



COURSE OUTLINE : STV 151

N Non-Credit

COURSE ID 010487

Cyclical Review: November 2021

COURSE DISCIPLINE : STV

COURSE NUMBER : 151

COURSE TITLE (FULL) : Engineering Drafting and Basic Design Mirrored Course

COURSE TITLE (SHORT) : Engineering Drafting and Basic Design Mirrored Course

ACADEMIC SENATE DISCIPLINE: Short Term Vocational

CATALOG DESCRIPTION

STV 151 is a mirrored course for ENGR 101 that offers limited seating through noncredit. It covers the fundamentals of traditional board drafting, descriptive geometry, orthographic projection and the graphical communication of technical engineering information. Students learn to create complete and accurate drawings that concisely communicate an engineering design. Topics include freehand drawing, lettering, and theory of orthographic and multi-view projections. Basic drafting skills, industry standards and technical graphics practices, and engineering and architecture scales are presented. The glass box theory is used to visualize orthographic projection as well as the fundamentals of auxiliary views, coordinate systems, sectioning, dimensioning, intersection of planes, visibility, lines and order of precedence of line types. Coordination dimensioning and geometric dimensioning and tolerancing (GD&T) subjects are covered including location tolerance, datum reference, tolerance symbols and feature control frames.

CATALOG NOTES

Seating in this course is limited. Permission from the Short Term Vocational department is mandatory.

Total Lecture Units:0.00

Total Laboratory Units: 0.00

Total Course Units: 0.00

Total Lecture Hours:27.00

Total Laboratory Hours: 81.00

Total Laboratory Hours To Be Arranged: 0.00

Total Faculty Contact Hours: 108.00

Total Student Contact Hours: 108.00

Recommended Preparation: ENGL 100 or ESL 141.



ENTRY STANDARDS

	Subject	Number	Title	Description	Include
1	ESL	141	Grammar And Writing IV	compose a 400 to 450-word thesis-based essay which:	Yes
2	ESL	141	Grammar And Writing IV	a. summarizes and cites appropriately a reading passage provided as a prompt;	Yes
3	ESL	141	Grammar And Writing IV	b. includes a clear thesis statement;	Yes
4	ESL	141	Grammar And Writing IV	c. uses evidence to support the thesis;	Yes
5	ESL	141	Grammar And Writing IV	d. shows clear organization into an introduction, body and conclusion;	Yes
6	ESL	141	Grammar And Writing IV	e. uses appropriate rhetorical modes such as comparison/contrast, cause/effect and persuasion in order to support a thesis;	Yes
7	ESL	141	Grammar And Writing IV	demonstrate control of verb tenses in active and passive voice, gerunds and infinitives, conditionals real and unreal, adjective, noun, and adverb clauses, and transitional expressions;	Yes
8	ESL	141	Grammar And Writing IV	comprehend multi-paragraph reading passages in textbooks.	Yes
9	ENGL	100	Writing Workshop	Read, analyze, and evaluate contemporary articles and stories to identify topic, thesis, support, transitions, conclusion, audience, and tone;	Yes
10	ENGL	100	Writing Workshop	read, analyze, and evaluate contemporary articles and stories for the comprehension of difficult content and the identification of main ideas and (topic-based) evidence;	Yes
11	ENGL	100	Writing Workshop	read, analyze, and evaluate student compositions for unity, development, use of evidence, interpretation, coherence, and variety of sentence form;	Yes
12	ENGL	100	Writing Workshop	write a summary of a contemporary article or story with correct citation techniques;	Yes
13	ENGL	100	Writing Workshop	write an argumentative essay that has an introduction, body paragraphs, and a conclusion, demonstrating a basic understanding of essay organization;	Yes
14	ENGL	100	Writing Workshop	write an argumentative essay that addresses the topic, is directed by a thesis statement, uses appropriate textual evidence, develops logical interpretations, and concludes with some compelling observations;	Yes



15	ENGL	100	Writing Workshop	write an argumentative essay that integrates the ideas of others (i.e., authors) through paraphrasing, summarizing, and quoting with correct citation techniques;	Yes
16	ENGL	100	Writing Workshop	write an argumentative essay that generates novel ideas (those that add to the conversation rather than repeating the author's ideas) related to the topic and the readings;	Yes
17	ENGL	100	Writing Workshop	write compositions (e.g., summaries and argumentative essays) that are easy to read and follow, though some errors in grammar, mechanics, spelling, or diction may exist;	Yes
18	ENGL	100	Writing Workshop	proofread and edit essays for content, language, citation, and formatting problems.	Yes

EXIT STANDARDS

- 1 Demonstrate rules of orthographic projection by creating detailed multi-view drawings;
- 2 analyze an object and create auxiliary and section views of its features when necessary;
- 3 explain the glass box theory and the geometric relationships of orthographic views.

