King Saud University
College of Pharmacy
Pharmacognosy Department

POSTGRADUATE STUDIES

M.Sc. in Pharmacy (Pharmacognosy)

Program Manual

2022-2023 G

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بسم الله الرحمن الرحيم

Content

Introduction

The Department of Pharmacognosy is an integral part of the College of Pharmacy. It was established in 1959. The department aims to prepare graduates for their professional careers and provides people with the clinical services they need. The department focuses on natural bioactive substances' chemical and biological attributes in plants, animals, or microbes. Besides the department's contribution to teaching bachelor's degree pharmacy program, it currently runs a Master's degree program and a Ph.D. program offering a Doctor of Philosophy degree. During the past years, the Degree programs at the Pharmacognosy Department underwent several assessments and modifications due to the continuous development of the college curriculum and pharmacognosy-related research and applications.

Program Information

Degree's Name: M.Sc. in Pharmacy (Pharmacognosy)

Credit Hours: 30 hours

Program's Language: English

System for Study: Course works and thesis.

Tuition: 100,000 RS

Reasons for Establishing the Program:

1. The program has been designed according to the benchmarks set by universities globally. It aims to Enrich students' knowledge of the latest updates in the pharmacognosy field and cover many related branches and disciplines of specialization.
2. To fulfill the needs of the candidates in the specialization from different related sectors.
3. To supply governmental and private health sectors and universities with highly qualified researchers and lecturers.
4. To enhance scientific research in the field of Pharmacognosy.

5. To establish scientific and training partnerships with both local and international universities and centers.

Program's Mission

To graduate well-qualified researchers with advanced research techniques in the Pharmacognosy field through high-quality education and research environment that contribute to community awareness and education.

Program's Goals

1. Create a collaborative learning environment that encourages deepening knowledge, critical thinking, and innovation in pharmacognosy research.
2. Equip graduates with advanced analytical and practical skills in natural product isolation, characterization, and evaluation.
3. Enhance the scientific research by applying cutting-edge advanced techniques for discovering and developing novel bioactive compounds from natural sources.
4. Facilitate student engagement in collaborative research projects and scientific programs with national and international research institutions and centres.

Program Highlights

Program Beneficiaries

1- Graduates holding bachelor's degrees in Pharmaceutical Sciences or Pharm. D. degree.

2- Pharmacists working as teaching assistants in Saudi and non-Saudi universities.

3- Pharmacists in hospitals, drug manufacturers, research centers, and authorities.

Employment Opportunities

1. Lecturer in local universities and public or private colleges.
2. Researcher in local universities and public or private colleges.
3. Administrative leadership positions in the Ministry of Health, hospitals, drug manufacturers, authorities, and other related institutes.
4. Academic positions in public and private universities and colleges.

5. Technical or supervisory positions in the Ministry of Health and hospitals, pharmaceutical companies & industry, regularity authorities, and other relevant institutions and agencies.
6. Occupations as health education specialists.
7. Managers and owners of outlets that sell and trade medicinal herbs.

Graduate Attributes

The graduate of the program should acquire the following attributes:

1- Has advanced and specialized knowledge in Pharmacognosy, gained from conducting academic and scientific activities, which contribute to developing the field of natural products.
2- Commitment to integrity, ethical practices, and professionalism.
3. Participate in finding constructive solutions to scientific and social issues.
4. Initiate professional planning, continuous learning, and decision-making.
5. Actively participate in research groups.
6. Show professionalism and full responsibility for the work and decisions, new practices, and ways of thinking that enhance the community's quality of life.

Program Learning Outcomes

1. Knowledge and Understanding:

1.1 Demonstrate specialized advanced knowledge in the field of Pharmacognosy and related research.

1.2 Discuss operations, materials, methods, and practices related to natural products.

1.3 Identify the quality principles in Pharmacognosy and related research.

1.4 Describe professional and research ethics.

1.5 Recognize the different multidisciplinary databases useful for researchers working in the field of Pharmacognosy.

2. Skills

2.1 Design research projects in Pharmacognosy using skills in collecting, evaluating, and criticizing data governing theoretical and practical principles.

2.2 Interpret the provided information and data from various sources to solve highly complex problems related to the isolation, characterization, and evaluation of natural products.

2.3 Use of complex processes and advanced techniques in the separation, purification, and structure elucidation of compounds derived from natural sources.

2.4 Communicate efficiently, verbal or non-verbal, using advanced digital tools and information technology to present research results.

