

# ESTABLISHING UNDERGRADUATE CONCENTRATIONS

OFFICE OF THE EXECUTIVE VICE PRESIDENT AND PROVOST OF THE UNIVERSITY

### DEFINITION

These are the minimum requirements for approval. Individual undergraduate concentrations may have additional requirements.

A concentration is a formalized selection of courses within a major.

An undergraduate concentration:

- Requires a minimum of 15 semester hours of which at least 9 semester hours must be upper division. Specialized concentrations (e.g. BIS Concentrations) may have additional or different requirements.
- Is offered by a single unit and is intended exclusively for students pursuing that particular major. If a concentration consists of courses from more than one college the approval of each college Dean is required.

#### PROPOSAL PROCEDURES CHECKLIST

Before academic units can advertise undergraduate concentrations or include them in their offerings as described in the university catalogs, they must be recommended for approval by the Curriculum and Academic Programs Committee and approved by the Executive Vice President and Provost.

A complete proposal should include:

X 1. A supporting letter from the chair of the academic unit verifying that:

- The proposed concentration has been reviewed and has received faculty approval through appropriate governance procedures in the unit.
- The unit has the resources to support the concentration as presented in the proposal, without impacting core course resources.
- X 2. A supporting letter from the office of the supervising dean verifying that the concentration has been reviewed and has received approval through appropriate governance procedures in the college. Signature on approved document.
- X 3. A supporting letter from each college/school dean from which individual courses, or the entire concentration, are taken.
- X 4. A statement concerning demand for the program (student/community/market).
- X 5. A description of the requirements for this concentration. Be specific in listing required courses and specify the total minimum number of hours required for the concentration.
  - Are any new courses required? If so, provide course syllabi and Proposal for Curriculum Action forms.
- $X \square 6$ . A list of the primary faculty participants.
- $X \square$  7. A minimum residency requirement: How many hours of the concentration must be ASU credit?
- $X \square 8$ . Please prepare and attach a Major Map.
- X 9. A completed Appendix document. This information is to be used during the implementation phase to ensure this program appears correctly and completely on Degree Search.
- 10. Attach other information that will be useful to the review committees and the Office of the Provost.

# Proposal for a Bachelor of Arts in Business Concentration (Statistics)

# Summary of the Bachelor of Arts in Business Degree Program

The Bachelor of Arts in Business is an innovative, inter-disciplinary program providing attractive concentrations that are valuable in a business context. Students in the Bachelor of Arts in Business program will take the entire W. P. Carey School of Business curriculum including a set of lower-division "skill" courses (Accounting, Computer Information Systems, Economics, Mathematics, and Statistics), the business core (Finance, Legal and Ethical Studies, Management, Marketing, and Supply Chain Management), plus courses in a specific concentration area outside of the business school that we believe will be valuable in a business context. Concentration areas are chosen in consultation with our university partners and are designed to produce graduates who will meet market demands.

The Bachelor of Arts in Business is intended to prepare students for positions in a variety of professions where business plays an important role in ensuring success. The program will produce graduates with the capability and motivation for continued learning throughout their careers.

# **BA in Business Degree Requirements**

The B.A. in Business program consists of at least 57 hours of course work distributed between basic skill courses, business core courses, and concentration courses as shown below. Only courses in which a student receives a grade of "C" (2.00) or higher may be used to meet the degree requirements. Students must meet all prerequisites and course requirements as listed in the catalog. At least 30 hours must be ASU credit.

**Basic Skill Courses (24-26 hrs):** Accounting (6 hrs): ACC 231 and ACC 241

Computer Information Systems (3 hrs): CIS 105

Economics (6 hrs): ECN 211 and ECN 212

Mathematics and Statistics (9-11 hrs): MAT 210 or MAT 270; MAT 211 or MAT 271; ECN 221 or an approved statistics course.

**Business Core (16 hrs):** FIN 300, LES 305, MGT 300, MKT 300, SCM 300, WPC 301

**Concentration Courses:** 18 - 24 hours, at least 12 hours of upper-division course work and at least 12 hours must be ASU credit. (**Typically delivered by a partner program outside the W. P. Carey School.**) Name of Proposed Concentration: B.A. in Business, Concentration in Statistics

# Number of courses required and total hours: Six Courses; 18 Hours

Concentration Requirements: Students will complete the following courses:

(See attached for concentration course descriptions)

# **Prerequisites:**

MAT 270 MAT 271 MAT 272 STP 280 Recommended course

**Concentration Requirements:** 

STP 281 Statistical Analysis for Researchers (3 hours)
STP 3XX Design and Analysis of Experiments (3 hours)
STP 3XX Applied Regression Analysis and Time Series (3 hours)
STP 4XX Quality Improvement (3 hours)
STP 3XX or 4XX Choose one Elective from among Statistical Computing, Categorical Data Analysis, Nonparametric Statistics, or Multivariate Analysis (3 hours)
STP 4XX Senior Capstone Course (3 hours)

Minimum Residency Requirement. Students must complete a minimum of 12 hours upper division, resident credit.

