FACULTY OF PHARMACY – ZAGAZIG UNIVERSITY

Toxicology and Forensic Chemical Analysis Diploma Program Specification

A. Basic Information:

1. Program Title: Toxicology and Forensic Chemical Analysis Diploma

2. Program Type: Credit hours program (1 year, 30 CU)

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

4. Department (s):

The program is under the supervision of Pharmacology and Toxicology Department.

5. Coordinators:

Prof. Hany El-Bassosy (Vice dean for postgraduate affairs and scientific research)

Ass. Prof. Islam Ahmed Abd El-Hamed Ibrahim (Diploma coordinator)

6. Date of Program specification approval: Program specification was approved by Faculty Council

7. External Evaluator: Prof.

8. Internal Evaluator: Prof. Waleed Barakat (Professor of Pharmacology and Toxicology; Faculty of Pharmacy; Zagazig University).

B. Professional Information:

I- Program Aims

The faculty of Pharmacy, Toxicology and Forensic Chemical Analysis Diploma is a one-year (30 CU) program that delivered for pharmacy graduates. The program combines coursework and research to build and extend pharmacists' knowledge in the field of toxicology and forensic chemical analysis, so they can professionally help healthcare teams to prevent, treat and manage different types of toxicities including environmental and occupational toxicities, drug abuse and doping in addition to professional participation in crime scene investigations. The program offers several courses in toxicology and forensic chemical analysis, in addition to a supervised, structured research project on a topic relevant to toxicology and forensic chemical analysis. Program outcomes include: career advancement as a hospital and occupational toxicology specialist and forensic chemical analysis specialist.

The program aims are summarized as follows:

1. Develop knowledge and skills in toxicology and forensic chemical analysis practice.

2. Prepare pharmacists capable of providing high quality pharmaceutical care to prevent different types of toxicities and being integral members of the health care and crime investigation teams.

3. Nurture pharmacists with the advanced pharmaceutical care knowledge in areas related to toxicology and forensic chemical analysis.

4. Develop communication, problem solving, decision making and research skills.

5. Develop self-learning attitude for continuous improvement of professional knowledge

II- Attributes of the Graduates

Upon completion of the program, the graduates will be able to:

1. Develop professional and personal skills that enhance collaboration with other healthcare professionals and legal authorities and promote prevention of environmental and occupational toxicities, drug abuse and doping.
2. Specify chemical analysis tools on identification of different types of toxicities and criminal evidence.
3. Design an optimal individualized plan and a monitoring strategy of different types of toxicities.
4. Resolve different drug-toxicity problems encountered in various healthcare settings.
5. Provide evidence-based drug toxicity information and education services to healthcare professionals and patients.
6. Respect Moral and ethical principles for professional practice in the area of specialty
7. Demonstrate effective communication, leadership, time management and teamwork skills

8. Become a life-long learner for continuous improvement of professional knowledge and skills.

III. Intended Learning Outcomes (ILO's):

A- Knowledge and Understanding

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

A1 Enumerate the signs and symptoms of different types of toxicities.

A2 Outline the evidence-based approach to drug therapy decisions for treating different types of toxicities.

A3 Describe systematic approach to toxicity monitoring including different biochemical laboratory tests.

A4 Outline different issues regarding drug abuse and doping.

A5 Explain the concepts and principles of toxicology and forensic chemical analysis.

A6 Outline the laws and legislations that regulate the use of drugs and pharmaceutical preparations.

A7 Summarize environmental and occupational toxicity management programs in different health care facilities.

B- Professional and Practical Skills

At the end of the program students will be able to:

B1 Design appropriate treatment and monitoring plans of different types of toxicities according to patients needs to ensure achievement of the desired therapeutic outcomes.

B2 Identify, prioritize, analyze, evaluate, and resolve different toxicology and forensic chemical analysis issues.

B3 Interpret different laboratory results including chemical, biochemical, and hematological data.

B4 Advise patients and other healthcare professionals about effective management of environmental and occupational toxicities.

B5 Perform different forensic chemical analysis tests with interpretation of results.

B6. Prepare proper crime scene investigation reports and documentation.

