

## Laboratory Facilities

The department of Pharmacy is proud of their well equipped teaching and research laboratories. The laboratories are purpose-built and offer the students to carry out practical works, project, and research works. Pharmacy Department has a total of 12 laboratories including a computer laboratory, six undergraduate practical labs, two research labs, two R & D analysis and formulation labs (under developing) and one B. Pharm. Project lab for students' practical and thesis purpose. There is a store room for chemical and equipments storage and distribution as required by different labs throughout the semester. All the labs are well-resourced with modern and sophisticated scientific instruments with proper documentation maintenance for both of chemicals and instruments log book. All of the instruments are periodically calibrated. SOPs are maintained and strictly followed by students, faculties and lab assistants.

### Lists of laboratories with lab assistants and lab advisors

Room No	Lab Attendant	Faculty as advisor	Name of Lab
307	Md. Selim Reza	Md. Abu Sufian	Store
309	Mr. Murad	Dr. ZabunNahar and SamiaShabnaz	Biotechnology Research Lab
310	Md. Abdul Halim	A. H. M. NazmulHasan	Inorganic, Organic Pharmacy and Medicinal Chemistry Laboratory
311	Mr. Murad	TasnovaTasnim	Pharmacognosy and Phytochemistry Laboratory
312	Md. Rezau IKarim	KanijNaharDeepa	Physical Pharmacy and Pharmaceutical Analysis Laboratory.

313	Md. Shahadat Hossain	Nadia Kabir	Physiology, Pharmacology and Pharmaceutical Microbiology Laboratory
314	Mr. Md. Mizanur Rahman	Md. Assaduzzaman	Computer Lab
408	Md. Monir Hossain	Irin Dewan and James Regan Karmokar	MS Thesis Lab
409	Md. Monir Hossain	Ishrat Jahan	R & D Formulation Lab
410	Mr. Habib	Sadia Noor	Biopharmaceutics and Pharmacokinetics Laboratory
411	Md. Monir Hossain	Prof. Dr. SM Asharaful Islam Dr. Mohammad Sofiqur Rahman	R & D Analysis Lab
412	MD Selim Reza	Dr. Md. Rabiul Islam	B Pharm Project Lab
413	Mr. Md. Haydar Ali	Mahjabeen Gazi	Pharmaceutical Technology and Cosmetology Laboratory

Department of Pharmacy has a separate computer lab for students' betterment to prepare assignment, presentation and other documentations are necessary to prepare. Presently there are 18 computers in lab for student's service. But it has a capacity of 32 computers in four columns all-around.

### *Pharmaceutical Analysis and Physical Pharmacy Lab*

Pharmaceutical Analysis and Physical Pharmacy Lab is used for conducting four separate labs which housed in a single room at 3<sup>rd</sup> floor of UAP City Campus which is equipped with UV-Spectrophotometer, p<sup>H</sup> meter, digital water bath, Viscometer etc. Adequate number of glassware, chemical reagents and equipment are there for the smooth conduction of the pharmaceutical analysis-I & II and physical Pharmacy –I & II lab courses. Each laboratory experiment is designed to provide students the knowledge of basic quantitative analysis such as titrimetric analysis, rate constant and viscosity determination and also provide students hands-on experience in executing elementary analytical skills and quality control tests for various dosage forms.



### *Physiology, Pharmacology & Pharmaceutical Microbiology Lab*

Physiology, Pharmacology & Pharmaceutical Microbiology Lab is housed in 3<sup>rd</sup> floor of UAP city campus (R-313), having well equipped machines imperative to perform experiments that include in Physiology, Pharmacology & Pharmaceutical Microbiology

courses. The primary equipment involves compound microscope, autoclave, laminar air flow, hemocytometer, incubator, hot air oven, and vacuum pump along with all essential laboratory glass wares. This Lab enables students to experience with the scientific investigation of human physiological processes, identification and diagnosis of infectious diseases with further suggested treatment methods.



