

NEW RIVER COMMUNITY COLLEGE**DUBLIN, VIRGINIA****COURSE PLAN**Course Number and Title: DRF 114 - Drafting IPrepared By: Jeff Levy Fall, 2009
(Instructors) (Date)Approved By: _____ Fall, 2009
(Dean) (Date)**I. Course Description**

(4 credits) DRF 114 introduces technical drafting from the fundamentals through advanced drafting practices. This course teaches geometric construction, orthographic projection, sections and conventions, pictorial drawings, isometric principals, oblique drawing, and dimensioning. Lecture 1 hour. Laboratory 6 hours. Total 7 hours per week.

II. Specific Objectives

Students will have basic working knowledge and proficiency of the following areas and listings upon the end of DRF-114

Textbooks:Technical Drawing, 13th Edition: Giesecke

© 2009, Published; Pearson, ISBN 978-0-13-513527-3

Discovering AutoCAD 2010 : by Mark Dix, Paul Riley

© 2010, Published by Pearson, ISBN 978-0-13-506998-1

FUNDAMENTAL CAD/DRAFTING SKILLS

I. DRAFTING SKILLS

- A. Utilize drafting tools and instruments correctly
- B. Use measuring instruments correctly
- C. Use drawing media and related drafting materials (e.g., papers, vellum, mylar; plotter cartridges, toner cartridges)
- D. Use basic measurement systems (e.g., fractions, decimals, and metric measurements)
- E. Add correct annotation to drawing
- F. Identify line styles and weights
- G. Prepare title blocks and other drafting formats
- H. Apply metric and/or dual dimensioning drawing standards
- I. Identify and use appropriate standard symbols
- J. Reproduction of originals using different methods (e.g., photocopy, plot, blueprint)

II. BASIC LAB SKILLS

Demonstrate use of drafting equipment, supplies, and procedures

- A. Identify standard sizes and types of drawing media
- B. Use standard references and resource materials (e.g., catalogs, building codes, Architectural Graphic Standards, ANSI Standards, Machinery Handbook)
- C. Verify accuracy of drawings
- D. Comply with copyright laws

III. INTERPRET ENGINEERING DRAWINGS AND CONTROL DOCUMENTS

Review Blueprint Notes and Dimensions

- A. Identify the types of dimensions
- B. Locate holes on a print
- C. Determine tolerances associated with dimensions on a drawing

- D. Determine the tolerance for a reference dimension
- E. List the essential components found in the general drawing notes

Identify Basic Types of Drawings

- A. Identify orthographic views
- B. Identify positions of views
- C. Visualize one or more views
- D. Identify isometric views
- E. Identify exploded isometric drawings
- F. Identify assembly drawings

List the Purpose of Each Type of Drawing

- A. Identify the purpose of orthographic drawing
- B. Identify the purpose of isometric drawing
- C. Identify the purpose of exploded isometric drawing
- D. Identify the purpose of assembly drawing

Verify Drawing Elements

- A. Determine the scale of the view or section
- B. Check for revisions
- C. Recognize out-of-date prints

Practice Geometric Dimensioning and Tolerancing (GD&T) Methodology

- A. Identify symbols for controlling location of parts
- B. Identify symbols for showing datums and basic dimensions on drawings

IV. PERFORM MEASUREMENT/INSPECTION

Identify Types of Measurement

- A. Distinguish between direct and calculated measurements
- B. Compute calculated measurements
- C. Justify the use of precision measurements in manufacturing

- D. Discuss the following: precision, reliability, and accuracy
- E. Demonstrate general measurement techniques
- F. Demonstrate precision measurement techniques

Select Proper Measurement Tools

- A. Match appropriate measurement tools with various types of measurement requirements
- B. Determine proper measurement tool usage
- C. Identify error possibilities in measurement tool selection
- D. Identify error possibilities within measurement procedures
- E. Identify common conversion error possibilities
- F. Discriminate between accepted measurement procedures and improper measurement procedures

Use Metric and English Standards of Measurement

- A. Discuss the English system of measurement
- B. Discuss the Metric system of measurement
- C. Use hand calculators to calculate angles

