SCHOOL OF SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS

Inquiry into the nature of physical phenomena is among the most persistent of human concerns. During the past century, both the scope and pace of such inquiry have broadened and accelerated, and its influence on our civilization has become pervasive. The discoveries and consequences of scientific inquiry have profoundly affected the human race—both in daily life and in practically all domains of intellectual life. The School of Science, Technology, Engineering, and Mathematics believes that an understanding of the sciences is an indispensable part of a sound education. Coursework in the School provides students with instruction that addresses fundamental issues in the broad range of scientific inquiry. The School seeks to instill in students an appreciation of critical thinking as well as knowledge of specific subjects. Students who decide to major in one of the disciplines of the School undertake specialized study and research in their selected fields.

The School offers majors in Biology, Chemistry, Mathematics, and Computer Sciences.

Note: *Students must complete all prerequisite courses in the School of Science, Technology, Engineering, and Mathematics with a grade of "C" or better before they may attempt the next course in a course sequence.*

Pre-health and Allied Health Careers

The School of Science, Technology, Engineering, and Mathematics offers programs related to the health professions. Students interested in medicine, optometry, physical therapy, pharmacy, or other allied health fields should consult the chairperson of the School of Science, Technology, Engineering, and Mathematics or the Pre-health professions advisors. The following section of this Catalog describes allied health career requirements and provides other information relevant to these fields.

Many health careers require graduate degrees earned after completing a baccalaureate degree. The School offers coursework that prepares students for admission to graduate programs in several allied health fields. Requirements for some health-related graduate programs are described below:

Medicine

There are allopathic and osteopathic medical schools, and students should appreciate both tracks. To enter one of these schools, students must complete at least one year of biology with laboratory, one year of general chemistry with laboratory, one year of organic chemistry with laboratory, one year of physics with laboratory, one year of college mathematics or one semester of calculus, one year of English, and other courses that will help assure success, such as those in advanced communication skills, logic, or computer science, and psychology.

In addition, pre-medicine students are advised to take Cell Biology, Biochemistry, Statistics, Psychology, and Sociology. Content from these additional courses appears on the entry exam for medical school (MCAT – Medical College Admission Test).

Pre-Health Professional academic advisors at Kentucky State University work closely with pre-medical students to ensure that they fulfill all of the requirements for admission to professional schools in a timely manner. Shadowing physicians, volunteer work and summer research work are highly valued for admission. Students will apply through a special website, AMCAS (American Medical College Admission Service) and/or AACOMAS (American Association of Colleges of Osteopathic Medicine Application Service), one year before they desire admission. Students who need more information about a pre-med track should consult the Pre-Health Professions advisors as early in their academic careers as possible.

Dentistry

To apply to dental school, students must complete at least two years of biology with laboratory, one year of general chemistry with laboratory, one year of organic chemistry with laboratory, one year of physics with laboratory, one year of college mathematics or one semester of calculus, one year of English, and other courses that will help assure success, such as those in advanced communication skills, logic, or computer science, and psychology.

Pre-Health Professional academic advisors work closely with pre-dental students to ensure that they fulfill all of the requirements for admission to professional schools in a timely manner. Each applicant is required to take the Dental Admission Test (DAT), which is designed to measure general academic ability and scientific knowledge of pre-requisite courses. Shadowing dentists, volunteer work and summer research work are highly valued for admission. Students will apply through a special website, ADEA Associated American Dental Schools Application Service (AADSAS), one year before they desire admission. Students who need more information about the pre-dental track should consult the Pre-Health Professions advisors as early in their academic careers as possible.

Optometry

Optometry is the profession of examining the eyes for defects and faults of refraction and prescribing corrective lenses or exercises. The Commonwealth of Kentucky sponsors a program that enables 15 qualified pre-optometry students who are Kentucky residents to gain admission each year to the Southern College of Optometry in Memphis, Tennessee, and the optometry schools of Indiana University and the University of Alabama at Birmingham. Eight entering spaces are reserved at Southern, four at Indiana University, and three at the University of Alabama at Birmingham.

Students must complete one year of biology with labs, one year of advanced biology (Human Anatomy and Human Physiology are suggested), Microbiology with lab, one year of general chemistry, one or two semesters of Organic Chemistry with lab (varies by school), Biochemistry, Calculus I, one year of Physics with lab, Psychology, and Statistics. The Biochemistry requirement varies by school.

Each applicant is required to take the Optometry Admission Test (OAT), which is designed to measure general academic ability and scientific knowledge of pre-requisite courses. Many schools also require a minimum number of hours in observation of a practicing optometrist.

Students will apply through a special website, OptomCAS (Optometry College Application Service), one year before they desire admission.

Pharmacy

Pharmacy is the profession of providing direct input into overall patient drug management. The pharmacist reviews updated patient medication profiles on a daily basis and is increasingly involved with direct patient care. Pre-pharmacy courses include: two years of biology (general biology, human anatomy, physiology and microbiology), one year of general chemistry with labs, one year of organic chemistry with labs, calculus I (some schools require calculus II as well), statistics, one year of physics with labs (some schools no longer require physics), and medical terminology. Economics (most prefer microeconomics), psychology and/or sociology are also required. Biochemistry, cell biology, genetics are recommended as additional courses of value. An undergraduate degree is not required for admission to pharmacy school.

