



STARK STATE COLLEGE

GENERAL SYLLABUS

Course Information

Course Name: Ind Layout and Trigonometry
Course Number: ARL221

Required Materials

Textbook(s): Industrial Layout and Trigonometry Handbook Ariel Corp.
Required Readings: None
Additional Materials: Scientific Calculator, Laptops, Note Pads, Writing Utensils, Web Links, Handouts and related items as provided in class.

Course Outline/Calendar

The date of coverage and order of coverage may be modified based on the faculty member and events beyond the control of faculty members that interfere with class times and teaching.

| Week | Chapter/Topic/Lab |
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| 1 – Review of Industrial Math Basics | <ul style="list-style-type: none"> ○ Fractions, decimals, and percentages for industrial measurement. ○ Units of measurement and conversions (standard and metric). ○ Order of operations and precision rounding. |
| 2 – Geometry for Individual Applications | <ul style="list-style-type: none"> ○ Identifying and measuring lines, angles, and shapes (acute, right, obtuse). ○ Calculating area, perimeter, and volume for common shapes. ○ Introduction to the Cartesian coordinate system. |
| 3– Blueprint Reading Basics | Introduction to blueprints and schematics. <ul style="list-style-type: none"> ○ Types of drawings used in industry. ○ Interpreting title blocks, legends, and abbreviations. Understanding drawing scale. |
| 4 – Multiview and Selection Drawings. | Multiview and section drawings. <ul style="list-style-type: none"> ○ Interpreting orthographic projection (top, front, side views). ○ Reading section and detail views. ○ Introduction to geometric dimensioning and tolerancing (GD&T). |
| 5- Introduction to Basic Trgonometric Functions | Introduction to basic trigonometric functions. <ul style="list-style-type: none"> ○ Understanding the six trigonometric functions based on the right triangle (sine, cosine, tangent). ○ Using the Pythagorean theorem for layout tasks. ○ Solving for unknown sides in right triangles. |

| Week | Chapter/Topic/Lab |
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| 6- Angle Measurement and Inverse Functions | <ul style="list-style-type: none"> ○ Working with angles in degrees and radians. ○ Using inverse trigonometric functions to find unknown angles. |
| 7 – Right-Triangle Applications and Practical Projects | <ul style="list-style-type: none"> ○ Calculating angles and distances for pipe runs, inclines, and bracing. ○ Practice exercises involving grade and fall for construction layout. |
| 8 – The Law of Sines | <ul style="list-style-type: none"> ○ Introduction to the Law of Sines for solving oblique triangles. ○ Solving "angle-side-angle" and "side-side-angle" problems. |
| 9 – The Law of Cosines | <ul style="list-style-type: none"> ○ Introduction to the Law of Cosines. ○ Solving "side-side-side" and "side-angle-side" problems. ○ Combining the Law of Sines and Cosines for complex layout problems. |
| 10 – The Unit Circle and Circular Functions | <ul style="list-style-type: none"> ○ Understanding the unit circle and its application in advanced layout. ○ Working with linear and angular speed. |
| 11 – Circular Layout and Arc Calculations | <ul style="list-style-type: none"> ○ Calculating chord lengths, arc lengths, and segment areas. ○ Applying circular geometry to curved industrial structures and machine parts. |
| 12 – Introduction to CAD Software | <ul style="list-style-type: none"> ○ Basic 3D solid modeling for industrial components. ○ Translating blueprint information into digital models. |
| 13 – Advanced CAD and Trigonometry | <ul style="list-style-type: none"> ○ Using CAD to perform trigonometric calculations and layout tasks. ○ Creating detailed drawings for manufacturing. |
| 14 – Capstone Project Planning and Design | <ul style="list-style-type: none"> ○ Students receive an industrial layout design problem. ○ Develop a design plan, including drawings, calculations, and materials. |
| 15 – Capstone Project Execution | <ul style="list-style-type: none"> ○ Students use all course knowledge to complete the design and layout of the project. ○ Focus on efficient product flow and material handling. |
| 16 – Final Review and Assessments | <ul style="list-style-type: none"> ○ Final exam and project presentation. ○ Comprehensive final exam covering all industrial trigonometry and blueprint reading topics. |