

# Paul H. Chook Department of Information Systems and Statistics

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## Field Description

The department offers courses in the areas of computer information systems (CIS), operations research, and statistics. Courses in each of these areas provide training in problem solving techniques useful in gaining strategic advantage in the marketplace. CIS students are afforded the opportunity to gain a strong foundation in the business, managerial, and technical issues related to information systems with courses in programming, data management, telecommunications, the Internet and e-commerce, and the analysis and design of computer-based solutions to business problems. Operations research trains students in the application of mathematical models and decision making for business, industry, and government with an emphasis on modeling methods, analysis, and implementation relevant to operational and management planning issues. Statistics students are provided with a skills base for the application of statistical techniques and tools to a wide variety of areas, including computational statistics, sample survey, experimental design, and quantitative methods in marketing.

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## The Majors

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## General Information

The Department of Statistics and Computer Information Systems offers majors in the fields of computer information systems and statistics and quantitative modeling.

The **computer information systems** area prepares professionals in the development and use of computer-based technologies to develop systems that fulfill business information needs. Baruch's program trains students to analyze business needs and to design, implement, and use information systems to satisfy those needs.

The **operations research** area provides basic preparation for students who wish to pursue careers in the decision sciences and provides fundamental quantitative knowledge required by those who major in other business areas. Emphasis is placed on modeling methods, analysis, and implementation relevant to operational and management planning issues in many business areas, including marketing, production, finance, accounting, and information technology.

The **statistics** area not only provides the basic preparation for students who wish to pursue careers in statistics but also provides the quantitative knowledge required by those who major in other business areas. Statistics and quantitative modeling majors are provided with the base for the application of statistical techniques to a wide variety of fields.

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## BBA in Computer Information Systems

The CIS program provides a strong foundation in the business and managerial issues related to information systems. Computer information systems are presented in light of their role as tools for strategic advantage in the marketplace. To facilitate this, course offerings provide computer, technological, and problem - solving skills. The CIS program addresses such areas as CASE (computer-assisted software engineering), networks and telecommunications, electronic commerce, the Internet, client-server technology, and object-oriented technologies.

### Program Learning Goals

Database Development	Students will apply the principles of design and development of relational databases.
System Analysis and Design	Students will elicit, analyze, and model system requirements.
Software Programming	Students will implement software systems using a suitable programming language/development environment.
Information Technology Management	Students will identify and explain the factors that contribute to the successful design, implementation, and management of Information Technology systems in organizations.

General CIS Track		
<b>Required Courses</b>		<b>15 credits</b>
CIS 2300	Programming and Computational Thinking	3 credits
Choose from CIS 3100 or CIS 3110 or CIS 3120 †	Object Oriented Programming I, or Object Oriented Programming with Java, or Programming for Analytics	3 credits
CIS 3400	Database Management Systems	3 credits
CIS 4800	Systems Analysis and Design	3 credits
CIS 5800	Information Technology Development and Project Management	3 credits
<b>Elective Courses</b>		<b>9 credits</b>
<i>At least 3 credits should be from a course at the 4000 level</i>		
CIS 3100	Object Oriented Programming I	3 credits
CIS 3110	Object Oriented Programming with Java	3 credits

CIS 3120	Programming for Analytics	3 credits
CIS 3150	Introduction to Semantic Technologies	3 credits
CIS 3250	Blockchain Technologies and Applications	3 credits
CIS 3367	Spreadsheet Applications in Business	3 credits
CIS 3444	e-Business Technologies	3 credits
CIS 3500	Networks and Telecommunications I	3 credits
CIS 3550	Cybersecurity	3 credits
CIS 3630	Principles of Web Design	3 credits
CIS 3700	Green IT	3 credits
CIS 3710	Foundations of Business Analytics	3 credits
CIS 3750	Social Media Technologies in Organizations	3 credits
CIS 3770	Usability, Privacy, and Security	3 credits
CIS 3920 / STA 3920	Data Mining for Business Analytics	3 credits
CIS 4093	Special Topics in Computer Information Systems	3 credits
CIS 4100	Object-Oriented Programming II	3 credits
CIS 4160	Web Applications Development	3 credits
CIS 4170 / STA 4170	Data Visualization	3 credits
CIS 4350	Information Technology Audit	3 credits
CIS 4400	Data Warehousing for Analytics	3 credits
CIS 4500	Networks and Telecommunications II	3 credits
CIS 4610	Expert (Knowledge-Based) Systems and Related Technologies	3 credits
CIS 4620	FinTech: Principles and Applications	3 credits
CIS 4650	Operating Systems Concepts	3 credits
OPR 3300	Quantitative Methods for Accounting*	3 credits
OPR 3450	Quantitative Decision Making for Business I*	3 credits
STA 4920	Advanced Data Mining	3 credits
<p>* Students may not receive credit for both OPR 3450 and OPR 3300.</p> <p>** Students receiving credit for MGT 3500 (Introduction to Management Science) will not receive credit for OPR 3450.</p> <p>† If you have used one of these programming courses (CIS 3100, CIS 3110, CIS 3120) as a required course, you may use the others as electives.</p>		

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## Data Analytics Track

### Required Courses (15 credits)

<a href="#">CIS 2300</a>	Programming and Computational Thinking	
<a href="#">CIS 3120</a>	Programming for Analytics	3 credits
<a href="#">CIS 3400</a>	Database Management Systems	3 credits
<a href="#">CIS 3920 / STA 3920</a>	Data Mining for Business Analytics	3 credits
<a href="#">CIS 4400</a>	Data Warehousing for Analytics	3 credits

### Elective Courses (9 credits)

Choose three (3) courses of 3 credits each from the following, at least one of which should be a CIS course and one should be a STA course or an OPR course.