3. Values, Autonomy and Responsibility

3.1 Be committed to integrity, quality, and ethical practices.

3.2 Show professionalism and full responsibility for the work and decisions.

3.3 Participate in creating constructive solutions to societal issues and be a responsible citizen.

3.4 Initiate professional planning and continuous learning process.

3.5 Actively participate in research groups.

Program Regulations

Attendance Requirements: Students must attend at least 75% of lectures and laboratory sessions to take a final examination.

Program Graduation Requirements: Students will be considered graduates if they completed all program requirements, including study plan courses and minimum cumulative grade point average (CGPA) as given in university regulation.

Admission Requirements

In addition to the admission requirements mentioned in the unified regulations for graduate studies in Saudi universities and the organizational and executive rules and procedures for postgraduate studies at King Saud University, the department requires the following to enroll in the program:

1. Applicant must hold a bachelor's degree in pharmaceutical sciences or a Pharm. D. from an accredited university with a minimum of a "Good" GPA, provided that applicant's GPA is a minimum of "Very Good" in the specialty courses.
2. A score of at least 5 on the IELTS test or equivalent.
3. Certificates of equivalency must be submitted if certificates were obtained from an organization outside the Kingdom of Saudi Arabia.
4. Qualifying for a preliminary written examination.
5. Qualifying for a final interview.

Students' administration and support services are essential at KSU and supervised by the Vice Rector of graduate studies and scientific research affairs (https://graduatestudies.ksu.edu.sa/ar). The Deanship of graduate studies is responsible for student admissions, developing, monitoring, implementing, and following up on the required responsibilities and services. The Deanship of graduate studies has several units, e.g., Admission Unit, Student Affairs Unit, Graduation Unit, and Electronic Services Unit, which manage all graduate affairs. The **Admission Unit** is responsible for organizing the admission process for graduate studies at KSU. It receives applications for the regular programs as the study commences at the beginning of the first semester of the academic year. Applications for the regular programs can be submitted during the last five weeks of the first semester of the previous academic year. Screening of applications usually takes 2-5 months, dependent on the number of applicants and departmental requirements for admission, including written exams, interviews, etc. **Student Affairs Unit** facilitates and implements academic procedures, including enrollment into courses, withdrawal, and postponement of semesters, addressing student problems, and reporting them to the Deanship student affairs committee to make the necessary decision under the Unified Law of Graduate Studies. **The Electronic Services Unit** is responsible for the electronic services the Deanship provides, including the Deanship electronic website, the electronic admission portal, electronic archiving, and approval of research proposals. **Graduation Unit** oversees the student's fulfillment of the requirements for obtaining the master's and doctoral degrees, after which a list of candidate graduates is prepared and submitted to the University Council by the Deanship. The Graduation Unit collaborates with the Student Affairs Unit regarding student graduation.

Student Counseling Services

Faculty and teaching staff are available for individual student consultation and academic advice, including the amount of time teaching staff are expected to be available each week (office hours). Help session (problem-solving): 2 hours per week.

Student Support

1- Excellent library, computer center, and IT facilities.

2- Online information and learning materials.

3- A Program Tutor to help students understand the course structure.

4- An academic advisor (6-8 office hours) to help with registration, liaison with local authorities, and examination arrangements and results.

5- Accommodation Office to help students with accommodation needs.

6- A Tutor to provide support for disabled students.

Curriculum

1. Study Plan Structure

Program Structure		No. of Courses	Credit Hours	Percentage
Courses	Required	11	24	80%
	Elective	0	0	
Thesis		1	6	20%
Total		12	30	100%

2. Program Courses

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours
Level 1	PHG 515	Natural Products Separation Techniques	Required		3 (2+1)
	PHG 516	Research Methodologies	Required		2 (0+2)
	PHG 517	Terrestrial Natural Products	Required		3 (3+0)
	PHG 518	Seminar (1)	Required		1 (1+0)
Level 2	PHG 525	Biotechnology of Natural Products	Required		3 (3+0)
	PHG 526	Selected Topics in Pharmacognosy	Required		2 (2+0)
	PHG 527	Structure Determination of Natural Products (1)	Required		3 (3+0)
Level 3	PHG 535	Structure Determination of Natural Products (2)	Required	PHG 527	3 (2+1)
	PHG 536	Marine Natural Products	Required		2 (2+0)
	PHG 537	Seminar (2)	Required	PHG 518	1 (1+0)
	PHG 598	Thesis Proposal Preparation	Required	Completing 50% of the credit hours	1 (0+1)
Level 4	PHG 600	Thesis	Required	PHG 598	(6) units

