

**NEOSHO COUNTY COMMUNITY COLLEGE
MASTER COURSE SYLLABUS**

COURSE IDENTIFICATION

Course Code/Number: ETEC 121

Course Title: Engineering Graphics I

Division: Applied Science (AS) Liberal Arts (LA) Workforce Development (WD)
 Health Care (HC) Lifetime Learning (LL) Nursing Developmental

Credit Hour(s): Three (3)

Effective Date: Fall 2013

Assessment Goal Per Outcome: 70%

COURSE DESCRIPTION

This course is a foundation course for drafting and design fundamentals. The course involves a study of basic drafting equipment, techniques, and computers in the design process. Content includes engineering lettering, line conventions, orthographic projection, sections, auxiliary views, dimensioning practices and pictorial drawings.

MINIMUM REQUIREMENTS/PREREQUISITES AND/OR COREQUISITES

None

TEXTS

The official list of textbooks and materials for this course is found on *myNeosho*.

<http://www.neosho.edu/ProspectiveStudents/Registration/CourseSyllabi.aspx>

GENERAL EDUCATION OUTCOMES

1. Practice Responsible Citizenship through:
 - identifying rights and responsibilities of citizenship,
 - identifying how human values and perceptions affect and are affected by social diversity,
 - identifying and interpreting artistic expression.
2. Live a healthy lifestyle (physical, intellectual, social) through:
 - listing factors associated with a healthy lifestyle and lifetime fitness,
 - identifying the importance of lifetime learning,
 - demonstrating self-discipline, respect for others, and the ability to work collaboratively as a team.
3. Communicate effectively through:
 - developing effective written communication skills,
 - developing effective oral communication and listening skills.
4. Think analytically through:
 - utilizing quantitative information in problem solving,
 - utilizing the principles of systematic inquiry,
 - utilizing various information resources including technology for research and data collection.

COURSE OUTCOMES/COMPETENCIES (as Required)

1. Occupational Knowledge
 1. Select areas of specialization in the drafting profession.
 2. List industries that employ drafters.
 3. Distinguish between the advantages and disadvantages of a drafting occupation.
 4. Name areas in which a drawing will always be evaluated.
 5. Define the abbreviations of professional drafting organizations.
2. Use of Tools and Equipment
 1. Identify types of mechanical templates
 2. Identify and demonstrate use of precision measuring instruments
 3. Identify and demonstrate use of drafting tools and equipment
 4. Demonstrate proficiency in lettering and linework
 5. Match types of papers with their characteristics and uses.
 6. Classify standard media sheet sizes into the standard or alternate system by letter and dimension.
 7. Demonstrate the ability to use scale ratios found on an architect's scale.
 8. Demonstrate the ability to interpret scale graduations found on an engineer's scale.
 9. Demonstrate the ability to interpret scale graduations on a metric scale.
3. Geometric Construction
 1. Construct and identify polygons
 2. Bisect lines and angles
 3. Construct enlargement and reduction drawings
 4. Construct different line arc tangents
 5. Construct conic sections
 6. Demonstrate the ability to create ellipse using different methods
 7. Construct a parabola and hyperbolas
 8. Construct spirals and helix