<a href="#">CIS 3100</a>	Object Oriented Programming I	3 credits
<a href="#">CIS 3150</a>	Introduction to Semantic Technologies	3 credits
<a href="#">CIS 3710</a>	Foundations of Business Analytics	3 credits
<a href="#">CIS 4093</a>	Special Topics in CIS (with permission)	3 credits
<a href="#">CIS 4170 / STA 4170</a>	Data Visualization	3 credits
<a href="#">STA 3154</a>	Business Statistics II	3 credits
<a href="#">STA 3155</a>	Regression and Forecasting Models for Business Applications	3 credits
<a href="#">Course number revised to <a href="#">STA 4155</a> (effective Spring 2020)</a>		
<a href="#">STA 4920</a>	Advanced Data Mining	3 credits
<a href="#">OPR 3300 *</a>	Quantitative Methods for Accounting*	
<a href="#">OPR 3450 **</a>	Quantitative Decision Making for Business I	3 credits
<a href="#">OPR 3451</a>	Quantitative Decision Making for Business II	3 credits
<a href="#">MKT 4123</a>	Marketing Web Analytics and Intelligence	3 credits
<a href="#">MKT 4561</a>	Marketing Analytics	3 credits

\* Students may not receive credit for both OPR 3450 and OPR 3300.

\*\* Students receiving credit for MGT 3500 (Introduction to Management Science) will not receive credit for OPR 3450.

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## Information Risk Management and Cybersecurity Track

### Required Courses (15 credits)

<a href="#">CIS 2300</a>	Programming and Computational Thinking	3 credits
<a href="#">CIS 3400</a>	Database Management Systems	3 credits
<a href="#">CIS 3500</a>	Networks and Telecommunications I	3 credits
<a href="#">CIS 3550</a>	Cybersecurity	3 credits
<a href="#">CIS 4350</a>	Information Technology Audit	3 credits

### Elective Courses (9 credits)

At least 6 credits must be from the CIS courses

<a href="#">CIS 3100</a>	Object Oriented Programming I	3 credits
<a href="#">CIS 3110</a>	Object Oriented Programming with Java	3 credits
<a href="#">CIS 3120</a>	Programming for Analytics	3 credits
<a href="#">CIS 3750</a>	Social Media Technologies in Organizations	3 credits
<a href="#">CIS 3770</a>	Usability, Privacy, and Security (effective Spring 2017)	3 credits
<a href="#">CIS 3920 / STA 3920</a>	Data Mining for Business Analytics	3 credits
<a href="#">CIS 4093</a>	Special Topics in CIS (with a departmental permission)	3 credits
<a href="#">CIS 4100</a>	Object-Oriented Programming II	3 credits
<a href="#">CIS 4160</a>	Web Applications Development	3 credits
<a href="#">CIS 4500</a>	Networks and Telecommunications II	3 credits
<a href="#">CIS 4620</a>	Financial Information Technologies	3 credits
<a href="#">CIS 4800</a>	Systems Analysis and Design	3 credits
<a href="#">LAW 3108</a>	Law and the Internet	3 credits
<a href="#">LAW 3250</a>	Financial Regulation of Emerging Technologies	3 credits
<a href="#">LAW 3350</a>	Corporate Compliance, Governance & Whistleblowing	3 credits

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## BBA in Statistics and Quantitative Modeling (prior to Spring 2020)

The statistics and quantitative modeling major is designed to develop quantitative thinking skills that are invaluable in business. The student will take courses from a variety of quantitative disciplines that focus extensively on statistical methodology, mathematical modeling, and computer implementation issues applied to business. The use of the computer for the solution and analysis of business problems is an integral part of the program. Graduates of this program will have a broad foundation in statistics or quantitative modeling and will be well positioned for the analysis and solution of decision problems facing business and industry in the 21st century.

It is essential that the student consult with an area advisor to plan a program prior to taking any courses in the major.

