Ardabil University of Medical Sciences (ArUMS) School of Pharmacy International Guide 2019-2020
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Preface

Ardabil school of pharmacy has been established for 6 years and is completely young in training required scientific, professional and industrial manpower. A young school offers agility and reckless vision toward future goals with the hope of success for new–coming faculties in achieving this approach. Science of pharmacy and consequently the relevant profession and industry have to pass an endless road with exciting and cheerful features. An important topic is that passing the route is accompanied with novelty without any previously carved instruction(s) on a book or tablet. In this regard, scientific knowledge, skill, competency and longing of interested people for progress and development is determinant boosting the way. Finally it is hoped that the school management with along with interested faculties and hardworking students could play a significant role in rendering the route toward considerable scientific and professional developments in pharmacy.

Hope for a glorious and healthy tomorrow

Dr. Shahab Bohlouli
PharmD, phD
At first I should be so thankful to the almighty God for providing such a worthy opportunity to briefly introduce the Ardabil School of Pharmacy. At the same time with the establishment of the school in 2013, 26 PharmD students were initially received from September. As a subset of Ardabil University of Medical Sciences (ARUMS), the school includes active faculties in the fields of pharmaceutics, pharmacology and toxicology, pharmacognosy and biotechnology, clinical pharmacy and medicinal chemistry with relatively 300 PharmD students under their training. The whole faculties/staff eagerly pursue educational, research and cultural plan/strategies of the school. The school is consisted of various units namely, education office, research office, education development office (EDO), library, student research committee, information technology (IT), cultural affairs, public relations, executive affairs, supplies and commissary affairs, skill lab (model pharmacy), training pharmacy, laboratories of pharmacology, instrumental analysis, computational modeling, microbial control, chemistry, pharmaceutics, pharmacognosy, cell culture, biotechnology and animal lab.

The strategic plan of the school within 5-year (2018-2023) includes education and research mission/visions that are planned on the basis of support and promotion of health services. The most important mission of the school encompasses training of PharmD students that actively collaborate with other health-centered occupations and provide converged pharmaceutical care leading to enhanced health services. Moreover; the school is determined to take steps in advanced training, education and research on pharmaceutical, clinical and health sciences. Some of the most important school plans are extending physical space of the school, establishing herbs garden, increasing faculties, establishment of postgraduate studies in a few fields, development of interdisciplinary research activities in national and international levels, development of instrumentations within research laboratories of the school, setting up the laboratories for production and extraction of natural/synthetic bioactive compounds and finally contextualization for taking steps toward third-generation universities on the basis of accreditation planning approved by ministry of health and medical education. For more information, related principles and details of operational plans can be accessed via the school website (www.pharmacy.arums.ac.ir).

At the end I wish health, happiness and success for dear faculties, scientists, staff and students of our country.

Dr Nima Razzaghi-Asl
Associate Professor of Medicinal Chemistry & Dean of the Ardabil School of Pharmacy
Ardabil and it’s Historical Places

Ardabil is a historical city in northwestern Iran. It is located in the northeastern part of Iran’s historic Azerbaijan region. According to the 2016 census Ardabil province had a population of 1,270,420 people that includes 1.6 percent of the total population. Ardabil country is capital of Ardabil province which is limited to Meshkin-shahr from north, Namin county from east, Kowsar county from south and Nir county from west.

The province has unique historic and tourism attractions even in world level. For example, Sheikh Safi-ad-din Ardabili monument, Sareyn spas, Sabalan nature, ancient castles and etc. The city is famous for its hand-crafted products than industrial ones. Famous souvenir of Ardabil is different types of carpets, honey, different local sweets, stone jewelry, crème and dairy products. Ardabil is known for it’s trade in silk and carpet. The carpets are famous and represent subset of the best of classical Persian carpets.

