

**Prefix, Number and Name of Course: PSM 603 Topics in Professional Math and Science**

**Credit Hours: 3**

**In-Class Instructional Hours: 3**

**Labs: 0**

**Field Work: 0**

**Catalog Description**

*Prerequisites:* Graduate-level standing

Examination of topics in business and management to develop strategic thinking about quantitative information and aid in improving business and leadership skills for mathematicians and scientists within a variety of settings (i.e. industrial, managerial, academic, research).

**Reasons for Addition**

This course will be one of the three foundational PLUS (business-related) classes required by our Professional Science Masters (PSM) Professional Applied and Computational Mathematics (PACM) program, and is also required by many PSM degrees across campus and nationwide. The creation of the PSM degree has provided a place for the systematic development of management techniques customized for science and mathematics students. PSM 603 is intended to provide students with a comprehensive understanding of various business and management disciplines that they may encounter when they enter industry. By offering this as a special topics class, we can tailor this class to the current, specific program needs. Specific topics covered will vary in accordance with the instructor’s area of specialization.

<b>Student Learning Outcomes</b>	<b>Course Content References</b>	<b>Assessment</b>
Students will:		
1. Assess ethical theories in business-related activities and apply the techniques in real-world math and science scenarios.	I	1. Participation in class discussion, case studies, quizzes
2. Evaluate the practices, capabilities, and patterns leaders use to transform challenging opportunities into successes.	II	2. Participation in class discussion, in-class workshop and activities, individual assignments, quizzes
3. Apply the appropriate managerial and business issues critical to analyzing accounting data and other information used for identifying and assessing opportunities and risks, developing organizational plans, allocating resources, and accomplishing objectives.	III	3. Participation in class discussion, case studies, analysis of company financials, quizzes
4. Assess and apply the different phases of negotiation in the workplace.	IV	4. Participation in class discussion, case studies, quizzes
5. Evaluate the conditions that might affect the likelihood for a conflict and the impact of	IV	5. Participation in class discussion, case studies, quizzes

different conflict handling styles in the workplace.		
6. Analyze, evaluate, and apply problem solving processes and techniques.	V	6. Participation in class discussion, in-class group workshops and activities, quizzes
7. Demonstrate ability to communicate with team members when solving problems, within and outside of the math and science disciplines.	I, II, III, IV, V, VI	7. Participation in class discussion, in-class workshops and activities, presentations

### Course Content

- I. Ethical theories and professional ethics in the applied sciences
  - A. Theoretical foundations of research and business ethics
  - B. Practical problems, representative applications, and case examples in the STEM (science, technology, engineering, and mathematics) fields
  
- II. Leadership and management for applied sciences
  - A. Fundamental principles that support leadership practices
    - i. Modeling
    - ii. Shared vision
    - iii. Challenging the process
    - iv. Enabling others
    - v. Encouragement
  
- III. Accounting and finance for applied sciences
  - A. Firm value and future cash flows (private, public, and government)
  - B. Comparative analysis
  - C. How to read financial statements (from a team member perspective)
  - D. Risk assessment
  - E. Case examples in related STEM industries
  
- IV. Negotiation strategies
  - A. Distributive and integrative bargaining
  - B. Negotiation and barriers to negotiation
  - C. Foundations and methods of effective bargaining
  - D. Negotiation ethics
  - E. Group negotiation project in STEM sciences
  
- V. Creative problem solving
  - A. Links between creativity, problem solving, and decision making
  - B. Principle elements of problem solving
  - C. Problem solving processes and techniques
  - D. Problem solving teams and problem solving leadership (introduction)

## Resources

### Scholarships:

Ancona, D., et al. "Team Decision Making." In *Managing for the Future: Organizational Behavior and Processes*. 3rd ed. Cincinnati, OH: South-Western College Pub, 2004, pp. 16-24.

Bynum, T.W. & Rogerson, S. *Computer Ethics and Professional Responsibility*. Malden, MA: Blackwell Pub., 2004.

Ferrell, O., et al. *Business Ethics: Ethical Decision Making and Cases*. Mason, OH: Cengage Learning, 2013.

Fisher, R. & Ury, W. *Getting to Yes: Negotiating Agreement Without Giving In*. London, England: Penguin Books, 1991.

Hamlin, S.B. "The Art of Q & A." in *How to Talk So People Listen: The Real Key to Job Success*. New York, NY: Harper Paperbacks, 1989.

Hart, L. & Waisman, C. *The Leadership Training Activity Book: 50 Exercises for Building Effective Leaders*. New York, NY, 2005.

Himma, K.E & Tavani, H.T.. *The Handbook of Information and Computer Ethics*. Hoboken, NJ: Wiley, 2008.

Jaksa, J.A. & Pritchard, M.S. *Responsible Communication: Ethical Issues in Business, Industry, and the Professions*. Cresskill, NJ: Hampton Press, 1996.

Johnson, D.G. *Computer Ethics*. Occupational Ethics Series. Englewood Cliffs, NJ: Prentice-Hall, 1985.

Kawasaki, G. *Reality Check*. New York: Penguin Publishing, 2008.

Kouzes, J. & Posner, B. *The Leadership Challenge*. Jossey-Bass, 2002.

Kouzes, J. & Posner, B. *The Leadership Challenge Planner*. Jossey-Bass, 2002.

Maxwell, J. *Ethics 101: What Every Leader Needs to Know*. New York, NY, 2005.

Parnes, S. *Source Book for Creative Problem Solving: A Fifty Year Digest of Proven Innovation Processes*. Buffalo, NY: Creative Education Foundation, 1992.

Pratt, J. *Financial Accounting in an Economic Context*. 5<sup>th</sup> ed. John Wiley & Sons, 2003.

Rentz, K. & Lentz, P. *Lesikar's Business Communication: Connecting in a Digital World*. 13<sup>th</sup> ed. Richard D. Irwin, Inc., 2013.

Rentz, K. & Lentz, P. M: *Business Communication*. 3<sup>rd</sup> ed. Richard D. Irwin, Inc., 2014.

Singer, P. *Practical Ethics*. New York: Cambridge UP, 1979.

Tufte, E. *The Visual Display of Quantitative Information*. Cheshire, CT: Graphics Press, 2001.

**Periodicals:**

*Business Communication Quarterly*

*Ethical Theory and Moral Practice*

*Harvard Business Review*

*Harvard Management Communication Letter*

*Issues in Ethics*

*Journal of Behavioral and Applied Management*

*Journal of Business Communication*

*Journal of Business and Technical Communication*

*Journal of Information Ethics*

*Journal of Leadership Studies*

*Journal of Risk Finance*

*Leadership Quarterly*

*Professional Ethics*

*Science and Engineering Ethics*

**Electronic and/or Audiovisual Resources:**

*American Society of Civil Engineers*

<http://www.asce.org/professional/ethics/>

*Applied Ethics in Professional Practice Program*

<http://www.murdough.ttu.edu/pd.cfm?pt=AECM>

*Baruch College: Guide to Financial Statements*

<http://www.baruch.cuny.edu/tutorials/statements/>

*Center for the Study of Ethics in the Professions*

<http://www.iit.edu/departments/csep/>

*National Institute for Engineering Ethics*

<http://www.murdough.ttu.edu/pd.cfm?pt=NIEE>

*Online Ethics Center for Engineering and Science*

<http://temp.onlineethics.org/cases/nspe/index.html>

*Online Ethics Center, National Academy of Engineering*

<http://www.onlineethics.diamax.com/CMS/edu/resources/eduindex.aspx>

*The Society for Technical Communication*

<http://www.stc.org/>