4. Auxiliary and Section Views
 1. Construct an auxiliary view
 2. Develop an auxiliary view from front, top, and profile plane
 3. Identify rules of auxiliary view construction
 4. Identify material symbols used in sections
 5. Construct full and half section views
 6. Construct offset and revolved sections
5. Specifications and Handbooks
 1. Identify structured shapes
 2. Identify different types of manufacturing materials.
 3. Determine the gage size of wire and sheet metal.
 4. Identify mechanical standards references
 5. Identify standards in ANSI standard parts
 6. Identify ANSI miscellaneous standards
6. Layouts and Working Drawings
 1. Identify types of mechanical drawings
 2. Select and layout information on revision blocks
 3. Schedule information on a bill of materials/parts list
 4. Determine stages of design process
 5. Identify design problems and decision process
 6. Identify elements of design layout
 7. Interpret information found on outline or installation assemblies
 8. Interpret drawing notes and references
7. Dimensioning and Tolerance
 1. Determine dimension location and rules for a geometric shape
 2. Verify mating dimensions in an assembly drawing
 3. Determine fits for inch units
 4. Determine limits in inch units using basic hole system
 5. Determine tolerance ranges for different processes
 6. Select symbols for tolerance and form
 7. Identify surface quality specifications, symbols, and notes
 8. Place symbols in proper locations
 9. Dimension an object completely
 10. Calculate and dimension different fit tolerances using standard fit tables
8. Sketching and Mechanical Shape Description
 1. Identify types of presentation sketches
 2. List steps of sketching
 3. Construct an ellipse

4. Demonstrate difference shading techniques
 5. Develop types of axonometric drawings
 6. Construct presentation sketches
 7. Construct design sketches
 8. Construct an isometric presentation drawing
 9. Construct an oblique presentation drawing
 10. Construct a two point presentation perspective of on object
9. Fasteners and Hardware
1. Identify types of fasteners
 2. Identify screw threads nomenclature and profiles
 3. Identify screw thread symbols
 4. Identify classes of fit for unified and metric threads
 5. Identify parts of a thread note
 6. Identify types of threaded removable fasteners
 7. Identify shapes of bolts and nuts
 8. Identify types of locking devices
 9. Identify types of standard cap screws
 10. Identify types of machine screws
 11. Identify set screw heads and points
 12. Identify standard rivets
 13. Compare advantages of plastic fasteners over metal fasteners
 14. Identify types of springs and clips
 15. Identify types of keys and machine pins
 16. Identify washers
 17. Identify advantages of different fasteners
 18. Construct thread symbols
 19. Construct bolts, screws, and nuts
 20. Construct and assembly containing various fasteners
10. Computer Aided Design
1. Identify system hardware
 2. Identify systems software
 3. Identify and demonstrate the use of CAD commands
 4. Demonstrate systems start up and shut down procedures
 5. Demonstrate the ability to create simple drawings on the CAD system.
 6. Demonstrate proficiency in using coordinate systems.
 7. Demonstrate proficiency in setting grid, snaps, limits, and units
 8. Demonstrate the ability to input data by using keyboard, digitizer, mouse, etc.
 9. Demonstrate the ability to print or plot drawings

MINIMUM COURSE CONTENT

I. INTRODUCTORY BASICS

- A. Using the workbook with the text
- B. Integrating drawings with computers
- C. How the networks operate

- D. Outside reading's
- E. Lab times.

II. ENGINEERING FIELDS AND DESIGN PROCESS

- A. Engineering Fields
- B. Design Problems
- C. Identification Process
- D. Preliminary Ideas
- E. Idea Refinement
- F. Design Analysis
- G. Decision
- H. Implementation.

III. DRAWING INSTRUMENTS

- A. Drafting Media
- B. Drafting Equipment
- C. Line Types
- D. Lead Sizes
- E. Scales

IV. LETTERING

- A. Lettering Guides
- B. Vertical Letters
- C. Incline
- D. Spacing
- E. Mechanical Lettering
- F. Computer Lettering.

V. GEOMETRIC CONSTRUCTION

- A. Constructing Polygons
- B. Circles
- C. Geometric Solids
- D. Bisecting Lines and Angles
- E. Revolution of Shapes
- F. Enlargement and Reduction of Shapes
- G. Division of Lines
- H. Arcs
- I. Rectifying Arcs
- J. Parallel Lines
- K. Tangents
- L. Ogee Curves
- M. Conic Sections
- N. Ellipses
- O. Parabolas
- P. Hyperbolas
- Q. Spirals

R. Helices.

VI. ORTHOGRAPHIC SKETCHING

- A. Sketching Techniques
- B. Circular Features
- C. Oblique Pictorial Sketching
- D. Isometric Pictorial Sketching.