The significant historical and attraction places of Ardabil are as follows:

- The tomb of Sheikh Safi-ad-din Ishaq Ardabili, founder of the Safavid dynasty, is world heritage of Ardabil. It was registered on the Unesco world heritage list, in 2010. This monument is situated in the Ali-Ghapu area.
Climate of Ardabil

- Shorabil lake is a lake located in a hilly area south of the Iranian city of Ardabil. Ardabil Universities are located near the lake. The surface of the lake is 640 000 m² and is covered with a thin white layer of minerals which are useful in healing skin diseases and rheumatism.
- Masjed Jameh Ruins as a magnificent and unique mosque
- Mirza Ali Akbar mosque and school are old ones that back to qajar period
- Numerous historical bridges namely Pol-e Gilandeh, Pol-e Nayer, Pol-e Haft Cheshmeh, Pol-e Panj Cheshmeh and Pol-e She Cheshmeh and Qarah Soo Brigde, most built during Safavid era.
- Imamzadeh Saleh mausoleum that was built 250 years ago.
- Saint Mary Church, this Armenian Orthodox Church has a beautiful wooden main door and painted dome built in 1876
- Mausoleum of Sheikh Jebrail
- Babadavood anbaran-Friday mosque
- Fandango Forest which is one of the most beautiful natural effects located in east of Ardabil near Namin.
- Mineral Waters of Ardabil Province
- Ski resort Alvares
- The beautiful persian Ardabil bazaar was built during Safavid dynasty. In addition, main bazaar hall with open vaults has a hammam small yet mystiffying mosque.

There are three types of weather in Ardabil province: 1) Half wet and cold climate areas of central, southern and western province areas of the province 2) Cold and wet weather that has gripped mountainous, western and southern areas of the province 3) Dry and temperate climate of the northern part of the province. The slopes of Sabalan are the coldest areas of the province. Climate in Ardabil is dry and cold, the highest temperature in summer is 35 °C above zero and the lowest temperature reaches 25 °C below zero in winter.

Mountains of Ardabil Province
Sabalan mountains whose peak i.e. Soultan Savalan with a height of 4811m is the third highest point in Iran. Funnel-shaped crater of this mountain has become in the shape of a very aesthetically pleasing lake and its margins are covered with ice and snow during the year. In addition to Sabalan mountain, Baghrou Highlands, Salavat mountain and Khorouslu are also among the highest mountains of the province.

Rivers and lakes of Ardabil province
There are many lakes in Ardabil province such as Shorabil lake, Neur lake, Shor Gol lake, Noshahr lake, Aloucheh lake, Kamiabaad lake, Molla Ahmad lake, GaraSou Swqmp which waterfowl habita. In addition, there are many rivers including Aras, GaraSou, Darrah Rood, Kheyav Chaaee and Namin Chaaee.
As a subset of Ardabil University of Medical Sciences (ARUMS), school of pharmacy focuses on the scientific and humanistic bases for understanding and influencing interactions involving patients, medicines, caregivers, and health care systems. It integrates knowledge of pharmacy and pharmaceuticals with economics, history, sociology, psychology, management sciences, communication, epidemiology and law.

School of pharmacy was established by the support of honored authorities and attempts of Dr. Shahab Bohlooli (Professor of Pharmacology) in 2013 to educate pharmacy students and collaborate with other health professionals with the aim of providing accessible and integrative pharmaceutical care and enhancing patient recovery.
Education

Education is a form of learning in which the knowledge and skills of a group of people are transferred from one generation to the next by teaching, training, or research. Based on this definition we believe that our faculty, staff and students should work hard to fulfill the goals of education. ArUMS school of pharmacy is determined to educate PharmD students within a six-year course. The main departments are defined as:

- Pharmacology and Toxicology
- Pharmaceutics
- Pharmacognosy and Biotechnology
- Clinical Pharmacy
- Medicinal Chemistry

Research

Research is one of the most important issues that guarantees progress and sustainable development in every country. Without research, there will be no improvement in knowledge and educational affairs. According to this, ArUMS school of pharmacy has special policies towards research in the field of high-quality education and advanced training in the pharmaceutical, clinical and health-related sciences.
School of Pharmacy

- Medicinal Chemistry department
- Pharmacognosy department
- Pharmaceutics department
- Pharmacology and Toxicology department
- Education office
- Student Research Committee (SRC)
- Education Development Office (EDO)
- Clinical Pharmacy department

Other units:

research office, library, information technology (IT), cultural affairs, public relations, executive affairs, supplies and commissary affairs, skill lab (model pharmacy), training pharmacy, laboratories of pharmacology, instrumental analysis, computational modeling, microbial control, chemistry, pharmaceutics, pharmacognosy, cell culture, biotechnology and animal lab
Statistics

**ArUMS**

- Total number of students: 276
- Number of academic members: 13
- Number of staff: 20
- Number of staff working at the training pharmacy: 8
- Number of projects of academic members: up to 20
- Number of articles of academic members based on Scopus: About 300
Pharmacology and Toxicology

Includes drug composition and properties, molecular and cellular mechanisms, organ/systems mechanisms, signal transduction/cellular communication, molecular diagnostics, interactions, toxicology, chemical biology, medical applications, and antipathogenic capabilities. The two main areas of pharmacology are pharmacodynamics and pharmacokinetics. Pharmacodynamics studies the effects of the drug on biological systems, and pharmacokinetics is about the effect of the biological systems on the drug referring to absorption, distribution, metabolism, excretion and toxicity.

