

FACULTY OF SCIENCE
MAHIDOL UNIVERSITY



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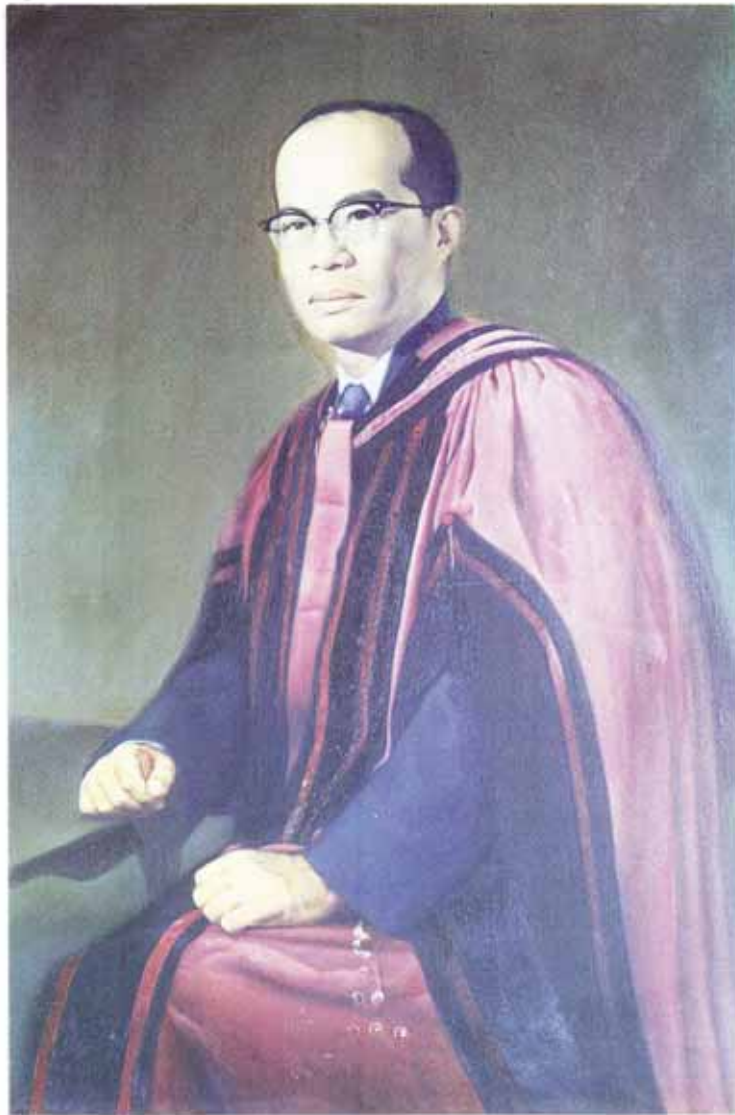






Mahidol University has its origins in the first teaching hospital in Thailand, namely Siriraj Hospital, founded by King Chulalongkorn in 1889. The university was established in 1943 as the University of Medical Sciences, and was renamed Mahidol University in 1969. This name refers to Prince Mahidol of Songkhla, father of the present King of Thailand, and widely considered to have introduced modern medicine into the country.

Mahidol University currently has 3 campuses. The original site on Pran Nok Rd., on the west bank of the Chao Phraya river, occupies 23 acres and houses the Faculties of Medicine (Siriraj Hospital), Medical Technology, and Nursing. The second location is a cluster of sites in the Phya Thai district, totalling 42 acres, housing the Faculties of Medicine (Ramathibodi Hospital), Science, Tropical Medicine, Dentistry, and Pharmacy. The third site, in the Salaya District of Nakorn Pathom Province (30 km from Bangkok) occupies 490 acres and houses the Faculties of Environment and Natural Resources, Social Sciences and Humanities, Engineering, and Graduate Studies, as well as several specialised institutes, colleges and centers. In addition, the Administrative Offices of the University are near the Phra Pinklao Bridge, and new campuses are being planned in other parts of the country, including at Kanchanaburi. The University has approximately 13,000 students, enrolled in some 250 courses, taught by about 2,500 staff.