3. Description of Courses

PHG 515	Natural Products Separation Techniques	3 (2+1)
The basic goal of this course is to provide the student with the theory and practice of the basic and advanced methods used in the extraction, separation, and purification of natural products. This includes chromatographic techniques, such as GC, HPLC as well as chiral separations, and non-chromatographic techniques, like solid-state, liquid-solid, and liquid-liquid extraction, solvent partitioning, countercurrent distribution, sublimation, electrophoresis, precipitation, and crystallization. Additionally, the course will discuss the challenges of isolating natural compounds from marine organisms and the stability of isolated natural products. At the end of the course, students will be able to select and apply suitable methods of extraction, manipulation, and isolate the different types of compounds with various complexities.		
PHG 516	**Research Methodologies**	**2 (0+2)**
The basic goal of this course is to provide the student with the laboratory skills needed for research in the Pharmacognosy field. It will stress the utilization of analytical methods used in the pharmacognosy field in addition to other simple and more advanced techniques. This will give the student a chance for direct contact with lab instruments and familiarize him/her with different terms, expressions, and research tricks. The course is also emphasizing lab safety measurements, report writing, quality control procedures, and teaching scientific documentation methods. At the end of the course, students will be able to develop and sharpen their research instincts in the future.		
PHG 517	**Terrestrial Natural Products**	**3 (3+0)**
The basic goal of this course is to provide the student with the necessary knowledge about the bioactive natural products derived from living organisms growing on the earth. The student will learn the strategies of drug discovery from natural sources and how to recognize a given natural product in terms of its chemical class, biosynthetic origin, chemical functionality, and structure-activity relationship. At the end of the course, the student will be able to appreciate and understand the importance of the natural products discovery and how to predict the chemical and biological properties of newly discovered molecules of natural products.		
PHG 518	**Seminar (1)**	**1 (1+0)**
The basic goal of this course is to develop the ability of the student to choose and present current topics of interest in Pharmacognosy. At the end of the semester, students will present the chosen topic in front of department faculty and graduates. At the end of this course, students will be able to acquire the necessary knowledge and skills of seminar preparation and presentation.		
PHG 525	**Biotechnology of Natural Products**	**3 (3+0)**
The basic goal of this course is to provide students with the necessary knowledge about cell biology, molecular biology, and techniques required to produce biological products using		

genetically modified biological systems. It also introduces the principles of recombinant DNA technology, generation of transgenic organisms, plant tissue culture, fermentation, biotransformation, and biologics' bioprocessing. At the end of this course, students will be able to acquire the necessary knowledge of the various methods of biotechnology applied in Pharmacognosy.		
PHG 526	**Selected Topics in Pharmacognosy**	**2 (2+0)**
The basic goal of this course is to acquaint students with recent knowledge and developments in various areas of pharmacognosy and its applications, including natural anticancer, endophytes, metabolomics, anti-viral agents, antibiotics, forensic pharmacognosy and reverse pharmacognosy, etc.		
PHG 527	**Structure Determination of Natural Products (1)**	**3 (3+0)**
The basic goal of this course is to introduce the student to different techniques used for the identification and determination of the structure of substances from natural origin. Physical methods, such as melting and boiling points, and spectroscopic techniques, like optical rotation, IR, UV, ^{1}H, and ^{13}C NMR and MS, will be discussed. Furthermore, students should be able to employ degradative and synthetic reactions for structure determination or confirmation of the proposed molecule. At the end of this course, students will be able to acquire the necessary knowledge to employ these techniques to help in the structure determination of compounds from natural sources.		
PHG 535	**Structure Determination of Natural Products (2)**	**3 (2+1)**
The basic goal of this course is to introduce the student to 1D and 2D NMR techniques, such as DEPTs, HSQC, HMBC, NOESY, and INADEQUATE, and their applications in the structure determination of natural compounds. The course offers the chance for the student to practice and solve the structure of selected natural compounds by reading and analyzing example spectra. At the end of this course, students will be able to acquire the necessary knowledge and understand some analytical methods and their applications in deducing the final structure of the compounds from natural sources.		
PHG 536	**Marine Natural products**	**2 (2+0)**
The basic goal of this course is to provide the student with the necessary knowledge about the bioactive natural products derived from marine invertebrates such as soft corals, sponges, anemones, marine algae, and marine microorganisms, and from some marine vertebrates and their methods of discovery. Students will acquire the ability to identify a given natural product based on its chemical class, biosynthetic origin, chemical functionality, and structure-activity relationship. At the end of the course, the student will be able to appreciate and recognize the promising future of marine natural products as a new resource for drug discovery.		
PHG 537	**Seminar (2)**	**1 (1+0)**

The basic goal of this course is to give the student the chance to present his/her master's research proposal. At the end of this course, the student will have the chance to present his/her master's research proposal to the faculty and other department students and benefit from their comments and suggestions.		
PHG 598	**Thesis Proposal Preparation**	**One unit**
The basic goal of this course is to provide the student with the necessary instructions and suggestions to choose, design, statistically analyze results, and write a research proposal under the guidance of his/her academic instructor. At the end of this course, students will be able to acquire the necessary knowledge and skills to choose a research proposal.		
PHG 600	**Thesis**	**(6) Units**
Upon approval of the student research proposal, the student will prepare and write the thesis and then defend it to get approval from the assigned committee.		