All course work must be completed with a C (2.0) or higher.

Name	Rank	Degree	Level of Involvement
Roger Berger	Professor	Ph.D.	Director, will coordinate and oversee course implementation and assignments of courses; teach courses in statistics
Connie Borror	Professor	Ph.D.	Teach courses in statistics; serve as capstone/independent research advisor
Erika Camacho	Assistant Professor	Ph.D.	Teach courses in applied mathematics
Theresa Devine	Assistant Professor	MFA	Teach courses in applied computing
Suzanne W. Dietrich	Associate Professor	Ph.D.	Teach courses in applied computing
Omayra Ortega	Assistant Professor	Ph.D.	Teach courses in applied mathematics and statistics; serve as capstone/independent research advisor
Yasin Silva	Assistant Professor	Ph.D.	Teach courses in applied computing
Haiyan Wang	Assistant Professor	Ph.D.	Teach courses in applied mathematics

#### **Primary Faculty Participants:**

Feng Wang	Assistant Professor	Ph.D.	Teach courses in applied computing		
	Associate				
Stephen Wirkus	Professor	Ph.D.	Teach courses in applied mathematics		
Kuai Xu	Assistant Professor	Ph.D.	Teach courses in applied computing		
Yuntao Zhu	Assistant Professor	Ph.D.	Teach courses in applied mathematics		
Yuntao Zhu	Assistant Professor		Teach courses in applied mathematics		

Names of director who will serve as the liaison between W. P. Carey and the Division of Math and Natural Sciences:

Roger Berger, Director

# Name of advisor(s) who will coordinate with W. P. Carey undergraduate advisors and students in the concentration:

Maisha Olive, Aisha Alexander

# **Demand for Graduates:**

A degree that incorporates solid business skills and statistics will attract a number of students to Arizona State University and is attractive to a number of current business majors who would like additional preparation in the area of statistics. Although the number of students involved will likely be smaller than other W. P. Carey Concentrations (25 students per year estimated), the quality of these students is likely to be quite high and the content will be very valuable to these students. The W. P. Carey Bachelor of Arts in Business with a Concentration in Statistics has been designed to help students move into business or governmental positions using statistics to help make decisions and solve problems in the face of uncertainty. The program involves both theoretical and applied statistics with a focus on practical and applied aspects of statistics. In addition to students pursuing the BA in Business (Statistics), this program will be attractive as a concurrent degree to students in other business and math majors.

Below are several anticipated career opportunities for students completing the BA in Business with a Concentration in Statistics.

Job Title/Description	Expected Starting Salary	Expected National Demand
Statistician	\$47,807	+ 13%
Pre-Actuaries	\$49,150	+ 21%
Financial Analysts	\$43,440	+ 20%
Operations Research Analy	\$40,000	+ 22%
Computer Systems Analysts	\$45,390	+ 20%
Market & Survey Researchers	\$36,220	+ 28%
Personal Financial Advisors	\$46,390	+ 30%

Social Scientist, Teacher	\$35,480	+ 25%
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# **Program Outcomes and Assessment:**

Using a solid foundation in business, students pursuing a BA in Business with a concentration in Statistics will be prepared to apply their skills within the business environment. To assess learning of students in this program, writing samples from the capstone course will be reviewed to assure that students are able to demonstrate critical thinking and writing skills as well as demonstrate a depth of knowledge and understanding of statistics. This program will follow the same assessment plan as the other BA concentrations in business.