Professor Stang Mongkolsuk, first Dean of the Faculty of Science, whose vision and dedication helped to develop the faculty into a major regional centre for research and teaching.



The Faculty of Science was founded as a Premedical School in 1958, and took the name of Faculty of Science, Mahidol University in 1969, one year after moving to its present location on Rama VI Road. Currently, the Faculty of Science consists of 14 departments: Anatomy, Biochemistry, Biology, Biotechnology, Chemistry, Computer Science, Foreign Languages, Mathematics, Microbiology, Pathobiology, Pharmacology, Physics, Physiology, and Plant Science. There are approximately 300 academic staff, with 165 at doctoral level, 113 at Master's level, and 33 at Bachelor's level. The Faculty is responsible for teaching science and English to all first year undergraduate students of the university, presently numbering about 2,000 students per year, using its facilities at the Salaya campus, and also assists in teaching second year students in health sciences and medicine.



The Faculty of Science offers B.Sc. programs in Physics, Mathematics, Computer Science, Chemistry, Biology, Biotechnology, and Plant Science, to a total of some 300 students per year. It also has very strong, well-established international graduate programs at the Master's and Ph.D. levels, with some 300 students at the Master's level and 80 students at the Ph.D. level. Former graduates from these programs are now staff members of most universities in Thailand, and some hold important administrative positions. All departments except for Plant Science offer programs at the Master's level, while 9 departments offer programs at the Ph.D. level, namely Anatomy, Biochemistry, Biology, Biotechnology, Chemistry, Microbiology, Pathobiology, Pharmacology, and Physiology. All graduate programs are in English, but undergraduate teaching is in Thai. In addition, various extracurricular activities of academic, cultural, or recreational nature are supported for both students and staff.

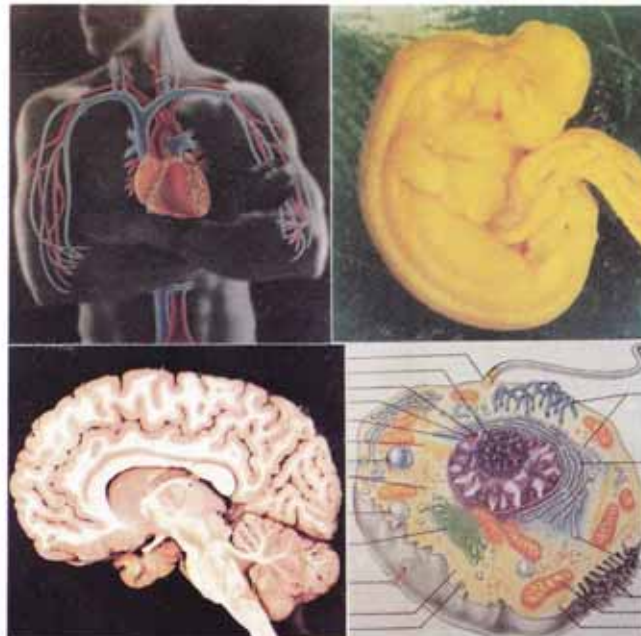
The Faculty of Science places a strong emphasis on research, not only as part of the thesis work for graduate programs, but also as a contribution to international scientific advancement and national development. This serious and sustained emphasis on research has created an excellent academic atmosphere within the Faculty, that has allowed staff to compete successfully for grants at both the national and international level, and perform work of excellent quality. Indeed, some 50% of the international publications from all the science faculties in Thailand come from the Faculty of Science, Mahidol University. Moreover, staff from the Faculty have won numerous awards for their outstanding research work at the university level, national level and regional level. Staff at the Faculty have also performed many administrative and consultative functions in various academic organisations at the national level, regional level and international level.