Each applicant is required to take the Pharmacy College Admission Test (PCAT), which is designed to measure general academic ability and scientific knowledge of pre-requisite courses. Many schools also require observation of a practicing pharmacist. Students will apply through a special website, PharmCAS (Pharmacy College Application Service), one year before they desire admission. Interested students should maintain close contact with the School's Pre-Health Professions advisors or the chairperson of School of Science, Technology, Engineering, and Mathematics.

Physical Therapy

Physical therapy is a profession dealing with the development and administration of programs of care to restore motor function, relieve pain, and prevent disability in individuals whose abilities are threatened by disease, injury, loss of a body part, or conditions existing at birth. A licensed physical therapist requires a doctoral degree (DPT, Doctor of Physical Therapy). In order to be admitted to the doctoral program, the student should complete the following pre-requisites: one year of general chemistry with labs, one year of physics with labs, one year of general biology (can include zoology), human anatomy, physiology, pre-calculus (or higher math), one year of psychology (general and an advanced course – some schools are specific about the advanced psychology course) and statistics.

Additional suggested courses of value include sociology, exercise physiology, biochemistry, medical terminology, and management courses. In addition, interested students must document 50-100 clock hours of work or volunteer experience directly related to physical therapy. Specific requirements vary by institution, so students should consult the websites of schools that are of interest.

Many schools require that students take the GRE (Graduate Record Exam) as part of the admission process. Students may also be asked to apply through a special website, PTCAS (Physical Therapist Centralized Application Service), one year before they desire admission. Interested students should maintain close contact with the School's Pre-Health advisors.

Veterinary Medicine

No colleges or universities in the Commonwealth of Kentucky offer training in veterinary medicine. However, the Kentucky Council on Postsecondary Education administers a Southern Regional Education Board Program in Kentucky through which qualified Kentucky resident students may be accepted to the veterinary medicine schools of Auburn University and Tuskegee University. (At the time of publication of this

Catalog, the Council had contracted for 36 entering spaces annually: 34 at Auburn and two at Tuskegee.)

Students accepted under the regional plan are relieved of the obligation of paying out-of-state fees, and their expenses are identical to those of in-state students. Formal applications must be filed through the Council on Postsecondary Education, which re-views these applications and submits those selected to Auburn or Tuskegee for admission approval. Any student interested in veterinary medicine should have completed 80 semester credit hours of pre-professional training with a minimum grade-point average of 2.5; however, preference is given to those students who have satisfied the requirements for a baccalaureate degree. Interested students should consult the Chairperson of the School of Science, Technology, Engineering, and Mathematics.

Biology

Biology is the scientific study of living systems. The Bachelor of Science in biology curriculum includes the study of organismal diversity, cell biology, physiology, genetics, evolution, and ecology. Students are encouraged to master basic principles of scientific inquiry while familiarizing themselves with the traditional aspects of a sound liberal education.

The School of Science, Technology, Engineering, and Mathematics offers programs leading to the Bachelor of Science degree in Biology with four options: General Biology, Pre-Professional, Biotechnology, and a track in Biology Education. Details on the former may be found elsewhere in this Catalog in the sub-section on the School of Education, Human Development, and Consumer Sciences. A minor in Biology is also offered.

Pre-Health Professional

For more information on our Pre-Health Professional programs (examples are Pre-Med, Pre-Vet, Pre-Pharm, Pre-Dental), please contact the School of Science, Technology, Engineering, and Math at Natural.Sciences@kysu.edu.

Pre-Biological Engineering

For more information on our Pre-Biological Engineering program, please contact the School of Science, Technology, Engineering, and Math at Natural.Sciences@kysu.edu.

Mathematics

Mathematical facts, procedures, skills, and processes are indispensable in acquiring understanding within all fields of science and central to the development and practice of critical thought and communication. Physics is the science that seeks to employ mathematics to explain the universe and its phenomena. Computer science packages these essentials into program courses at Kentucky State University which integrate theoretical as well as practical topics to provide students with the advanced conceptual framework and technical expertise required to succeed in new and ever-changing markets.

Students in the Bachelor of Arts, Science Mathematics degree are currently on a teach out plan and this degree will not be offered to incoming students after current students finish their degrees. The Mathematics program offers a degree with three options: Pure Mathematics, Applied Mathematics/ Pre- Engineering, and Mathematics Education. Minors in Mathematics and Physics are also offered. Incoming students who desire to pursue a mathematics degree option should declare a Pre- Mathematics major. Once a student has completed MAT 120 with a grade of "C" or better, he or she may request in writing to

convert to a Mathematics major. Both Pre-Mathematics and Mathematics majors are to be advised by Mathematics advisors.