## ***Biopharmaceutics and Pharmacokinetics Lab***

Biopharmaceutics and Pharmacokinetics Lab is located at 4<sup>th</sup> floor of the UAP City Campus (R-410). The laboratory is fully equipped with necessary equipment to perform biopharmaceutics and pharmacokinetics of drugs via employing *in vitro* approaches. It includes one disintegration tester (Veego), three dissolution tester (Electrolab), one electronic analytical balance (Ohaus), two friability tester (Veego), one electronics leak test apparatus, one pH Meter (ADWA), one ultrasonicator (Hwashin Tech.), three UV spectrophotometer (Shimadzu) and one water bath (Lab Tech). All the instruments are

well maintained with updated SOP and log book. The lab room is fully organized with all necessary glass wares including volumetric flask, conical flask, measuring cylinder, pipette, beaker, funnel, test tubes, pycnometer etc. to conduct regular lab classes. This laboratory facility is utilized for three lab courses of B. Pharm. program including Biopharmaceutics & Pharmacokinetics-I Lab, Biopharmaceutics & Pharmacokinetics-II Lab and Pharmaceutical Packaging Technology- Lab. Different physical and chemical studies of various types of drugs and packaging materials are performed in this lab such as weight variation test, friability test, pH measurement, wt./ml determination, disintegration test and dissolution test of available marketed pharmaceutical preparations as well as identification, content determination, different measurements and leak test of various types of commercially available aluminum foil, PVC and PVDC. These tests will provide students an in-depth understanding on the quality evaluation and also emphasize on the factors that influence the quality of pharmaceutical preparations and their packaging materials based on biopharmaceutics and pharmacokinetics properties. These lab courses make the students able to achieve fundamental and applied knowledge, communication skills, professionalism and ethics, leadership and interpersonal skills.



## *Inorganic Organic Medicinal Laboratory*

Inorganic Organic and Medicinal Laboratory is located at 3<sup>rd</sup> floor (R-310) of the UAP City Campus (R-410). Inorganic and Organic lab deal with the qualitative analysis of inorganic and organic compound respectively. Medicinal lab focuses on both qualitative and quantitative analysis of various compounds and drugs such as synthesis, purification etc. The laboratory is enriched with high-tech and advanced quality machineries and equipment with high efficiency such as UV-spectrophotometer, melting point detector, advanced water bath etc. Inorganic and organic lab courses enable them to find elemental composition of inorganic and organic compounds, detect ions in an aqueous solution, properties of inorganic molecules, determine the functional groups in organic samples and indentify the dosage forms by their color changes. Medicinal lab courses enrich the students with the knowledge of synthesis, purification, identification, release pattern, potency of different drugs such as Banzocaine, Aspirin, Paracetamol, Ibuprofen, Diclofenac, Glipizide, Glibenclamide etc.



## *Pharmaceutical Technology Lab*

Pharmaceutical Technology Lab is located at 4<sup>th</sup> floor of the UAP City Campus (R-413). The laboratory is equipped with necessary equipment to produce various dosage forms of drugs and cosmetic products. It includes two electronic analytical balance (RADWAG), two tapped density tester (VEEGO-2), one overhead stirrer (BD), one pH meter (Hanna). All the instruments are well maintained with updated SOP and log book. The lab room is fully organized with all necessary glass wares including volumetric flask, conical flask, measuring cylinder, pipette, beaker, funnels, test tubes, desiccator, mortar & pestle, petri dish, Viscometer, thermometer, water bath etc. to conduct regular lab classes. This laboratory facility is utilized for four lab courses of B. Pharm. Program, including Pharmaceutical Technology Lab-I, Pharmaceutical Technology Lab-II, Pharmaceutical Technology Lab-III and Cosmetology Lab. Different dosage forms of drugs and cosmetic products are prepared in this lab such as syrup, suspension, suppository, cream, ointment, dry powder for suspension, dry powder for solution, effervescent tablet, floating tablet, film coated tablet, ophthalmic solution, ophthalmic ointment, bilayer tablet, liquid filled capsules, beads, transdermal patch, solid dispersion and cosmetic preparations like shampoo, toothpaste, mouthwash, cold creams, vanishing creams, after shave lotions etc. The physical properties of ingredients also determined in this lab, such as measurement of angle of repose of different powders, measurement of bulk density, tapped density of different powders, measurement of percent compressibility of different powders, solubility profile of poorly water soluble drugs by evaporation technique etc. These tests will provide students an in-depth understanding on the manufacturing process, formulations with justifications, evaluation parameters and problems associated with these formulations. The objectives of this course are to focus on the rational use of different chemical compounds, solvents, polymers and the manufacturing procedure for the formulation of dosage forms of drugs and cosmetic products.