### Program Learning Goals

Quantitative Thinking Skills	Students will be able to apply the quantitative thinking and the mathematical modeling process to solve real-world problems
Data Analysis	Students will be able to identify appropriate methodology, conduct analysis, and interpret results
Deterministic Modeling Methods	Students will be able to model deterministic mathematical programming problems
Probabilistic Modeling Methods	Students will be able to model probabilistic problems dealing with decision analysis and simulation
Statistical Modeling	Students will be able to model statistical problem applied to business
Technological Skills	Students will be proficient in appropriate software to solve problems in statistics and quantitative modeling
Communication Skills	Students will be able to effectively communicate statistical and quantitative modeling methods for decision making to technical and non-technical audiences

### Major

#### Required Courses (12 credits)

STA 3000	Statistical Computing	3 credits
OPR 3450	Quantitative Decision Making for Business I *	3 credits
STA 3154	Business Statistics II	3 credits
STA 3155 Course number revised to STA 4155 effective Spring 2020	Regression and Forecasting Models for Business Applications	3 credits

#### Elective Courses (12 Credits)

Electives may be selected after consultation with an advisor:

CIS 3400	Database Management Systems	3 credits
CIS 4100	Object-Oriented Programming II	3 credits
OPR 3451	Quantitative Decision Making for Business II	3 credits
OPR 3452	System Simulation	3 credits
OPR 3453	Bayesian Statistical Inference and Decision Making	3 credits
OPR 4470	Special Topics in Operations Research	3 credits

OPR 5000	Independent Study and Research in Operations Research	3 credits
STA 3156	Sampling Theory and Practice	3 credits
STA 3253	Categorical Data Analysis	3 credits
STA 3255	Statistical Quality Control Methods	3 credits
STA 3560	Nonparametric Statistics	3 credits
STA 4000	Introduction to SAS Programming	3 credits
STA 4157	Design and Analysis of Experimental Data	3 credits
STA 4158	Analysis of Time Series	3 credits
STA 4370	Special Topics in Applied Statistics	3 credits
STA 5000	Independent Study and Research in Statistics	3 credits
MGT 3710	Introduction to Supply Chain Management	3 credits
MKT 3600	Marketing Research	3 credits
MTH 3020	Intermediate Calculus	4 credits
MTH 4120	Introduction to Probability	4 credits
MTH 4125	Introduction to Stochastic Processes	4 credits
MTH 4130	Mathematics of Statistics	4 credits
MTH 4140	Graph Theory	3 credits
MTH 4320	Fundamental Algorithms	4 credits
MTH 4451	Risk Theory	4 credits
MTH 4500	Introductory Financial Mathematics	4 credits
*OPR 3300 Quantitative Methods for Accounting may be substituted for OPR 3450 with the approval of the area advisor.		

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New requirements for <b>BBA in Statistics and Quantitative Modeling</b> (effective Spring 2020)		
Required Courses (12 credits)		
STA 3000	Statistical Computing	3 credits
OPR 3450	Quantitative Decision Making for Business I	3 credits
STA 3154	Business Statistics II	3 credits
STA 4155	Regression and Forecasting Models for Business Applications	3 credits

<b>Elective Courses (12 credits)</b>		
(No more than six credits outside of the CIS, OPR, STA and MTH)		
<a href="#">CIS 2300</a>	Programing and Computational Thinking	3 credits
<a href="#">CIS 3100</a>	Object Oriented Programing	3 credits
<a href="#">CIS 3120</a>	Programing for Analytics	3 credits
<a href="#">CIS 3400</a>	Database Management Systems I	3 credits
<a href="#">CIS 4100</a>	Object-Oriented Programming II	3 credits
<a href="#">CIS 4400</a>	Data Warehousing for Analytics	3 credits
<a href="#">OPR 3451</a>	Quantitative Decision Making for Business II	3 credits
<a href="#">OPR 3453</a>	Bayesian Statistical Inference and Decision Making	3 credits
<a href="#">OPR 4470</a>	Special Topics in Operations Research	3 credits
<a href="#">OPR 5000</a>	Independent Study and Research in Operations Research	3 credits
<a href="#">STA 3920 / CIS 3920</a>	Data Mining for Business Analytics	3 credits
<a href="#">STA 4000 / CIS 4000</a>	Introduction to SAS Programming	3 credits
<a href="#">STA 4157</a>	Design and Analysis of Experimental Data	3 credits
<a href="#">STA 4158</a>	Analysis of Time Series	3 credits
<a href="#">STA 4170 / CIS 4170</a>	Data Visualization	3 credits
<a href="#">STA 4370</a>	Special Topics in Applied Statistics	3 credits
<a href="#">STA 4920</a>	Advanced Data Mining	3 credits
<a href="#">STA 5000</a>	Independent Study in Statistics	3 credits
<a href="#">MKT 3600</a>	Marketing Research	3 credits
<a href="#">MKT 4123</a>	Marketing Web Analytics and Intelligence	3 credits
<a href="#">MKT 4561</a>	Marketing Analytics	3 credits
<a href="#">MTH 3020</a>	Intermediate Calculus	4 credits
** Any MTH 4000 and above is also accepted as an elective		
Note: OPR 3300 Quantitative Methods for Accounting may be substituted for OPR 3450 with the approval of the area advisor.		

#### Statistics: BA Major

Arts and sciences students can major in one of the following three programs in the Department of Statistics and Computer Information Systems:



- [Statistical Theory](#)
- [Psychometrics](#)
- [Sociometrics](#)

The department offers courses for students who are primarily interested in mathematics, psychology, and sociology. Statistical theory, using the Colleges extensive computer installations, provides professional training for those who desire a career in operations research, quality control and reliability, health sciences and governmental statistics, design and analysis of surveys, and computer information systems. Joint major programs in conjunction with the Departments of Psychology and Sociology and Anthropology are offered and include courses to augment study in psychometrics and sociometrics.

