

# *MACHINE TECHNOLOGY 205*

*Engineering Drawings for Machinists, Welders and  
Industrial Maintenance Technicians*

*FALL 2015*

*SYLLABUS & SCHEDULE*

FALL 2015 SYLLABUS

For MACHINE TECHNOLOGY 205

*Engineering Drawings for Machinists, Welders and Industrial Maintenance Technicians*

Laney College - Class code #42266

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This course is 3 units and required for the Machine Technology as well as Welding Technology degrees and certificates. It can be taken for a grade or P/NP.

Class meets 5:30 – 6:45pm, Tues. & Thurs. in Room G207.

Instructor: David Baruch - Contacting me (*Questions, comments & discussion are always welcome*):

My email: [dbaruch@peralta.edu](mailto:dbaruch@peralta.edu) Please note: I do not carry a 'smart-phone' type of device so I am not generally able to respond to emails immediately - but I can respond from my home computer by that evening or the following morning. If needed, an old-fashioned phone call would be faster.

My Website: [www.laney.edu/wp/david\\_baruch](http://www.laney.edu/wp/david_baruch) (Go here for access to handouts & other current info.)

My Phone: 510 693-1330 - Please try to limit phone calls to reasonable hours. I'm not setup for texting.

Office Hours: 4:30 – 5:20 Tue. & Thur. in the machine shop. *Other Resources* - There are additional opportunities for assistance: Individual or group help/tutoring can be scheduled; Out of class discussions are welcome; study groups are encouraged; staff are available to answer questions – I urge you to take advantage of any of this help offered.

Required Texts

1. Print Reading for Industry – Tenth Ed. by Brown & Brown ISBN 978-1-63126-051-3

*\*Important: Be sure your copy is the correct edition and is accompanied by the 'Bonus Print' packet – We are no longer using the Ninth edition. And procure your copy as quickly as possible: You will be at a serious disadvantage in this course if you haven't gotten your copy after the first class or two.*

2. Geometric Dimensioning and Tolerancing. A Companion to the ASME Y14.5M-1994 Dimensioning & Tolerancing Standard by Alex Krulikowski (This pocket reference is available at a small cost thru the Machine Shop staff). It is not generally needed until after the first month of the course.

Grade: Quizzes 30%, Homework/In-Class Exercises 20%, Midterm 20%, Final 30%

Note: Make-ups for missed tests are rarely offered in this class, so don't count on them! They will only be allowed in extraordinary circumstances where the reasons can be documented. In other words, make it a point to be there on test day!

Attention: As such, there are no prerequisites for this course. However, the subject of industrial prints must necessarily incorporate a lot of manufacturing & engineering concepts as well as a special vocabulary; this makes the course potentially very challenging for students who have a more limited academic experience or lack exposure to the world of manufacturing (or previous shop courses). If you find yourself in this situation, you should be prepared to put in an extra amount of work outside of class and be willing to seek help from staff .... See "Homework".

Homework: NB (Note well), doing homework is one of the essentials to success in this course; simply coming to class will not be enough. A minimum amount of homework for this class consists of reading the assigned units in advance of each class meeting as well as completing at least two or more of the exercises at the end of each unit. Periodically you will be asked to turn in exercise answer sheets at the beginning of the class that covers that

chapter. (*A common rule-of-thumb suggests two hours of home work for every hour of class ... some students will need to allow additional time*). Questions that come up in homework assignments are welcome in class.

**Cell phones and internet accessible devices:** The use of these devices will not be allowed during quizzes and tests.

Consequently, be sure to have a plain, non-cell-phone calculator in your possession. Furthermore, you are asked to keep cell phones on silent setting during regular class time .... Plan your phone calls for a time other than in class!

### **The importance of this course:**

**Print reading** is an essential skill for anyone in the manufacturing world including the machine trades, welding, industrial maintenance and related disciplines. Engineering drawings (now often in conjunction with “solid models” from CAD software) are the primary way of specifying how manufactured things are to be made and assembled – they are the key, go-to documents to meet customer and end-user requirements. *Keep in mind, furthermore, that drawings are a core component of legally binding contracts agreed to when accepting jobs to make customer parts; this adds another level of responsibility to follow them accurately.* So, for these reasons, it is the aim of this class to train students to understand prints as fully as possible and use them effectively.