Some research areas: Pharmacokinetics and drug metabolism, drug analysis by chromatography systems, study of herbal medicines and chemicals on biological systems using molecular and cellular techniques, gastrointestinal disorders, diabetes, toxicology, environmental toxicology and exposure science, systems biology and epigenetics, oxidative stress and inflammation, evaluating the effectiveness of new cancer drugs, mechanistic toxicology, immunotoxicology, carcinogenicity, pharmacogenetics, ethnopharmacology

Pharmaceutics

Pharmaceutics is the discipline of pharmacy that deals with the process of turning a new chemical entity (NCE) into a medication to be used safely and effectively by patients. It is also called the science of dosage form design. There are many chemicals with pharmacological properties, but they need special assessments to act therapeutically effective at their sites of action. Pharmaceutics gets the formulation of drugs in relation with their delivery and disposition in the body. Pharmaceutics deals with the formulation of a pure pharmaceutical substance into a dosage form. Branches of pharmaceutics include: Pharmaceutical formulation, pharmaceutical manufacturing, dispensing pharmacy, pharmaceutical, technology, physical pharmacy, pharmaceutical jurisprudence

Some research areas: Development and characterization of novel nano-based carriers, delivery of anti-cancer agents through SLNs, NLCs and nanogels, active drug targeting via manipulating extra and intracellular drug and genes delivery pathways, formulation and preparation of dosage forms, instrumental analysis of pharmaceuticals, preparation of novel drug delivery systems: nano, micro, polymeric particles, design and preparation of polymeric hydrogels in controlled, release systems, biologic and targeted drug delivery systems, preparation of peptide and protein delivery systems by means of biodegradable and biocompatible polymers, formulation of cosmetic products and transdermal drug delivery, in vitro and in vivo evaluation of pharmaceuticals products
Pharmacognosy and Biotechnology

Pharmacognosy is the study of medicines derived from natural sources. The American Society of Pharmacognosy defines pharmacognosy as "the study of the physical, chemical, biochemical and biological properties of drugs, drug substances or potential drugs of natural origin as well as searching for new drugs from natural sources.

Biotechnology is the use of living systems and organisms to develop or make useful products, or "any technological application that uses biological systems, to make or modify products and processes for specific use" (UN Convention on Biological Diversity). Depending on the tools and applications, it often overlaps with the fields of bioengineering and biomedical engineering.

Some research areas: Quantitative and qualitative analysis of medicinal plants for screening of bioactive compounds in essence and , Screening of medicinal plants for isolation and identification of effective compounds, Effect evaluation of antibacterial, alpha-amylase, antioxidant and acetyl cholinesterase inhibitory of medicinal plants, Identification of essential oil compounds from medicinal plants by GC-MS, Ethnobotany, Evaluation of cellular signaling pathways in cancer treatment, Production of peptides, peptidomimetics, nucleic acids, and therapeutic proteins with biotech processes, Production of monoclonal antibodies for direct use in the treatment of diseases and for targeted therapy, Application of mammalian cells in mass production of biopharmaceuticals, Application of microbes, yeast and phage display in pharmaceutical production
Clinical Pharmacy

Clinical pharmacy is the branch of Pharmacy where pharmacists provide patient care that optimizes the use of medication and promotes health and disease prevention. Clinical pharmacists take care of patients in all health care settings but the clinical pharmacy movement initially began inside hospitals and clinics. Clinical pharmacists often collaborate with physicians and other healthcare professionals.

Some research areas: Clinical trials and ADR studies, rational drug prescribing and usage pattern, clinical pharmacokinetic studies

Medicinal Chemistry

Medicinal chemistry and pharmaceutical chemistry are disciplines at the intersection of chemistry, especially synthetic organic chemistry, pharmacology and several other biological specialties which work on design, chemical synthesis and development of marketing pharmaceutical agents, or bioactive molecules (drugs).