B7 Demonstrate understanding of the laws and legislations of drug use and distribution.

C- Intellectual Skills

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

C1 Integrate knowledge of the toxicology and forensic chemical analysis.

C2 Evaluate the effectiveness of institutional protocols to manage environmental and occupational toxicities.

C3 Select the required chemical, biochemical, and hematological laboratory tests in order to monitor different types of toxicities and to identify strong criminal evidence.

C4 Adopt risk management strategies including toxicity control programs as well as medication errors minimizing strategies

C5 Develop an appropriate research strategy starting from formulating a research question till communication of results.

C6 Apply good communication principles for counseling and education of patients and other healthcare professionals in addition to effective cooperations with the legal authorities.

D- General and Transferable Skills

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

D1 Communicate effectively in an oral and a written way

D2 Practice computer skills including word and internet communications.

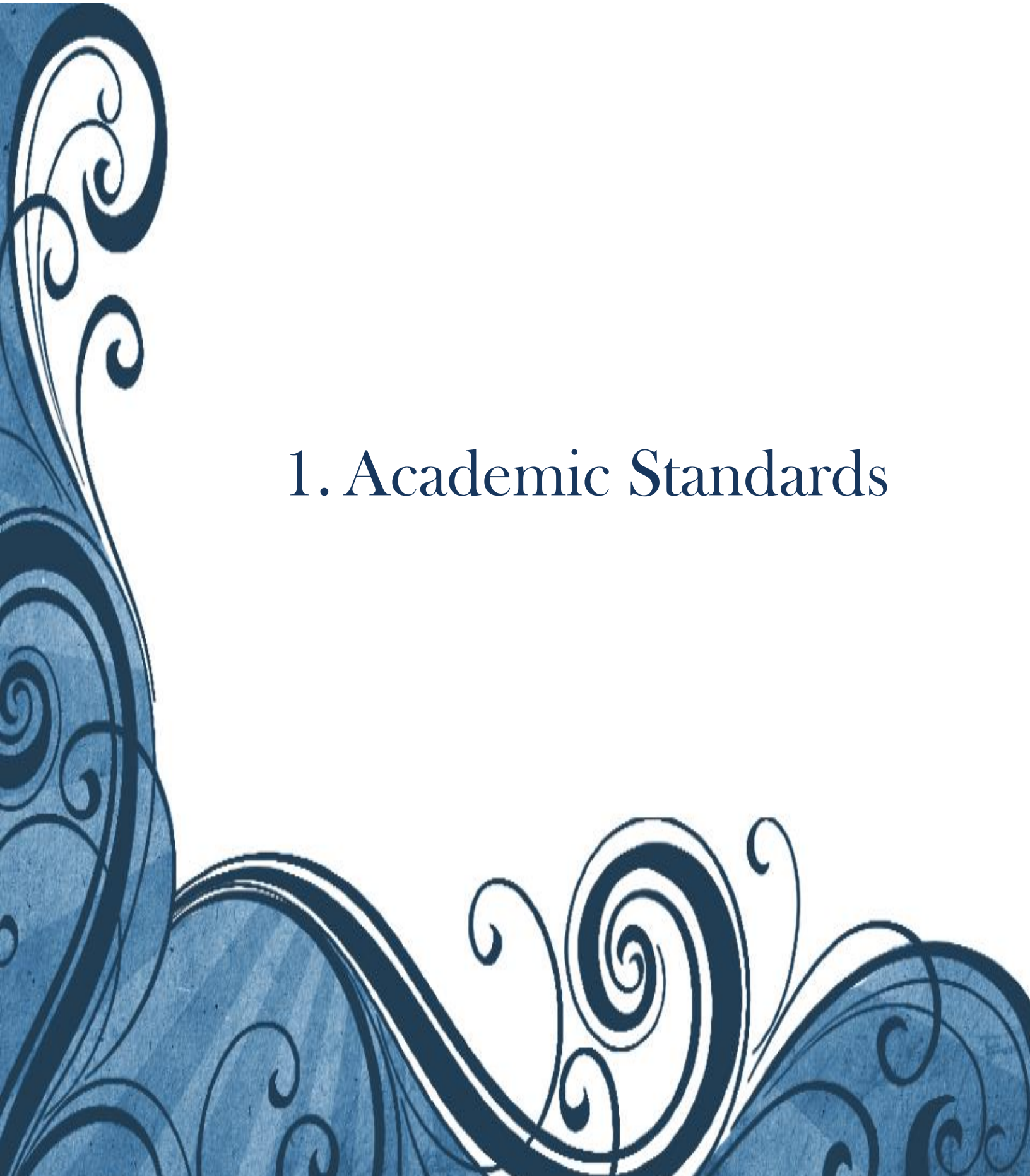
D3 Practice self-assessment of learning needs

