation; medical terminology; physical pharmacy; pharmaceutics; 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). **[A4]** Explain the principles of medical sciences (Anatomy; histology; physiology and pathology; biochemistry; parasitology; pharmacology; clinical pharmacology; therapeutics; medical microbiology; immunology and virology). **[A5]** State the basics of social and behavioral sciences (Psychology; communication; social& administrative pharmacy and pharmacy ethics).

	[A6] Outline the fundamentals of pharmacy management (Sales, marketing and drug promotion; pharmaceutical business administration and pharmacoeconomics). **[A7]** List the principles of health and environmental sciences (Public health; Egyptian health system and its policies; biostatistics; healthy lifestyle; toxicology and forensic medicine; first aid and emergency medicine). **[A8]** Define the principles of pharmacy practice (Pharmaceutical care and professional pharmacy (clinical, hospital, community... etc); complementary and alternative medicines; drug and poison information; pharmacy laws and regulations).
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.	**[A9]** Describe physic-chemical properties of active and inactive ingredients, radio-labeled materials used in preparation of medicine. **[A10]** Verify biotechnology concepts, techniques and applications.
2.3 Principles of different analytical techniques using GLP guidelines and validation procedures	**[A11]** Demonstrate fundamentals of various analytical techniques and their applications in pharmaceutical chemistry including GLP and validation procedures.
2.4 Principles of isolation, synthesis, purification, identification, and	**[A12]** Illustrate the principles of isolation, purification and identification of pharmaceutical compounds and other active

standardization methods of pharmaceutical compounds.	compounds. **[A13]** Outline fundamentals of standardization methods of biologically active compounds.
2.5 Principles of drug design, development and synthesis.	**[A14]** Underline the basis of drug design and development. **[A15]** Determine the principles of pharmaceutical compounds synthesis.
2.6 Properties of different pharmaceutical dosage forms including novel drug delivery systems.	**[A16]** Describe the properties of different dosage forms. **[A17]** specify the properties of targeted and advanced drug delivery systems.
2.7 Principles of various instruments and techniques including sampling, manufacturing, packaging, labeling, storing and distribution processes in pharmaceutical industry.	**[A18]** Mention various instruments and techniques for GPMP and quality assurance of sampling, manufacturing, packaging, labeling, storing and distribution processes in pharmaceutical industry.
2.8 Principles of pharmacokinetics and biopharmaceutics with applications in therapeutic drug monitoring, dose modification and bioequivalence studies.	**[A19]** Explain the principles of pharmacokinetics and bio-pharmaceutics and their applications in therapeutic drug monitoring and dose modification.
2.9 Principles of hospital pharmacy including I.V. admixtures, TPN and drug distribution system,	**[A20]** Verify the basis of hospital pharmacy and drug distribution system.
2.10 Principles of public health issues including	**[A21]** Outline the fundamentals of public health and raising awareness for safe use and

sources and control of microbial contamination as well as sanitation, disinfection, sterilization methods and microbiological QC of pharmaceutical products.	disposal of medicine. **[A22]** Identify sources and control of microbial contamination. **[A23]** List the different methods of sterilization, sterility testing and their application in microbiological quality control of pharmaceutical products.
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.	**[A24]** Illustrate the body functions in health and disease states. **[A25]** Categorize different biochemical pathways and their correlation with different diseases. **[A26]** Outline basis of molecular biology.
2.12 Etiology, epidemiology, laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches.	**[A27]** Illustrate etiology, epidemiology and clinical features of different diseases. **[A28]** Specify the laboratory diagnosis of different diseases. **[A29]** Determine pharmaco-theraputic approaches for various diseases.
2.13 Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra- indications, ADRs and drug interactions.	**[A30]** Identify pharmacological properties of drugs, adverse reactions, contraindications and drug-drug interactions.
2.14 Principles of clinical pharmacology,	**[A31]** Specify the principles of clinical pharmacology, impact of drug interactions on

