**MESABI RANGE COMMUNITY & TECHNICAL COLLEGE**

# Course Outline

**Course Title:** **Applications of Industrial Mechanical Technology Capstone** **Submitted By:** **Keith Mattson and Bill Parker**
**Semester Course Prefix and Number:** **IMT 2268** **Approval Date:**
**Old Quarter Course Prefix and Number:** **Revision Date:** **March 2011**

**Number of Credits:** **2** **Number of Lecture Credits:** **0**
**Semester(s) Offered:** **Number of Lab Credits: 2 Number of Lab Hours: 4**
**Class Size: 24** **Number of Studio/Demonstration/Internship Credits: 0**
**Negotiated by AASC on (date)4-21-09**

**Course Purpose Code:**

_____ **0 –** Developmental Courses
_____ **1 –** Non-transferable, General Education
__X__ **2 –** Technical course related to career programs
_____ **3 –** College course which has the primary goal of applying certain concepts (e.g. vocal ensemble)
_____ **4 –** Other college course not considered a part of general education (MNTC) (e.g. computer science, health, physical education)
_____ **5 –** Course which is intended to fulfill the Minnesota Transfer Curriculum (MNTC) requirements or intended for transfer.
_____ **9 –** Continuing Education/Customized Training specialized credit course (not occurring in 0-5)

**Catalog Description:**

This course requires students to utilize their knowledge and skills developed throughout the industrial technology curriculum to solve a unique manufacturing or process problem. Students will be required to develop and apply additional skills and knowledge in a resource constrained, work-like atmosphere. Specifically, this course will require students, working in manufacturing or process teams, to develop and implement a process, tool, fixture, or method required in the completion of a task. Students will be required to perform all steps in the process, from concept, analysis, developing specification and prints, to the building, fabricating, installation, pilot production, and full production. Lean manufacturing principles and modern manufacturing concepts will be required, along with industry standard requirements on productivity, cost, quality, and stability. This course will draw from knowledge obtained in courses from the industrial technology curriculum taken previously and concurrently.

**Prerequisites and/or recommended entry skills/knowledge:**

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| Course Prerequisite(s): | 2nd year IT student or EIAT student, or consent of instructor. |
| Reading Prerequisite: | None |
| Composition Prerequisite: | College Writing or Technical Writing, or consent of Instructor. |
| Mathematics Prerequisite: | Math 094 or equivalent |

**Career Programs and Transfer Majors Accessing this Course:**

Industrial Technology – mining emphasis

**Minnesota Transfer Curriculum Goal(s) partially met by this course if applicable:**

(Notes: No more than two goals may be met by any one course. Curriculum Committee review and the Chief Academic Officer's approval are required.)

0. __X__ None
1. _____ Communications
2. _____ Critical Thinking
3. _____ Natural Sciences
4. _____ Mathematical/Logical Reasoning
6. _____ The Humanities and Fine Arts
7. _____ Human Diversity
8. _____ Global Perspectives
9. _____ Ethical and Civic Responsibility
10. _____ People and the Environment

5. ____ History and the Social and Behavioral Sciences

**Learning Outcomes**: (including any relevant competencies listed in the Minnesota Transfer Curriculum)

Upon completion of this course, the student will be able to:

- Perform a concept and tradeoff assessment of potential solutions to the problem
- Develop a detailed plan outlining the major tasks, material requirements, costs, personnel requirements, facilities requirements, machinery requirements, and end products required.
- Develop and determine a bill of materials for the process
- Construct technical documentation and prints defining the process.
- Perform a cost analysis of the project and estimate the unit cost of the final product
- Develop safety guidelines for the product
- Define a work-plan for the process
- Develop training materials for technicians in assembly, repair, and operations
- Apply the concepts of lean manufacturing in all stages of the process
- Follow the DMAIC process throughout all stages of the process
- Provide documentation stating that the customer requirements for the process have been met, including control charts, capability analyses, cost analyses, and others..

**Student Assessment Methods:**

Various Informal and Formal Assessment methods, lab assignments, worksheets, exams, Group projects, portfolio assessment, analyses, and written technical reports.

**Use of Instructional Technology**: (includes software, interactive video and other instructional technologies):

Videos, software-based lab simulators, Microsoft Excel, Word, and Power Point

Lecture covers theory and terminology. Lab will cover application and provide a chance to apply and further develop concepts introduced in lecture.

**Outline or Statement of Major Course Content:**

See catalog description

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**Additional Special Information**: (special fees, directives on hazardous materials, etc.)

**Transfer Information:** (Please list colleges/majors that accept this course in transfer.)

**Approvals:**

| Body | Representative Signatures | Date |
|---|---|---|
| **Curriculum Committee** | | |
| **Faculty Association** | | |
| **Academic Affairs Standards Committee** | | |
| **Chief Academic Officer** | | |

**Distribution**: Original – Administrative Office
**Copies**: Curriculum Committee Chair, AASC Chair, Transfer Specialist, Originating Faculty Member, Scheduler, Records, Student Services, Learning Center, Library
**Revised**: October 2006

References:
http://www.marthamine.co.nz/ore_process.html