D4 Retrieve information from different sources to improve professional abilities.

D5 Work effectively in a team

D6 Develop decision making, critical thinking, problem solving and time management skills

D7 Develop self-learning skills



1. Academic Standards

External References for standards

Faculty of Pharmacy is adapting the Academic References Standards for postgraduate studies (March 2009) as well as outcomes of General Pharmacy Practice (Diploma), Postgraduate Certificate delivered by University of Glasgow, Scotland, UK.

. Matrix 1: Comparison between the Program graduate attributes and (ARS, 2009)

ARS Graduates Attributes	Program Graduates Attributes
1. Apply acquired knowledge in professional practice	2. Specify chemical analysis tools to identify different types of toxicities and criminal evidence. 3. Design an optimal individualized plan and a monitoring strategy of different types of toxicities.
2. Identify professional problems and suggest solution strategies	4. Resolve different drug-toxicity problems encountered in various healthcare settings.
3. Master professional skills and use the appropriate techniques in professional practice	1. Develop professional and personal skills that enhance collaboration with other healthcare professionals and legal authorities and promote prevention of environmental and occupational toxicities, drug abuse and doping.
4. Communicate with and lead different teams through systematic	7. Demonstrate effective communication, leadership, time

professional work	management and teamwork skills
5. Take evidenced-based decisions	5. Provide evidence-based drug toxicity information and education services to healthcare professionals and patients.
6. Use available resources efficiently	
7. Recognize his role in community service and development.	
8. Show commitment to integrity, credibility and professional ethics and accept accountability	6. Respect Moral and ethical principles for professional practice in the area of specialty
9. Recognize the importance of self-development and continuous education	8. Become a life-long learner for continuous improvement of professional knowledge and skills.

Matrix 1I: Comparison between the Program Intended Learning Outcomes ILOs and (ARS, 2009)

	ARS	Program ILOs
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A1 Enumerate the signs and symptoms of different types of toxicities. A2 Outline the evidence-based approach to drug therapy decisions for treating different types of toxicities. A3 Describe systematic approach to toxicity monitoring including different biochemical laboratory tests. A4 Outline different issues regarding drug abuse and doping. A5 Explain the concepts and principles of toxicology and forensic chemical analysis.
	2.1.2 - Moral and legal principles for professional practice in the area of specialization.	A6 Outline the laws and legislations that regulate the use of drugs and pharmaceutical preparations.
	2.1.3 - Principles and the basics of quality in professional practice in the area of specialization.	A4 Outline different issues regarding drug abuse and doping. A7 Summarize environmental and occupational toxicity management programs in different health care facilities.
	2.1.4 - Mutual influence between professional practice and its impact on the environment.	

Professional and Practical Skills	2.3.1- Master basic and modern professional skills in the area of specialization.	B1 Design appropriate treatment and monitoring plans of different types of toxicities according to patients needs to ensure achievement of the desired therapeutic outcomes. B2 Identify, prioritize, analyze, evaluate, and resolve different toxicology and forensic chemical analysis issues. B4 Advise patients and other healthcare professionals about effective management of environmental and occupational toxicities. B5 Perform different forensic chemical analysis tests with interpretation of results. B7 Demonstrate understanding of the laws and legislations of drug use and distribution.
	2.3.2- Write and evaluate professional reports.	B3 Interpret different laboratory results including chemical, biochemical, and hematological data. B6. Prepare proper crime scene investigation reports and documentation.
Intellectual Skills	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	C1 Integrate knowledge of toxicology and forensic chemical analysis. C2 Evaluate the effectiveness of institutional protocols to manage environmental and occupational toxicities. C4 Adopt risk management strategies including toxicity control programs as well as medication errors minimizing strategies

