Course Title: Manufacturing Essentials for Innovators
Course Code: BUS 126
Instructor: Kern Peng

Course Summary:
BUS 126 is a course intended to provide the fundamental manufacturing knowledge that will help product designers and innovators to determine the best manufacturing strategy for their products. An efficient and effective manufacturing setup not only allows innovators to bring products to the market quickly and cost effectively but also provides an environment and resources for further innovation. The course is delivered through lectures, case studies, class discussions, and field trips.

*Please see course page for full description and additional details.

Grade Options and Requirements:
• No Grade Requested (NGR)
  o This is the default option. No work will be required; no credit shall be received; no proof of attendance can be provided. HOWEVER, engagement with the content and participation in the class conversations are strongly encouraged.
• Credit/No Credit (CR/NC)
  o A passing grade (for "Credit") means attending at least 70% of the class meetings with adequate class participation and preparation of the assigned content of class discussions and case studies in those class meetings.
• Letter Grade (A, B, C, D, No Pass)
  o In addition to satisfy the requirements for Credit, students who choose this option are required to either 1) submit a written assignment (4-6 page paper) due prior to the last class meeting, or 2) make a 15-20 minute presentation to the class. The choices of assignment content as well as the grading criteria will be discussed in the first class meeting.

*Please Note: If you require proof that you completed a Continuing Studies course for any reason (for example, employer reimbursement), you must choose either the Letter Grade or Credit/No Credit option. Courses taken for NGR will not appear on official transcripts or grade reports.

Tentative Weekly Outline:
Week 1: 3/31/15: Introduction to manufacturing
The past and the future of manufacturing
Why and when manufacturing is critical to innovation
Overview of factory physics
Competitive priorities and manufacturing strategies
Week 2: 4/7/15: Manufacturing processes
Process choices and process design
Economic evaluation and breakeven analysis
Fixed and variable costs consideration
Forecast and master product schedule (MPS)

Week 3: 4/14/15: Design for manufacturing (DfM); Design for Assembly (DfA)
Component design considerations
Processing design considerations
Trade-off considerations
Yield and cost considerations

Week 4: 4/21/15: Capacity planning and equipment management
Capacity planning
Flow, layout, simulation
Equipment selection
Equipment sustaining

Week 5: 4/28/15: Materials and Inventory management
Supply chain dynamics and supply chain management
Bill of materials (BOM) and inventory management
LEAN, Just-In-Time (JIT), Theory of constraints (TOC)

Week 6: 5/5/15: Operational control
Performance standards and indicators
Quality assurance, TQM, Six-sigma
Statistical process control (SPC)

Week 7: 5/12/15: Operational workforce
Skills and training, generalist vs. specialist
Motivation
Performance management
Safety and ergonomics

Week 8: 5/19/15: Intelligent and smart factory
Automation, Robotics, flexible manufacturing system(FMS), 3D-printing, etc.
Cyber-physical systems(CPS), Internet of Things(IoT) - sensing, monitoring, feedback, etc.
Cloud, Big data - applications, control, discovery, etc.
Innovation in manufacturing

Field Trips: Two field trips to visit manufacturing facilities of local companies
The field trips are about 1.5-2 hours each. More information will be available at the first class meeting as the visiting arrangement is based on the number of students the facilities can accommodate.