4. Thesis and Its Requirements

1. Based on the decision of the University Council, the ninth session of the academic year - 1434/1435 AH,

   https://iu.edu.sa/uploads/files/Post_Graduate_Regulations_(0).pdf

   the research project course is compulsory for all graduate students in the master and doctoral stages.
2. The research project course can be registered after passing 50% of the study plan courses as stipulated in Article 42 of the Unified Regulations for Graduate Studies or after completing the academic courses.
3. The course is registered with the academic advisor who is prepared to supervise, and the conditions for supervision are applied to him with the approval of the department.
4. The scheduled student registers for a semester for a master's degree and two semesters for a doctorate, during which the student finishes his research project and submits it to the department. The period may be extended upon the recommendation of the department and college councils based on the report of the student's advisor explaining the reasons and the approval of the Deanship of Graduate Studies.
5. The student prepares a research project proposal according to the general framework for designing the research project through his academic advisor.

6. The department holds a discussion session for the student's proposed plan.
7. The student submits the research project to the research plans proposal approval portal during the timetable and periods specified and announced on the Deanship's website.
8. After the department council approves the research project proposal, it is approved on the Research Plans Proposal Approval Portal and submitted to the College Council.
9. After the college council approves the research project proposal, it is approved on the Research Plans Proposal Approval Portal and submitted to the Deanship of Graduate Studies.
10. The student is considered to have passed the course after the final approval by the Deanship of Graduate Studies, and a grade of an equal pass is given to him without appreciation. In the event of an extension, he is given a continuous grade.
11. The student can obtain a statement of the research proposal by entering the research plans approval portal on the Deanship of Graduate Studies website.
12. The course is calculated as one academic unit for each student when calculating the teaching load of a faculty member.
13. Passing the course is a requirement for the student to register for the thesis course.
14. One division is offered for the thesis course in which all students are registered.
15. At the department's request, each student can be registered in an independent division linked to the teaching member's name to organize the teaching load calculation.
16. The result of the thesis course is monitored for all regular students. If the student does not communicate with the supervisor, the student will be warned, based on Article 52 of the unified regulations for postgraduate studies.

5. Scientific Supervision

Each student will be assigned a supervisor. The supervisor must be from the Department of Pharmacognosy/College of Pharmacy. The supervisor(s) should be able to devote sufficient time to dedicated supervision and should be readily and consistently available to the student.

Supervising theses may be handled by supervisors with outstanding experience and scientific competence in the field of research who are not members of the university's faculty, by a decision

of the University Council based on the recommendation of the competent department council, the College Council and the Council of the Dean of Graduate Studies for Master's theses, according to the following conditions:

1. To be a PhD holder.
2. At least three years have passed since he obtained his Ph.D.
3. He should have at least three research papers - in his field of specialization - from research published or accepted for publication in refereed scientific journals.

The supervisor will be responsible for the following tasks:

• Guiding the management of the research project.
• An introduction to the major sources of information in the field of Pharmacognosy.
• Assistance with both general and sophisticated research approaches that are acceptable for the field of Pharmacognosy.
• Involvement of the master's student in the relevant research community.
• Carrying out regular monitoring and evaluation of the student's progress and reporting on this progress as required.
• To be available to the student during planned hours if he or she requires assistance.

6. Thesis Defense/Examination

The supervisor of the thesis, after the student has finished preparing it, submits a report on its completeness and validity for discussion to the head of the department in preparation for the completion of the procedures determined by the Council of the Deanship of Graduate Studies, which are:

1. To form the discussion committee, the master's student must pass all courses.

2. The thesis supervisor submits a request to form a discussion committee to the department head by the end of the thirteenth week of the semester.

3. Based on a proposal from the department council, the concerned college council proposes a discussion committee per the provisions of Articles 55 and 54.

4. The majority of the committee members should be from the relevant department to which the student belongs.

5. The names of the members of the proposed discussion committee shall be submitted to the Council of the Deanship of Graduate Studies to take a decision thereon within a period not exceeding one month from the date of the decision of the College Council.