# **Statistics Courses**

STP 280 Probability and Statistics for Researchers (3 hours) Methods for data summary, numerical summary measures, probability concepts, discrete and continuous probability distributions, expected values, statistics, sampling distributions, point estimation, and introduction to statistical inference for a single parameter. Pre-requisite: MAT 251 or MAT 260 or MAT 265 or MAT 270

STP 281 Statistical Analysis for Researchers (3 hours)

Confidence intervals, hypothesis testing, one and two-factor analysis of variance, simple linear regression, multiple regression, chi-square tests, and introduction to statistical quality control. Pre-requisite: STP 280

STP 3XX Design and Analysis of Experiments (3 hours)

Factorial and nested designs, randomized designs, randomized complete block designs, Latin squares, fixed and random effects, expected mean squares, multiple comparisons, and analysis of covariance. Pre-requisite: STP 281

STP 3XX Applied Regression Analysis and Time Series (3 hours) Simple linear regression, multiple linear regression, indicator variables, influence diagnostics, stepwise selection, logistic regression, time series models, forecasting via exponential smoothing, evaluation of forecasts, autocorrelation, ARIMA models, and Box-Jenkins methods. Pre-requisite: STP 281

# STP 3XX Statistical Computing (3 hours)

Statistical techniques using a professional statistical programming language (e.g., SAS, R). Emphasis on correct methods, writing, and presentation of results. Pre-requisite: STP 281

STP 4XX Quality Improvement (3 hours)

In-depth concentration on statistical process control for attribute and variables data, process capability analysis, and measurement systems analysis.

STP 4XX Categorical Data Analysis (3 hours)

Analysis of categorical data, contingency tables, goodness of fit tests, random sampling, and logistic regression.

STP 4XX Nonparametric Statistics (3 hours) Statistical methods requiring relatively mild assumptions about the form of the population distribution. Hypothesis testing, point and interval estimation, and multiple comparison procedures for a variety of statistical problems.

STP 4XX Multivariate Analysis (3 hours)

Dimension reduction (principal components, factor analysis, and canonical correlation), clustering, and classification techniques.

STP 4XX Senior Capstone Course (3 hours)

external sponsor (company, government agency, or non-profit organization). This is not an internship. This will be a team project with a defined scope of work, deliverables, oral presentation updates (and feedback from sponsor), and written midterm and final reports.

Approved by Faculty Council, W. P. Carey School of Business: May 4, 2011

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Dean's Approval: \_

Robert E. Mittelstaedt, Jr.



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# APPENDIX - PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE CONCENTRATION

(This information is used to populate the <u>Degree Search</u>/catalog website. Please consider the student audience in creating your text.)

1. Program Description (150 words maximum)

The Bachelor of Arts in Business with a concentration in Statistics is designed for students interested in a degree with solid business skills and an emphasis in math and statistics. These students will be prepared to move into business or governmental positions using statistics to help make decisions and solve problems in the face of uncertainty. The program involves both theoretical and applied statistics with a focus on practical and applied aspects of statistics.

#### 2. Contact and Support Information

Office Location (Building & Room): West Campus N 101C

Campus Telephone Number: 602-543-

Program email address:

Program website address: http://wpcarey.asu.edu/undergraduate/business-degrees/BA.cfm

# 3. Additional Program Description Information

- A. Additional program fee required for this program? Yes X No These students will pay the traditional W. P. Carey Program Fee.
- B. Does this program have a second language requirement? Yes  $\Box$  No  $\Box X$
- 4. Career Opportunities & Concentrations Provide a brief description of career opportunities available for this degree program. If program will have concentrations, provide a brief description for each concentration. Students with a Bachelor of Arts in Business with a concentration in statistics will move into business or governmental positions using statistics to help make decisions and solve problems in the face of uncertainty. Students will find positions as statisticians, financial analysts, market and survey researchers, personal financial advisors, etc.
- 5. Additional Admission Requirements If applicable list any admission requirements (freshman and/or transfer) that are higher than and/or in addition to the university minimum undergraduate admission requirements.) New freshmen admitted to this program must meet university entrance requirements. Transfer students from within campus or other institutions must meet university requirements and have a 3.0 ASU and 3.0 Transfer GPA. Additionally, all students must take the ACT or SAT exam.
- Keywords List all keywords used to search for this program. Keywords should be specific to the proposed program. Business, Statistics
- 7. Advising Committee Code List the existing advising committee code associated with this degree.
- 8. Minimum Math Requirement List the minimum math course required to satisfy this degree.