DEPARTMENT OF ANATOMY

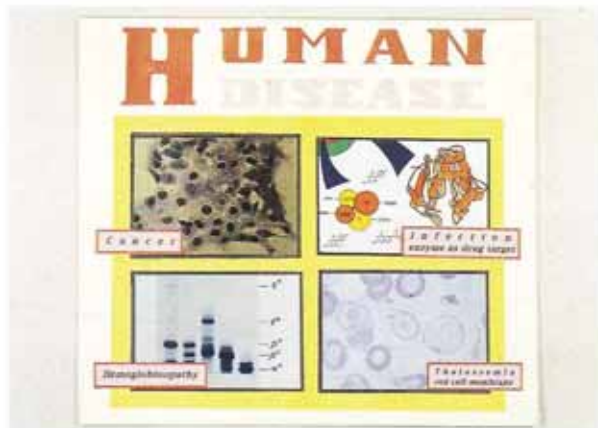
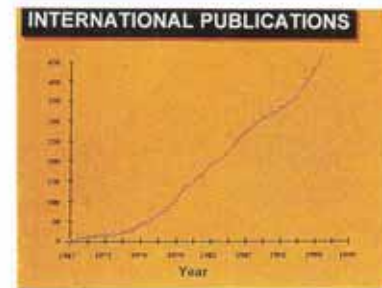
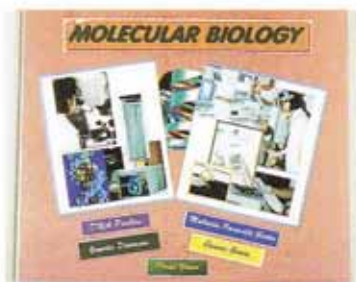
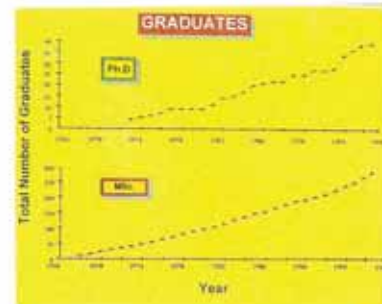
Anatomy is a fast developing science dealing with the organization of biomolecules, ultrastructures, cells, tissues, organs and systems in animals including man. Knowledge of anatomy is of fundamental importance for biology and medicine, and contributes in providing greater insight into biochemical, physiological, pharmacological and pathological processes.

The Department of Anatomy is responsible for teaching medical, paramedical as well as graduate students enrolled for the B.Sc., M.Sc. and Ph.D. degrees. The department engages in a wide range of basic and applied research including cell biology (neuronal pathways), parasitology (liver flukes and blood flukes), reproductive biology (antifertility drugs), development and pathology of kidney, biotechnology (*in vitro* fertilization and embryo transfer, improvement of prawn culture through hormonal treatment, farming of economic animals, such as frogs and snails) and electron microscopy (using both TEM and SEM).



DEPARTMENT OF BIOCHEMISTRY

The Department offers M.Sc. and Ph.D. programs in biochemistry. Research activities can be grouped into three main areas : infectious diseases, encompassing metabolic studies of *Plasmodium falciparum*, mechanisms of antimalarial drugs, development of new antimalarials, molecular mechanism of melioidosis, drug resistance in parasites and bacteria ; biochemical technology including industrial applications of lectins and enzymes such as haloperoxidases, glycosidases (carbohydrate engineering) and lipases ; and DNA technology, involving genome research on prawn and malaria parasite, cloning of bacterial insecticidal toxins, fish growth hormone and catalase in lactic acid bacteria, and the construction of a variety of diagnostic DNA probes. Other research interests include virus infection in prawn, molecular pathophysiology of thalassemia, apoptosis in thalassemia and malaria, molecular biology of cancer, mechanism of cyanogenesis in cassava, rubber latex metabolism, and iodine test kits



DEPARTMENT OF BIOLOGY

The Department of Biology seeks to promote a profound understanding of living organisms and their environment, and a desire to use this understanding to improve our own long-term survival and welfare.

The undergraduate program covers a wide range of basic and applied training for the students' future careers in governmental and industrial organizations or future graduate study. Biology major students learn the fundamentals of living organisms, be it plants, animals or microorganisms, from biomolecules, cells, organisms and populations with special emphasis on interaction between organisms in the ecosystem, as well as the effects of environmental changes and conservation biology.

The graduate programs, M.Sc. in environmental biology and Ph.D. in biology, cover a wide range of basic and applied fields of research, which are mostly related in some way to natural population problems or to the environment. These include aquatic biotechnology, plant tissue culture, biological products, pollution and toxicology, medical entomology and malacology, population genetics and cytogenetics, primate biology and conservation of wildlife.



