



King Fahd University of Petroleum & Minerals
DEPARTMENT OF MATHEMATICAL SCIENCES

UNDERGRADUATE PROGRAM



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



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DEPARTMENT OF MATHEMATICAL SCIENCES

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Dhahran, Saudi Arabia



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THE DEPARTMENT OF MATHEMATICAL SCIENCES

In addition to functioning as a mainstream mathematics department, the Department of Mathematical Sciences acts as a service department, teaching about 5000 students each semester, from pre-calculus to advanced graduate mathematics.

o Establishment and Location

Established in 1963, the Department of Mathematical Sciences is one of the oldest departments at King Fahd University of Petroleum & Minerals (KFUPM) and is located in Academic Building No. 5.

o Mission Statement

The mission of the department is three-fold:

- To increase the quality and amount of its undergraduate and graduate teaching with the aim of establishing effective and innovative undergraduate and graduate programs that will contribute to the development of the human resources and fulfill the need for highly trained manpower in the Kingdom.
- To enhance its research (both basic and applied) with greater emphasis on the quality of research to a level comparable to that of the leading centers of mathematics.
- Owing to its distinctive character of being in a technological university, the department endeavors to play a more active role in the scientific and technological development of the university and the Kingdom through closer inter-departmental cooperation and development of inter-disciplinary programs, and through its





commitment to broadening and deepening the mathematical training of students in all majors and at all levels.

ACADEMIC PROGRAMS/DEGREES OFFERED

The Department of Mathematical Sciences offers the following degrees:

- o Bachelor of Science (BS) Degree in Mathematics
- o Bachelor of Science (BS) Degree in Statistics

In addition, the department also offers the following graduate degrees:

- o Master of Science (MS) Degree in Mathematics.
- o Doctor of Philosophy (PhD) Degree in Mathematics.

BS IN MATH

o **Role of Mathematics**

Mathematics occupies a crucial and unique role in human society and represents a strategic key in the development of mankind.

Mathematics plays a vital role in almost all areas of study such as engineering, chemistry, physics, geophysics, geology, economics and other social sciences. In fact, mathematics is the language of precise reasoning, which avoids ambiguity; it is essential for all quantitative sciences.

o **Applications of Mathematics**

Mathematics is basic to science, engineering and any analytic endeavor and it is very important in their development. For instance,

- Airplane design is based on fluid and solid dynamic analysis.

- Structural, electrical and mechanical engineering make extensive use of partial differential equations.
- Modeling of finance and economics is based on optimization theory.
- Image processing is based on functional analysis.
- The structure of computer languages is based on algebra.
- Analysis of engineering system is based on systems of differential equations.

o Career Opportunities

The field of mathematics offers a variety of exciting and rewarding career opportunities, not only in the mathematical sciences but also in other disciplines for which a mathematical background is valuable.



Mathematicians often work as part of a team of scientists and engineers who conduct research, solve problems, or develop products and systems in technology, industry, finance or business. Others continue studying mathematics in graduate school and conduct basic research in mathematics itself.

The comprehensive and flexible nature of the BS program in mathematics prepares the graduates to:

- Teach in universities, colleges, and high schools.
- Work in banks and other financial institutions.
- Work in industry.
- Work in government agencies.
- Pursue MS and PhD programs in mathematics and other sciences, and work in universities and research centers.

o Degree Requirements

The objective of the BS program in mathematics is to prepare the students for career opportunities in educational institutions, industry, government organizations and other areas involving applications of mathematics. The program also prepares the students for graduate studies in mathematics and other research organizations using mathematical tools. The program is broad-based and covers the main streams of mathematics, namely pure mathematics, applied mathematics, numerical analysis, and statistics. The curriculum is designed to strengthen both the conceptual and computational talent of the students and as such, the graduates will have a solid background to pursue higher educational programs as well as take up assignments in industry and other related practical fields.

