University of Pennsylvania  
School of Engineering and Applied Science  
Executive Master’s in Technology Management  
Third Term 2011-2012  

EMTM 561  
MANAGING R&D IN TURBULENT TIMES  

COURSE SUMMARY:  

How do R&D managers create value? This course addresses the issues and increasing challenges facing R&D managers in today’s global environment. The approach is both strategic and tactical, and is designed to meet the significant needs of those who one day, either as managers, consultants or entrepreneurs, must understand the use of technology in industry or government as a powerful tool for growth, innovation, and competitive advantage.  

Discussions, workshops and case studies focus on the effective linkage of technology and business strategies. Specific class sessions concentrate on R&D processes, business models for global R&D management, methods of measuring and optimizing the return on R&D, commercializing innovation and the commercial development process, technology exploitation through licensing and joint ventures, meeting the new global patent regulations, lawful gathering information and industrial espionage, and organization and human resources issues in R&D. Lessons learned from recent international benchmark studies and best-in-class examples are included.  

Time  
Friday, 9:00 p.m. to Noon  

Location  
TBD  

Faculty  
Professor Ernest R. Gilmont
GENERAL COURSE ORIENTATION AND REQUIREMENTS:

The course is taught in a seminar fashion with active class discussion and participation. Course work includes preparation of mini-papers, and a major paper in lieu of a final examination, all of which call for analysis of R&D practices within individually assigned companies. Papers will draw on individual research and content from the course and follow an outline to be presented. Students should be prepared to present their assignments in class for general discussion. The course will also include analysis and discussion of related case studies. The course grade will depend on class participation, group work and the assigned papers.

Supplemental readings to support each class topic will be provided in a coursepack. Additional material will be distributed in class.

COURSE CONTENT

SESSION I
March 9, 2012

A. Management of R&D in Industry
• R&D Function, Strategy and Trends
• Classifying Technologies by Competitive Impact & Competitive Position
• Linking Market & Technology Objectives
• Questions for Company Technology and R&D
• The Real Economic Payoff
READINGS: Third Generation R&D, pages 1-21
Course Pack 1-3

B. Linking R&D to the Business
• Bringing R&D Together with Other Business Functions
• The Mandate to Preserve R&D and Create a True Partnership
• Managing Multiple Sources of Technology with R&D Processes That Really Work
• Third Generation R&D
READINGS: Third Generation R&D, pages 23-40
Course Pack 4

SESSION II
March 23, 2012

A. Issues of Global R&D Management
• Trends and Benefits of Global R&D
• Addressing the Biggest Practical Problems
• Managing R&D in Smaller Companies
READINGS: Course Pack 5-7

B. Managing R&D in a Global Economy
• Globalization Issues, especially with Asia
• The New Paradigm: R&D Offshoring and Outsourcing
• Lessons Learned by Global Companies; Six Models of Success
• Geographic Differentiation: Challenges in the Major Regions
READINGS: Course Pack 8-13

SESSION III
April 6, 2012

A. Key R&D Business Processes: Portfolio Management
• Objective and Comprehensive R&D Strategic Portfolio Planning
• Examples of Portfolio Arrays
• Other Frequently Used Tools
• Impact on the Enterprise
READINGS: Third Generation R&D, pages 93-121
Course Pack 14-17

B. Opportunity Identification & Screening
• Framework for Project Management: A Detailed Six Phase Program
• Project Attractiveness: Evaluate Technical & Commercial Risk, Strategic Fit & Reward
READINGS: 18-19

C. Portfolio Analysis Workshop
• Case-based Team Exercise
• Class Presentation and Discussion

SESSION IV
April 20, 2012

A. Commercializing Innovation
• Seeing Beyond the Science – Invention vs. Innovation
• Turning Possibilities into New Products: The Commercial Development Process
• Effective Commercialization Strategies
READINGS: Course Pack 20-25

B. Managing Intellectual Property (IP)
• Current IP landscape and Global Patent Strategies
• Impact of New First-Inventor-to-File Priority System
• Complicated Area of Law Relating to New Science
• Patents vs. Trade Secrets vs. Trademarks  
READINGS: Course Pack 26-31

SESSION V  
May 4, 2012

A. Sourcing New Technology  
• International Joint Ventures vs. Cooperative Linkages  
• R&D Issues in Technology Transfer  
• Major Alliance Pitfalls  
READINGS: Course Pack 32-35

B. R&D Organization  
• Structure and significant human resource issues to meet corporate needs  
• Shopping the World for Technical Talent: Shortages of Skilled Labor and Visa Issues  
• Case Study: Presentation and Discussion of a Corporate Research Organization  
READINGS: Course Pack 36-41

C. Technology Valuation: Maximum Return from the R&D Investment  
• Methods of measuring R&D effectiveness  
• Strategic Perspectives  
• R&D metric elements  
• The value proposition  
READINGS: Course Pack 42-44

SESSION VI  
May 18, 2012

A. Gathering Information  
• Ethics and Sources  
• Legal vs. Illegal Actions  
• Industrial Espionage (Stealing Secrets)  
READINGS: Course Pack 45-47

B. Challenges, Issues and the Future  
• Principal issues for R&D in the 21st century enterprise  
• Challenges to the conventional wisdom; Avoiding Innovation’s Terrible Toil  
• Applying competitive intelligence for strategic advantage  
• Developing seamless interfaces; R&D at the table  
READINGS: Course Pack 48-52

COURSE REFERENCES
I. Required text:

II. Alternate texts:

