SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: Metrology and Quality Control

Code No. MCH 241

Program Mechanical Engineering Technician -- Machining

Semester: Four

Date: 1987 01 09

Author: Dan Shaw

New: XX Revision:

APPROVED: J.P. Arquette

Chairperson Date

Metrology and Quality Control MCH 241

Course Name **Course Number**

PHILOSOPHY/GOALS: The measure of good tradespeople is dependent upon his/her ability to accurately maintain size on machine parts. This course is designed to strengthen the students ability to measure and inspect to precise tolerances and to acquaint the student with the use and care of precision inspection equipment.

In today's market, industry is demanding quality. To achieve **"quality"** suppliers are being forced to use Statistical Process Control. The latter part of this course will be a basic introduction to SPC including recording of data and its interpretation.

METHODS OF ASSESSMENT (GRADING METHOD):

It is to be noted attendance is compulsory and you will lose approximately 1% for every hour absent or late.

Homework and lab assignments	-	25%
Tests	-	40%
Major project	-	15%
Attendance, initiative and co-operation	-	20%
		100%

Grade marks can be given as a percentage for grades "A", "B" and "C".

A - consistently over 85%
B - 75% - 64%
C - 60% - 74%

It is to be noted that below 60% is considered a failure grade and the course must be repeated.

MATERIALS

All classes require note book, calculator and writing material.

TOPIC N0»	PERIODS	TOPIC DESCRIPTION	REFERENCE
	1	History of Measurement - standards - need for standards - systems of measurement	Lecture notes
	2	Lab and Demonstration	Lab project
	1	Measurement Tools - shop tools - precision inspection tools - use and care - sources oE error	Lecture notes
	2	Lab and Demonstration	Lab project
	1	Gage Blocks - sets - build up - care and use - accessories	
	2	Lab and Demonstration	Lab project
	2	Measurement of Geometric Shapes - tapers - dove tail - centre distance - large radii	
	2	Lab and Demonstration	Lab project
	1	Comparators - types and uses	Lecture notes
	2	Lab and Demonstration	Lab project
	1	Gear Calculation & Measurement - use of gear tooth vernier - gear tooth gauges	Lecture notes
	2	Lab and Demonstration	Lab project
	1	Thread Measurement - 3 wire - gauges	Lecture notes

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
	2	Lab and Demonstration	Lab project
	1	Surface Finish and Non-Destructive Testing - die penetrant - physical comparison - profilometer	Lecture notes

There will be two tests on measurement.

One at mid-point of course and one at the end.

STATISTICAL PROCESS CONTROL

Introduction - history - need for quality - definition of quality	Lecture notes
Where to Start - pareto analysis - cause and effect	Lecture notes
Histograms - data collection - how to construct	Lecture notes
Variation - definition of variability - pattern analysis - spread - prediction	Lecture notes
Basic Probability - notation - arithmetic - distribution of averages	Lecture notes
Capability Concepts - normal curve - capability index - long run - short run capability	Lecture notes

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
7	1	Normal Probability Paper - advantages - how to use - interpretation	Lecture notes
8	2	Control Charts for Averages and Ranges - common cause variation - special cause variation - control chart concepts - construction of X and R control charts	Lecture notes
9	2	Use of Averages and Range Chart - establishing control limits - action for out of control - control versus capability - evaluation of capability	Lecture notes
10	2	Control Charts for Attributes P-Chart - limitations - application - p - chart control limits - construction of p - charts - using p - charts - sample size	Lecture notes
11	2	Control Chart Interpretation - range chart - averages chart - X and R chart (patterns) - interpretation of runs - warning limits - interpreting the p - chart - p - charts (patterns)	Lecture notes
12	1	Measurement System Analysis - the measurement system - sources of error - gauge capability - range chart method - error calculation - implementing SPC	Lecture notes

There will be two tests on SPC.

One at mid-point of course and one at the end.