Career-Related Services

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Mathematics

Center for STRATEGIC ADVISING
& CAREER COUNSELING

Career Options for Mathematics Majors

This booklet contains specific information about majoring in mathematics at The University of Texas at Austin, as well as career opportunities related to this major. The careers listed typically require a bachelor's degree, and special certification or training requirements are noted. Please use this booklet as an idea generator, rather than as a comprehensive list of all career options for mathematics majors. The career descriptions were obtained from the Center for Strategic Advising & Career Counseling (CSA&CC) library resources and career websites (see listing of sources on last page).

The first section, "Direct Career Opportunities," includes careers that use the quantitative and analytical skills acquired by mathematics majors. The second section, "More Career Opportunities," lists careers that are potentially available to all natural sciences majors who have related experience or coursework.

For mathematics majors, there are many career options that require a master's or doctoral degree but do not require any particular undergraduate degree. Examples of these include law, international affairs, museum administration, library and information studies, hospital administration, and many more. For careers requiring graduate education, please visit our library or speak to a career counselor.

The CSA&CC offers many other services and resources to help you with your career planning. These include:

- Career Counseling
- Career Assessment
- Career Information Library
- Internship Information
- Graduate School Planning Assistance

Visit our website at utexas.edu/ugs/csacc or call 232-8400 for more information.

Majoring in Mathematics at The University of Texas at Austin

Departmental Website: www.ma.utexas.edu/dev/math
Campus Location: RLM 8.100
Phone Number: 471-7711

DESCRIPTION OF MAJOR

Mathematics is the study of quantitative relationships expressed in numbers and symbols. It focuses on mathematical concept and theories and involves their formulation, testing, interpretation, and practical application. Mathematics is usually referred to as either pure (theoretical and abstract) or applied (practical and result-oriented).

AREAS OF STUDY

Actuarial Science
Applied Mathematics
Mathematical Science
Pure Mathematics
Teaching
Mathematics Honors

EXAMPLES OF COURSES

328K Introduction to Number Theory
Provides a transition from the problem-solving approach of Mathematics 408C and 408D to the rigorous approach of advanced courses. Properties of the integers, divisibility, linear and quadratic forms, prime numbers, congruences and residues, quadratic reciprocity, number theoretic functions.

339U Actuarial Contingent Payments I
Intermediate actuarial models for life insurance, property insurance, and annuities.

M 341 Linear Algebra and Matrix Theory
Vector spaces, linear transformations, matrices, linear equations, determinants. Some emphasis on rigor and proofs.

362K Probability I
An introductory course in the mathematical theory of probability, fundamental to further work in probability and statistics, includes basic probability properties, conditional probability and independence, various discrete and continuous random variables, expectation and variance, central limit theorem, and joint probability distributions

Skills gained by Math Majors:
Logical reasoning
Organize, analyze, and interpret numerical data
Proficiency for accuracy and detail
Quantitative problem-solving
Work independently or in small groups
Abstract formulation of models

Direct Job Opportunities

This sampling includes careers that use the quantitative and analytical skills typically acquired by mathematics majors.

Actuary
Provide potential solutions and expert advice for industry and societal problems involving economic risk. Assemble and analyze statistics, calculate risk probabilities, and model financial forecasts. Work for insurance companies, financial firms, banks, investment houses, and government agencies. Strong math background is preferred.

Budget Analyst
Provide technical assistance and advice in the preparation of annual budgets. Evaluate proposals to determine if they fit with organization's financial resources and priorities. Perform cost-benefit analyses and explore alternate funding methods. Assist with long-term financial planning. Work for corporations, government agencies, and professional associations. Higher-level positions require a graduate degree.

Commodities and Securities Sales Agent (Broker)
Buy and sell stocks, bonds, annuities, and other financial products for individual investors or institutions. May perform research for clients, provide trading advice, and offer price quotes. Must meet state licensing requirements.

