

## Part-Time MBA Program Concentration: Management of Engineering and Technology Development

### Course Descriptions

Course Title: *Engineering Economic Analysis (BUAD 6691)* (3 cr hr)

**Description:** Organizations that do engineering and/or technology development must address the economic aspects of their projects. Early portions of the course assume that benefits, costs, and quantities have a high degree of certainty. The latter portion of the course explores risk (uncertainty) with regard to benefits, costs, and quantities. Topics include:

- Time Value of Money & Economic Equivalence
- Project Analysis and Selections
- Estimating Methods
- Life Cycle Costing
- Project Feasibility
- Learning Curves
- Value Management/Engineering
- Project Feasibility
- Decision-Making with Expected Values v. Probabilistic Analysis
- Decision-Making with Decision Trees/Risk Profiles/Risk Preference
- Risk Adjustment Mechanisms in Decision-Making
- Applied Simulation
- Assessing Probability in Decisions
- Decision-Making Under Extreme Variation
- Characterizing Extreme Conditions and Their Probabilities
- Characteristics of Catastrophically Failed Projects and Ventures

Course Title: *Management of Emerging Technologies (BUAD 6601)* (3 cr hr)

**Description:** The course focuses on effective techniques for managing the development of technological goods, such as new products and software. Concepts covered include product development phase-gate processes, product architecture choices, prototyping, concurrent engineering, and agile software development. Also covered in the class are technologies that make development easier, less expensive, and faster, including ubiquitous low-cost CAD/CAM design software, 3D printing, various third-party design services, and microprocessor-based development platforms such as Raspberry Pi and Arduino.

**Course Title: Supply Chain Management (BUAD 6611) (3 cr hr)**

**Description:** This course deals primarily with the design and operation of logistics networks or supply chains, and the flow of materials and information on them. Students in this course will be exposed to both the strategic and operational aspects of managing today's complex supply chains. Specific topics include vendor-managed inventory; efficient customer response; collaborative planning, forecasting and replenishment; planning distribution and supply; managing product variety, transportation, supply chain planning, distribution and supply; managed product variety; transportation; supply chain planning software; eMarketplaces; inter- and meta-mediaries and design and optimization of supply networks.

**Course Title: Predictive Analytics (aka Decision Processes Under Uncertainty)  
(BUAD 6681) (3 cr hr)**

**Description:** *Decision Analysis* is a conceptual framework and a broad set of techniques that are extremely useful in formulating and analyzing decision problems. The focus is complex decision making that contains uncertainty in outcomes and decision structure. Some of the topics associated with DPUU are: 1) decision problem modeling, 2) decision trees and influence diagrams, 3) Monte Carlo simulation, 4) utility theory, 5) sensitivity analysis, 6) risk tolerance/attitudes, 7) multiple/conflicting objectives, 8) value of information, and 9) stochastic processes. The course will cover most of these topics in varying degrees of detail.

**Course Title: Project Management Part I (6621) (1.5 cr hr)**

**Description:** This course focuses on the management of complex projects and the rules and techniques which have been developed in the past 25 years to assist managers with such projects. All three phases of Project Management – Planning, Scheduling and Control – are explored in detail. In addition to studying various scheduling techniques for projects, this course explores issues dealing with project selection methods, project risk assessment, project team dynamics, new product development projects, runaway projects, and monitoring and control of projects.

**Course Title: Project Management Part II (BUAD 6631) (1.5 cr hr)**

**Prerequisite: Project Management Part I**

**Description:** This course picks up where Project Management Part I ends. The objectives of this course are to:

- extend the student's knowledge of project management, particularly in the areas of project cost management (cost estimating and application of earned value management) and project risk management. We will use a (30 day trial version) of an add-on software package to MS Project for quantitative risk management.
- expand the student's capabilities with MS Project

- extend the student’s knowledge in other areas of project management including (1) project selection, (2) value engineering as well as (3) program management and (4) project portfolio management.

Similar to Project Management Part I, students should understand that the Project Management Part II is “flipped”. On-line lectures and quizzes are viewed prior to each class. Class time is spent working advanced project management problems, case studies and in the application of various project management tools. A typical (face-to-face) class might involve developing an MS Project schedule based on information from a case study, developing a cost estimate, developing earned value reporting and drafting a status report for upper management on the project.

Without having viewed the on-line lectures, effective participation in the class sessions is difficult. The goal in “flipping” the class is to develop the student’s confidence in their ability to apply these advanced project management tools and practices to real-world problems. The class will also make use of other eLearning technologies including blogs, simulations, virtual environments and supplementary videos and recordings.

As noted above, we will also make much more use of Microsoft’s MS Project 2010. There is not an “Apple” compatible version of MS Project, nor is there an Apple compatible version of the Risk Management software we will use. To run this software on an Apple computer, students must partition their hard drive and run Windows. For students who choose not to partition their hard drives and run Windows, they will need to use the computers in the Peninsula Center computer lab that have MS Project installed on them. This presents potential scheduling and other logistics issues which are the responsibility of the student.

**Course Title:** *Lean Toolkit (BUAD 6641)* (1.5 cr hr)

**Description:** In this course, students learn the Lean methodology, which is used to reduce process lead time, improve responsiveness to customers, increase efficiency, and reduce inventory. Specifically, students learn how to identify inefficiencies in processes using a particular type of business process mapping (value stream mapping) and, subsequently, lean tools aimed at reducing those inefficiencies. This course in combination with Six Sigma Toolkit qualifies a student for Yellow Belt Certification. A Yellow Belt Certification is required to take Lean/Six Sigma Project, which leads to a Green Belt Certification.

**Course Title:** *Six Sigma Toolkit (BUAD 6651)* (1.5 cr hr)

**Description:** In this course, students are introduced to the many tools and techniques for improving the quality of products, processes, and services. Six Sigma tools are often based on statistics and they are widely acknowledged as the Best Practices for improving quality. This course in combination with Lean Toolkit qualifies a student for Yellow Belt Certification. A Yellow Belt Certification is required to take Lean/Six Sigma Project, which leads to a Green Belt Certification.

**Course Title:** *Lean/Six Sigma Project (BUAD 6671)* (1.5 cr hr)

**Prerequisites:** Lean Toolkit and Six Sigma Toolkit

**Description:** Students learn Lean and Six Sigma tools in the Lean Toolkit and Six Sigma Toolkit courses for improving the quality and efficiency of business processes. These courses also offer a first exposure to the application of those tools. This course offers more experience in applying Lean and Six Sigma tools to a real-world project in the student's workplace. Analogous with industry standards, a student who completes this course earns a Lean Six Sigma Green Belt certification.