	2.2.2- Solve specified problems in the lack or missing of some information.	C4 Adopt risk management strategies including toxicity control programs as well as medication errors minimizing strategies
	2.2.3 - Analyze research of specified topics.	C5 Develop an appropriate research strategy starting from formulating a research question till communication of results.
	2.2.4 - Evaluate risks in professional practices	C4 Adopt risk management strategies including toxicity control programs as well as medication errors minimizing strategies
	2.2.5 - Professional decision-making in the contexts of diverse disciplines.	C3 Select the required chemical, biochemical, and hematological laboratory tests in order to monitor different types of toxicities and to identify strong criminal evidence.
	Exceeding ARS 2009	C6 Apply good communication principles for counseling and education of patients and other healthcare professionals in addition to effective cooperations with the legal authorities.
General and Transferable Skills	2.4.1- Communicate effectively.	D1 Communicate effectively in an oral and a written way
	2.4.2- Effectively use information technology in professional practices	D2 Practice computer skills including word and internet communications
	2.4.3- Self-assessment and define his personal learning needs.	D3 Practice self-assessment of learning needs
	2.4.4- Use variable sources to get information and knowledge.	D4 Retrieve information from different sources to improve professional abilities

	2.4.5 – Show teamwork and time management skills	D5 Work effectively in team
	2.4.6 –Lead others in different professional disciplines.	D6 Develop decision making, critical thinking, problem solving and time management skills
	2.4.7 - Continuous and self learning.	D7 Develop self learning skills

Matrix 1II: Comparison between the Program Graduates Attributes and (Graduates Attributes of General Pharmacy Practice (Diploma), Postgraduate Certificate delivered by University of Glasgow, Scotland, UK)

University of Glasgow (Diploma) Graduates Attributes	Program Graduates Attributes
□ apply appropriate knowledge, skills and attitudes in order to carry out effectively the role of the general pharmacist practitioner within your pharmacy practice base and wider healthcare teams	1. Develop professional and personal skills that enhance collaboration with other healthcare professionals and legal authorities and promote prevention of environmental and occupational toxicities, drug abuse and doping.
□ establish population health needs and apply specialist pharmaceutical knowledge to public health issues. □apply knowledge of pathophysiology, pharmacology and the clinical use of drugs and therapeutic guidelines to the treatment of common disease states	2. Specify chemical analysis tools to identify different types of toxicities and criminal evidence. 3. Design an optimal individualized plan and a monitoring strategy of different types of toxicities.
□ identify, prioritise and resolve complex pharmaceutical care issues	4. Resolve different drug-toxicity problems encountered in various healthcare settings.

□ access, gather, interpret, critically evaluate and summarise medicines information	5. Provide evidence-based drug toxicity information and education services to healthcare professionals and patients. 8. Become a life-long learner for continuous improvement of professional knowledge and skills.
□ carry out effective consultations with patients respecting their diverse needs and with regard to confidentiality and consent	6. Respect Moral and ethical principles for professional practice in the area of specialty 7. Demonstrate effective communication, leadership, time management and teamwork skills

Matrix 1V: Comparison between the Program Intended Learning Outcomes ILOs and (ILOs of General Pharmacy Practice (Diploma), Postgraduate Certificate delivered by University of Glasgow, Scotland, UK)

Benchmark results demonstrate nearly 70% consistency with ILOs of General Pharmacy Practice (Diploma), Postgraduate Certificate delivered by University of Glasgow, Scotland, UK

	University of Glasgow (Diploma)	Program ILOs
Knowledge and Understanding	□ the organisation and structure of the NHS □ health policy and its impact on working practices □ medicines management and its application to individual patient care □ effective methods of working with patients, health and non-health professionals □ consultation methods and their applicability to patient care □ compliance, adherence and concordance`	A6 Outline the laws and legislations that regulate the use of drugs and pharmaceutical preparations.