### *Pharmacognosy and Phytochemistry Lab*

Pharmacognosy and Phytochemistry Lab is a research lab located at the 3<sup>rd</sup> floor (R-311) of UAP City Campus which is equipped with UV-Spectrophotometer, centrifuge machine, incubator, colony counter, p<sup>H</sup> meter, digital water bath, ultrasonicator, refrigerator, rotary evaporator, heating mantle, etc. Adequate number of glassware, chemical reagents and equipments are there for the smooth conduction of Pharmacognosy I & II lab courses and Phytochemistry research activities. Pharmacognosy I lab is designed to conduct visual identification of different medicinal plants. Pharmacognosy II lab deals with qualitative analysis of carbohydrates e.g. glucose, fructose, lactose, sucrose, distinguishing between reducing and non-reducing sugar, aldose and ketose sugar and monosaccharides and disaccharides, examinations of starch, extraction and isolation of caffeine from tea, coffee; identification of alkaloids. This course utilizes electronic balance (Shimadzu), Spectroline Fluorescence Analysis Cabinet, UV lamp, water bath, bunsen burner and TLC tank. Among the research works

conducted in the lab compound isolation, identification and biological and phytochemical activity evaluation are noteworthy.



## ■ **Research Policy and Program**

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Since 1996, UAP is the pioneer in launching four years Bachelor of Pharmacy (B. Pharm Hons.) program and one year Master of Science in Pharmaceutical Technology (MS. Pharm Tech) program. The Pharmacy department is one of the most progressive and established departments of the university as well as in the country. Following a bi-semester system, the Bachelor of Pharmacy requires minimum 8 semesters to prepare students as pharmacists and the Master of Science in Pharmaceutical Technology requires minimum 2 semesters to instruct and train the graduate pharmacists for working as integrated members of health-care system.

The areas of strength of the Pharmacy department are its twelve highly equipped teaching and research laboratories which are complete with up-to-date analytical instruments and machineries for evaluation of various dosage forms, design and manufacture of dosage forms, understanding of microbial disease pathogenesis and transmission, study of bio-chemical and biological studies of potential drug substance of natural origin.

### *Pharmaceutics and Pharmaceutical Technology Research*

Pharmaceutics and Pharmaceutical Technology Research Group is conducting the study of different validation methods, different drug delivery systems (like microsphere, pellets, biodegradable implants, self emulsifying drug delivery system-SEDDS, solid dispersion-SD, bilayer drug delivery system, liposomes and noisome drug delivery system), different dosage form like tablet, minitab, bilayer tablet, compressible capsule etc., drug formulation, basic quality evaluations of raw, intermediate and finished products, drug delivery, drug release kinetics, protein binding of drugs, mixture design of dosage form and observation of polymeric interaction, crystallization and nano-crystallization, Dissolution and solubility enhancement of poorly soluble drugs by solid dispersion and using hydrophilic carrier, Biphasic oral solid drug delivery, Liquisolid technique, Self-emulsifying drug delivery and controlled release dosage form technology.