- A BA student majoring in statistics cannot minor in mathematics or declare a second major in actuarial science, financial mathematics, or mathematics.
- Any business courses included in this program (CIS, OPR, STA, etc.) do not count toward the 90-credit liberal arts minimum required for the BA degree.

**\*\*\* NOTE: This program is under revision, so it is important to consult a faculty advisor to plan a proper sequence of courses. Interested students should contact Professor Kamiar Rahnema Rad ([Kamiar.RahnemaRad@baruch.cuny.edu](mailto:Kamiar.RahnemaRad@baruch.cuny.edu)). \*\*\***

## Statistical Theory

### Base Courses

<a href="#">CIS 2200</a>	Introduction to Information Systems and Technologies	3 credits
<a href="#">STA 2000</a>	Business Statistics I	3 credits
<a href="#">MTH 2630</a>	Analytic Geometry and Calculus I	5 credits
<a href="#">MTH 3030</a>	Analytic Geometry and Calculus II	5 credits

### Major

The major consists of 24 credits, with up to 9 credits in mathematics. **Required Courses**

<a href="#">STA 3551</a>	Theory of Statistics I - Introduction to Probability and Distribution Theory	3 credits
<a href="#">STA 4552</a>	Theory of Statistics II - Statistical Inference	3 credits

### Elective Courses

<a href="#">CIS 3100</a>	Object-Oriented Programming I	3 credits
<a href="#">OPR 4652</a>	Introduction to Mathematical Programming	3 credits
<a href="#">OPR 4653</a>	Introduction to Statistical Decision Theory and Game Theory	3 credits
<a href="#">OPR 4654</a>	Queueing Theory and Inventory Models	3 credits
	Sampling Theory and Practice	3 credits
<a href="#">STA 3255</a>	Statistical Quality Control Methods	3 credits
<a href="#">STA 3560</a>	Nonparametric Statistics	3 credits
<a href="#">STA 4158</a>	Analysis of Time Series	3 credits
<a href="#">STA 4256</a>	Advanced Sampling Methods	3 credits

<a href="#">STA 5559</a>	Introduction to Multivariate Analysis	3 credits
<a href="#">MTH 4010</a>	Advanced Calculus I	3 credits
<a href="#">MTH 4020</a>	Advanced Calculus II	3 credits
<a href="#">MTH 4100</a>	Linear Algebra and Matrix Methods	3 credits
<a href="#">MTH 4120</a>	Introduction to Probability	3 credits
<a href="#">MTH 4130</a>	Mathematics of Statistics	3 credits
<a href="#">MTH 5010</a>	Advanced Calculus III	3 credits

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### Psychometrics

Note: A number of the courses listed below are not currently offered. Students interested in psychometrics should consult with a department advisor.

### Base Courses

<a href="#">CIS 2200</a>	Introduction to Information Systems and Technologies	3 credits
<a href="#">STA 2000</a>	Business Statistics I	3 credits
<a href="#">MTH 2630</a>	Analytic Geometry and Calculus I	5 credits

### Major: 24 credits Required Courses

<a href="#">STA 2555</a>	Applied Methods I - Probability and Statistics	3 credits
<a href="#">STA 3556</a>	Applied Methods II - Statistical Inference	3 credits
<a href="#">STA 4561</a>	Factor Analysis and Classification Techniques	3 credits
<a href="#">PSY 3053</a>	Tests and Measurements	3 credits

### Elective Courses

<a href="#">OPR 4653</a>	Introduction to Statistical Decision Theory and Game Theory	3 credits
<a href="#">STA 3156</a>	Sampling Theory and Practice	3 credits
<a href="#">STA 3560</a>	Nonparametric Statistics	3 credits
<a href="#">STA 5559</a>	Introduction to Multivariate Analysis	3 credits

<a href="#">MTH 3030</a>	Analytic Geometry and Calculus II	5 credits
<a href="#">MTH 4100</a>	Linear Algebra and Matrix Methods	3 credits
<a href="#">PSY 3056</a>	Social Psychology	3 credits
<a href="#">PSY 3180</a>	Vocational Psychology	3 credits
<a href="#">PSY 3181</a>	Business and Industrial Psychology	3 credits
<a href="#">PSY 3182</a>	Interviewing Techniques	3 credits
<a href="#">PSY 3183</a>	Psychology and Urban Problems	3 credits
<a href="#">PSY 4092</a>	Special Problems in Psychology	2 credits
<a href="#">PSYS 4282</a>	Advanced Psychological Testing	3 credits

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#### **Sociometrics**

*Note:* A number of the courses listed below are not currently offered. Students interested in sociometrics should consult with a department advisor.