VII. ORTHOGRAPHIC DRAWING WITH INSTRUMENTS

- A. Orthographic Projection
- B. Alphabet of Lines
- C. Six - View Drawings
- D. Three - View Drawings
- E. Line Techniques
- F. Point Numbering
- G. Lines and Planes
- H. Layout Three - View Drawings
- I. Two - View Drawings
- J. Simplified and Removed Views
- K. Partial Views
- L. Curve Plotting
- M. Conventional Practices
- N. Conventional Intersections
- O. Fillets and Rounds.

VIII. AUXILIARY VIEWS

- A. Folding - Line Theory
- B. Auxiliary Views from Top
- C. Front, and Profile
 - 1. Partial Views
 - 2. Auxiliary Sections
 - 3. Secondary Auxiliary Views
 - 4. Elliptical Features.

IX. SECTIONS

- A. Basics of Sectioning
- B. Sectioning Symbols
- C. Full Sections
- D. Ribs
- E. Half Sections
- F. Offset Sections
- G. Broken - Out Sections
- H. Revolved Sections
- I. Conventional Revolutions
- J. Removed Sections
- K. Conventional Breaks

- L. Phantom Sections
- M. Auxiliary Sections.

X. SCREWS, FASTENERS, AND SPRINGS

- A. Threads
- B. Specifications
- C. Drawing Threads
- D. Nuts and Bolts
- E. Screws
- F. Washers and Pins
- G. Pipe Threads and Fittings
- H. Keys
- I. Rivets
- J. Springs.

XI. DIMENSIONING

- A. Units of Measure
- B. English/ Metric Conversion
- C. Dual Dimensioning
- D. Metric Designation
- E. Numeric and Symbolic Dimensioning
- F. Dimensioning by Computer
- G. Dimensioning Rules
- H. Finish Surfaces
- I. Location Dimensions
- J. Outline Dimensioning
- K. Machined Holes
- L. Chamfers
- M. Keyseats
- N. Knurling
- O. Necks and Undercuts
- P. Tapers
- Q. Notes.

XII. TOLERANCES

- A. Tolerance Dimensions
- B. Mating Parts
- C. English Units
- D. Basic Hole System
- E. Basic Shaft System
- F. Cylindrical Fits
- G. Metric System
- H. Notes
- I. Geometric Tolerances
- J. Rules for Tolerancing
- K. Location Tolerancing

L. Surface Texture.

XIII. WORKING DRAWINGS

- A. Legal Documents
- B. Dimensions and Units
- C. Laying out a Detail Drawing
- D. Notes and Other Information, Drafter's Log
- E. Assembly Drawings
- F. Working Drawings.

IVX. THREE - DIMENSIONAL PICTORIALS

- A. Oblique Drawings
- B. Oblique Projection Theory
- C. Isometric Drawings
- D. Axonometric Projection
- E. Perspectives
- F. Computer 3D Graphics.

STUDENT REQUIREMENTS AND METHOD OF EVALUATION

INSTRUCTIONAL METHODS

1. Lecture and discussion will be used in presentation of concepts, information, and assignment requirements.
2. Demonstrations of assignments will be presented on the drafting machines and computers.
3. Lab time will be provided for drafting assignments on the drafting machines and CAD.
4. Outside assignments will consist of reading and completion of worksheets.
5. Illustrations will be presented on the chalkboard, overhead projector, audio-visuals and computer network. Handouts, mock-ups, models or charts will be used to clarify problems.

STUDENT REQUIREMENTS

1. Concepts will be evaluated through the use of workbook, periodic tests, and computer drawings.
2. Worksheets and drawings will be scored according to format requirements for style and accuracy.
3. Points will be assigned and accumulated for each worksheet, test, and computer application.