Perform Measurements With Hand Held Instruments

- A. Use steel rule to measure
- B. Use caliper to measure

V. GEOMETRIC CONSTRUCTIONS

Draw Straight Lines

- A. Bisect lines and arcs
- B. Bisect angles
- C. Draw parallel lines
- D. Construct a line perpendicular to a line from a point
- E. Construct tangent lines
- F. Divide a line into equal parts

- G. Measure lines
- H. Draw a line perpendicular through a point on a line

Construct Angles

- A. Measure angles
- B. Transfer an angle
- C. Construct a right triangle
- D. Construct an equilateral triangle with one side given

Construct Plane Figures

- A. Construct squares, rectangles, and standard polygons
- B. Inscribe a polygon inside a circle
- C. Construct a hexagon with the distance across flat sides given
- D. Construct polygons by circumscribing a circle

Construct Circles and Arcs

- A. Construct a circle through three given points
- B. Draw an arc tangent to an acute angle and an obtuse angle
- C. Draw an arc tangent to a right triangle
- D. Draw an arc tangent to a straight line and an arc
- E. Draw an arc tangent to two arcs

Create Multi-view Drawings

- A. Identify and place appropriate views for orthographic projections
- B. Construct auxiliary views to determine true size, shape, and location of nonorthogonal features
- C. Identify and place appropriate views
- D. Identify and place views for sectioning

- E. Utilize various material patterns in sections
- F. Construct a full, half, and offset section of an object
- G. Construct aligned sections of an object with holes, ribs, or spokes
- H. Construct an assembly section
- I. Construct broken-out sections of an object
- J. Construct conventional breaks
- K. Construct rib sections of an object
- L. Construct axonometric drawings, isometric, diametric, trimetric, oblique
- M. Identify perspective drawings

VI. ORTHOGRAPHIC DRAWINGS

- A. Identify, create, and place appropriate orthographic views
- B. Identify, create, and place appropriate auxiliary views
- C. Identify, create, and place appropriate section views

VII. PICTORIAL DRAWINGS

- A. Identify and create axonometric drawings (e.g., isometric, diametric, trimetric)
- B. Identify and create oblique drawings (e.g., cabinet, cavalier)
- C. Identify perspective drawings (e.g., 1-point, 2-point, 3-point)

VIII. BASIC INTERSECTIONS AND DEVELOPMENTS

Construct Development and Intersection Drawings

- A. Label points, lines, and planes in views
- B. Identify true lengths and types of lines
- C. Identify true sizes and types of planes
- D. Construct lengths of lines and true sizes of planes using auxiliary views
- E. Construct true lengths of lines using rotation
- F. Construct true sizes of planes using rotation

- G. Locate elements of single curved surfaces
- H. Construct intersections of surfaces
- I. Construct intersections of surfaces using the two-view method
- J. Construct radial line developments
- K. Construct parallel line developments

IX. DIMENSIONING

- A. Apply dimensioning rules correctly (e.g., avoid redundant dimensioning, avoid dimensioning to hidden lines)
- B. Use correct dimension line terminators (e.g., arrowhead, ticks, slashes)
- C. Dimension objects (e.g., lines, arcs, angles, circular)
- D. Dimension complex shapes (e.g., spheres, cylinders, tapers, pyramids)
- E. Dimension features from a center line
- F. Dimension features on a circular center line
- G. Dimension a theoretical point of intersection
- H. Use appropriate dual dimensioning standards
- I. Use size and location dimension practices
- J. Use various dimensioning styles (e.g., Cartesian, polar, ordinate, datum)
- K. Dimension orthographic drawings
- L. Convert dimensions from English to metric
- M. Dimension objects using different coordinate systems
- N. Dimension an object using a rectangular coordinate system
- O. Use associative dimensioning correctly

- P. Dimension drawings using ANSI standards
- Q. Document revisions

Apply Tolerances

- A. Interpret decimal tolerance dimensions
- B. Dimension clearance fit tolerances of mating parts
- C. Dimension interference fit tolerances of mating parts

Apply Geometric Tolerances

- A. Select appropriate datum points and reference features
- B. Apply symbols for true position

X. REPRODUCE DOCUMENTS

- A. Identify drafting line styles and weights (e.g., center, hidden, object, dimension)
- B. Use/apply appropriate line styles and weights
- C. Reproduce originals

Prepare Title Blocks and Other Drafting Forms

- A. Identify and prepare title block
- B. Identify and prepare bill of material/parts list
- C. Identify and prepare revision history block