#### **Base Courses**

<a href="#">CIS 2200</a>	Introduction to Information Systems and Technologies	3 credits
<a href="#">STA 2000</a>	Business Statistics I	3 credits
<a href="#">MTH 2630</a>	Analytic Geometry and Calculus I	5 credits

#### **Major: 24 credits Required Courses**

<a href="#">STA 2555</a>	Applied Methods I - Probability and Statistics	3 credits
<a href="#">STA 3556</a>	Applied Methods II - Statistical Inference	3 credits
<a href="#">STA 3563</a>	Design of Social Research	3 credits
<a href="#">SOC 4032</a>	Methods of Sociological Research	3 credits

#### **Elective Courses**

<a href="#">OPR 4653</a>	Introduction to Statistical Decision Theory and Game Theory	3 credits
<a href="#">STA 3156</a>	Sampling Theory and Practice	3 credits
<a href="#">STA 3560</a>	Nonparametric Statistics	3 credits

<a href="#">STA 5559</a>	Introduction to Multivariate Analysis	3 credits
<a href="#">MTH 3030</a>	Analytic Geometry and Calculus II	5 credits
<a href="#">MTH 4100</a>	Linear Algebra and Matrix Methods	3 credits
<a href="#">SOC 3155</a>	Urban Sociology	3 credits
<a href="#">SOC 3052</a>	Social Stratification	3 credits
<a href="#">SOC 3055</a>	Population and Society	3 credits
<a href="#">SOC 3064</a>	Modern Organizations	3 credits
<a href="#">SOC 3082</a>	Small Groups	3 credits

#### Equivalent courses in the arts and sciences and business curricula:

The following pairs of courses are considered as equivalent for purposes of credits. Students can be given credit for either course but not for both:	
<a href="#">STA 2000</a> and <a href="#">STA 2100</a> (STA 2000 may be used for either the BA or BBA)	
<a href="#">STA 3154</a> and <a href="#">STA 3556</a>	
<a href="#">STA 3155</a> (Course number revised to <a href="#">STA 4155</a> effective Spring 2020) and <a href="#">STA 4554</a>	
<a href="#">STA 4157</a> and <a href="#">STA 4557</a>	
<a href="#">OPR 3453</a> and <a href="#">OPR 4653</a>	

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## The Minors

### General Information

The Department of Information Systems and Statistics offers five minor concentrations\*. Each is outlined below:

- [Computer Applications in Business](#)
- [Cybersecurity and Information Assurance](#)
- [Data Analytics](#)
- [Quantitative Methods and Modeling](#)
- [Statistics](#)
- [Liberal Arts Interdisciplinary Minor in Information Technology and Social Responsibility](#)
- [Business Minors for Non-Business Majors](#)

\* Optional second minors open only to students pursuing a major within the Zicklin School of Business

**Computer Applications in Business (9 credits)**

This minor is designed to prepare students majoring in other areas of business to be competent end users and decision makers in a computer information systems environment. The focus is on using microcomputers and higher-level applications software to implement useful applications in a wide range of business areas.

**Required Courses**

Three courses (9 credits) from any of the following:

- Any courses from the list of 3000-, 4000-, or 5000-level CIS courses with the exception of CIS 3270, CIS 3810, and CIS 4910;
- At most one course from either OPR3300: Quantitative Methods for Accounting or OPR3450: Quantitative Decision Making for Business I
- All prerequisites must be satisfied.

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**Cybersecurity and Information Assurance (9 credits)**

This minor would provide an opportunity for students majoring in various areas of business to develop basic understanding of information security and assurance issues that organizations face today and the potential solutions available.

**Required Courses (9 credits)**

<a href="#">CIS 3500</a>	Networks and Telecommunications I	3 credits
<a href="#">CIS 3550</a>	Cybersecurity	3 credits
<a href="#">CIS 4350</a>	Information Technology Audit	3 credits

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**Data Analytics (9 credits)**

This minor would provide an opportunity for students majoring in various areas of business to develop basic data literacy and to integrate techniques and solutions from the areas of technology, statistics, and quantitative modeling in developing business intelligence to facilitate organizational decision-making

**Required Courses (6 credits)**

<a href="#">CIS 2300</a>	Programming and Computational Thinking	3 credits
<a href="#">CIS 3920 / STA 3920</a>	Data Mining for Business Analytics	3 credits

**Elective Courses (3 credits) - Choose one course from the following list.**

<a href="#">CIS 3120</a>	Programming for Analytics	3 credits
<a href="#">CIS 3400</a>	Database Management Systems	3 credits
<a href="#">CIS 4170 / CIS 4170</a>	Data Visualization	3 credits

<a href="#">CIS 4400</a>	Data Warehousing for Analytics	3 credits
<a href="#">STA 3154</a>	Business Statistics II	3 credits
<a href="#">STA 3155</a>	Regression and Forecasting Models for Business Applications	3 credits
<b>Course number revised to <a href="#">STA 4155</a> effective Spring 2020</b>		
<a href="#">MKT 4123</a>	Marketing Web Analytics and Intelligence	3 credits
<a href="#">MKT 4561</a>	Marketing Analytics	3 credits
<a href="#">MGT 3500</a>	Business Decision Models	3 credits
or		
<a href="#">OPR 3450</a> *	Quantitative Decision Making for Business I	3 credits

\* Students receiving credit for MGT 3500 will not also receive credit for OPR 3450.