Cost Estimator
Compile and analyze data on all factors that influence costs of future business projects such as materials, labor, and location. Make site visits, conduct surveys, and prepare written report summarizing potential cost of project. Make bid proposal and recommendations to management.

Data Miner
Analyze databases in government, business, or scientific applications to extract additional information or find useful patterns or correlations. Data mining is a multidisciplinary field, so coursework in computer science is helpful in addition to math and statistics. Some data miners specialize in areas such as biology (bioinformatics) or marketing. May require a graduate degree for positions beyond entry-level.

Financial Analyst
Analyze companies' financial situations and recommend ways to spend, invest, and manage money. Analyze financial statements and histories, assess industry trends, interview corporate officers, develop economic forecasts, and make recommendations through oral and written reports. Work for banks, insurance companies, mutual funds, securities firms, and government agencies. Business and mathematics coursework is helpful.

Internal/Financial Auditor
Examine and analyze accounting records to determine financial status of establishment and prepare financial reports concerning operating procedures.

Loan Officer
Provide guidance and information for prospective loan applicants. Analyze and verify clients' creditworthiness. May negotiate repayment plans with delinquent borrowers. Work for commercial banks, credit unions, and other financial institutions.

Management Analyst
Gather and evaluate budget, management, and program data to help government managers operate their departments more effectively. Requires strong quantitative skills.

Management Consultant Analyst
Analyze business problems by collecting information from both internal and external sources, developing possible solutions, and then making recommendations to management team. Usually work for consulting firms, who hire recent college graduates for 2-3 year analyst positions.

Operations Research Analyst
Use mathematical models and develop analytical tools to improve the operations of an organization, reduce its operating costs, and improve its performance. Conduct needs assessment, interview employees, and generate new operational systems. Work under the supervision of a senior analyst. Higher level positions require a graduate degree.

Secondary School Teacher
Instruct high school and junior high school students in mathematics. Most secondary school teachers teach several courses in a single subject area. Public schools generally require certification; private schools typically do not.

Statistician
Design surveys and experiments. Collect, process, and analyze data and interpret the results. Summarize data, write reports, and make recommendation to managers. Ensure that accurate statistical techniques are used to make decisions in politics, social services, drug development, and the military. While most industry positions require a graduate degree, entry-level positions are available with the federal government.

Systems Analyst
Determine organization's information needs, write detailed specifications, choose programming tools and methods, supervise code writing, test program and get feedback, and solve problems and add requested features. Work can be done on a consulting basis with the job title of Systems Consultant.

Underwriter
Review individual applications to determine whether an insurance company should take on a particular risk. Analyze actuarial studies and other information, price premiums to balance risk and profit, and answer inquiries from agents and clients. Coursework in finance or accounting may be helpful.

More Job Opportunities

This section lists other opportunities that may be available to all natural sciences majors. Entry into these careers usually requires internship or volunteer experience or relevant coursework in addition to a mathematics degree. This is a sampling of job opportunities; for more options and ideas, please visit the SLCC career information library.

ADVERTISING/MARKETING/SALES

Buyer
Purchase merchandise directly from manufacturers and resell it to retailers (wholesale buyer) or purchase goods from wholesalers for resale (retail buyer). Become expert in particular kind of merchandise (such as scientific equipment or pharmaceuticals), stay informed about new trends, analyze customers' buying preferences, and decide what merchandise employer will sell.

Customer Service Representative
Interact with customers to provide information in response to inquiries about scientific and technical products and services and to handle and resolve complaints.

Green Marketing Analyst
Create innovative ways to introduce environmentally conscious products into the marketplace. Analyze sales data and consumer spending habits and consult with other marketing team members and graphic designers.

Pharmaceutical Sales Representative
Market a pharmaceutical company's products to physicians, hospitals, and pharmacists. Conduct sales meetings, give presentations, and maintain current knowledge about employer's products. Sales experience is helpful.