	□ health beliefs: theories and models □ advantages and limitations of different methods of communication in the context of medicines management □ the audit as a tool to improve the quality of patient care □ change management as a tool to improve service provision. □ ethical issues influencing prescribing decisions	**Not covered**
	□ an evidence-based approach to drug therapy decisions □ a systematic approach to the delivery of care to patients with complex needs □ applied therapeutics □ a systematic approach to complex queries about medicines use □ clinical governance in the context of medicines management	A1 Enumerate the signs and symptoms of different types of toxicities. A2 Outline the evidence-based approach to drug therapy decisions for treating different types of toxicities.

	□ application of pharmacokinetic and pharmacodynamic principles to individual patient care □ a systematic approach to drug and therapy monitoring in patients with complex conditions □ the effective use of complex clinical data sets	A3 Describe systematic approach to toxicity monitoring including different biochemical laboratory tests. A5 Explain the concepts and principles of toxicology and forensic chemical analysis.
	□ pharmaceutical public health	A4 Outline different issues regarding drug abuse and doping. A7 Summarize environmental and occupational toxicity management programs in different health care facilities.

Professional and Practical Skills	□ applying a knowledge of the pharmacology of drugs, pathophysiology of disease states and evidence-based treatment guidelines in the context of individual patients □ responding to symptoms and counter prescribing medication for patients with minor ailments	B1 Design appropriate treatment and monitoring plans of different types of toxicities according to patients needs to ensure achievement of the desired therapeutic outcomes.

	applying the principles of medicines management and pharmaceutical care in practice interpreting prescriptions for medicines and evaluating for safety, quality, efficacy, legality, and economy identifying, prioritizing, analyzing, evaluating, and resolving pharmaceutical care issues (including social issues) related to real patients irrespective of complexity carrying out a review of patients' medication at a range of levels, document recommendations and influencing prescribers and patients appropriately to institute agreed changes conducting an analysis of a patient safety issue, evaluating options and drawing an appropriate conclusion conducting a clinical audit, evaluating the outcome and making recommendations for change.	B2 Identify, prioritize, analyze, evaluate, and resolve different toxicology and forensic chemical analysis issues. B3 Interpret different laboratory results including chemical, biochemical, and hematological data.

	□ advising patients, carers and healthcare professionals about medicines usage and health promotion □ advising on the clinical significance of drug-drug, drug-patient and drug-disease interactions and devising a course of action to minimise risk to the patient	B4 Advise patients and other healthcare professionals about effective management of environmental and occupational toxicities.
	□ performing complex pharmaceutical calculations in order to advise on safe drug administration □ interpretation of the significance of general, biological and medical statistics	B5 Perform different forensic chemical analysis tests with interpretation of results.
	Not covered	B6. Prepare proper crime scene investigation reports and documentation.
	□ demonstrating respect for the patient irrespective of ethnic, cultural or religious background □ carrying out the role of the clinical pharmacist effectively within the multidisciplinary healthcare team	B7 Demonstrate understanding of the laws and legislations of drug use and distribution.

	□ investigating medicines information enquiries using an appropriate research strategy, and formulating and communicating responses to queries in a timely manner □ investigating medicines information enquiries using appropriate evidence and formulating a response appropriate to the needs of the enquirer □ developing the pharmaceutical service and applying change management techniques	**Not covered**
Intellectual Skills	□ contributing to the improvement of healthcare outcomes through reflective practice and innovation. □ recognising, valuing and use appropriate theories, concepts and principles from a range of disciplines □ assessing the outcome of personal contributions to patient care	C1 Integrate knowledge of the toxicology and forensic chemical analysis. C2 Evaluate the effectiveness of institutional protocols to manage environmental and occupational toxicities.