DEPARTMENT OF BIOTECHNOLOGY



B iotechnology is a field of science that exploits living organisms or components of living organisms to make useful products. Biotechnology promises to revolutionize the agricultural, industrial, health and environmental sectors.

The Department offers a four year curriculum leading to a B.Sc. in biotechnology. The postgraduate programs leading to M.Sc. and Ph.D. degree in biotechnology have been offered since 1992 and 1996, respectively. The B.Sc. program provides basic course work and also includes two months of industrial training and a senior research project on the application of biotechnology in areas relevant to national development.

The Department also undertakes active research programs that emphasize links with the Thai industrial sector. These research projects exploit our state of the art capabilities in biotechnology areas that include genetic engineering, industrial microbiology, food biotechnology, plant biotechnology and bioprocess engineering. Current research projects range from development of new microbial strains for industrial production of enzymes, antibiotics, animal feed additives, fermented products and modern insecticides, to studies on secondary metabolites from medicinal plants and on the genetic engineering of pest resistant plants.

DEPARTMENT OF CHEMISTRY

The Department of Chemistry offers a B.Sc. program with lecture courses being fully supported by laboratory classes. The Department is equipped with most of the major chemical instruments used in analysis and research. There are also programs leading to the M.Sc. and Ph.D. degree in organic chemistry, physical chemistry and chemical physics. An M.Sc. degree is also offered in polymer science, and applied analytical and inorganic chemistry. A Ph.D. program in polymer science is being planned.

Graduate research topics are available in the following areas of chemistry: natural products chemistry; synthesis of biologically active compounds; development of iron chelators for clinical use; physico-chemical properties of liquid crystals; natural and synthetic polymers; trace analysis; advanced ceramics; use of computers in chemical education; quantum chemistry; and statistical mechanics.



DEPARTMENT OF COMPUTER SCIENCE

The Department of Computer Science offers B.Sc. and the M.Sc. degree programs in computer science with a curriculum emphasizing the fields of database systems, data communication, information systems and artificial intelligence. These areas also represent the major research interests of the Department.

In cooperation with the Mahidol University Computing Center, the Department also provides short courses and professional training in various disciplines of computing sciences to encourage computer literacy.



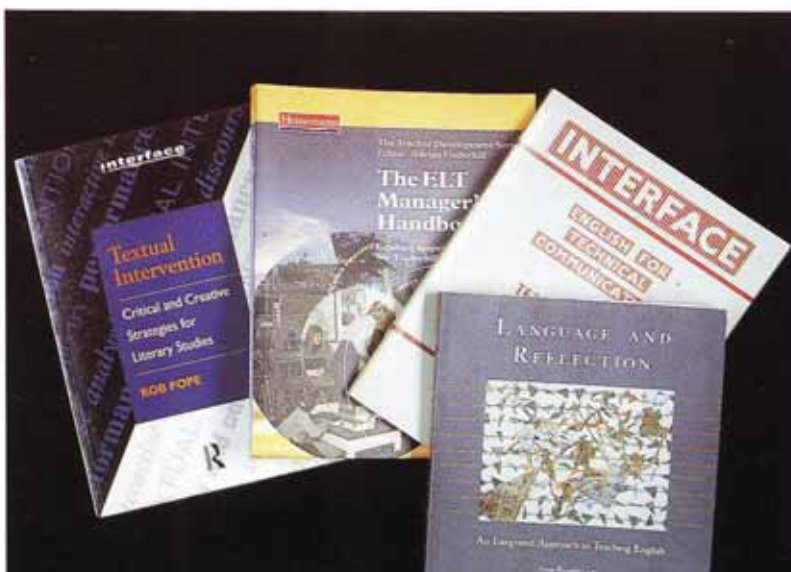
DEPARTMENT OF FOREIGN LANGUAGES

The Department of Foreign Languages teaches several foreign languages, including English, French, German and Japanese. Courses in French, German and Japanese are elective courses open to all students in Mahidol University. English is a required course for all first year students (of every faculty) and is also a required course for some second year students. Additionally, the Department offers other elective courses, such as Business English, for third and fourth year students.

