

# Management

*Professors Colbaugh, Sueyoshi*

*Associate Professors Anselmo (Chair of the Department), Holcomb*

*Visiting Assistant Professor Ulibarri*

*Adjunct Faculty: Foster, Mazumdar, Ostergren, Peterson, Sung*

***Degrees offered: A.S. in Business; B.S. in Management and B.S. in Management of Technology***

The Department of Management provides undergraduate degree programs that draw heavily on Tech's strengths in science, engineering, and technology. The aim of the department is to develop in students substantive decision-making skills and tools, as well as the functional knowledge required to effectively manage complex technology-based organizations in today's competitive global economy. Management students take the same basic science and math courses required of every Tech student—two semesters each of chemistry, physics, calculus, and another lab science such as biology, engineering, or geology. Added to this foundation are courses in accounting, business computer systems, economics, finance, management, marketing, operations research, and statistics.

New Mexico Tech offers degrees in management and management of technology. The B.S. in Management is appropriate for those planning to enter the fields of human resources management, labor relations, or general management. The B.S. in Management of Technology integrates management course work with study in an engineering field of the student's choice. This degree focuses on the application of quantitative methods to problem solving in management. In accordance with the overall mission of New Mexico Tech, it is expected that problems addressed will be primarily within engineering and applied science disciplines, including natural resource and environmental management problems. Each management student is assigned a faculty advisor who will help him or her select a degree option and recommend courses to be taken.

The Department of Management also offers an Associate of Science degree in Business. This program is designed for students seeking to complete a two-year degree in business, and/or those who may wish to transfer to a four-year bachelor's program in business or management. Required courses are transferable among participating New Mexico institutions.

## Undergraduate Program

### Associate of Science in Business

*Minimum credit hours required—65*

*The following courses are required:*

- ACCT 201 (3), 202 (3), 371 (3)
- BA 315 (3), 317 (3)
- BCS 209 (3)
- ECON 251 (3), 252 (3)
- ENGL 111 (3), 112 (3)
- Mathematics: Six credit hours chosen from MATH 103 (3), 104 (3), 105 (5), 131 (4)
- TC 151 (3)
- Business Electives: Nine credit hours selected in consultation with the faculty advisor
- Humanities and Social Science Elective: Three credit hours chosen from Section I of the General Degree Requirements (page 48)
- A total of eight credit hours in courses with associated laboratories from the disciplines of biology, chemistry, geology, or physics
- Electives to complete 65 credit hours

Students must achieve a minimum GPA of 2.0 in required courses in order to graduate.

**Sample Curriculum for the Associate of Science in Business***Summer*

- 5 Mathematics  
 5 Total credit hours

*Semester 1*

- 3 ENGL 111 (college English)  
 3 Mathematics  
 3 ACCT 201 (fundamentals I)  
 3 ECON 251 (macroeconomics)  
 12 Total credit hours

*Semester 2*

- 3 ENGL 112 (college English)  
 4 Science with lab (biology, chemistry, geology, or physics)  
 3 ACCT 202 (fundamentals II)  
 3 ECON 252 (microeconomics)  
 3 BCS 209 (business computing)  
 16 Total credit hours

*Semester 3*

- 3 BA 315 (business law I)  
 3 ACCT 371 (financial accounting)  
 4 Science with lab (biology, chemistry, geology, or physics)  
 3 TC 151 (intro to visual communication)  
 3 Humanities/Social Science  
 16 Total credit hours

*Semester 4*

- 3 BA 317 (business law II)  
 9 Business Electives  
 4 Electives  
 16 Total credit hours

**Core Requirements for the Bachelor of Science in Management**

*In addition to the General Degree Requirements (page 48), the following core of business and economics courses is required of all Management students:*

- ACCT 201 (3), 202 (3); ACCT 350 is recommended
- BA 315 (3), 490 (3)
- BCS 209 (3), 283 (3), 305 (3)
- FIN 302 (3)
- MGT 101 (1), 330 (3), 381 (3), 472 (3), 488 (3)
- MKT 335 (3)
- ECON 251 (3), 252 (3). *These courses may be used to fulfill the Social Science portion of the General Degree Requirements, page 48.*
- At least two semesters of a single approved foreign language are strongly suggested but not required.
- Electives to complete 130 credit hours. To be selected in consultation with a faculty advisor.

