A 20-Year Outlook for the Forest Bioproducts Industry: Implications, Challenges, Opportunities

Georgia Tech Professional Masters in Manufacturing Leadership

2013 Members Meeting

April 18-19, 2013
Atlanta, Georgia
Market Pull

• The idea sprang from IPST members, who expressed the need for young professionals with advanced technical qualifications combined with leadership, manufacturing management, and business capabilities
• Industry desires a management / technical blended masters program
  • Desire development of their manufacturing leaders of tomorrow
• An informal market scan showed significant enthusiasm among company officials and young professionals
• An on-line / distance learning format was well received
• Program design has evolved into a common core curriculum with an industry related elective program
Professional Masters in Manufacturing Leadership: Targeted Students

- Objective: Develop manufacturing leaders through a two-year professional distance-learning program. Equip promising young professionals to assume positions of business and technical leadership in manufacturing or at the corporate level.
- Target Students: Mill/plant technical professionals with 3-5 years experience seeking career development leading to manufacturing leadership positions.
- Student Pre-Requisites: Bachelor of Science degree, 3 plus years professional experience in a related manufacturing industry, and three letters of recommendations.
- Format: Continuing education; mostly online, with two one-week on-campus periods per year.
- Coursework: Design assumption is 30 semester hours; 15 hours per year

<table>
<thead>
<tr>
<th>PROFESSIONAL MASTERS DEGREE PROGRAM IN MANUFACTURING LEADERSHIP</th>
<th>LEADERSHIP*</th>
<th>BUSINESS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Four Quadrants</td>
<td>MANUFACTURING PRACTICES*</td>
<td>MANUFACTURING CONCENTRATION</td>
</tr>
</tbody>
</table>

* Designates Manufacturing Leadership program core areas
Example Program Content for a Professional Masters in Manufacturing Leadership (PMML)

<table>
<thead>
<tr>
<th>PMML Core</th>
<th>PMML Elective Concentration: Forest Bioproducts</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Leadership</td>
<td>D. <strong>Forest Bioproducts</strong></td>
</tr>
<tr>
<td>B. Business</td>
<td>a. Forest Materials (chemistry, material science)</td>
</tr>
<tr>
<td>C. Manufacturing Practices</td>
<td>b. Pulping, Bleaching and Papermaking Technologies</td>
</tr>
</tbody>
</table>

**Elective Concentration for the Paper Industry (draft concept only)**

d. Markets, Products and Corporate Strategic Planning

e. Sustainable Manufacturing Processes and Products

f. Biorefining Pathways and Biochemical Products

New Materials: Nanocellulose and Composites

Industry Competitive Analysis and Future Forest
Example Program Content for a Professional Masters in Manufacturing Leadership (PMML)

Seven core courses include:
- PMML 6001 – Design and Analysis of Manufacturing Systems
- PMML 6002 – Fundamentals of Enterprise-Level Business Management
- PMML 6003 – Financial Analysis of Manufacturing Systems
- PMML 6004 – Operational and Sustainable Manufacturing
- PMML 6005 – Manufacturing Excellence Capstone
- PMML 6006 – Developing Leadership Sills
- PMML 6007 – Strategic Management of Manufacturing Systems

Four one-week on-site visits will focus on the following topics:
- Fall Year 1 Overview of Manufacturing
- Spring Year 1 Lean Six Sigma
- Fall Year 2 Leadership Development
- Spring Year 2 Strategic Leadership Development

The Elective Concentration Sequence includes three courses, two of which are content rich followed by an elective concentration focused case study capstone course.
### Example Program Content for a Professional Masters in Manufacturing Leadership (PMML)

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>On-Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>PMML 6001-Mfg Systems</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>PMML 6002-Business Mgmt</td>
<td></td>
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<tr>
<td>Spring</td>
<td>PMML 6003-Financial Analysis</td>
<td>Yes</td>
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<td></td>
<td>PMML 6004-Mfg Best Practices</td>
<td></td>
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<tr>
<td>Summer</td>
<td>PMML 6005-Case Study</td>
<td>No</td>
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<tr>
<td>Fall</td>
<td>PMML 6006-Leadership Skills</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>PMML 61X1-Concentration 1</td>
<td></td>
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<tr>
<td>Spring</td>
<td>PMML 6007-Strategic Leadership</td>
<td>Yes</td>
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<tr>
<td></td>
<td>PMML 61X2-Concentration 2</td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td>PMML 6005-Capstone</td>
<td>No</td>
</tr>
</tbody>
</table>

**Year 1**
- Fall Year 1: 1 Week On-Site, Two 7 Week Courses
- Spring Year 1: 1 Week On-Site, Two 7 Week Courses
- Summer Year 1: No On-Site, One 7 Week Case Study

**Year 2**
- Fall Year 2: 1 Week On-Site, Two 7 Week Courses
- Spring Year 2: 1 Week On-Site, Two 7 Week Courses
- Summer Year 2: No On-Site, One 7 Week Case Study

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*Georgia Tech Institute of Paper Science and Technology*
PMML Development

Next Steps:
• Georgia Tech approval this summer
• Board of Regents approval estimated Fall 2013
• First cohort Fall 2014

• Considerations:
  • Funding source(s) for start-up and course development
  • Distance learning model:
    • “Remote classroom” (lower cost)
    • MOOC’s in credit program (high front-end cost)
  • Leveraging existing peer university courses
  • Pricing (highly a function of enrollment)