pharmacovigilance and the rational use of drugs.	pharmacotherapy for various diseases, and pharmacovigilance.
2.15 Basis of complementary and alternative medicine.	**[A32]** Underline the basis of complementary and alternative medicine.
2.16 Toxic profile of drugs and other xenobiotics including sources, identification, symptoms, management control and first aid measures.	**[A33]** Verify toxic profile of drugs and other xenobiotics and their control. **[A34]** Illustrate first aid measures regarding drug toxicity and emergency conditions.
2.17 Methods of biostatistical analysis and pharmaceutical calculations.	**[A35]** Explain methods of biostatistical analysis and biological standardization. **[A36]** Describe methods of pharmaceutical calculations.
2.18 Principles of management including financial and human resources.	**[A37]** Outline the principles of financial management and human resources.
2.19 Principles of drug promotion, sales and marketing, business administration, accounting and pharmacoeconomics.	**[A38]** List the fundamentals of drug promotion, marketing, business administration, accounting and pharmaco-economics.
2.20 Principles of proper documentation and drug filing systems.	**[A39]** Illustrate the principles of clinical pharmacy practice, including patient profiles, proper documentation and drug filing system.
2.21 Regulatory affairs, pharmacy laws and ethics of health care and pharmacy profession.	**[A40]** State the laws that govern and affect pharmacy practice, ethics of health care and pharmacy profession.

Professional and Practical Skills	
3.1 Use the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.	**[B1]** Use the proper pharmaceutical and medical terms and abbreviations and symbols in pharmacy practice.
3.2 Handle and dispose chemicals and pharmaceutical preparations safely.	**[B2]** Handle and dispose chemicals and pharmaceutical preparations in a safe way according to GLP principles.
3.3 Compound, dispense, label, store and distribute medicines effectively and safely.	**[B4]** Compound, dispense and label pharmaceutical dosage forms safely and effectively with application of good manufacturing practice (GMP) principles.
3.4 Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins.	**[B5]** Extract, isolate, purify and identify active substances from different origins. **[B6]** Synthesize, purify, identify and standardize active substances from different origins.
3.5 Select medicines based on understanding etiology and path physiology of diseases.	**[B7]** Select medicines in accordance with understanding of disease etiology and pathophysiology.
3.6 Monitor and control microbial growth and carry out laboratory tests for identification of Infectious and non- infections in biological specimens.	**[B8]** Monitor and control microbial growth and handle biological specimens safely. **[B9]** Perform microscopical, biochemical and serological laboratory tests to diagnose infectious and non infectious disease.

3.7 Assess toxicity profiles of different xenobiotics and detect poisons in biological specimens	**[B11]** Assess toxicity profiles of different xenobiotics. **[B12]** Detect poisons in different biological samples.
3.8 Apply techniques used in operating pharmaceutical equipment and Instruments.	**[B13]** Apply techniques used in operating pharmaceutical equipment and instrument.
3.9 Maintain public awareness on rational use of drugs and social health hazards of drug abuse and misuse	**[B14]** 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.
3.10 Advise patients and other health care professionals about safe and proper use of medicines.	**[B15]** Underpin a role in advising patients and other health care professionals about medicines and their proper use.
3.11 Conduct research studies and analyze the results.	**[B17]** Construct a research study and analyze the results.
3.12 Employ proper documentation and drug filing systems.	**[B18]** Design proper documentation and drug filling system focusing on clinical pharmacy practice.
Intellectual Skills	
4.1 Apply pharmaceutical knowledge in the formulation of safe and effective medicines as well as in dealing with new drug delivery systems.	**[C1]** Reconstruct pharmaceutical knowledge in formulation of safe and effective medicines. **[C2]** Use information in dealing with new drug delivery system in practice settings.

4.2 Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice.	**[C3]** Comprehend GLP, (GPMP), good storing practice (GSP) and good clinical practice (GCP) guidelines in pharmacy practice.
4.3 Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations.	**[C4]** Adopt quantitative and qualitative methodology for quality control (QC) and assay of raw materials and other substances. **[C5]** Suggest different methods for QC and assay of varoius pharmaceutical preparations.
4.4 Recognize and control possible physical and/or chemical incompatibilities that may occur during drug dispensing.	**[C6]** Solve problems concerning physical and chemical incompatibilities that may occur during drug dispensing.
4.5 Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	**[C7]** Select appropriate methods of isolation, purification, identification of active substances from different origins. **[C8]** Choose the appropriate methods of synthesis, identification and standardization of active substances from different origins.
4.6 Apply the principles of bio – informatics and computer –aided tools in drug design.	**[C9]** Apply principles of bio-informatics and computer-aided tools in drug design.
4.7 Apply various principles to determine the characteristics of biopharmaceutical products.	**[C10]** Employ analytical technology fundamentals to determine characteristics of biopharmaceutical products.