XI. CREATE TECHNICAL SKETCHES

- A. Identify and create orthographic drawings (single-view, two-view, and three-view sketches)
- B. Sketch a first-angle projection
- C. Sketch design drawings
- D. Understand and apply techniques of sketching
- E. Letter using freehand lettering techniques

XII. PLAN AND ORGANIZE ACTIVITIES

Determine Scope of Drafting Assignment

- A. Understand completion date
- B. Identify number of drawings involved
- C. Identify assignment requirements
- D. Understand drawing responsibilities

Select Appropriate Drafting Techniques for Drawings

- A. Identify types of drawings required
- B. Identify types of materials needed
- C. Identify techniques used to produce designed drawings

Maintain Supporting Documents

- A. Identify supporting documents involved
- B. Understand document filing system
- C. Understand document responsibilities

FUNDAMENTAL DRAFTING SKILLS

Total number of skills:

151 Skills

Basic CAD Skills

Operate AutoCAD 2005 at a proficient level with working knowledge of:

- A. How to start a new drawing from scratch
- B. How to use a template
- C. How to name, save and edit new and existing drawings
- D. how to use the various format commands in conjunction with working drawings
 - 1. Units

2. Drawing Limits
3. Text Style
- E. How to use the various view pull down commands
 1. Redraw
 2. Regen
 3. Regen All
 4. Toolbars
- F. How to use various Tools pull down commands
 1. Spelling
 2. Display Order
 3. Options
- G. How to use and setup the DRAW Toolbar and it's commands
 1. Line
 2. Polyline
 3. Circle Diameter
 4. Circle Radius
 5. Polygon
 6. Rectangle
 7. Arc, Start end Direction and others
 8. Elipse
 9. Insert Block
 10. Make Block
 11. Hatch
 12. Single Line Text
 13. Multi Line Text
 14. Donut
- H. How to use and setup the MODIFY Toolbar and it's commands
 1. Move
 2. Copy
 3. Mirror
 4. Trim
 5. Stretch
 6. Offset
 7. Array
 8. Scale
 9. Break
 10. Chamfer
 11. Fillet
 12. Edit Text
 13. Erase
 14. Explode
- I. How to use the various Object Snap Commands
 1. Snap to endpoint
 2. Snap to Midpoint

3. Snap to Intersection
4. Snap to Quadrant
5. Snap to Perpendicular
6. Snap to Nearest
7. Snap to Node
8. Object Snap Settings

J. How to use the various Dimension Commands

1. Linear Dimension
2. Aligned Dimension
3. Radius Dimension
4. Diameter Dimension
5. Angular Dimension
6. Quick Dimension
7. Continuous Dimension
8. Quick Leader
9. Dimension Edit
10. Dimension Text Edit
11. Dimension Styles

K. How to use the various Zoom Toolbar Commands

1. Zoom Window
2. Zoom Dynamic
3. Zoom All
4. Zoom Extents
5. Zoom In
6. Zoom Out

L. How to use the various Standard Toolbar Commands

1. New
2. Open
3. Save
4. Print/Plot
5. Print Preview
6. Cut
7. Paste
8. Undo
9. Redo
10. Pan
11. Real time Zoom
12. Properties

M. How to use the various Layer Toolbar Commands

1. Layer Properties Manager

2. Freeze
3. Thaw
4. Layer On
5. Layer Off
6. Lock
7. Line Type
8. Line Weight
9. Layer Color
10. Line Type, Line Weight, Color "BY LAYER"

FUNDAMENTAL AutoCAD SKILLS

Total number of skills:

89 Skills

IV. Instructional Procedures

Lecture, demonstration, discussion in problem solving, reviews, and tests will be used in each area. Laboratory assignments will be designed to support materials covered in lectures and required of each student.

V. Instructional Materials

Materials and equipment to be used by instructor: video types/DVD's, overhead slides, PowerPoint presentations, CD's, marker boards, on-line tutorials, Blackboard e-learning software, computer and a variety of other multimedia devices.

Materials and equipment to be provided by the student:

- USB Flash Drive 2GB
- Drafting Tools: (available at book store or Mish Mish in Blacksburg)
 - Drafting brush
 - .3mm, .5mm & .7mm pencil (HB & H lead for each pencil)
 - 30/60 Triangle
 - 45/90 Triangle
 - Metric Scale
 - Arch. Scale
 - White Pearl Eraser

- Drafting Dots or Drafting Tape
- Zippered Drafting pouch to carry drafting tools in.