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### Quantitative Methods and Modeling (9 credits)

The minor in quantitative methods and modeling is designed to prepare students majoring in other areas of business with a background of quantitative skills that facilitate the decisionmaking process. In addition to one required course, two elective courses are selected with the approval of the area advisor to complement the students major and provide the student with an appropriate background.

#### Required Courses

Choose any three of the following (All Prerequisites must be satisfied):

<a href="#">CIS 3400</a>	Database Management Systems	3 credits
<a href="#">CIS 3920 / STA 3920</a>	Data Mining for Business Analytics	3 credits
<a href="#">CIS 4100</a>	Object-Oriented Programming II	3 credits
<a href="#">OPR 3300</a>	Quantitative Methods for Accounting	3 credits
or		
<a href="#">OPR 3450</a>	Quantitative Decision Making for Business I	3 credits
<a href="#">OPR 3451</a>	Quantitative Decision Making for Business II	3 credits
<a href="#">OPR 3452</a>	System Simulation	3 credits
<a href="#">OPR 3453</a>	Bayesian Statistical Inference and Decision Making	3 credits
<a href="#">OPR 4470</a>	Special Topics in Operations Research	3 credits
<a href="#">OPR 5000</a>	Independent Study in Operations Research	3 credits

<a href="#">STA 3000</a>	Statistical Computing	3 credits
<a href="#">STA 3154</a>	Business Statistics II	3 credits
<a href="#">STA 3155</a> Course number revised to <a href="#">STA 4155</a> effective Spring 2020	Regression and Forecasting Models for Business Applications	3 credits
<a href="#">STA 4000</a>	Introduction to SAS Programming	3 credits
<a href="#">STA 4920</a>	Advanced Data Mining	3 credits
<a href="#">STA 5000</a>	Independent Study in Operations Research	3 credits

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### Statistics

The minor in statistics consists of the courses listed below.

### Required Courses

Choose any three of the following (All Prerequisites must be satisfied):

<a href="#">STA 3000</a>	Statistical Computing	3 credits
<a href="#">STA 3154</a>	Business Statistics II	3 credits
<a href="#">STA 3155</a> Course number revised to <a href="#">STA 4155</a> effective Spring 2020	Intermediate Statistical Methods	3 credits
<a href="#">STA 3156</a>	Sampling Theory and Practice	3 credits
<a href="#">STA 4000</a>	Introduction to SAS Programming	3 credits
<a href="#">STA 4370</a>	Special Topics in Applied Statistics	3 credits
<a href="#">STA 4920</a>	Advanced Data Mining	3 credits
<a href="#">OPR 3450</a>	Quantitative Decision Making for Business I	3 credits

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### Liberal Arts Interdisciplinary Minor in Information Technology and Social Responsibility

The internet age has fostered an environment of widespread interconnectedness. This hyperconnectivity, and the new media that proliferate along with it, come with their own specific problems. The purpose of this concentration is to study the effects of these new technologies on the individual, the workplace, and society at large. In this program of study students will examine the increasing importance of individual and organizational social responsibility in today's interconnected and computer-mediated environment, as well as the specific issues that stand at the intersection of social responsibility and information technology.

#### Required Course: 3 credits

<a href="#">CIS 4910</a>	Information Technology and Social Responsibility*	3 credits
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#### Elective Courses 6 credits

*Two courses selected from the following:*

<a href="#">BLS 3013</a>	Mass Media and the Black American	3 credits
<a href="#">CIS 3270</a>	Computer Ethics* ( <a href="#">PHI 3270</a> )	3 credits
<a href="#">CIS 3700</a>	Green IT*	3 credits
<a href="#">CIS 3810</a>	Principles of New Media*	3 credits
<a href="#">COM 3060</a>	Media Analysis and Criticism	3 credits
<a href="#">COM 3076</a>	International Communication	3 credits
<a href="#">JRN 3220</a>	Media Ethics	3 credits
<a href="#">JRN 3500</a>	Advanced Reporting and Writing	3 credits
<a href="#">LIB 3040</a>	Information and Society ( <a href="#">COM 3040</a> or <a href="#">PAF 3040</a> )	3 credits
<a href="#">PHI 3040</a>	Mind and Computers	3 credits
<a href="#">PHI 3050</a>	Ethics, Economics, and the Business System	3 credits

Courses may be organized into the following suggested tracks:

#### Media

<a href="#">BLS 3013</a>	Mass Media and the Black American	3 credits
<a href="#">CIS 3810</a>	Principles of New Media*	3 credits
<a href="#">COM 3060</a>	Media Analysis and Criticism	3 credits
<a href="#">COM 3076</a>	International Communication	3 credits