4.8 Select and assess appropriate methods of infection control to prevent infections and promote public health.	**[C11]** Suggest the appropriate methods to prevent infections and promote health care.
4.9 Utilize the pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	**[C12]** Integrate the knowledge of physiology, pharmacology and toxic profile for proper selection of drugs in various disease conditions.
4.10 Calculate and adjust dosage and dose regimen of medications.	**[C13]** Calculate and adjust dosage and dose regimen of medications and prescription dispensing.
4.11 Assess drug interactions, ADRs and pharmacovigilance.	**[C14]** Choose the proper drug in various disease conditions based on knowledge of drug-drug interaction and adverse drug reactions.
4.12 Apply the principles of pharmacoeconomics in promoting cost/effective Pharmacotherapy.	**[C15]** Use principles of pharmacoeconomics in promoting cost/effective pharmacotherapy.
4.13 Analyze and interpret experimental results as well as published literature.	**[C16]** Evaluate and interpret experimental results and published literature.
4.14 Analyze and evaluate evidence-based information needed in pharmacy Practice.	**[C17]** Analyze a wide range of information including both scientific and library based material in pharmacy practice.

General and Transferable Skills	
5.1 Communicate clearly by verbal and means.	**[D1]** Interact effectively with patients, the public and health care professional, including both written and oral communication.
5.2 Retrieve and evaluate information from different sources to improve professional competencies.	**[D3]** Reprocess and evaluate information from different sources to improve professional abilities.
5.3 Work effectively in a team.	**[D4]** Implement tasks as a member of a team.
5.4 Use numeracy, calculation and statistical methods as well as information technology tools.	**[D5]** Use numeracy, computation and statistical methods. **[D6]** Practice computer skills including word, spreadsheet, database use and internet communications.
5.5 Practice independent learning needed for continuous professional development.	**[D7]** Update pharmaceutical knowledge for development of pharmacy profession through independent lifelong continuous education.
5.6 Adopt ethical, sales and safety guidelines.	**[D8]** Adopt ethical, legal and safety guidelines.
5.7 Develop financial, sales and market management skills.	**[D9]** Develop management skills including financial sales and marketing.
5.8 Demonstrate creativity and time management abilities.	**[D10]** Manage time as evidenced by the ability to plan and implement efficient mode of working.

5.9 Implement writing and presentation skills.	**[D11]** Implement writing and presentation skills.
5.10 Implement writing and thinking, problem- solving and decision- making abilities.	**[D12]** Develop critical thinking, problem solving and decision making skills.

The Educational Program ILOs Exceeding the National Academic Reference Standards (NARS/2009)

Faculty Educational Program ILOs
A-Knowledge and understanding
[A3] Outline the basics of macro and microscopical characters of different medicinal plant organs, detection of adulteration as well as, their proper collection, storage and marketing in addition to chemo taxonomical classification of medicinal plants.
[A41] Outline the principles of plant biotechnology and molecular biology used for production of new and increasing the amount of pharmaceutical natural product.
B- Professional and Practical Skills
[B3] Handle experimental animals in laboratory settings for the purpose of using such skills in drug research and/or approval.
[B10] Perform different analytical tests for blood and body fluids to determine the functional state of different body organs.
[B16] Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.
C- Intellectual skills
[C18] Assess public attitude and determine communication tools in various situations.
D- General and Transferable Skills
[D2] Ask the right questions to clarify patient concerns.