Scientific Sales/Service Manager
Direct the actual distribution or movement of a scientific or technical product or service to the customer. Coordinate sales distribution by establishing sales territories, quotas, and goals and establish training programs for sales representatives. Analyze sales statistics gathered by staff to determine sales potential and inventory requirements and monitor the preferences of customers.

BUSINESS

Health Information Administrator
Plan, develop, and supervise systems for the management of health records that are consistent with current medical, ethical, and legal requirements. Supervise medical records personnel, analyze patient and institutional data, develop in-service training programs, act as liaison to medical staff, safeguard confidentiality of health records, and testify in court as needed. Work for hospitals, clinics, rehabilitation centers, insurance companies, and nursing homes.

Management Consultant Analyst
Analyze business problems by collecting information from both internal and external sources, developing possible solutions, and then making recommendations to management team. Usually work for consulting firms, who hire recent college graduates for 2-3 year analyst positions.

Project Manager
Plan, administer, and coordinate projects that relate to product development, product improvement, research for new ventures, new product sales launches, or organizational structure. Develop product schedules, allocate resources, interface with vendors, and hire, train, and supervise employers. Work for companies that provide scientific or technical products and services.

Quality Control Analyst
Inspect, test, and audit materials, manufacturing processes, and products for compliance with company and industry quality standards. Develop quality assurance programs and prepare documentation reports. Work for companies that provide scientific or technical products and services.

Regulatory Affairs Specialist
Ensure that companies comply with government and industry laws and regulations concerning the development, manufacturing, and marketing of health care products such as pharmaceuticals, medical devices, biotechnology products, and nutritional supplements. Help company seek FDA approval for clinical studies and act as regulatory resource. Advise scientists and project managers and review technical documents.

CORPORATE COMMUNICATION

Public Relations Specialist
Write articles for internal publications, write press releases, assemble press kits, arrange speaking engagements, assist in fundraising activities. Work in a variety of settings: business (especially in scientific, pharmaceutical, or biotech companies), government, non-profit, and education.

Technical Recruiter
Maintain contacts in the community and travel, often to college campuses, to seek qualified job applicants. Screen and interview applicants and make job offers. Stay up-to-date on organizational hiring policies, equal employment opportunity, and affirmative action guidelines. Work for scientific and technical companies, government agencies, and non-profit organizations.

Technical Writer
Write technical materials, such as equipment manuals, appendices, or operating and maintenance instructions. May assist in layout work.

Web Designer
Use knowledge of computer applications to translate client needs into artistically appealing website. Select color, text, and artwork and update/maintain site as needed. May use science knowledge to contribute to content of websites for scientific and technical companies.

EDUCATION

College Academic Advisor (Natural Sciences)
Advise natural sciences students at all levels about selection of courses, schedule planning, and other academic issues. May present seminars and workshops and develop and implement academic programs and refer students to other campus resources.

Corporate Trainer
Develop and conduct individual, group, and classroom training for employees on a wide variety of subjects. Develop training manuals, handouts, procedures, and supplemental training materials. Other duties involve test creation and administration for the advancement of employees.

Environmental Educator
Make students aware of environmental issues such as recycling, pollution, and conservation through classroom learning, hands-on activities, nature walks, and online presentations. Work for nature centers, aquariums, camps, zoos, botanical gardens, and parks. Developing an area of expertise such as wildlife or geology is helpful.

Secondary School Teacher
Instruct high school and junior high school students in scientific subject areas. Most secondary school teachers teach several courses in a single subject area. Public schools generally require certification; private schools typically do not.

Science Educator
Develop and implement science education programs. Create tours, demos, classes, workshops, films, field trips, and printed materials. Deliver educational outreach programs to schools and community centers. Provide instructional and curriculum support for teachers. Work for museums, science centers, planetariums, and programs sponsored by government agencies such as NASA and the National Science Foundation.

ENVIRONMENT AND OUTDOOR

Alternative Energy Specialist
Design and install systems that use renewable energy sources, such as glass and thermal solar panels and wind turbines. May act as liaison with utility companies. Entry-level technician jobs are available and some companies such as General Electric offer training programs for students.