JRN 3220	Media Ethics	3 credits
<b>Information Society</b>		
CIS 3810	Principles of New Media*	3 credits
COM 3076	International Communication	3 credits
JRN 3500	Advanced Reporting and Writing	3 credits
LIB 3040	Information and Society ( COM 3040 or PAF 3040 )	3 credits
<b>Philosophy and Ethics</b>		
CIS 3270	Computer Ethics* ( PHI 3270 )	3 credits
JRN 3220	Media Ethics	3 credits
PHI 3040	Mind and Computers	3 credits
PHI 3050	Ethics, Economics, and the Business System	3 credits
<p>*For the purposes of this program, this course counts as an Arts and Sciences course.</p> <p><a href="#">back to top</a></p> <p><b>Business Minors for Non-Business Majors</b></p> <p>Students in the Weissman School of Arts and Sciences or in the Marx School of Public and International Affairs who wish to take business courses may do so by declaring a minor in statistics and quantitative modeling or in technology, business, and the Internet. Before declaring the minor, they must complete either BUS 1001 (1 credit) or have previously completed BUS 1011 (3 credits). To be awarded the minor, students must have a GPA of 2.0 or more in the courses included in the minor. Eligibility to declare such a minor is restricted to students who have an overall GPA of 2.0 or more at time they declare the minor. Courses that apply to the minor may not be used for any other requirement. This minor does not fulfill the requirement to complete a liberal arts minor.</p> <p>Students must choose three courses (9 credits) from the following:</p> <p><b>Statistics and Quantitative Modeling</b></p>		
STA 3000	Statistical Computing	3 credits
STA 3154	Business Statistics II	3 credits
CIS 3920 / STA 3920	Data Mining for Business Analytics	3 credits
STA 3155	Regression and Forecasting Models for Business Applications	3 credits
Course number revised to STA 3155 effective Spring 2020		
STA 4000	Introduction to SAS Programming	3 credits
STA 4920	Advanced Data Mining	3 credits
OPR 3300	Quantitative Methods for Accounting	3 credits
or		
OPR 3450	Quantitative Decision Making for Business I	3 credits

Technology, Business, and the Internet		
<a href="#">CIS 2300</a>	Programming and Computational Thinking	3 credits
<a href="#">CIS 3100</a>	Object-Oriented Programming I	3 credits
<a href="#">CIS 3367</a>	Spreadsheet Applications in Business	3 credits
<a href="#">CIS 3400</a>	Database Management Systems	3 credits
<a href="#">CIS 3444</a>	e-Business Technologies	3 credits
<a href="#">CIS 3630</a>	Principles of Web Design	3 credits
<a href="#">CIS 4800</a>	Systems Analysis and Design	3 credits
<a href="#">LAW 3108</a>	Law and the Internet	3 credits
<a href="#">MKT 4555</a>	Internet Marketing	3 credits

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## Courses

### Courses in Computer Information Systems (CIS)

<a href="#">CIS 2200</a>	Introduction to Information Systems and Technologies	3 hours; 3 credits
<a href="#">CIS 2300</a>	Programming and Computational Thinking	3 hours; 3 credits
<a href="#">CIS 3093</a>	Special Topics in Computer Information Systems	3 hours; 3 credits
<a href="#">CIS 3094</a>	Special Topics in Computer Information Systems	1.5 hours; 1.5 credits
<a href="#">CIS 3100</a>	Object-Oriented Programming I	3 hours; 3 credits
<a href="#">CIS 3110 (previously CIS 4110)</a>	Object-Oriented Programming with Java	3 hours; 3 credits
<a href="#">CIS 3120</a>	Programming for Analytics	3 hours; 3 credits
<a href="#">CIS 3150</a>	Introduction to Semantic Technologies	3 hours; 3 credits
<a href="#">CIS 3250</a>	Blockchain Technologies and Applications	3 hours; 3 credits
<a href="#">CIS 3270</a>	Computer Ethics	3 hours; 3 credits
<a href="#">CIS 3367</a>	Spreadsheet Applications in Business	3 hours; 3 credits
<a href="#">CIS 3400</a>	Database Management Systems	3 hours; 3 credits
<a href="#">CIS 3444</a>	E-Business Technologies	3 hours; 3 credits
<a href="#">CIS 3500</a>	Networks and Telecommunications I	3 hours; 3 credits

