

**NEOSHO COUNTY COMMUNITY COLLEGE  
MASTER COURSE SYLLABUS**

**COURSE IDENTIFICATION**

Course Code/Number: ETEC 115

Course Title: Blueprint Reading

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: Spring 2010

Assessment Goal Per Outcome: 70%

**COURSE DESCRIPTION**

This course begins with a thorough explanation of how blueprints are structured and the conventions that are used in making them and reading them. These principles are then applied to detail drawings and assembly drawings of mechanical equipment. Special features of blueprints in applications ranging from sheet metal work through electrical and air conditioning work are addressed. The course concludes with information on how to sketch in the style of a blueprint to convey information simply and completely.

**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)

A student who successfully completes the course should be able to:

- I. Demonstrate the ability to read basic blueprints.
  - A. Discuss basic components of blueprints.
    1. Identify details, markings, and machine parts from an assembly drawing.
    2. Identify an object from an orthographic drawing.
    3. Identify elements located within the title block of a detail drawing.
    4. Explain why more than one orthographic projection is needed to show an object on a blueprint.
  - B. Demonstrate an understanding of building drawings.
    1. Name building materials, given their standard symbols.
    2. Explain how to find useful information on a flow diagram.
    3. Explain how to find useful information on an industrial plat.
    4. List the contents of a set of building drawings.
    5. Describe the purpose of a structural drawing.
  - C. Demonstrate an understanding of piping and plumbing drawings.
    1. State the definition of piping.
    2. Explain why joints are sometimes brazed instead of soldered.
    3. Explain how to assemble a screwed joint.
    4. Identify different types of pipe joints.
    5. Identify piping-system components shown in a single-line drawing.
    6. Define electrochemical corrosion.
  - D. Demonstrate an understanding of electrical drawings.
    1. Identify different electrical symbols on a drawing.
    2. Identify the power distribution panels in your plant.
    3. Identify different types of conduit and cable.
    4. Select the best electrical drawing to use when looking for a faulty circuit between the basement and the first floor.

5. Explain how electricity at 480 volts is reduced by a transformer to 120/240 volts.
  6. Define the terms voltage, current, and power.
- E. Demonstrate an understanding of air conditioning and refrigeration drawings.
1. Explain how a refrigeration system works.
  2. Describe the types of ac controls.
  3. Name three kinds of condensers used in air conditioning systems.
  4. Explain the difference between unitary and central air-conditioning equipment.
  5. Explain how to find useful information on a duct drawing.
- F. Demonstrate the ability to use and make sketches.
1. Name the four kinds of sketches.
  2. Identify an isometric sketch.
  3. Describe the appearance of a perspective drawing.
  4. Discuss how to sketch straight lines and curved lines.
  5. State the definition of a vanishing point.

II. Demonstrate the ability to understand basic technical diagrams.

- A. Demonstrate a basic understanding of technical diagrams.
1. State the definition of a schematic.
  2. List some characteristics of schematics.
  3. Identify a schematic among other kinds of technical drawings and diagrams.
  4. Explain how flow is indicated on a schematic.
- B. Demonstrate an understanding of symbols on schematics.
1. Identify various types of lines on schematics
  2. Identify the following schematics by their symbols: Electrical, Fluid-power, Piping
  3. Give the purpose of legends and other tables of symbols.
  4. Describe a set-by-step approach to troubleshooting when using a schematic.
- C. Demonstrate an understanding of electrical symbols.
1. State the meaning of symbols and lines on an electrical schematic.
  2. Explain the difference between a fuse and a circuit breaker.
  3. Explain how to trace an electrical circuit.
- D. Describe electrical diagrams.
1. Explain the difference in current flow between a series circuit and a parallel circuit.
  2. Explain the purpose of a wiring diagram.
  3. Demonstrate how to read an electrical schematic.
  4. Identify the objects represented by the symbols on an industrial schematic.
- E. Describe piping symbols.
1. Explain the function of a valve in a piping system.
  2. Name the ways of joining pipe.
  3. Identify the symbols for various kinds of fittings and describe the function of each fitting.
- F. Describe piping diagrams.
1. Give the purpose of a valve in a piping system.
  2. Explain the difference between a check valve and a cock valve.
  3. Identify the symbols for various types of valves.

- III. Demonstrate the ability to determine pipe size from a diagram.
  - G. Discuss air conditioning and refrigeration diagrams.
    - 1. Describe the subsystems of an air conditioning system.
    - 2. Identify the symbols for air conditioning and refrigeration components.
    - 3. Explain the operation of an air conditioning and refrigeration control system.

## **MINIMUM COURSE CONTENT**

The following topics must be included in this course. Additional topics may also be included.

- I. Reading Blueprints
- II. Reading Technical Diagrams

## **STUDENT REQUIREMENTS AND METHOD OF EVALUATION**

### **INSTRUCTIONAL METHODS**

- 1. Lecture and discussion will be used in presentation of concepts, information, and assignment requirements.
- 2. Sample prints and diagrams will be presented in class.
- 3. Demonstrations of assignments will be presented.
- 3. Workbook assignments.
- 4. Outside assignments will consist of reading and completion of assignments.
- 5. Audio-visuals may supplement instruction.

Concepts will be evaluated through the use of workbook, periodic tests, print and diagram identification and practical application.

### **GRADING SCALE**

Grades will be determined according to the following scale:

- A = 90% - 100%
- B = 80% - 89%
- C = 70% - 79%
- D = 60% - 69%
- F = 0 - 59%

## **ASSESSMENT OF STUDENT GAIN**

In addition to pre and post testing, students will be evaluated by observation using safe practices with hand and power tools. 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**