Any required class or technical elective used toward a B.S. in Management or a B.S. in Management of Technology may not be taken on an S/U basis. Management majors must achieve a minimum GPA of 2.0 in required courses in order to graduate.

**Bachelor of Science in Management***Minimum credit hours required—130*

*In addition to the General Degree Requirements (page 48) and the core business requirements (above), the following courses are required:*

- Business Elective Sequence: At least nine (9) credit hours selected in consultation with and approved by the student's faculty advisor. Examples of appropriate elective sequences include FIN 410, 480, 490; ECON 361, 362, 490; MGT 462, 473, 491; and MGT 331, 451, 490.
- ACCT 350 (3) is recommended

**Sample Curriculum for the Bachelor of Science in Management***Semester 1*

- 1 MGT 101 (modern management issues)  
 3 ENGL 111 (college English)  
 4 CHEM 121 & 121L (general)  
 4 MATH 131 (calculus)  
 4 Biology/Geology/Engineering with lab  
 16 Total credit hours

*Semester 2*

- 3 ENGL 112 (college English)  
 4 CHEM 122 & 122L (general)  
 4 MATH 132 (calculus)  
 4 Biology/Geology/Engineering with lab  
 15 Total credit hours

*Semester 3*

- 5 PHYS 121 & 121L (general)  
 3 ACCT 201 (fundamentals I)  
 3 BCS 209 (business computing)  
 3 ECON 251 (macroeconomics)  
 3 Social Science  
 17 Total credit hours

*Semester 4*

- 5 PHYS 122 & 122L (general)  
 3 ACCT 202 (fundamentals II)  
 3 BCS 283 (applied statistics)  
 3 ECON 252 (microeconomics)  
 3 Humanities/Social Science  
 17 Total credit hours

*Semester 5*

- 3 ACCT 350 (managerial accounting)  
 3 BA 315 (business law I)  
 3 BCS 305 (information systems)  
 3 MGT 330 (organizational behavior)  
 3 MKT 335 (principles)  
 3 Elective  
 18 Total credit hours

*Semester 6*

- 3 FIN 302 (principles)  
 3 MGT 381 (market analysis)  
 3 ENGL 341 (technical writing)  
 3 Business Elective  
 6 Electives  
 18 Total credit hours

*Semester 7*

- 3 MGT 451 (leadership & motivation)  
 3 MGT 472 (production & operations)  
 3 Humanities  
 3 Business Elective  
 3 Elective  
 15 Total credit hours

*Semester 8*

- 3 BA 490 (business policy)  
 3 MGT 473 (production and operations II)  
 3 MGT 488 (technology entrepreneur)  
 3 Humanities  
 3 Business Elective  
 15 Total credit hours

## Bachelor of Science in Management of Technology

Minimum credit hours required—130

In addition to the General Degree Requirements (page 48) and the core business requirements (page 92), the following courses are required:

- ES 110 (2), 111 (3), 216 (3), and nine (9) approved credit hours of engineering courses numbered 300 or above
- MATH 231 (4)
- MGT 462 (3) is recommended
- At least two semesters of a single approved foreign language are strongly suggested but not required.
- Electives to complete 130 hours

### Sample Curriculum for the Bachelor of Science in Management of Technology

#### Semester 1

- 1 MGT 101 (modern management issues)
- 3 ACCT 201 (fundamentals I)
- 3 ENGL 111 (college English)
- 4 CHEM 121 & 121L (general)
- 4 MATH 131 (calculus)
- 2 ES 110 (intro to engineering)
- 17 Total credit hours

#### Semester 2

- 3 ACCT 202 (fundamentals II)
- 3 ENGL 112 (college English)
- 4 CHEM 122 & 122L (general)
- 4 MATH 132 (calculus)
- 3 ES 111 (programming for engineers)
- 17 Total credit hours

#### Semester 3

- 5 PHYS 121 & 121L (general)
- 3 ECON 251 (macroeconomics)
- 4 MATH 231 (calculus)
- 4 Biology/Geology/Engineering with lab
- 16 Total credit hours

#### Semester 4

- 5 PHYS 122 & 122L (general)
- 3 BCS 283 (applied statistics)
- 3 ECON 252 (microeconomics)
- 3 ES 216 (fluid mechanics)
- 4 Biology/Geology/Engineering with lab
- 18 Total credit hours

#### Semester 5

- 3 ACCT 350 (managerial accounting)
- 3 BA 315 (business law I)
- 3 BCS 209 (business computing)
- 3 MGT 330 (organizational behavior)
- 3 MKT 335 (principles)
- 15 Total credit hours

#### Semester 6

- 3 BCS 305 (information systems)
- 3 FIN 302 (principles)
- 3 ENGL 341 (technical writing)
- 3 Humanities
- 3 Social Science
- 3 Engineering Elective
- 18 Total credit hours

#### Semester 7

- 3 MGT 381 (strategic market analysis)
- 3 MGT 462 (decision analysis)
- 3 MGT 472 (production & operations I)
- 3 Humanities
- 3 Engineering Elective
- 15 Total credit hours

#### Semester 8

- 3 BA 490 (business policy)
- 3 MGT 488 (technology entrepreneur)
- 3 Engineering Elective
- 3 Humanities/Social Science
- 3 Elective
- 15 Total credit hours

## Minor in Management

Minimum credit hours required—18

The following courses are required:

- FIN 302 (3)
- MGT 330 (3), 472 (3)
- MKT 335 (3)
- Six (6) credit hours of Management Department courses numbered 300 or above.

Note: ECON 252 and BCS/MATH 283 are prerequisites for FIN 302 and MKT 335. Non-majors must obtain instructor consent in lieu of the prerequisite of ACCT 202 for FIN 302.

## Accounting Courses:

### ACCT 201, Fundamentals of Accounting I, 3 cr, 3 cl hrs

Financial accounting procedures, concepts, and reports for sole proprietorships.

### ACCT 202, Fundamentals of Accounting II, 3 cr, 3 cl hrs

Prerequisite: ACCT 201; BCS 209

Financial accounting for partnerships and corporations, an introduction to managerial accounting concepts.

### ACCT 350, Managerial Accounting, 3 cr, 3 cl hrs

Prerequisite: ACCT 202 and BCS 209 or consent of instructor

Cost-benefit choices among accounting methods and systems in support of strategic decisions and operational control, including behavioral effects of accounting systems within organizations. Analysis of cost behavior patterns and how they alter cost accounting for automated manufacturing environments. Construction of budgets, forecasts, and estimates for new product/process costs.

### ACCT 353, Cost Accounting, 3 cr, 3 cl hrs

Prerequisite: ACCT 202 or consent of instructor

The development and use of cost accounting for inventory valuation, income determination, cost control including process accounting and variance analysis.

### ACCT 371, Financial Accounting I, 3 cr, 3 cl hrs

Prerequisite: ACCT 202

A detailed study of the financial recording and reporting process. Emphasis is placed on the form and content of financial statements.

### ACCT 372, Financial Accounting II, 3 cr, 3 cl hrs

Prerequisite: ACCT 371

Current financial accounting theory and practice as they relate to financial statement preparation and analysis. Emphasis on special topics includes accounting for pensions and leases, accounting changes, and earnings per share presentation. Topics of current financial accounting interest are reviewed as they develop.