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Students must complete the following math prerequisites for the program:

MAT 270 MAT 271 MAT 272 (Recommended) STP 280



# Major Map: Business (Statistics) (B.A.) W. P. Carey School of Business, Polytechnic Campus Catalog Year: 2012-2013

			Completed AT	P: Yes No	Completed AGEC: Ves No
Course Subject and Title (courses in <b>bold/shading</b> are critical courses)	Hrs.	Upper Division	Transfer Course/Grade	Minimum Grade if Required	Additional Critical Requirement Notes
TRACKING TERM ONE: 0-15 CREDIT HOURS				1	
WPC 101: Student Success in Business	1				An SAT, ACT, Accuplacer, or TOEFL score
CIS 105: Computer Applications and Information Technology (CS)	3			Grade of C	determines placement in first-year composition
	4			Grade of C	<ul> <li>courses</li> <li>ASU Math Placement Exam score determines</li> </ul>
MAT 270: Calculus with Analytic Geometry I ENG 101or 102: First-Year Composition OR	4			Glade of C	placement in Mathematics course
ENG 105: Advanced First-Year Composition OR					Submission of a Current SAT Reasoning score or
ENG 107 or 108: English for Foreign Students	3			Grade of C	ACT score (we do not require the writing portion of these tests) by the end of the first semester in
PGS course (SB):	3				the program.
					See academic advisor for appropriate Student
					Success course requirement if not a first-time freshman.
Humanities, Fine Arts & Design (HU):	3				<ul> <li>Maintain 2.0 ASU cumulative GPA.</li> </ul>
TRACKING TERM TWO: 16-30 CREDIT HOURS	1				
Complete 1 course from:					Maintain 2.0 ASU cumulative GPA.
ECN 211: Macroeconomic Principles (SB) - OR -	2	_		0 1 60	
ECN 212: Microeconomic Principles (SB)	3			Grade of C	_
MAT 271: Calculus with Analytic Geometry II (MA) ENG 101 or 102: First-Year Composition OR	4			Grade of C	_
ENG 105: Advanced First-Year Composition OR					
ENG 107 or 108: English for Foreign Students	3			Grade of C	
Natural Science Quantitative (SQ):	4				
SOC course (SB):	3				
TRACKING TERM THREE: 31-45 CREDIT HOURS					
Complete remaining course from:					Completed First-Year Composition requirement
ECN 211: Macroeconomic Principles (SB) - OR - ECN 212: Microeconomic Principles (SB)	3			Grade of C	• Maintain 2.0 ASU cumulative GPA.
					-
ACC 231: Uses in Accounting Information I	3			Grade of C	_
STP 280: Probability and Statistics for Researchers	3			Grade of C	_
Natural Science Quantitative (SQ) or General (SG):	4				_
COM 100: Introduction to Human Communication or COM 225: Public Speaking (L) or					
COM 230: Small Group Communication or					
COM 259: Communication in Business and the Professions	3				
TRACKING TERM FOUR: 46-60 CREDIT HOURS		1	·		
STP 281: Statistical Analysis for Researchers	3			Grade of C	<ul> <li>Maintain 2.0 ASU cumulative GPA.</li> <li>The following courses are critical requirements</li> </ul>
ACC 241: Uses of Accounting Information II	3			Grade of C	that must be completed by the end of Term Four:
WPC 301: Business Forum	1			Grade of C	CIS 105, MAT 270, MAT 271, ECN 211, ACC
ENG 302: Business Writing (L) or ENG 301: Writing for Professions (L)	3				231, ECN 212, ACC 241, STP 280, STP 281.
Cultural Diversity (C):	3				-
Elective (Recommended: MAT 272: Calculus with Analytic Geometry	5				-
III)	4				
TRACKING TERM FIVE: 61-75 CREDIT HOURS					
STP 3XX: Design and Analysis of Experiments	3	$\boxtimes$		Grade of C	
MGT 300: Organization & Management Leadership	3			Grade of C	
SCM 300: Global Supply Operations	3			Grade of C	
Literacy and Critical Inquiry (L):	3				
Upper Division General Education Elective:	3	$\boxtimes$			
TRACKING TERM SIX: 76-90 CREDIT HOURS					
STP 3XX: Applied Regression Analysis and Time Series	3	$\boxtimes$		Grade of C	The approved Statistics Concentration Elective
STP 3XX OR STP 4XX Statistics Concentration Elective	3	$\boxtimes$		Grade of C	courses are listed after Term 8.
FIN 300: Fundamentals of Finance	3	$\boxtimes$		Grade of C	
Historical Awareness (H):	3				
Upper Division Elective:	2	$\boxtimes$			