Some research areas: Design and discovery of potentially bioactive molecules via structure based and ligand based techniques, synthesis and spectroscopic characterization of bioactive heterocyclic compounds, structure activity relationship (SAR) study of heterocyclic compounds, optimization of synthetic methods using novel techniques and green chemistry, drug likeness, synthesis and characterization of inorganic nanoparticles and bioconjugate chemistry, protein-ligand binding
22 Bahman Training Pharmacy of Ardabil University of Medical Sciences (ArUMS) was established in 2017 for training of PharmD students with the aim of providing, maintaining and promoting public health. In training pharmacy, our highly qualified pharmacists and faculties provide referrals and medical doctors free consultation services in the fields of drug interaction, side effects, prescription of medications during pregnancy and lactation and etc. Moreover, a consultation room is available for confidential questions of referrals.

22 Bahman pharmacy can also provide special medications and cancer chemotherapeutic agents for referrals.

<table>
<thead>
<tr>
<th>Working days</th>
<th>Working hours</th>
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<tbody>
<tr>
<td>Saturday to Thursday</td>
<td>9:00 am – 1:00 pm</td>
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<tr>
<td></td>
<td>4:00 pm – 8:00 pm</td>
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<tr>
<td>Friday and public holidays</td>
<td>closed</td>
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Address: 22 Bahman Training Pharmacy, 30 Tir St., Shahid modarres Ave., Ardabil, Iran.
Phone: +98 45 332 627 62
Telefax: +98 45 332 627 64
Education Development Office (EDO) of the school has been active since the establishment of the school and aims at upgrading pharmacy education. EDO works to promote the quality of education system in association with the university Education Development Center (EDC). This office recognizes potential capacities, performs comprehensive surveys and creates appropriate administrative affairs for conducting innovative activities on educational processes. EDO applies modern knowledge and technology in order to provide suitable environment for implementing useful experiences and educational modification. Altogether, motivated participation of school will surely benefit EDO to form various task forces in the field of innovation, learning and assessment of education and research activities. Following programs are pursued by the office:

- Curriculum planning
- Evaluation of education
- Research in education
- Scholarship
- Faculty development
- The elite
- Virtual education

Besides the above activities, EDO plans on regularly executive meetings of committees, journal clubs, lectures and scientific seminars in order to achieve the desired educational goals.

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Student education development committee

Student education development committees consist of students from the universities of medical sciences of the country providing a structured admission for students to assist in development and promotion of medical education. This committee creates the necessary platforms for empowerment and sharing of student experiences in the field of medical education development to educate students who have the ability to advocacy to empower students in educational decision. Also, helping students to maximize their individual and professional growth and preparing them to lead effective medical education initiatives.

Besides the above activities, student education development committee of the school plans on regularly executive meetings of committees, journal clubs, lectures, scientific seminars and also publication of pharmacy education development journal in order to achieve the desired educational goals.
The Student Research Committee (SRC) is one of the important school units that was established to promote the level of knowledge, create and strengthen the research spirit, support the collective research activities of students, guide and empower students for efficiency and development of scientific research.

The committee is composed of student members and a school member as a supervisor and the activities of this committee are determined by the opinion and voting among these individuals. One of the school students is selected as the secretary of the SRC via election of the central council of SRC. The secretary is a school candidate at the Central Student Committee of the University and is responsible for the implementation of all committee approvals.

Committee duties:

- Creating research driven and creative thinking among students
- Organizing and supporting research activities of students
- Discovering the talent and interests of students and direct them
- Creating the motivation and institutionalization of research culture among students
- Empowering students by holding classes and workshops related to scientific and research techniques and methods
- Establishing a logical and efficient relationship between faculties and students to collaborate on projects
- Providing opportunities for publication, presentation and applying the results of student research
- Establishing and developing a qualitative research journal of the SRC
- Creation and development of collaborative networks of student researches inside and outside the university
- Strengthening the relationship of the SRC with community-based research through participation in the project
Address: School of Pharmacy, Ardabil University of Medical Sciences,
Daneshgah Boulevard, Ardabil, Iran
Tell: +98 (45)33522437
+98 (45)33522439
Email: office@pharmacy.arums.ac.ir
Website: www.pharmacy.arums.ac.ir
Postal code: 5618953141

Head of EDO: Dr. Saghi Sepehri
Mahsa Kamrani Moghaddam
Mahsa Rezazadeh
Radin Alikhani
Designed by Mona Mansoury