### ACCT 403, Tax Accounting, 3 cr, 3 cl hrs

Prerequisite: ACCT 372 or consent of instructor

Federal income tax laws and the determination of taxable income for individuals, partnerships, corporations, and fiduciaries. Tax research and planning.

### ACCT 405, Accounting for Non-Profit Organizations, 3 cr, 3 cl hrs

Prerequisite: ACCT 372 or consent of instructor

Control and reporting problems for government organizations and other non-profit entities. Fund accounting principles, procedures, and reports.

### ACCT 490, Selected Topics, 1–3 cr, 1–3 cl hrs

Prerequisite: Upper-class standing or consent of instructor

Current topics in accounting.

**ACCT 491, Directed Study, 1–3 cr, 1–3 cl hrs**

*Prerequisite: upper-class standing or consent of instructor*

Individual studies directed by consenting faculty with prior approval of the department head.

## Business Administration Courses:

**BA 315, Business Law I, 3 cr, 3 cl hrs**

*Prerequisite: ENGL 112 or consent of instructor*

Origin and development of law, judicial procedure, torts, law of contracts, and personal property.

**BA 317, Business Law II, 3 cr, 3 cl hrs**

*Prerequisite: BA 315*

Sales, negotiable instruments, secured transactions, bankruptcy. Agencies, partnerships, and corporations.

**BA 490, Business Policy/Corporate Strategy, 3 cr, 3 cl hrs**

*Prerequisites: ACCT 202; FIN 302; ECON 251, 252; MGT 330; BCS 209, 283; MKT 335; senior standing*

Integration of the basic functions of a business enterprise—e.g., marketing, finance, and production—through case analysis. From the perspective of top management, emphasis will be placed on examination of external environments, and the development of strategies for the organization's creation of proper relationships and responses to social, political, and economic conditions.

## Business Computer Systems Courses:

**BCS 209, Business Computing Systems, 3 cr, 3 cl hrs**

Introduction to software systems, including word processing, spreadsheet, and database applications, used to solve business problems. Current computer topics and issues.

**BCS 254, Introduction to Applied Linear Algebra, 3 cr, 3 cl hrs**

*Prerequisite: MATH 131 passed with grade C- or better*

Solution of linear systems. Matrix algebra. Rank. Determinants. Eigenvalues and eigenvectors. Numerical aspects of matrix calculation. Introduction to vector spaces and linear transformations. Applications. (Same as MATH 254)

**BCS 283, Elementary Applied Statistics, 3 cr, 3 cl hrs**

*Prerequisite: MATH 132 passed with grade C- or better*

Exploratory data analysis. Introduction to probability and random variables. Concepts of population and sample. Estimation and hypothesis testing. Simple linear regression and one-way analysis of variance. Techniques in data analysis using statistical computer packages. (Same as MATH 283)

**BCS 305, Business Information Systems, 3 cr, 3 cl hrs**

*Prerequisite: BCS 209*

A study of the implementation and use of computer-based information systems in business organizations. Emphasis will be placed on the characteristics and use of decision support systems from an organizational and individual problem-solving perspective.

**BCS 415, Introduction to Operations Research: Deterministic Methods, 3 cr, 3 cl hrs**

*Prerequisite: BCS 254 passed with grade C- or better*

A survey of operations research techniques including linear programming, non-linear models, and graph theoretical models. (Same as MATH 415)

**BCS 486, Introduction to Stochastic Processes, 3 cr, 3 cl hrs**

*Prerequisites: MATH 254 and 382, each passed with grade C- or better*

Conditioning. The Poisson process. Theory of Markov chains, continuous time Markov and semi-Markov processes. Topics from renewal theory and Markov renewal theory. Queuing Theory. Applications in science and engineering. (Same as MATH 486)