2- Programme Structure and Contents

a- Program duration: 5 years into ten semesters (Number of hours = 177 hours)

b- Program structure:

- **The Bachelor of Pharmacy program is completed in five years (ten terms), each term is made up of 15 weeks of full-time study.**
- **The following table illustrates the comparison between the Curriculum Structure of Faculty of Pharmacy، Zagazig University، and the structure of a Pharmacy Curriculum allocated by the NARS, 2009.**

No. of hours/week	Lecture	Practical	Total	%	NARs%
Basic Sciences	20	20	30	17	10-15
Pharmaceutical Sciences	52	48	76	43	35-40
Medical Sciences	19	12	25	15	20-25
Pharmacy Practice	17	14	24	12	10-15
Health and Environmental Sciences	7	7	10.5	6	5-10
Behavioral and Social Sciences	3	---	3	2	2-4
Pharmacy Management	3	---	3	2	2-4
Discretionary	3	4	5	3	up to 8
Total	**125**	**104**	**177**	100%	

c- Study plan:

item	No. of hours
University requirements	5 hrs
Faculty compulsory courses	168 hrs
Faculty elective courses	4 hrs 6 courses (Clinical nutrition, Heterocyclic synthesis of drugs; Manufacturing and production of Crude drugs of natural origin; Good manufacturing practice (GMP); Advanced pharmacology; Forensic chemistry.
Practical field training	300 hrs of training in pharmacy setting
Program level	5 years / ten terms

d- Curriculum Structure:

Matrix 3: Comparison between curriculum structure of NARS, 2009 and Bachelor of Pharmacy Program

Course Category	Course	Lecture	Practical	Total
Basic Sciences	General & Physical chemistry	2	2	3
	Organic chemistry1	2	2	3
	Organic chemistry2	2	2	3
	Organic chemistry3	2	2	3
	Organic chemistry4	2	2	3
	Analytical chemistry1	1	2	2
	Analytical chemistry2	1	2	2
	Analytical chemistry3	2	2	3
	Analytical chemistry4	2	2	3
	Mathematics	1	0	1
	Botany and medicinal plants	2	2	3
	English and medical terms	1	0	1
	Total = 30			

Pharmaceutical Sciences	Biopharmaceutics & Pharmacokinetics	2	2	3	
	Sterile products & Controlled release	2	2	3	
	Pharmaceutics 1	2	2	3	
	Pharmaceutics 2	2	2	3	
	Pharmaceutics 3	2	2	3	
	Pharmaceutics 4	2	2	3	
	Industrial pharmacy 1	2	1		2.5
	Industrial pharmacy 2	2	1		2.5
	Medicinal chemistry1	2	2	3	
	Medicinal chemistry2	2	2	3	
	Medicinal chemistry3	2	2	3	
	Medicinal chemistry4	2	2	3	
	Pharmacognosy1	3	2	4	
	Pharmacognosy2	2	2	3	
	Chromatography of natural products	2	2	3	
	Phytochemistry1	2	2	3	
	Phytochemistry2	2	2	3	

	Natural products biotechnology	2	2	3
	General microbiology & immunology	3	2	4
	Pharmaceutical microbiology	2	2	3
	Production of raw materials	2	2	3
	Quality control	2	2	3
	Bioassay1	2	2	3
	Biotechnology	2	0	2
	Drug design	2	2	3
Total = 76				
Medical Sciences	Anatomy and Histology	2	2	3
	Physiology	2	0	2
	Pathology and Parasitology	2	1	2.5
	Biochemistry 1	2	2	3
	Biochemistry 2	3	2	4
	Pharmacology 1	3	2	4
	Pharmacology 2	2	2	3
	Medical microbiology	3	1	3.5
Total = 25				

Pharmacy Practice	Clinical Biochemistry1	2	2	3
	Clinical Biochemistry2	2	2	3
	Hospital and Clinical Pharmacy	2	1	2.5
	Community Pharmacy	2	1	2.5
	Applied pharmacognosy	2	2	3
	Herbal medicines	2	2	3
	Clinical pharmacology	3	2	4
	Pharmacotherapy	2	2	3
Total = 24				
Health and Environmental Sciences	Bioassay 2	2	2	3
	Toxicology 1	2	2	3
	Toxicology 2	2	2	3
	Public health	1	1	1.5
Total = 10.5				
Behavioral and Social Sciences	Human Rights	2	0	2
	Psychology	1	0	1
Total = 3				
Pharmacy Management	Drug marketing and communication skills	2	0	2
	Accounting and	1	0	1

	pharmaceutical business administration			
Total = 3				
Discretionary	Elective course 1	1	2	2
	Elective course 2	1	2	2
	Research Project	1	0	1
Total = 5				

e- Summer Training:

- Every student should complete 300 hours of training in one of the following pharmacy settings: community or hospital pharmacies, pharmaceutical Firms and/or research institutes. The student should learn how to communicate with patients and healthcare team. The student also should know how to manage, dispense and properly store different dosage forms. Finally, the student should know the regulations of dispensing OTC medications as well as rules and laws controlling the pharmacy profession.

f- Program Learning Outcome Mapping With Courses Matrix

جدول رقم (1): الفرقة الأولى - الفصل الدراسي الأول

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
AC110	Analytical chemistry-1	1	2	2	A1, A11, A12,B2, B4, C6, D7
POC110	Pharmaceutical Organic Chemistry-1	2	2	3	A1,A15,B2, B5, C6,D7
PG110	Botany and Plant Taxonomy	2	2	3	A3,C6
AC111	General and Physical Chemistry	2	2	3	A1, A9, B2, D7
PC110	Pharmaceutics-1	2	2	3	A2,A12, A36, B1, B2, B4, C1,C11,D6,D7
EL110	English and Medical Terminology	1	-	1	A2,B1, D1
	Total	10	10	15	

جدول رقم (2): الفرقة الأولى - الفصل الدراسي الثاني

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
AC122	Analytical chemistry-2	1	2	2	A1, A11, A12,B2, B4, C6, D7
POC121	Pharmaceutical Organic Chemistry-2	2	2	3	A1,A15,B2, B5,C6,D7
PG121	Pharmacognosy 1	3	2	4	A2, A3,A12,B2, B4,C4, C6,
PC121	Pharmaceutics-2	2	2	3	A2, A9, B2,C1, D6, D7
MS120	Mathematics and Statistics	1	-	1	A1, B1, C14, D4,
HR120	Human Rights and Professional Ethics	2	-	2	A5, A8, A38, C15, D1, D2, D7
	Total	11	8	15	

جدول رقم (3): الفرقة الثانية الفصل - الدراسي الأول

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
AC213	Analytical chemistry-3	2	2	3	A1, A11, A12,B2, B4, C6, D7
POC212	Pharmaceutical Organic Chemistry-3	2	2	3	A1,A15,B2, B5,C6,D7
PG212	Pharmacognosy 2	2	2	3	A2, A3,A12,B2, B4,C4, C6,
PC212	Pharmaceutics-3	2	2	3	A2, A16, A17, B2, B3, C1, C2, D6, D7
MD210	Anatomy & Histology	2	2	2	A4
DM21	Drug Marketing and Communication Skills	2	-	2	A5, A6, D1, D2, D9, D10,
	Total	12	10	17	

جدول رقم (4): الفرقة الثانية - الفصل الدراسي الثاني

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
AC224	Analytical chemistry 4	2	2	3	A1, A11, A12,B2, B4, C6, D7
POC223	Pharmaceutical Organic Chemistry-4	2	2	3	A1,A15,B2, B5,C6,D7
PC223	Pharmaceutics-4	2	2	3	A2, A9, A16, A17,A38, B2, B3, C1, C2, C5, D6, D7
MI22	General Microbiology + Immunology	3	2	4	A2, A4, A27, B2, B6, B7, B8, C9, D7
PT220	Physiology	2	-	2	A4, A24, B1, C10, D6,
PS220	Psychology	1	-	1	A5, C15, D1, D2, D3, D11
	Total	12	8	16	

جدول رقم (5): الفرقة الثالثة الفصل- الدراسي الأول

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
PC314	Biopharmaceutics and Pharmacokinetics	2	2	3	A2, A9, A19, D6
PG313	Chromatography of Natural Products	2	2	3	A12, B1, B4, C6, D3, D7
PT312	Pharmacology 1	3	2	4	A2, A4, A29, A30, B2, B6, C10, C12, D6, D7
BC310	Biochemistry 1	2	2	3	A2, A4, A25, B2, B8, B9,C6,D3, D7
MC310	Medicinal Chemistry-1	2	2	3	A2, A15, B2, B5, C6, D6, D7
MI311	Pharmaceutical Microbiology	2	2	3	A2, A18, A22, A23, B2, B7, C3, C9, D7
	Total	13	12	19	

