

Majoring in

Operations Research

Description of Operations Research

What is Operations Research?

Operations Research (O.R.) is the discipline of applying advanced analytical methods to help make better decisions. By using techniques such as mathematical modeling to analyze complex situations, operations research gives executives the power to make more effective decisions and build more productive systems.

What do O.R. majors study?

O.R. majors focus on the collection, analysis, and presentation of numerical data. Many important problems in government, private industry, health and environmental fields, and the academic world require sophisticated operation research techniques for their solution. Some of the typical classes taken by and O.R. major may include Multivariate Calculus, Introduction to Probability Theory, Linear Algebra and Mathematical Modeling.

What skills do O.R. majors have?

O.R. majors usually possess:

- Advanced quantitative skills;
- Ability to organize, synthesize, and analyze numerical data;
- Proficiency at making logical decisions; and
- Ability to conduct and interpret research studies.

What else do O.R. majors study?

As a liberal arts major, O.R. provides a broad background to strengthen critical thinking; problem solving; written, oral, and interpersonal communication; quantitative, analytical, and reasoning skills. These skills are also considered very important for success in the workplace. A strong liberal arts background also provides the foundation of an educated person.

Course Requirements

General education: About 60 credit hours of general education courses are required. These courses give a broad range of knowledge in science, behavioral science, foreign language, writing, arts, ethics, civilization, literature, and urban environment.

Major courses: A minimum of 41 credit hours of statistics, operations research, math, and computer science courses above the 100 level are required in this program of study. O.R. majors take courses such as:

- Applications of statistics
- Calculus
- Computational issues in statistical science
- Concepts of statistics
- Deterministic operations research
- Game theory and linear programming
- Linear algebra
- Mathematical modeling
- Multivariate calculus
- Probability theory
- Statistical inference
- Stochastic operations research
- Structured programming

O.R. majors who meet the requirements for two concentrations within the math curriculum may receive a double major in math and operation research.

Electives: About 20 credit hours are required.

Some O.R. majors choose to use their electives toward a minor (18-21 credit hours) to give them an additional area of specialization.

Careers in Operations Research

The O.R. major provides a good background for entry in a number of career fields. The entry requirement of each career listed varies in the amount of experience and education needed.

- Actuarial statistician
- Attorney

- Business analyst
- Data miner
- Database administrator
- Cost estimator
- Cryptographer/cryptologist
- Econometrician
- Financial analyst
- Forensic statistician
- Game designer
- Government statistician
- Investment banker
- Market and survey researcher
- Measurement statistician
- Meteorologist
- Professor
- Programmer analyst
- Project manager
- Quality analyst/quality control director
- Risk analyst
- Software engineer
- Statistical programmer
- Teacher
- Webmaster

Like most liberal arts majors, an internship and participation in undergraduate research may expand the chances of finding a job in this field.

Next Steps

If you are interested in learning more about becoming a statistics major at VCU, consider doing each of the following things. Check them off as you complete each step.

- Check out the VCU OR. webpage at www.or.vcu.edu.

- ☐ Take a calculus and introductory O.R. course.
- ☐ Read about the major in the *Undergraduate Bulletin*.
- ☐ Review the statistics major graduation worksheet with an academic advisor.
- ☐ Talk to one or more upper-level O.R. students about their major experience.
- ☐ Discuss the major with one or more O.R. professors.
- ☐ Go to the Career Center or the Occupational Outlook Handbook website (www.bls.gov/oco) to read about careers in O.R.
- ☐ Go to the VCU bookstore and browse through the math and statistics textbook section.
- ☐ Explore internship possibilities through the Career Center and the Statistics and Operations Research Department.
- ☐ Go to the website www.thescienceofbetter.org for more information on operations research and topics related to the field.

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