**BCS 488, Introduction to Operations Research: Stochastic Methods, 3 cr, 3 cl hrs**

*Prerequisites: BCS 283 or Math 382, passed with grade C- or better*

Monte Carlo Simulation Theory. Application of simulation to problems in science, engineering, and business. Queuing systems simulation. Inventory theory. (Same as MATH 488)

**BCS 491, Directed Study, 1–3 cr, 1–3 cl hrs**

*Prerequisite: upper-class standing or consent of instructor*

## Economics Courses:

*These courses may be used to fulfill the Social Science portion of the General Degree Requirements, page 48.*

**ECON 251, Principles of Macroeconomics, 3 cr, 3 cl hrs**

Macroeconomic theory and public policy. National income concepts, unemployment, inflation, balance of international trade problems and problems related to economic growth.

**ECON 252, Principles of Microeconomics, 3 cr, 3 cl hrs**

Microeconomic theory and public policy. Supply and demand, theory of the firm, market allocation of resources, income distribution, competition and monopoly, governmental regulation and unions.

**ECON 361, Business Conditions Analysis, 3 cr, 3 cl hrs**

*Prerequisites: ECON 251, 252*

The goals of economic policy, national income accounting, theory of income determination, economic forecasting.

**ECON 362, Managerial Economics, 3 cr, 3 cl hrs**

*Prerequisites: ECON 251, 252*

A coordination of economic theory and managerial practice. Consumer demand, production functions, cost behavior, output determination, and pricing within various market structures.

**ECON 372, Natural Resource and Environmental Economics, 3 cr, 3 cl hrs**

*Prerequisites: ECON 362 or ES 316 or consent of instructor*

Introduction to the economic concepts and methods used in defining and analyzing natural resources and environmental quality problems.

**ECON 490, Selected Topics, 1–3 cr, 1–3 cl hrs**

*Prerequisite: Upper-class standing or consent of instructor*

Current topics in economics.

**ECON 491, Directed Study, 1–3 cr, 1–3 cl hrs**

*Prerequisite: Upper-class standing or consent of instructor*

## Finance Courses:

**FIN 302, Principles of Finance, 3 cr, 3 cl hrs**

*Prerequisites: ACCT 202; BCS 283; ECON 252; or consent of instructor*

Theory and techniques of financial management for business.

**FIN 410, Theory of Financial Decisions, 3 cr, 3 cl hrs**

*Prerequisites: FIN 302; BCS 283; or consent of instructor*

Detailed study of contemporary capital market and market equilibrium theories. Consideration of individual and firm risk attitudes and ways of dealing with financial risk. Discussion of firm valuation methods and firm level approaches to risky financial decision making.

**FIN 480, Investments, 3 cr, 3 cl hrs**

*Prerequisites: BCS 283; FIN 302 or ES 316; or consent of instructor*

Portfolio theory and empirical capital market analysis. Contemporary investment theory, including option pricing models and derivatives. Active portfolio management in light of the vast array of financial investment alternatives available in today's markets.

**FIN 490, Selected Topics, 1–3 cr, 1–3 cl hrs**

*Prerequisite: Upper-class standing or consent of instructor*

Current topics in finance.

**FIN 491, Directed Study, 1–3 cr, 1–3 cl hrs**

*Prerequisite: Upper-class standing or consent of instructor*

## Management Courses:

### MGT 101, Modern Management Issues, 1 cr, 1 cl hr

Seminar on modern management issues and the role of managerial personnel in today's technology firms. Guest speakers and faculty presenting overview of current issues and research topics.

### MGT 301, Survey of Engineering Management, 3 cr, 3 cl hrs

*Prerequisites:* ES 110 and 111 or equivalent

Survey designed for engineering majors. Topics include introductions to qualitative and quantitative management models and their implementation.

### MGT 330, Management and Organizational Behavior, 3 cr, 3 cl hrs

*Prerequisites:* ENGL 112 and upper-class standing or consent of instructor

Classical and contemporary organization theories, interpersonal and organization behavior, motivation, communication, leadership, decision process in organizations.