The Department conducts teaching in such a way that it will benefit students in their various fields, such as general science, medicine, other health sciences and engineering. Different teaching materials are used for students in these varied fields of study. Within the syllabus of each course, the four skills of language usage are emphasized : reading, listening, speaking and writing.

Mahidol University was the first university in Thailand to offer a Master's degree program in teaching English for specific purposes. Besides stressing fluency in English usage, graduates learn language teaching methodology, curriculum design and construction of effective language assessment tools.

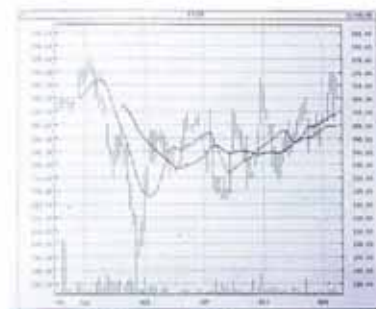
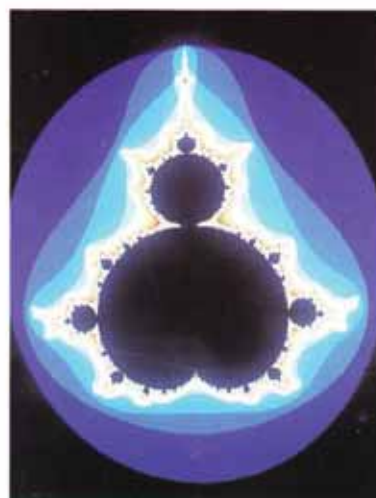
The department is committed to help the community in language instruction, and offers courses such as English for children, English for every day use, and TOEFL preparation courses several times a year. Other goals include producing computer-assisted instruction (CAI) materials for students to use outside regular classrooms in language laboratories and computer centers on Mahidol University campuses. In addition, courses are being prepared for use with teleconferencing technology. Research activities include studies of teaching methodology, curriculum development, teacher learner interaction and syllabus design. In developing courses, analyses of learner proficiency and subsequent needs are conducted.



DEPARTMENT OF MATHEMATICS

The Department of Mathematics offers a B.Sc. degree in mathematics and an M.Sc. degree in applied mathematics. The B.Sc. program aims at providing students with knowledge in both basic and advanced areas of mathematics. Undergraduates are taught to apply their mathematical knowledge to other fields of interest.

In the M.Sc. more advanced mathematics courses are offered. Students are taught to mathematically model various problems in science and related fields. Applying these models is usually done numerically and thus a great part of the students' education deals with the use of computers. At present, research is being done in the fields of biotechnology simulation and statistical analysis.



DEPARTMENT OF MICROBIOLOGY



The Microbiology Department provides instruction both at the M.Sc. and Ph.D. levels. The graduate program is in English and includes courses in general and medical aspects of microbiology, parasitology, and immunology.

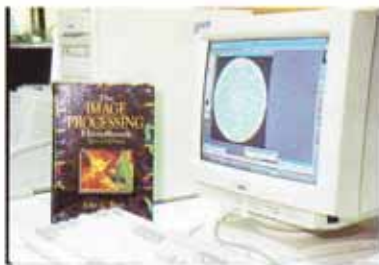
The Department places a strong emphasis on research. Research areas are : immunology of parasitic diseases, reproductive immunology, development of simple, rapid and inexpensive immunodiagnostic tests for identifying drugs of abuse, preparation of potent polyvalent antivenoms against poisonous snakes, research and development of modern diagnostic techniques, epidemiology, vaccine development, molecular biology and genetic engineering of etiologic agents of important diseases (i.e. malaria, other bacterial and parasitic diseases, viral diseases), microbial insecticides, fungal research and antibiotics production.

In addition to research interests in medical microbiology, the Department is now actively engaged in research in industrial microbiology. Recent interests include studies on improvements in production and quality of fish sauce and fish products; the use of enzyme technology, genetic engineering, protein engineering and enzyme immobilization for production of β -lactam antibiotics and their derivatives ; and the search for new useful antimicrobial agents from natural microorganisms.