جدول رقم (6): الفرقة الثالثة – الفصل الدراسي الثاني

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
PC325	Sterile Products and Controlled Drug Delivery Systems	2	2	3	A15, A17, A18, B2, B3, B5, C1, C2, C4, C5, D6, D7
PG324	Phytochemistry-1	2	2	3	A2, A12, B2, B4, C6, , D3, D6, D7
PT323	Pharmacology 2	2	2	3	A2, A4, A29, A30, B2, B6, C10, C12, D6, D7
BC321	Biochemistry 2	3	2	4	A2, A4, A25, B2, B8, B9, C6, D3,D7
MI322	Parasitology and Pathology	2	1	2.5	A4, A24, A27, A28, B2, B6, B7, B8, C9, D7
MC321	Medicinal Chemistry-2	2	2	3	A2, A15, B2, B5, C6, D6, D7,
	Total	13	11	18.5	

جدول رقم (7): الفرقة الرابعة – الفصل الدراسي الأول

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
PG415	Phytochemistry 2	2	2	3	A2, A12, B2, B4, C6, , D3, D6, D7
BC412	Clinical Biochemistry 1	2	2	3	A2, A4, A24, A25, A28, B2, B8, B9, C6,D3, D7
PT414	Bioassay 1	2	2	3	A2, A31, A35, B4, C6, D6, D7
PT415	Toxicology 1	2	2	3	A2, A7, A8, A33, B11, C10, D6
MC412	Medicinal Chemistry 3	2	2	3	A2, A15, B2, B5, C6, D6, D7
MI413	Medical Microbiology	3	1	3.5	A2, A4,A27, A28, B2, B6, B7, B8, C9, D6, D7
	Total	13	11	18.5	

جدول رقم (8): الفرقة الرابعة – الفصل الدراسي الثاني

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
PP420	Hospital Pharmacy and Clinical Pharmacy	2	1	2.5	A8, A20, A37, B2, B3, C1, C11, C15, D1, D3, D6, D7, D9, D11
PG426	Biotechnology of Natural Product	2	2	3	A10, A26,B5, C6, C8, D3, D6, D7
BC423	Clinical Biochemistry 2	2	2	3	A2, A4, A24, A25, A28, B2, B8, B9, C6,D3, D7
PT426	Bioassay 2	2	2	3	A2, A31, A35, A36, B4, C6, D6, D7
PT427	Toxicology 2	2	2	3	A2, A7, A8, A34, B10, C10, D6
MC423	Medicinal Chemistry 4	2	2	3	A2, A15, B2, B5, C6, D6, D7
MI424	Biotechnology	2	-	2	A2, A10, A15, B2, B5, C6, C8, D6, D7
	Total	14	11	19.5	

جدول رقم (9): الفرقة الخامسة – الفصل الدراسي الأول

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
PP511	Community Pharmacy	2	1	2.5	A8, A21, A36, A37, B13, C15, D1, D3, D6, D7, D9, D11
PC516	Industrial Pharmacy 1	2	1	2.5	A2, A15,B12, C1, D7
PG517	Applied Pharmacognosy	2	2	3	A2, A12, B2, B5, C6, D3, D6, D7,
PT518	Clinical Pharmacology	3	2	4	A2, A4, A31, B6, C10, D3, D6, D7
	Elective 1	1	2	2	
PT519	Pharmacotherapy	2	2	3	A4, A29, B2, B6, C10, C12,C13, D6, D7
MI515	Public Health	1	1	1.5	A7, A21, B2, B7, B13, B14, C9, D3, D6, D7
	Total	13	12	18.5	

جدول رقم (10): الفرقة الخامسة – الفصل الدراسي الثانى

Course code	Course title	No. Of hours per week			PROGRAM ILO'S COVERED
		Lect	Pract.	Total	
PC527	Industrial Pharmacy 2	2	1	2.5	A2, A15, B3, B12,C1, C3, D7
PG528	Phytotherapy	2	2	3	A2, A4, A8, A32, B5, C6, D3, D6, D7
AC525	Quality Control	2	2	3	A2, A11, A18, B1, B2, B4,B16, C3, C4, C6,D4, D7
	Elective 2	1	2	2	
MC524	Drug Design	2	2	3	A14, A15, A17, B2, B5, C7, D4, D5, D7
POC314	Production of Raw Materials	2	2	3	A15, B2, B5, C6, D7
BA510	Accounting and Business Administration	1	-	1	A5, A6, A7, D1, D2, D8, D9
RP520	Research project	1	-	1	A5, B15, C14, D2,D4, D5, D9, D10, D11
	Total	13	11	18.5	