### MGT 331, Human Resource Management, 3 cr, 3 cl hrs

Planning and utilization of human resources, including recruitment, selection, equal employment opportunity, safety, compensation, appraisal, unions, training, and job evaluation.

### MGT 381, Strategic Market Analysis, 3 cr, 3 cl hrs

*Prerequisites:* BCS 283; FIN 302; MKT 335; upper-class standing

Analysis of data derived from either survey instruments, archival sources, or both. Design and implementation of instruments designed to elicit information useful to managers. Single and multiple variable impacts on managerial decision making.

### MGT 451, Technology Management Seminar, 3 cr, 3 cl hrs

*Prerequisite:* MGT 330

Seminar focused on current management issues in complex technology organizations. Motivating and measuring performance in ambiguous situations. Leadership and growth issues in entrepreneurial technology organizations.

### MGT 462, Systems, Risk, and Decision Analysis, 3 cr, 3 cl hrs

*Prerequisites:* BCS 283 or MATH 283 or MATH 382 and upper-class standing or consent of instructor. Management majors should enroll in BCS 283.

Analysis of systems and managerial decisions under conditions of risk or uncertainty. Optimal project evaluations and ranking of alternatives using expected value and expected utility criteria. Topics include risk sharing, Bayesian revision of probabilities, value of information, and preference assessment procedures. (Same as IT 462)

### MGT 472, Production and Operations Management I, 3 cr, 3 cl hrs

*Prerequisites:* BCS 283 and upper-class standing or consent of instructor

Application of quantitative methods to problems encountered in management. Problem solving emphasis with extensive use of applications software. Topics include linear and integer programming, forecasting, queuing theory and simulation.

### MGT 473, Production and Operations Management II, 3 cr, 3 cl hrs

*Prerequisites:* MGT 472 and upper-class standing or consent of instructor

Application of concepts and principles related to management of the production function in manufacturing and services. Problem solving emphasis with extensive use of applications software. Topics include independent and dependent demand inventory models, facility layout, facility location; quality control; and project management.

### MGT 488, Technology Entrepreneur Workshop, 3 cr, 3 cl hrs

*Prerequisites:* FIN 302; MGT 381; ACCT 202; senior standing; or consent of instructor

This workshop is designed to familiarize participants with the process of technology marketing. Assessment of new-product marketability, development of marketing and business plans, presentation of plans in a competitive environment to an evaluation panel composed of people from various business backgrounds.

### MGT 490, Selected Topics, 1–3 cr, 1–3 cl hrs

*Prerequisite:* Upper-class standing or consent of instructor

Current topics in management.

### MGT 491, Senior Seminar, Technical Management, 3 cr, 3 cl hrs

*Prerequisite:* upper-class standing and consent of instructor

## Marketing Courses:

### MKT 335, Principles of Marketing, 3 cr, 3 cl hrs

*Prerequisite:* ECON 252; BCS 283; or upper-class standing and consent of instructor

Processes, principles, and functions in current marketing systems.

### MKT 490, Selected Topics, 1–3 cr, 1–3 cl hrs

*Prerequisite:* Upper-class standing or consent of instructor

Current topics in marketing.

### MKT 491, Directed Study, 1–3 cr, 1–3 cl hrs

*Prerequisite:* Upper-class standing or consent of instructor

## Staff Research Interests

Anselmo—Decision Analysis and Risk Management,

Computational Finance, Electronic Commerce

Colbaugh—Complex Additive Systems Modeling, Simulation, and Analysis

Holcomb—Telecommunication Law and Regulation, Ethical

Issues in Information Assurance and Security

Mazumdar—Database Systems, Massive Storage Systems,

Computational Logic

Ostergren—Program Management, Product Development, Total

Quality Management

Peterson—Management, Economics, Accounting

Sueyoshi—Management Science, Data Envelopment Analysis,

Risk and Policy Analysis

Sung—Information Security, E-commerce