STUDENT LEARNING OUTCOMES

- 1 complete a series of basic drafting assignments utilizing lecture and text information;
- 2 demonstrate knowledge of basic drafting and dimensioning through a series of drawing assignments;
- 3 apply basic knowledge of industrial drafting practices through tests and lecture information.

COURSE CONTENT WITH INSTRUCTIONAL HOURS

	Description	Lecture	Lab	Total Hours
1	Introduction to Graphic Representation of Physical Objects <ul style="list-style-type: none"> • History of drafting and engineering graphics • Drafting and design • Civil engineering applications • Mechanical engineering applications • Engineering design • Importance of fundamentals to modern computer aided design Industry standards ASME 14.5 • American Design Drafting Association (ADDA) • American Society of Mechanical Engineers (ASME) • American Society of Civil Engineers (ASCE) 	2	2	4



2	Instruments and Drafting Tools <ul style="list-style-type: none"> • Units of measurement • Reading scales • Drafting board, drafting machine, drawing head • Compass and protractor • Calipers and micrometers 	2	5	7
3	Geometric Construction <ul style="list-style-type: none"> • Geometry of straight line • Geometry of curves • Bisecting lines and curves • Tangencies 	2	5	7
4	Standard Lettering <ul style="list-style-type: none"> • Upper case Gothic and other fonts • Free hand lettering uses in industry today • Mark ups, field notes and corrections 	1	2	3
5	Theory of Orthographic Drawing <ul style="list-style-type: none"> • Glass box theory or concept • Six principal views and their relationships • Projection plane and visual rays • Assumption of infinite distance to a plane • Normal view 	2	7	9
6	Process and Practice of Orthographic Projection Drawing <ul style="list-style-type: none"> • Selection of views • Projection of views • Orthographic freehand sketching • Reading orthographic projection • Projection of normal surfaces • Projection of inclined surfaces • Projection of skewed surfaces • Projection of curved surfaces 	2	7	9



7	Pictorial Drawing and Sketching <ul style="list-style-type: none"> • Axonometric projection • Isometric projection • Dimetric projection • Trimetric projection • Oblique projection • Perspective drawing 	2	7	9
8	Auxiliary Views <ul style="list-style-type: none"> • Descriptive geometry • Fold lines • True length • True size and shape • When to create an auxiliary view 	2	7	9
9	Sectioning <ul style="list-style-type: none"> • Types of sections • Standard Full and half sections • Revolved sections • Cross hatching conventions and standards 	1	6	7
10	Lines and Line Types <ul style="list-style-type: none"> • Solid or edge lines • Hidden or dashed lines • Center lines and center marks • Construction and projection lines • Line quality and thickness 	1	2	3
11	Civil Engineering Applications <ul style="list-style-type: none"> • Elevations • Topographical maps • Surveying • Definition of Geographic Information systems (GIS) • Definition of Building Information Management (BIM) • Title block 	2	6	8
12	Mechanical and Manufacturing Engineering Applications <ul style="list-style-type: none"> • Fasteners • Basic hole and shaft systems • Standard notation for fasteners • Production drawings • Drawing notes • Title block 	2	6	8



13	Engineering Design Process <ul style="list-style-type: none"> • Engineering design process steps • Iteration • Drawing revision • Roles of engineers, designers, technologists and technicians 	2	5	7
14	Dimensioning <ul style="list-style-type: none"> • Dimension standards • Coordinate dimensioning • Arrows and leaders • Fully defined dimensions • Clarity and order of dimensions 	2	7	9
15	Geometric Dimensioning and Tolerancing (GD&T) <ul style="list-style-type: none"> • Fundamental rules • GD&T symbols • Feature control frames • Datums • Material condition modifiers • Maximum and least material conditions • Importance of GD&T in manufacturing 	2	7	9
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OUT OF CLASS ASSIGNMENTS

- 1 drawings (e.g. create an engineering drawing)
- 2 essay (e.g. write a brief summary of an industry organization such as the American Society of Civil Engineers ASCE)

METHODS OF EVALUATION

- 1 Exams
- 2 projects (e.g. create a set of engineering drawings of each part of a machinist's vise)
- 3 final Exam

METHODS OF INSTRUCTION

- Lecture
- Laboratory
- Studio
- Discussion
- Multimedia
- Tutorial
- Independent Study



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- Collaboratory Learning
- Demonstration
- Field Activities (Trips)
- Guest Speakers
- Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	ISBN	Date
Visualization and Engineering Design Graphics with Augmented	Required	SDC Publications	3	Print	Mariano Alcañiz	978-1-63057-269-3	2019
Engineering Graphics Principles with Geometric Dimensioning and Tolerancing	Required	SDC Publications	2	Print	E. Max Raisor	978-1630571214	2017