1. Additional Recommended Materials and equipment for DRF 114

- Either a Laptop/Notebook or Desktop computer with following requirements:
 - Duo Core Processor(s)
 - Min 2GB or RAM
 - Windows VISTA
 - Video Card with 256mb – 512MB RAM
 - Video Card recommendations
 - ATI
 - Nvidia
 - Video Card should support OPEN GL format & approved by Autodesk
 - DO NOT PURCHASE:
 - On Board Video
 - Shared Memory
 - Or any other video card that does not have Open GL Format
- Software from the following sources:
 - www.autodesk.com
 - You must join and register with the Engineering Student Community
 - Free Downloads
 - AutoCAD 2010
 - Inventor 2010
 - AutoCAD Architecture 2010
 - Revit Architecture 2010
 - Impression 3
 - 3D Studio Max 2010 (30 day trial)
 - Maya 2010 (30 day trial)

VII. Evaluation

1. The numeric range for grades will be:

A = 91 - 100.....		
.....	Course Projects	50%
B = 81 - 90.....		
.....	Tests	30%
C = 71 - 80.....		
	Homework / Quizzes.....	20%
D = 61 – 70		
F = 60 or below		

2. Attendance

Regular attendance at classes is **required**. When absences from a class becomes necessary, it is the **responsibility** of the student to both inform the instructor prior to the absence and schedule makeup time after the absence. Frequent unexplained absences may result in a dismissal from the course. Student's absence from the first two weeks of class is automatically withdrawn. The student is responsible for making up all work missed during an absence.

3. Cheating Policy

NRCC policy on cheating (found in current Student Handbook and elsewhere) will be enforced.

4. Additional Resource Material for Instruction

XI. Withdrawal Policy

Student Initiated Withdrawal Policy

A student may drop or withdraw from a class without academic penalty during the first sixty percent (60%) of a session. For purposes of enrollment reporting, the following procedures apply:

- a. If a student withdraws from a class prior to the termination of the add/drop period for the session, the student will be removed from the class roll and no grade will be awarded.
- b. After the add/drop period, but prior to completion of sixty percent (60%) of a session, a student who withdraws or is withdrawn from a course will be assigned a grade of "W." A grade of "W" implies that the student was making satisfactory progress in the class at the time of withdrawal, that the withdrawal was officially made before the deadline published in the college calendar, or that the student was administratively transferred to a different program.
- c. After that time, if a student withdraws from a class, a grade of "F" will be assigned. Exceptions to this policy may be made under documented mitigating circumstances if the student was passing the course at the last date of attendance.

A retroactive grade of "W" may be awarded only if the student would have been eligible under the previously stated policy to receive a "W" on the last date of class attendance. The last date of attendance for a distance education course will be the last date that work was submitted.

Late withdrawal appeals will be revised and a decision made by the Coordinator of Student Services.

Instructor Initiated Withdrawal Policy

A student who adds a class or registers after the first day of class is counted absent from all class meetings missed. Each instructor is responsible for keeping a record of student attendance in each class.

Students who have not attended class by the last day to drop class and receive refund must be deleted by the instructor during the following week. No refund will be applicable.

When a student's absences equal twice the number of weekly meetings of a class (equivalent amount of time for summer session), the student may be dropped for unsatisfactory attendance in the class by the instructor.

- **When an instructor determines that absences constitute unsatisfactory attendance, a Faculty Withdrawal Form should be completed and submitted to the Admissions and Records Office within five days of when the student met the withdrawal criteria. The last date of attendance must be documented. A grade of "W" will be recorded during the first sixty percent (60%) period of a course. Students withdrawn after the sixty percent (60%) period will receive a grade of "F" except under mitigating circumstances when a letter of appeal has been submitted by the student. A copy of this documentation must be placed in the student's academic file.**

The student will be notified of the withdrawal by the Admissions and Records Office. An appeal for reinstatement into the class may be approved only by the instructor. Since attendance is not a valid measurement for Independent and Distance Learning (IDL) courses, students may be withdrawn due to nonperformance. Students should refer to his/her IDL course plan for the instructor's policy.