DEPARTMENT OF PATHOBIOLOGY

The Department offers M.Sc. and Ph.D. degrees in Pathobiology and started a Diploma program in Experimental Pathology in 1992.

The curriculum is designed to prepare students for a professional career in the area of pathobiological science with an emphasis on basic principles of injury, particularly, at cellular and subcellular levels, and the pathogenesis of several disease processes, namely, infectious agents (dengue and HIV), parasitic agents (malaria, liver fluke, schistosome), mycotoxins (aflatoxin, trichothecene), toxic agents and carcinogens (alcohol, nitrosamine). The Department is composed of units in cellular pathology, immunopathology, biochemical pathology, immunochemistry, toxicopathology, genetic toxicology and animal pathology.



DEPARTMENT OF PHARMACOLOGY

The Department offers M.Sc. and Ph.D. degree students in Pharmacology. In addition, the Department serves as the coordinator for the Inter-departmental Graduate Program in Toxicology of the Faculty of Graduate Studies.

Research interests include drug-receptor interaction, pathophysiology of thalassemia, chemical mediators, clinical pharmacokinetics and drug metabolism, assessment of bioavailability of locally made drugs, chemical carcinogenesis, natural product chemistry and pharmacology, antimalarial drug development, industrial and environmental toxicology, antidotes for pesticides, and effects of drugs on central nervous system.

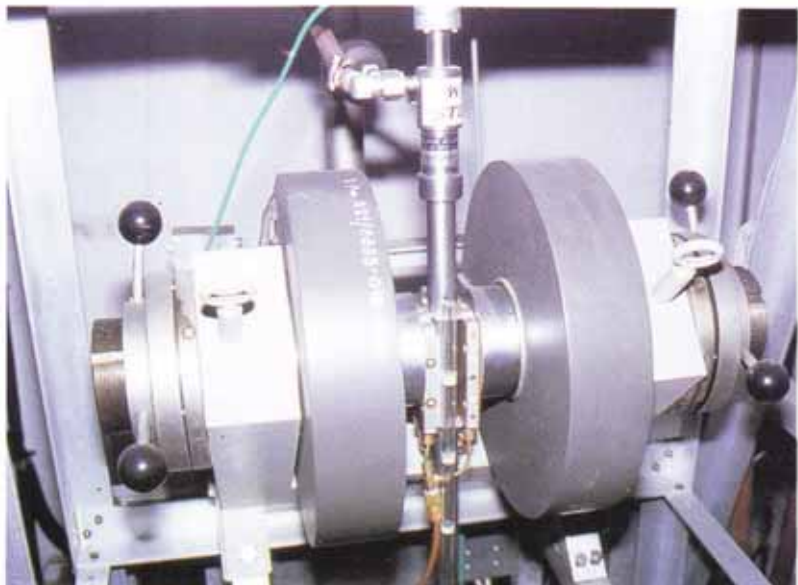
Since the Department is actively involved in both pharmacology and toxicology, staff are well-versed not only in the beneficial effects but also the adverse effects of chemicals.



DEPARTMENT OF PHYSICS

The Department of Physics offers B.Sc. and M.Sc. degrees in physics. A new M.Sc. program in materials technology is being offered in 1997. In the undergraduate curriculum, emphasis is put on both theoretical and experimental physics, and in the fourth year, there is a senior project with good access to quality research equipment.

Original research within experimental and theoretical areas is being conducted in the Department. Work is mainly done in the fields of materials science, computational physics, semiconductor physics, nonlinear optics, holography and fiber optics. Pure theoretical physics work is also performed in the fields of Disordered Systems, Quantum Chaos, Superconductivity and Quantum Hall Effects



DEPARTMENT OF PHYSIOLOGY

Physiology is concerned with the function of organisms and the processes that control and regulate important properties of living systems. The Department of Physiology offers two graduate programs leading to M.Sc. and Ph.D. degrees in Physiology and an M.Sc. degree in Physiology of Exercise.

Fields of research include : gastrointestinal physiology and toxic physiology, calcium metabolism, renal physiology, cell physiology and tissue culture, reproductive physiology, cardiovascular, respiratory and adaptive physiology, neurophysiology and physiology of exercise.