<a href="#">CIS 3550</a>	Cybersecurity	3 hours; 3 credits
<a href="#">CIS 3630</a>	Principles of Web Design	3 hours; 3 credits
<a href="#">CIS 3700</a>	Green IT	3 hours; 3 credits
<a href="#">CIS 3710</a>	Foundations of Business Analytics	3 credits
<a href="#">CIS 3750</a>	Social Media Technologies in Organizations	3 hours; 3 credits
<a href="#">CIS 3770</a>	Usability, Privacy, and Security	3 hours; 3 credits
<a href="#">CIS 3810</a>	Principles of New Media	3 hours; 3 credits
<a href="#">CIS 4093</a>	Special Topics in Computer Information Systems	3 hours; 3 credits
<a href="#">CIS 4094</a>	Special Topics in Computer Information Systems	1.5 hours; 1.5 credits
<a href="#">CIS 4100</a>	Object-Oriented Programming II	3 hours; 3 credits
<a href="#">CIS 4160</a>	Web Applications Development	3 hours; 3 credits
<a href="#">CIS 4170</a>	Data Visualization	3 hours; 3 credits
<a href="#">CIS 4350</a>	Information Technology Audit	3 hours; 3 credits
<a href="#">CIS 4400</a>	Data Warehousing for Analytics	3 hours; 3 credits
<a href="#">CIS 4500</a>	Networks and Telecommunications II	3 hours; 3 credits
<a href="#">CIS 4620</a>	FinTech: Principles and Applications	3 hours; 3 credits
<a href="#">CIS 4650</a>	Operating Systems Concepts	3 hours; 3 credits
<a href="#">CIS 4800</a>	Systems Analysis and Design	3 hours; 3 credits
<a href="#">CIS 4910</a>	Information Technology and Social Responsibility	3 hours; 3 credits
<a href="#">CIS 5000</a>	Independent Study and Research in Computer Information Systems	3 hours; 3 credits
<a href="#">CIS 5800</a>	Information Technology Development and Project Management	3 hours; 3 credits
<a href="#">CIS 5900</a>	Computer Information Systems Internship	3 hours; 3 credits
<a href="#">CIS 2200H</a>	Hon Info Systems	3 hours; 3 credits
<a href="#">CIS 3367H</a>	Hon Sprdsht App Bus	3 hours; 3 credits
<a href="#">CIS 4450H</a>	Hon Network & Com	3 hours; 3 credits
<a href="#">CIS 6001H</a>	Hon CIS I	3 hours; 3 credits per semester
<a href="#">CIS 6002H</a>	Hon CIS II	3 hours; 3 credits per semester

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Courses in Statistics (STA)

<a href="#">STA 2000</a>	Business Statistics I	3 hours; 3 credits
<a href="#">STA 2100</a>	Statistics for Social Science	4 hours; 3 credits
<a href="#">STA 3000</a>	Statistical Computing	3 hours; 3 credits
<a href="#">STA 3093</a>	Special Topics in Statistics	3 hours; 3 credits
<a href="#">STA 3094</a>	Special Topics in Statistics	1.5 hours; 1.5 credits
<a href="#">STA 3154</a>	Business Statistics II	3 hours; 3 credits
<a href="#">STA 3155</a> Course number revised to <a href="#">STA 4155</a> effective Spring 2020	Regression and Forecasting Models for Business Applications	3 hours; 3 credits
<a href="#">STA 3156</a>	Sampling Theory and Practice	3 hours; 3 credits
<a href="#">STA 3253</a>	Categorical Data Analysis	3 hours; 3 credits
<a href="#">STA 3255</a>	Statistical Quality Control Methods	3 hours; 3 credits
<a href="#">STA 3560</a>	Nonparametric Statistics	3 hours; 3 credits
<a href="#">STA 4000</a>	Introduction to SAS Programming	3 hours; 3 credits
<a href="#">STA 4155</a> Course number revised from STA 3155 effective Spring 2020	Regression and Forecasting Models for Business Applications	3 hours; 3 credits
<a href="#">STA 4157</a>	Design and Analysis of Experimental Data	3 hours; 3 credits
<a href="#">STA 4158</a>	Analysis of Time Series	3 hours; 3 credits
<a href="#">STA 4370</a>	Special Topics in Applied Statistics	3 hours; 3 credits
<a href="#">STA 4920</a>	Advanced Data Mining	3 hours; 3 credits
<a href="#">STA 5000</a>	Independent Study and Research in Statistics	3 hours; 3 credits
<a href="#">STA 2000H</a>	Hon bus Statistics	3 hours; 3 credits
<a href="#">STA 6001H</a>	Hon Statistics I	3 hours; 3 credits
<a href="#">STA 6002H</a>	Hon Statistics II	3 hours; 3 credits

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#### Courses in Operations Research (OPR)

<a href="#">OPR 3093</a>	Special Topics in Operations Research	3 hours; 3 credits
<a href="#">OPR 3094</a>	Special Topics in Operations Research	1.5 hours; 1.5 credits

<a href="#">OPR 3300</a>	Quantitative Methods for Accounting	3 hours; 3 credits
<a href="#">OPR 3450</a>	Quantitative Decision Making for Business I	3 hours; 3 credits
<a href="#">OPR 3451</a>	Quantitative Decision Making for Business II	3 hours; 3 credits
<a href="#">OPR 3452</a>	System Simulation	3 hours; 3 credits
<a href="#">OPR 3453</a>	Bayesian Statistical Inference and Decision Making	3 hours; 3 credits
<a href="#">OPR 4470</a>	Special Topics in Operations Research	3 hours; 3 credits
<a href="#">OPR 5000</a>	Independent Study and Research in Operations Research	3 hours; 3 credits
<a href="#">OPR 3300H</a>	Hon Quant Meth Acc	3 hours; 3 credits
<a href="#">OPR 6001H</a>	Hon Opr I	3 hours; 3 credits
<a href="#">OPR 6002H</a>	Hon Opr II	3 hours; 3 credits
<a href="#">OPR 6003H</a>	Hon Opr III	3 hours; 3 credits

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