## *Pharmacology and Biotechnology Research*

Biotechnology research lab is one of the most sophisticated labs in the Department of Pharmacy where plasmid DNA isolation, protein synthesis, PCR technology and polymorphism of different genes and other biotechnology related research works are performed.

## *Phytochemistry and Natural Products Research*

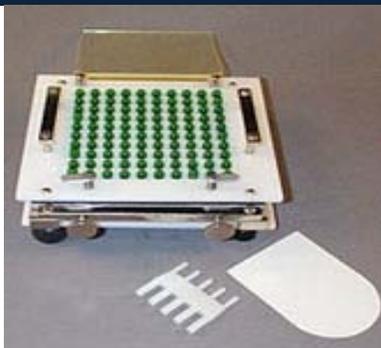
This group works to explore the potential of medicinal plants of folklore medicinal uses. Isolation of Bioactive molecule, evaluation of analgesic and anti-inflammatory, anthelmintic, antibacterial and antifungal, anticancer, antidiabetic, antidiarrhoeal, diuretic, hepatoprotective, and thrombolytic activity among others. Quantitative analysis of antioxidative components like total amount of phenolics, flavonoids and flavonols are estimated using spectrophotometric method.

## *Microbiology Research*

Microbiology lab focuses on the isolation and purification of causative agents of different diseases along with the determination of resistance pattern of different microorganisms against antibiotics.



Tablet Machine



Capsule Machine



Dissolution Machine



FTIR Spectroscopy



UV- Spectrophotometer



Over head Stirrer



Stability Chamber Machine



Dryer



HPLC



Distillation plant



Magnetic hot plate with stirrer

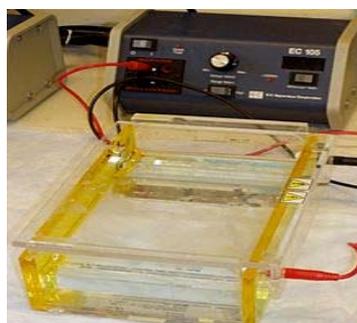


Sieve shaker machine

### Machine and Equipments of Pharmaceutical Research Lab



Laminar Air flow Cabinet



Gel Electrophoresis



PCR Machine



Column Chamber



Cantab for Cognitive Tests



Rotary Evaporator



Moisture Analyzer



Soxhlet water bath

Solvent Filtration Unit with  
PumpTemperature and humidity  
controlled refrigerator

Ultrasonic power sonicator



Micro centrifuge machine

**Machine and Equipments of Pharmacology and Biotechnology, Microbiology and  
Phytochemistry Research Lab**

***Biotechnology Research Lab***

Biotechnology Research Lab is housed in 3<sup>rd</sup> floor of UAP city campus (R-309) providing facilities for performing basic and common biotechnology laboratory techniques. It provides hands on experience in the areas of laboratory safety, aseptic techniques, measurements, calculations, preparation of solutions, use of pH meters, spectrophotometers, centrifuges, etc., as well as training in specific biotechnology techniques, including DNA extraction and amplification, Agarose gel electrophoresis

and restriction digestion of DNA. It has a Laminar air Flow Cabinet (ESCO) for preparation of biological samples, solutions and reaction mixtures to prevent contamination. For safety and preservation of temperature sensitive reagents and human bloods, Ultra Low Refrigerator (-80°C) (Witeg), Refrigerator (-32°C) (Simens) and Normal Refrigerator (Sharp) are used. Vortex Mixture (Digisysytem), Mini Shaker (IKA), Metabolic Shaker (ZHICHENE) and Micro centrifuge (Hermles) are available in the laboratory for separation and mixing of biological samples and reaction mixtures.