A total of 121 credit hours are required for a BS degree in MATH with the following breakdown:

- General education requirements : 61 credit hours
- MATH core requirements : 30 credit hours
- Electives
 - o MATH electives : 15 credit hours
 - o Free electives : 15 credit hours

BS in STATISTICS

o Role of Statistics

Statistics is the science that deals with collecting data, analyzing it and making decisions based on it. A statistician is a valuable asset in every industry from the design stage through the data collection stage to the analysis. The input of the statistician is essential for the success of every endeavor.

Statistics is a critical skill in science and technology, because statistical methods can be used to describe and understand variability (uncertainty). Virtually all real-world processes and systems exhibit variability. Experimental research in engineering and sciences involves the use of experimental data to develop a theory about some phenomenon. Then the theory is tested against additional sample data.



o Applications of Statistics

The uses of statistics are enormous. In every branch of human knowledge, one sees statistics being used. Whether it is in physical sciences, engineering, medical sciences, or social sciences, statistics is always there. We drive better cars, eat better foods, take more effective medications, thanks to a large extent to statistical methods

- **In Industry:** Quality control and reliability depend heavily on statistics.
- **In Medicine and Pharmacology:** Statistics is widely used in gene studies and the development of new and improved drugs.
- **In Agriculture:** The field of experimental design plays a key role.
- **In Economics, Business and Finance:** Statistics is extensively used in income studies, pricing and investment, accounting, etc.
- **In Sociology and Psychology:** Statistics is very important in social studies as well as testing and evaluation.

o Career Opportunities

The BS program in statistics with its balance of theory and application, especially with the interdisciplinary structure of the electives, gives the graduates the capability of working in such diverse fields as:

- Light and heavy industries
- Business sector
- Marketing companies
- Banking sector
- Medical and pharmaceutical fields
- Government agencies
- Social work
- Computer related fields.



o Degree Requirements

The objective of the BS program in Statistics is to prepare students for career opportunities in industry and government, as well as the private sector in such fields as business, banking, insurance, health, and for further graduate studies. The program has a good balance of theory, application and data analysis, as well as carefully selected sequences of courses from computer science, management information systems, accounting and finance, and management and marketing. This interdisciplinary approach is aimed at making the program flexible, giving the students a broad base of education, and improving their chances

of employment. Graduates of the program are well-qualified statisticians with good knowledge in computing, information systems, management and marketing.

A total of 122 credit hours are required for a BS degree in STAT with the following breakdown:

- General education requirements : 67 credit hours
- Core requirements : 26 credit hours
- Electives
 - ┆ STAT electives : 12 credit hours
 - ┆ Other electives : 12 credit hours
 - ┆ Free electives : 3 credit hours
- Summer training : 2 credit hours.

FACULTY

The department has over 70 faculty members in diverse areas of mathematics, including pure mathematics, applied mathematics and statistics. Only highly qualified faculty members of proven expertise are recruited. This, in turn, has contributed immensely towards maintaining a standard of teaching and research which is comparable to that of reputable institutions of advanced learning.

FACILITIES

- Computing

The Information Technology Center (ITC) operates a full-scale Enterprise Network where all University servers, PC labs, workstation labs and office PCs are inter-connected with



high-speed Ethernet and remote dial-up connections to the internet. The ITC operates Unix and PC environments on a variety of platforms. It maintains several Unix workstations and PC labs with printing facilities located in various academic buildings. It also makes available various applications ranging from word processing to compilers and specialized software.

The Department maintains an excellent computing laboratory equipped with computers, software and related equipment.

Library

The University Library is centrally located at a short walking distance from classrooms and laboratories. The Library maintains a large number of volumes, most of which are in science and engineering. The Library additionally has a collection of electronic databases, particularly those of CD-ROM.



CONTACT INFORMATION

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For further information about the degree plan, please refer to the Department web page at <http://www.kfupm.edu.sa/math/>