DEPARTMENT OF PLANT SCIENCE

The Department of Plant Science offers numerous courses in all aspects of plant life for undergraduate studies. The B.Sc. program covers a wide range of basic and applied courses for providing students with sufficient career flexibility. Scientists with knowledge of plants are needed in governmental and private sectors. Advanced technologies are requiring more intensive basic plant science training. Courses include anatomy, morphology, taxonomy, genetics, physiology, ecology, tissue culture, phytochemistry, plant growth regulators, breeding, plant genetic resources conservation and applied plant science.

Students can choose to work with department staff on a wide range of research topics such as phytochemistry and tissue culture techniques of medicinal plants, plant tissue culture techniques for production of economic crops, chromosome studies for plant taxonomy and plant breeding, taxonomic and ecological studies of algae, mechanisms and uses of plant growth regulators, plant breeding of economic crops, and plant genetic resources conservation.



FACULTY LIBRARY

The Faculty of Science Library was named as the Stang Mongkolsuk Library in honor of Professor Dr. Stang Mongkolsuk, the first dean, and founder of the Faculty

The library is located on the first, the second and the third floors of the Physics Building. On the first floor, the library houses educational technology resources and provides facilities for producing educational media. On the second floor, the library renders many services such as lending and borrowing library resources, searching for educational information through the library computer network and collecting books and other special publications. On the third floor, the library houses both Thai and foreign journals shelved alphabetically by titles.

The library houses and collects information on science and medical sciences to support teaching, learning, and research of faculty members, government officials, scientists, researchers and students of the Faculty, as well as users from other faculties/institutes of Mahidol University. The service covers books, journals, indexing and abstracting journals, research reports, books on industrial standards, academic information databases on CD-ROM, providing bibliographies with abstracts, journal articles, multimedia & CAI; databases for books, theses and union list of serials; and also educational technology resources in the form of videotapes, recorded cassette tapes, lecture tapes, slide tapes and microforms.



SUPPORTING FACILITIES

To enhance the quality of both research and teaching, the following facilities have been created, Central Instrument Facility, Multidisciplinary Laboratory, Laboratory Animal Unit, Audio-Visual Unit, Workshop and the Health Care Unit.

Central Instrument Facility

The Facility supports research in all departments of the Faculty of Science and in other faculties of the University. It aims to render services in instrumentation, consultation, and training for personnel both inside and outside the University.



Multidisciplinary Laboratory

The Laboratory provides materials, chemicals, experimental animals, microorganisms, together with instruments and equipment for students' class experimentation in the life sciences and medical sciences. Examples include light microscopes, dynographs, spectrophotometers, incubators and high speed centrifuges. It also provides laboratory space for medical students and graduate students in the life sciences.



Laboratory Animal Unit

Animals for experimentation such as rats, mice, hamsters, rabbits are provided by this unit.



Maintenance and Repair Workshop

The workshop carries out maintenance and repair of electronic instruments and electrical appliances together with some mechanical and metal works.



Audio-Visual Unit

This unit has facilities for making slides, photographs, posters, medical illustrations and recording and display of videotapes. The unit also takes care of audiovisual facilities in lecture rooms



Health Care Unit

Treatments for minor health problems of staff and students are provided here. More serious cases are referred to the hospitals of Mahidol University.

The Faculty compound also hosts part of the Chulabhorn Research Institute, the Mahidol University Computer Center and laboratories sponsored by the National Science and Technology Development Agency and the National Center for Genetic Engineering and Biotechnology.

Correspondence:


Address : Faculty of Science, Mahidol University, Rama 6 Road, Bangkok 10400, Thailand

Telephone : 2461358-74,2460063

Telefax : (662)2477050

Telex : 84770 UNIMAH TH

Web site : <http://einstein.sc.mahidol.ac.th>



ออกแบบ - พิมพ์ บริษัท ซิกม่า ดีไซน์ กราฟิกส์ จำกัด 457/41 อรุณอมรินทร์ บางกอกน้อย กรุงเทพฯ 10700
ZIGMA DESIGN GRAPHICS CO., LTD. 457/41 ARUNAMRIN RD, BANGKOKNOI BANGKOK. 10700
TEL. 434-2212 FAX. 434-2212