To this end, we will focus first on two main aspects: Visualization and interpretation. **Visualization** includes the graphic formats and projections which enable us to "see" the original 3-D objects as represented in a 2-D format. **Interpretation** includes everything else that defines the part: This includes notes, dimensions, symbols, tolerances and so forth. In a third area of focus, we will spend time identifying some of the mechanical components seen in many manufactured parts as well as some of the manufacturing processes used to make them. Finally, attention will be given to measurement methodology for dimensions and specifications given in blue-prints.

NOTE: In the *interpretation* part of this course, there will be an expanded coverage of GD&T (Geometric Dimensioning and Tolerancing) that goes beyond what is offer by the "Brown and Brown textbook. For this, we will rely on supplementary materials, ie., Krulikowski's GD&T pocket handbook and a series of handouts found on my website. Students will be introduced to our CMM (Coordinate Measuring Machine) in order to illustrate GD&T principles and how GT&T specifications are measured.

### **Student Learning Outcomes:**

- **#1 Determine specifications and tolerances** Analyze engineering drawings to determine all necessary specifications to correctly manufacture required part or assembly.
- **#2 Welding specifications** Evaluate welding specification according to ANSI/ASW A2.4-98 to determine correct joint, weld preparation, process, procedure and inspection criteria.
- **#3 GD&T** Explain ASME-14.5M-1994 GD&T, how it differs from coordinate dimensioning and tolerancing, its advantages and how it relates to machined and welded parts.
- **#4 Mathematical computation** Demonstrate correct use of mathematical applications to determine a part's engineering specifications from a blueprint.

MACHINE TECHNOLOGY 205 - FALL 2015

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Class Date	NOTES	Unit #	GDT Guide Pg.#	* Material to be Prepared Before Class	Tests
<b>Aug 25</b>				Introduction to prints - What they show. The language of industry.	
<b>27</b>		1, 2 & 3		Anatomy of prints: Line Conventions - Title Blocks & Part Lists	
<b>Sept 01</b>		4		Some vocabulary: Geometric Terms & Construction	
<b>03</b>	8th W w Refund & wo "W"	5		Multiple Views on Dwgs - Orthographic Projection, Emphasis on Third angle ~	
<b>08</b>		5		Multiple Views on Dwgs Cont.	
<b>10</b>		6		Section Views	
<b>15</b>	14th: File Pass-NotPass				<b>Quiz</b>
<b>17</b>		7		Auxiliary Views	
<b>22</b>		8, 17 *		Screw Systems (* Quick read of U 17 about other fasteners & hardware)	
<b>24</b>		9		Dimensioning commonly encountered on drawings. Begin looking at U 10, Tolerancing	
<b>29</b>		10		Tolerancing	
<b>Oct 01</b>		11		Misc. Machining Specification & Notes	
<b>06</b>		12		Surface Texture (Roughness) Symbols	
<b>08</b>					<b>Quiz</b>
<b>13</b>		13	2, 3 & 8	GD&T: Characteristics symbols & Categories; Basic Dim., Feat, Contrl Frm.;RFS, MMC & LMC	
<b>15</b>			33-37	Form Tolerances ( —, □, ○, ⌀ )	
<b>20</b>			13-23	Datums & their symbols; Basic Dims.; 6 Degrees of freedom & DFRs	
<b>22</b>			38-43	Orientation Tolerances ( ∠, ⊥, // )	
<b>27</b>			54-57	Tolerance of Position as relating to Datums & Basic dimensions	
<b>29</b>				TOP Continued {Review Midterm as needed}	
<b>Nov 03</b>					<b>Midterm</b>
<b>05</b>			71 & 2 62 & 3	Symmetry and Concentricity; Runout, Circular & Total	
<b>10</b>			45, 46	Profile (of a line & of a surface)	
<b>12</b>	14th l/d w/d w "W", Att Ver	14 & 15		Dwg Revision Systems & Detail Dwgs	* Tuesday 11th is a holiday
<b>17</b>					<b>Quiz</b>
<b>19</b>		16		Assembly Dwgs	
<b>24</b>		18/19/20		Specialized Parts: Gears, Cams, Plastic parts	
<b>26</b>				<b>THANKSGIVING HOLIDAY</b>	
<b>Dec 01</b>		21		Precision Sheet Metal Parts (Handout)	
<b>03</b>		23		Welding	
<b>08</b>				Instrumentation & Control Dwgs.	
<b>10</b>				Review	
<b>15</b>					<b>FINAL</b>

\*Schedule Subject to Change - Students will be notified of changes in advance.