Chemistry

The science of chemistry is concerned with the structure, composition, and reactions of matter. Chemistry instruction at the University is designed to familiarize the student with current views of these concepts. The relevance of chemistry is readily apparent, for the universe and the life forms it contains are chemical systems undergoing specific chemical reactions. To understand the universe and ourselves, it is necessary to understand the laws governing these chemical systems. A deeper knowledge of chemistry is necessary to solve many of humanity's problems: feeding the hungry, healing the sick, and finding bettering living conditions in general. Coursework in chemistry at Kentucky State University considers both experimental and theoretical topics and emphasizes their interdependence. A minimum of 120 semester credit hours is required to earn the Bachelor of Science degree in Chemistry. A minor in chemistry is also offered. **Students in the Bachelor of Science in Chemistry degree are currently on a teach out plan and this degree will not be offered to incoming students after current students finish their degrees.**

Chemistry, B.S. and Secondary Education Teaching Certification in Chemistry

For more information on our Chemistry Education Race Track, please contact the School of Science, Technology, Engineering, and Mathematics at Natural.Sciences@kysu.edu, (502) 597-6603 or visit the office in Carver Hall Room 132 or contact the School of Education, Human Development, and Consumer Sciences in Hathaway Hall, Suite 108, (502) 597-5919.

Computer Science

The Computer Science program offers courses leading to a Bachelor of Science in Computer Science, and a Master of Science in Computer Science. Students pursuing the bachelor's degree in computer science select an academic track from computer information security, computer information systems, game development, mathematics, or network engineering. Students will learn skills in programming, systems, information security, databases, game programming, and networking components. The baccalaureate degree program in computer science is modeled in accordance with guidelines established by the Accreditation Board for Engineering and Technology (ABET). The M.S. in Computer Science has two academic concentrations to choose from: cyber security and information engineering.

Master Degree

The Master of Science in Computer Science Program offers students the opportunity to combine a sound foundation and a professionally oriented computer science education with the applied and in-demand skills necessary for today's careers in technology. The program is designed to be flexible enough to accommodate the needs of students who have completed an undergraduate degree in computer science and want to further their studies and those with degrees in areas other than computer science, who seek to broaden their education in the discipline. All of our graduate classes are offered in the evenings or online. See Graduate Programs for program information.

Bachelor's

- Biology Bachelor of Science - Biotechnology Track (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/biology-bs-biotechnology-track/)
- Biology Bachelor of Science - General Biology Track (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/biology-bs-general-biology-track/)
- Biology Bachelor of Science - Pre-Professional Track (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/biology-bs-pre-professional-track/)
- Chemistry Bachelor of Science (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/chemistry-bs/)
- Computer Science Bachelor of Science - Computer Information Security Track (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/computer-science-bs-computer-information-security-track/)
- Computer Science Bachelor of Science - Game Development Track (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/computer-science-bs-game-development-track/)
- Computer Science Bachelor of Science - Information Systems Track (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/computer-science-bs-information-systems-track/)
- Computer Science Bachelor of Science - Mathematics Track (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/computer-science-bs-mathematics-track/)
- Computer Science Bachelor of Science - Network Engineering Track (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/computer-science-bs-network-engineering-track/)
- Mathematics Bachelor of Arts - Pure Mathematics (closed to new enrollment July 1, 2023) (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/mathematics-ba-pure-mathematics/)
- Mathematics Bachelor of Science - Applied Mathematics Pre-Engineering Track (closed to new enrollment July 1, 2023) (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/mathematics-bs-applied-mathematics-pre-engineering-track/)
- Mathematics Bachelor of Science - Education Track (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/mathematics-bs-education-track/)
- Mathematics Bachelor of Science - Pre-Engineering Biosystems Track (closed to new enrollment July 1, 2023) (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/mathematics-bs-pre-engineering-biosystems-track/)
- Mathematics Bachelor of Science - Pre-Engineering Chemistry Track (closed to new enrollment July 1, 2023) (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/mathematics-bs-pre-engineering-chemistry-track/)
- Mathematics Bachelor of Science - Pre-Engineering Materials Track (closed to new enrollment July 1, 2023) (https://kysu-

public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/mathematics-bs-pre-engineering-materials-track/)

- Mathematics Bachelor of Science - Pure Mathematics (closed to new enrollment July 1, 2023) (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/mathematics-bs-pure-mathematics/)

Minors

- Biology Minor (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/biology-minor/)
- Chemistry Minor (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/chemistry-minor/)
- Computer Gaming Minor (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/computer-gaming-minor/)
- Computer Information Systems Minor (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/computer-information-systems-minor/)
- Computer Science Minor (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/computer-science-minor/)
- Mathematics Minor (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/mathematics-minor/)
- Physics Minor (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/physics-minor/)

Certificates

- Computer Technician Certificate (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/computer-technician-certificate/)
- Cyber Security Certificate (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/cyber-security-certificate/)
- Network Associate Certificate (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/network-associate-certificate/)
- Network Professional Certificate (https://kysu-public.courseleaf.com/undergraduate/agriculture-community-sciences/science-technology-engineering-mathematics/network-professional-certificate/)