Environmental Consultant
Offer recommendations to local, state, and federal government agencies and private businesses who need to adopt environmentally sound practices, adhere to environmental regulations, or clean up contaminated sites. Develop strategies for clients to improve air quality or design recycling programs. Research ecological impacts of development and recommend solutions to mitigate these impacts, especially for endangered or threatened species. Work for environmental consulting firms.

Environmental Science and Protection Technician
Perform laboratory and field tests to monitor the environment and investigate sources of pollution, including those that affect health. May collect samples of gases, soil, water, and other materials for testing and take corrective actions as assigned.

Forest and Conservation Technician
Gather information on condition of forest land tracts such as species and population of trees, insect damage, and potential fire hazards. Supervise and train forest workers in maintaining forests and their recreational facilities. Work for government agencies or large corporations in the lumber and paper industries.

Forester
Manage forest land for conservation, recreational, and economic purposes. Inventory timber and negotiate contracts for tree procurement and removal. Create strategies for conserving wildlife, soil, and water quality and monitor overall health of forest. Requires concentration of courses in biology.

Recycling Coordinator
Design and implement curbside and drop-off recycling and hazardous waste programs through city governments or private firms. Conduct public outreach campaigns to educate people about the advantages of recycling. May ensure compliance with ordinances or apply for grants.

GOVERNMENT

Environmental, Health and Safety Manager
Develop programs and processes for companies to ensure compliance with federal, state, and local laws. Requires thorough knowledge of environmental regulations such as the Clean Air and Clean Water Acts. Act as liaison with environmental regulators from government agencies.

Environmental Regulator
Enforce environmental laws to protect the health of people, plants, animals, and the environment. Grant permits to industrial and municipal facilities and measure pollution and emission levels. Alert media and the public to problems such as toxic spills and poor water quality. Collect samples and analyze data. Work for federal, state, and local government agencies.

Legal Assistant
Assist lawyers by researching legal precedent, investigating facts, or preparing legal documents. Conduct research to support a legal proceeding, to formulate a defense, or to initiate legal action. Often requires specialized coursework.

Patent Agent
Help businesses secure patents for new inventions such as pharmaceuticals, computer hardware, chemical processes, biotech products, and plant varieties. Work closely with inventors to prepare patent application. If registered by the U.S. Patent and Trademark Office (requires a bachelor's degree in science or engineering and passing score on examination), can represent companies in the patent application and discuss the application with patent examiners. Work for patent firms, law firms, corporate law departments, or on a freelance basis.

Patent Examiner
Review patent applications to assess compliance with regulations, determine scope of protection claimed by inventors, research relevant technologies to compare proposed patent with prior inventions, and communicate findings to patent agent or inventor. Work for U.S. Patent and Trademark Office.

HUMAN SERVICES

Americorps Volunteer
Serve full-time for a year in organizations and agencies throughout the country, work to fight illiteracy, improve health services, create businesses, increase housing opportunities, or bridge the digital divide. Benefits include an Education Award or an end-of-service stipend.

Child Life Specialist
Alleviate the stress of hospitalization for children and their families through play therapy and other kinds of counseling. Act as advocate and information source for children and collaborate with medical team.

Community Organizer
Establish and organize community groups to solve social problems in the community. Assess strengths and weaknesses of existing resources and propose changes. Promote cooperation and coordination among government agencies, nonprofit organizations, and other community groups. Conduct research, prepare budgets, and assist in fundraising.

Patient Advocate
Work to represent the interests of patients/consumers in healthcare settings. Explain medical procedures, services, and policies, help troubleshoot patients' concerns and problems, act as advocate for patient with health care staff. Provide resources, information, and referrals to patients and their families. Conduct training programs for medical employees.

Volunteer Coordinator
Recruit, train, schedule and provide supervision to volunteers at non-profit organizations. Arrange for on-the-job and other required training, supervision and evaluation of volunteers. Serve as liaison between administration, staff, and volunteers.