TRACKING TERM SEVEN: 91-105 CREDIT HOURS				
STP 4XX: Quality Improvement	3		Grade of C	
MKT 300: Marketing and Business Performance	3		Grade of C	
International Business course (G)			Grade of C	
Upper division Humanities, Fine Arts & Design (HU):	3	$\boxtimes$		
TRACKING TERM EIGHT: 106-120 CREDIT HOURS				
STP 4XX: Senior Capstone Course	3	$\boxtimes$	Grade of C	
LES 305: Legal, Ethical and Regulatory Issues in Business	3	$\boxtimes$	Grade of C	
Upper division Elective:	3	$\boxtimes$		
Upper Division Elective:	3	$\boxtimes$		

#### Statistics Concentration 3XX and 4XX Electives:

STP 3XX Statistical Computing STP 4XX Categorical Data Analysis STP 4XX Nonparametric Statistics

STP 4XX Multivariate Analysis

#### Graduation Requirements Summary

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	Total Hours (120)	Total Hrs at ASU	Hrs Resident	Transfer UD Bus.	Overall GPA	BUS GPA (2.000	Major GPA (2.000	C Min. Req.	Total UD Hrs (51)	Total Comm.	Total Comm. Coll.
		(30)	Credit for	Hrs (9 max)	(2.000 Min.)	Min.)	Min.)			College Hrs. (64	Bus. Hrs. (30 Max)
			Academic							Max)	1
			Recognition								1
L			(56)								
											1 1
											1

#### General University Requirements: Legend

• General Studies Core Requirements:

- Literacy and Critical Inquiry (L)
- Mathematical Studies (MA)
- Computer/Statistics/Quantitative applications (CS)
- Humanities, Fine Arts, and Design (HU)
- Social and Behavioral Sciences (SB)
- Natural Science-Quantitative (SQ)
- Natural Science-General (SG)
- General Studies Awareness Requirements:
  - Cultural Diversity in the U.S. (C)
  - Global Awareness (G)
  - Historical Awareness (H)
- First Year Composition

Additional Notes:



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# Area(s) of Interest

A. Select one (1) primary Area of Interest from the list below that applies to this program.

Architecture, Construction & Design Artistic Expression & Performance Biological Sciences, Health & Wellness Business, Management & Economics	Engineering & Technology Environmental Issues & Physical Science Interdisciplinary Studies Languages & Cultures
Communication & Media Computing & Mathematics Education & Teaching	<u>Law &amp; Justice</u> <u>Social Science, Policies &amp; Issues</u>

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- B. Select **any** additional Areas of Interest that apply to this program from the list below.
  - Architecture, Construction & Design
  - Artistic Expression & Performance
  - Biological Sciences, Health & Wellness
  - Business, Management & Economics
  - Communication & Media
  - X Computing & Mathematics
  - **Education & Teaching**

- Engineering & Technology Environmental Issues & Physical Science Interdisciplinary Studies Languages & Cultures Law & Justice
- Social Science, Policies & Issues



April 25, 2011

- To: Kay A. Faris, Associate Dean W. P. Carey School of Business
- From: Roger L. Berger, Director Division of Mathematical and Natural Sciences

Roger L Berger

Re: BA in Business (Statistics)

The Division of Mathematical and Natural Sciences is pleased to support the proposal for a new concentration called the BA in Business (Statistics). We have worked with Dean Faris to identify required Statistics courses for this proposed concentration.

The proposed required courses are courses that we are developing for our new BS in Statistics degree, and it will be very efficient to have the BA in Business (Statistics) majors taking the same courses. We plan to offer the 200-level courses in the 2011-12 academic year, and we will be adding upper division courses in the 2012-13 academic year.

We believe the proposed concentration will offer a strong option to quantitatively minded Business majors.



To: Kay A. Faris, Associate Dean W.P. Carey School of Business

From: Elizabeth Langland, Dean, New College

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Date: April 26, 2011

RE: BA in Business (Statistics)

I am pleased to support the proposal for a new concentration, BA in Business (Statistics). Indeed, such a new concentration is a wonderful way for us to capitalize on New College's new BS in Statistics, the first bachelor's degree in Statistics in Arizona. The faculty in Mathematical and Natural Sciences, who will be coordinating with W. P. Carey in offering the degree, have both the depth and breadth necessary to staff it and a clear plan for developing the necessary courses.

I share the assessment of others that this offering promises to be appealing to quantitatively minded Business majors, and I fully support its implementation.

New College of Interdisciplinary Arts and Sciences Office of the Dean

Mailing Address: PO Box 37100, Phoenix, AZ 85069-7100 Street/Shipping Address: 4701 W. Thunderbird Road, Glendale, AZ 85306-4908 (602) 543-7000 Fax: (602) 543-4565 newcollege@asu.edu http://newcollege.asu.edu