GRADING SCALE

Grades will be determined according to the following scale:

91% to 100% = A; 81% to 90 = B; 71% to 80% = C; 61% to 70% = D; 0% to 60% = F

ASSESSMENT OF STUDENT GAIN

The purpose of assessing student learning at Neosho County Community College is to ensure the educational purposes of the institution are met and appropriate changes are made in program development and classroom instruction to allow for student success.

Pre-assessment ideally begins during the advisement and enrollment process prior to the beginning of the course where the advisor and student determine through the interview process the level of placement for the student. During the period of the first two weeks of a normal semester, each student will be observed and/or interviewed and initial papers produced will be examined to determine needed competency development throughout the course. Post-assessment to determine gain in competency will be measured at the end of each unit of study.

Attendance Policy

1. NCCC values interactive learning which promotes student engagement in the learning process. To be actively engaged, the student must be present in the learning environment.
2. Unless students are participating in a school activity or are excused by the instructor, they are expected to attend class. If a student's absences exceed one-eighth of the total course duration, (which equates to one hundred (100) minutes per credit hour in a face-to-face class) the instructor has the right, but is not required, to withdraw a student from the course. Once the student has been dropped for excessive absences, the registrar's office will send a letter to the student, stating that he or she has been dropped. A student may petition the chief academic officer for reinstatement by submitting a letter stating valid reasons for the absences within one week of the registrar's notification. If the student is reinstated into the class, the instructor and the registrar will be notified. Please refer to the Student Handbook/Academic Policies for more information
3. Absences that occur due to students participating in official college activities are excused except in those cases where outside bodies, such as the State Board of Nursing, have requirements for minimum class minutes for each student. Students who are excused will be given reasonable opportunity to make up any missed work or receive substitute assignments from the instructor and should not be penalized for the absence. Proper procedure should be followed in notifying faculty in advance of the student's planned participation in the event. Ultimately it is the student's responsibility to notify the instructor in advance of the planned absence.

ACADEMIC INTEGRITY

NCCC expects every student to demonstrate ethical behavior with regard to academic pursuits. Academic integrity in coursework is a specific requirement. Definitions, examples, and possible consequences for violations of Academic Integrity, as well as the appeals process, can be found in the College Catalog, Student Handbook, and/or Code of Student Conduct and Discipline.

ELECTRONIC DEVICE POLICY

Student cell phones and other personal electronic devices not being used for class activities must not be accessed during class times unless the instructor chooses to waive this policy.

NOTE

Information and statements in this document are subject to change at the discretion of NCCC. Students will be notified of changes and where to find the most current approved documents.

ACCOMMODATIONS

If you are a student with a disability who may need accommodation(s), in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, please notify the Dean of Student Services in the Student Services Office, Sanders Hall, 620-432-0304, on the Chanute Campus, or the Dean for the Ottawa and Online Campuses, 785-248-2798, on the Ottawa Campus as soon as possible. You will need to bring your documentation for review in order to determine reasonable accommodations, and then we can assist you in arranging any necessary accommodations.

NON-DISCRIMINATION POLICY

The following link provides information related to the non-discrimination policy of NCCC, including persons with disabilities. Students are urged to review this policy.

<http://www.neosho.edu/Departments/NonDiscrimination.aspx>

SEXUAL MISCONDUCT POLICY (TITLE IX)

At NCCC, it is the responsibility of an instructor to help create a safe learning environment in the classroom, including both physical and virtual classrooms. All instructors are considered mandatory reporters at NCCC, therefore any information regarding sexual misconduct that is shared by a student in one-on-one meetings with the instructor must be reported to appropriate personnel at the College. Instructors will keep the information private to the greatest extent possible, but it is not confidential. Generally, climate surveys, classroom writing assignments or discussions, human subjects research, or events such as Take Back the Night events do not provide notice that must be reported to the Coordinator by employees, unless the reporting party clearly indicates that they wish a report to be made.

The following link provides information related to the sexual misconduct policy of NCCC, including resources, reporting options, and student rights. Students are urged to review this policy.

<http://www.neosho.edu/TitleIX.aspx>

COURSE NOTES