Elective Courses

Course code	Course Title	No. of hours per week			PROGRAM ILO'S COVERED
		Lect.	Pract.	Total	
BC524	Clinical nutrition	2	2	3	A7, B14,C9, D3
PT529	Advanced Pharmacology	2	2	3	A2, A4, A30, B2, C10, C14, D3, D5, D7, D10
POC525	Heterocyclic synthesis of drugs	2	2	3	A15, B2, B5, C6, D7
PG529	Manufacturing and production of crude drugs of natural origin	2	2	3	A12, B2, B5, C6, D6, D7
PC528	Good manufacturing practice (GMP)	2	2	3	A1, A11, A18, B1, B2, B3, B16, C3, D3, D6, D7
MC525	Forensic chemistry	2	2	3	A7, A12, A13, B4, C6

	Total contact hours	PROGRAM ILO'S COVERED
Summer training	300 hr	A5, A6, A8, A37, A38, B1, B2, B3, C15, D1, D2, D3, D7, D11

3- Admission policy

The faculty complies with the admission regulations and requirements of the Egyptian Supreme Council of University (ESCU)

4- Program admission requirements

The admission to the program requires general secondary school certificate with major in biology and chemistry, or an equivalent certificate from a foreign institute recognized by the Ministry of Higher Education

5- Regulation for progression and program completion

Pharmacy students spend five educational years, divided on ten terms (each of 15 weeks), each term is followed by practical, written and oral exam

1- Students must attend lectures and practical lessons, their attendance in practical lessons must be not less than 75 % otherwise, and the department

council prevents him/her from entering the written exam after approval from the faculty council.

3- A minimum of 60% of the maximum grade (MG) is the passing grade for any of the fundamental courses. In the complementary courses 50% MG would sufficient to pass the course.

4- Course grades are as follows

Degree classification:

Less than 60 %	**Fail**
From 60 % and less than 65 %	**Fair**
From 65 % and less than 75 %	**Good**
From 75 % and less than 85 %	**Very Good**
From 85 % and more	**Excellent**

For the students to be transferred from one academic year to the next**, he/she** is required to have successfully passed in all subjects. However, the student may still be transferred **if he/she** has failed in not more than two basic subjects and two complementary ones from the same academic year or from previous years of study. In such cases, students "carrying" subjects from one year to the next should re-sit for their "failed" subjects in their proper respective semesters.

Final year students who have failed in a maximum of two basic subjects and two complementary ones in that year or from previous years can re-sit for their exams in those subjects in September of the same year. Should the student fail

again**, he/she** has to re-sit for his/her exams in those subjects in their proper respective semesters thereafter as many times as necessary until he/she succeeds.

6- Assessment

Student Assessment Methods

ILOs	**Method of achievement and assessı**
Knowledge and Understanding Intellectual Skills	Written and oral Exam
Professional and practical Skills Intellectual Skills	Practical Exam Summer Training
Intellectual Skills General and Transferable Skills	Oral Exam Team Wrok Assignment

Methods of Assessment	**Weight of Assessment**
Written Exam	60% of total marks
Practical Exam	25% of total marks
Oral Exam	15% of total marks

7- Evaluation of program intended learning outcomes

Evaluator	Tool
1-Senior students	• Questionnaires • Meetings with bachelor students
2-Alumni	• Questionnaires • Meetings with graduates
3-Stakeholders	• Questionnaires for staff members • Questionnaires for Labor market organizations members& Heads and managers of the business sector • Meetings with Labor market organizations members
4-Internal Evaluator	Reviewing Prof. Abd allah ElShanawani Prof. Asem ElShazli
5-External Evaluators	Reviewing Prof. Mahmoud Bakr Al-Ashmawi, Department of Pharmaceutical Chemistry, Mansoura University
6-Others	Curriculum committee
7- Statistics	Students grades Rate of program completion/ graduation

Rate of pass/failure
Sample size of questioners = 20% of population

Appendix-1: courses specification