INTERNATIONAL

Foreign Service Officer
Analyze and report on political and economic developments, including agricultural trends, humanitarian and social conditions. Identify export markets, negotiate international agreements, and interpret US policies and interests for foreign governments, opinion leaders and the public. Issue visas to foreign nationals, provide development assistance, and arrange cultural exchanges.

Import/Export Agent
Coordinate settlements between domestic and foreign sellers and buyers. Oversee delivery of goods, supervise shipping and receiving, and act as trade representative. Oversee assessment of import and export taxes and handle any customs concerns.

Intelligence Officer
A member of the armed forces, police officer or civilian intelligence agency who specializes in the gathering, fusion and analysis of information and intelligence in order to provide advice to their government or another organization.

Peace Corps Volunteer
Peace Corps Volunteers work internationally in the following areas: education, youth outreach, and community development; health and HIV/AIDS; agriculture and environment; business development; and information technology. Within these areas, the specific duties and responsibilities of each volunteer can vary widely.

MEDIA/PUBLISHING

Copy Editor
Act as liaison between author, editor, and proofreader. Review manuscripts for grammar and style usage. May develop in-house style guide, supervise freelance staff, and handle author queries. Science degree is helpful for scientific publishing company and science textbook publisher.

Grant Writer
Write and develop grant proposals, which includes conducting needs assessments and matching product needs with available funding. Work for government or non-profit agencies.

Science Writer
Explain and describe scientific concepts and terminology in clear, simple language. Write textbooks, instruction manuals, documentary scripts, grant proposals, marketing materials, and website content. May specialize in areas such as marketing and public relations or medical writing. Conduct research, read background information, and interview scientists and experts. Work for companies, government agencies, nonprofit organizations, or on a freelance basis.

Scientific/Environmental Journalist
Investigate and write about issues of scientific and environmental interest, such as land conservation, pollution, and gene therapy. Investigate leads and tips, research topics, analyze documents, observe events, and interview experts. Work for magazines, newspapers, media companies, nonprofit organizations, or on a freelance basis.

Staff Writer
Research and write articles for magazine. May write article promos, short features, author bios, or photo captions. May work on freelance basis or for one particular magazine.

RESEARCH

Information Broker
Perform research for clients in business, healthcare, government, law, and science. Use Internet, database, and library resources to find specific information. May also analyze information, write reports, and train clients in information retrieval. Often work for consulting firms or on freelance basis.

Market Research Analyst
Research market conditions in local, regional, or national areas to determine potential sales of a scientific or technical product or service. May gather information on competitors, prices, sales, and methods of marketing and distribution. May use survey results to create a marketing campaign based on regional preferences and buying habits.

Publications Researcher
Research story and script ideas; maintain research files on topics and people; verify stories for accuracy. Work for newspaper, magazine, or book publishers, especially those related to science.

Public Policy Analyst
Provide information and suggest scientific policy initiatives to policy makers. Present findings to interested organizations and the media, analyze effectiveness of previous policies, and recommend changes based on findings.

Science Technician
Provide technical and laboratory support to scientists and engineers in manufacturing, research and development, and quality control. Assist with the development and evaluation of laboratory procedures, data interpretation, and problem solving. Collect data, monitor experiments, verify and analyze information, write technical summaries, and maintain lab supply inventories.

SOURCES

Career Opportunities in Science by Susan Echaore-McDavid. Checkmark Books, 2003.

Careers in Health Care by Barbara Swanson. McGraw- Hill, 2005.

The ECO Guide to Career that Make a Difference by The Environmental Careers Organization. Island Press, 2004.

Great Jobs for Math Majors by Stephen Lambert and Ruth DeCotis. McGraw-Hill, 2005.

Careers for Number Crunchers and Other Quantitative Types by Rebecca Burnett. McGraw-Hill, 2002.

Occupational Outlook Handbook: *www.bls.gov/oco*