	□ selecting a range of biochemical, haematological, microbiological and near-patient tests in order to monitor efficacy and toxicity of drug therapy	C3 Select the required chemical, biochemical, and hematological laboratory tests in order to monitor different types of toxicities and to identify strong criminal evidence.
	□ advising on risk management issues and ways to minimise error	C4 Adopt risk management strategies including toxicity control programs as well as medication errors minimizing strategies
	Not covered	C5 Develop an appropriate research strategy starting from formulating a research question till communication of results.
	□ evaluating and discussing legal and ethical influences related to the pharmaceutical care of individuals □ demonstrating the effective application of patient confidentiality and the principles of patient consent	**Partially covered through C6**
	□ working independently, efficiently and professionally within current NHS frameworks and the RPSGB code of ethics and professional conduct, managing any conflicting priorities □ accepting responsibility for your own actions and for the care of patients assigned to your	**Partially covered through C6**

	care	
	□ applying effective negotiating and influencing skills in order to achieve a definite outcome □ communicating clearly, precisely and appropriately with patients and all other healthcare professionals □ carrying out effective consultations with patients and carers to encourage compliance	C6 Apply good communication principles for counseling and education of patients and other healthcare professionals in addition to effective cooperations with the legal authorities.
General and Transferable Skills	□ effective written and verbal communication with academic tutors, peers, practice tutors, patients, carers and the multi-disciplinary healthcare team □ interpersonal skills: the ability to interact with patients, the public and other health and social care professionals	D1 Communicate effectively in an oral and a written way
	□ high-level information technology skills	D2 Practice computer skills including word and internet communications
	□ demonstrating appropriate initiative whilst recognising personal and professional limitations	D3 Practice self-assessment of learning needs
	□ reviewing, evaluating critically and synthesising sources	D4 Retrieve information from different sources to improve professional abilities

	of information and research methodologies cited in published literature to support the care of individual patients □ retrieving and document information in a clear and structured way □ critical appraisal and summation of information from a variety of sources	
	□ the ability to work independently and as part of a team within professional codes of practice and conduct, with recognition of the moral and ethical issues related to medicines management issues □ a positive attitude and constructive approach to group discussions	D5 Work effectively in team
	□ undertaking a structured approach to problem solving, forming an appropriate judgement even in the absence of complete data □ the ability to make appropriate decisions based on available information, with insight into the risks and benefits	D6 Develop decision making, critical thinking, problem solving and time management skills

	that may result from working with incomplete data □ time management and organisational skills □ high-level problem-solving skills.	
	□ the use of CPD as a tool for lifelong learning. □ accepting responsibility for your own lifelong learning and continuing professional development □ the ability to be a reflective practitioner and autonomous learner, with the ability to take responsibility for academic, professional and personal development	D7 Develop self learning skills

2- Programme Structure and Contents

a- Programme duration: 1 year divided into two semesters each semester made up of 15 weeks.

b- Programme structure: (30 CU)

Learning activity	Lectures	Practical	Project	Total
No. of hours/week	18	11	1	30

c- Study plan:

First Semester			Second semester		
Course	CU		Course	CU	
	L	P		L	P
Environmental & occupational toxicology (DTF 101)	2	1	Analytical toxicology (DTF 207)	2	1
Laws and legislations (DTF 102)	1	0	Forgery (DTF 208)	1	1
Forensic toxicology (DTF 103)	2	1	Drug abuses and doping (DTF 209)	2	1
Household toxicology (DTF 104)	1	1	Toxicology information for the public (DTF 210)	1	1
Postmortem toxicology (DTF 105)	2	1	Crime scene investigations (DTF 211)	2	1
Elective course 1 (DTF 106)	1	1	Elective course 2 (DTF 212)	1	1
			Research Project (DTF 213)	1	
Total	9+5=14		Total	9+7=16	
Total CU for the diploma	29 + 1 (project) = 30				

Elective courses: Molecular Toxicology; Advanced analytical Toxicology; Applied Toxicology; Impact of fire, weapons, and explosives.

d. Research Project Requirements:

Brief description:

The program contains a mandatory 'Research Project' which constitutes 1CU and must be completed under the supervision of a faculty member. A comprehensive dissertation and presentation on the project work is required from the student in order to pass the project.