6. After the approval of the Council of the Dean of Graduate Studies to form a discussion committee, the head of the concerned department sends the letter to the members of the committee, provided that the thesis is not discussed until one week has passed from the date of the decision of the Council of the Dean of Graduate Studies.

7. The period between the approval of the Council of the Deanship of Graduate Studies to form a discussion committee and the discussion date should be at most four months, and it is counted within the regular period for obtaining the degree.

8. The principal supervisor completes the form for setting a date for discussing a scientific thesis approved by the Deanship of Graduate Studies. The form is approved by the head of the department and the Vice Dean for Graduate Studies and Scientific Research, and a copy of the form is sent after its approval to the Deanship of Graduate Studies.

9. The department announces the discussion date in the designated places in the department and the college and through other available channels.

10. The discussion of theses shall be public, and an exception may be made to be confidential if the matter so requires, by a decision of the College Council based on the recommendation of the concerned department.

11. The committee's ruling is issued immediately after the discussion.

12. If at least two-thirds of the discussion committee members find that the thesis is unfit for discussion before the discussion, a detailed report is prepared with the justifications and reasons. The report is submitted to the Deanship of Graduate Studies to cancel the student's enrollment following Paragraph 9 of Article 26 of the Uniform Regulations for Graduate Studies.

13. The discussion may not occur or begin in a member’s absence. If this happens, the committee's reporter informs the head of the department to set a new date for the discussion, provided that a request to select a new date for the discussion is completed and approved by both the department head and the vice dean for graduate studies and scientific research and sent to the Deanship Postgraduate studies, accompanied by justifications for the absence of the committee member.

14. If one of the discussion committee members apologizes, he shall be compensated by an alternate member based on the proposal of the department council, the recommendation of the college council, and the approval of the Council of the Dean of Graduate Studies. The request shall accompany the justifications for the committee member's apology.

The following are required for the examination committee for master's theses:

1. The number of its members shall be odd, and the supervisor shall be its rapporteur.

2. The number of committee members shall not be less than three among the faculty members, and the supervisor and the assistant supervisor, if any, shall not represent a majority.

3. The terms of supervision of messages apply to the committee members.

4. At least one of the committee members should be one of the professors or the associate professors.

5. To take its decisions with the approval of at least two-thirds of the members.

Important Links

All about the requirements, registration fees, enrolment, and documents/templates related to postgraduate programs of the university, including admission, registration, withdrawal, progress reporting, etc., are available on the following website of the Deanship of Postgraduate Studies of King Saud University: https://graduatestudies.ksu.edu.sa/en and the website of the College of Pharmacy: https://pharmacy.ksu.edu.sa/en/node/2939. In addition to the following websites:

1. The general framework for writing Postgraduate Theses: https://graduatestudies.ksu.edu.sa/sites/graduatestudies.ksu.edu.sa/files/imce_images/ltr_lm_lktb_lrsyl_ljmy.pdf
2. Postgraduate students' manual: https://graduatestudies.ksu.edu.sa/sites/graduatestudies.ksu.edu.sa/files/imce_images/dlyl_tlb_ldrst_lly2020.pdf
3. Students with Disability Services Policies and Procedures at King Saud University: https://graduatestudies.ksu.edu.sa/sites/graduatestudies.ksu.edu.sa/files/imce_images/dlyl_lqwd_wljrt_ltnzymy_lkhdmt_ltlb_dhwy_lq_bjm_lmlk_swd.pdf
4. Electronic Registration Guide (Adding and deleting courses): https://graduatestudies.ksu.edu.sa/sites/graduatestudies.ksu.edu.sa/files/imce_images/dlyl_ltsjyl_llktrwny_1.pdf
5. Guide to submitting the research proposal through the electronic portal: https://graduatestudies.ksu.edu.sa/sites/graduatestudies.ksu.edu.sa/files/imce_images/tqdym_lmqtrh_lbhthy.pdf
6. How to apply (postponement of admission - postponement of study - apology - deletion) through the academic system portal: https://graduatestudies.ksu.edu.sa/sites/graduatestudies.ksu.edu.sa/files/imce_images/lhrkt_lfsly_1.pdf
7. Guide to applying to the online admission portal for graduate programs:

https://graduatestudies.ksu.edu.sa/sites/graduatestudies.ksu.edu.sa/files/imce_images/dlyl_ltqdym_43_1.pdf

8. Electronic graduation procedures for postgraduate students:

https://graduatestudies.ksu.edu.sa/sites/graduatestudies.ksu.edu.sa/files/imce_images/__0.pdf

Approved in the 12th meeting of the Pharmacognosy Department

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