For the purpose of DNA amplification, a PCR machine from ESCO Healthcare is provided by which 24 samples can be run at once. The laboratory grants two Electrophoresis Gel Systems (Biometra) for performing Agarose Gel Electrophoresis. For gel imaging and analysis, we have a sophisticated Gel Documentation System supplied from Syngene. In addition, incubation of PCR products for restriction digestion can be done by using temperature and duration controlled -Heating Block. We also have a Nano spectrophotometer (Genova Nano) for measuring the concentration and the purity of DNA samples with great precision and accuracy. Besides, the laboratory is equipped with an Electronic Balance, an Autoclave and a Binocular microscope. The laboratory follows all the regulations governing biological laboratories that dictate the safety procedures and protocols for disposal of hazardous chemicals and biological.



### *Research & Development Formulation Lab*

Research & Development Formulation Lab is used for conducting four separate Labs which housed in a single room at 4<sup>th</sup> floor of UAP City Campus (411). This lab is well equipped with mixture machine, double cone blender, drum mixture, coating pan, compressor, bottle dryer, tablet compress machine (single punch and 8 punch). Each laboratory experiment is designed to provide students the knowledge of basic tablet compression, tablet blending, mixing and drying.



### *Research and Development Analysis Laboratory*

Research and Development Analysis Lab is located at 4<sup>th</sup> floor (R-409) of the UAP City Campus (R-411). It is designed by epoxy floor, sandwich panel wall, double door entrance-exit and has dehumidifier with HVAC system. Pharmaceutical analysis principally deals with analysis of pharmaceutical products. Our laboratory is devoted to the developmental analysis of different drugs, stability testing, determination of impurities, etc. The complex tasks of pharmaceutical development may also include development of new pharmacopoeial methods, stress testing to validate stability-indicating methods, impurity analysis and identification, herbal material analysis, cleaning validations, degradation tests and stability studies. We are specifically interested in: method development and validation, analysis of marketed pharmaceutical products as well as analysis of prepared dosage forms in the pharmaceutical technology lab. The techniques used are High performance Liquid Chromatography (HPLC), Automatic Titrator and Fourier-transform infrared spectroscopy (FTIR).



### *Pharmaceutical Technology Research Lab*

Pharmaceutical Technology Research Lab, dedicated to thesis students of Master's program focused on pharmaceutical technology, is accommodated in 4<sup>th</sup> floor (R-408) of UAP city campus. This exclusive lab is furnished with varied equipments like air compressor machine, coating pan, die punch, dissolution tester, electronic analytical balance, fume cupboard, hot plate, magnetic stirrer, digital over head stirrer, sieve shaker, oven, pH meter, ultrasonicator, vortex mixer, water bath and UV-Spectrophotometer. Adequate numbers of glassware and chemical reagents are made available for untroubled conduction of researches on conventional as well as advanced drug delivery system such as micro and nano particles, solid dispersion, SEEDS, Liposomes etc. This Lab enables students to experience with the formulation development and characterization of the developed formulations using various techniques during their thesis in Master's program.



### *B Pharm Project laboratory*

B Pharm Project laboratory is located at 4<sup>th</sup> floor of the UAP City Campus(R-410). This laboratory is equipped with sufficient machineries and PCs to conduct different types of project works of 4<sup>th</sup> year students. Adequate numbers of equipment e.g. tablet dissolution and disintegration tester, friability tester, HPLC water purification systems, moisture analyzer and UV spectrophotometer have been used by the undergraduate students for their B. Pharm. project works which mainly comprised of different tablet evaluation tests. In this laboratory, six students can run six different projects at a time.



## *Computer Lab*

The Department of Pharmacy has its own computer laboratory located at 3<sup>rd</sup> floor of the UAP City Campus (R- 314) which is equipped with 25 modern and updated PCs. The laboratory has internet and printing facility. All of the PCs have Intel Core i3 or Core 2 Duo processors and CRT/ LCD monitors (17"/ 19"). Students could browse from any PC free of charge for unlimited time period. Students use this lab for the purposes of internet based study like searching research articles, reading e-books and doing group assignments etc. This lab is also equipped with a scanner.

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Department of Pharmacy

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