The major intended learning outcomes of the research project:

1) Identify a research problem and use available sources (internet and databases) for gathering literature review.
2) Identify the steps of scientific research.
3) Perform a plan; analysis, design and evaluation of a given problem.
4) Demonstrate certain levels of communication skills.
5) Demonstrate ability to work in team during the project.
6) Demonstrate ability in writing, editing and ordering a dissertation.
7) Identify plagiarism during dissertation writing.

e. Learning Outcomes in Domains of Teaching Strategies & Assessment Methods:

ILOs	teaching method	assessment method
Knowledge and Understanding Intellectual Skills	Lectures Case study Self learning	Written and oral Exam
Professional and practical Skill	Case study Problem solving Supervised research	Practical Exam Case discussion Rubric
Intellectual Skills General and Transferable Skills	Group presentation Structured Assignment Supervised research	Oral Exam Rubric

f- Program Curriculum:

Course Code	Course Title	Credit hours	Program ILOs Covered
Mandatory Courses:			
DTF 101	Environmental and occupational toxicology	3	A1, A2, A3, A5, B1, B2, B4, C1, C2, C4, C6, D6, D7
DTF 102	Laws and legislations	1	A6, B7, C6, D1, D4
DTF103	Forensic toxicology	3	A5, B2, C1, C6, D2, D3
DTF 104	Household toxicology	2	A1, A2, B1, C4, D6, D7
DTF 105	Postmortem toxicology	3	A5, B2, C1, C6, D1
DTF 207	Analytical toxicology	3	A3, A5, B2, B5, C1, C3, D2, D4
DTF 208	Forgery	2	A5, B2, C6, D1
DTF 209	Drug abuse and doping	3	A4, B2, C4, D6
DTF 210	Toxicology information for the public	2	A1, B4, C6, D1
DTF 211	Crime scene investigations	3	A5, B6, C1, D2
Elective courses:			
	Molecular toxicology	2	A5, B2, C1, C6, D2, D3
	Advanced analytical toxicology	2	A3, A5, B2, B5, C1, C3, D2, D4
	Applied toxicology	2	A1, A2, A3, A5, B1, B2, B4, C1, C2, C4, C6, D6, D7
	Impact of fire, weapons and explosives	2	A5, B6, C1, D2
	Project	1	B2, C5, D1, D2, D3, D4, D5, D6, D7

The admission to the program requires a bachelor's degree in pharmacy from Egypt or an equivalent certificate from a foreign institute recognized by the Ministry of Higher Education and accepts incoming students according to the rules of acceptance of expatriates.

1- Students must attend lectures and practical lessons, their attendance must be not less than 75 % otherwise, and the diploma council prevents him/her from entering the final written exam.

2- A minimum of 60% of the maximum grade (MG) is the passing grade for all courses.

3- 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**

4- The Faculty of Pharmacy Council will grant the Diploma in Toxicology and forensic chemical analysis after passing the courses and the graduation project

5- Assessment

Methods of Assessment	Weight of Assessment
Written Exam	60% of total marks
Practical Exam/course activities	20% of total marks
Oral Exam	20 % of total marks

For courses with no practical, the final will constitute 80% of the total assessment

Grade Scale	Grade point average value (GPA)	Numerical scale
A+	5	≥ 95%
A	4.5	90- < 95%
B+	4	85- < 90%
B	3.5	80- < 85%
C+	3	75- < 80%
C	2.5	70- < 75%
D+	2	65- < 70%
D	1.5	60- < 65%

6- Evaluation of program intended learning outcomes

Evaluator	Tool
1- candidates	Questionnaires
2-Stakeholders	Questionnaires for staff members participating in teaching Questionnaires for Labor market organizations members
3-External reviewer	Prof.
4- Internal reviewer	Prof. Waleed Barakat
4-Others	Committee supervising Toxicology and forensic chemical analysis diploma program

7- Learning Resources, Facilities and Equipment

- The requirements of text book and other materials for teaching are identified by the instructor teaching the course.
- Textbooks are made available to students through the Faculty library and are listed in the course specification
- Course handouts are also available for the students
- Air conditioned, well seated teaching hall equipped with data show is available for the students
- Faculty of pharmacy and medicine labs are available in case of courses need practical application