

# CIVIL/CONSTRUCTION ENGINEERING TECHNOLOGY (CET) TRANSFER ASSURANCE GUIDE (TAG) March 15, 2007

<b>1. Ohio Transfer Module:</b>		
<b>Ohio Transfer Module (OTM) Requirements:</b> 36-40 semester hours / 54-60 quarter hours. Students should select courses within the OTM that complement the selected major and meet any specific general education requirements. Students are encouraged to complete the OTM within their associate degree programs, to ensure maximum transferability and application of credit.		
<b>Required Disciplines</b>	<b>Minimum Required Hours</b>	<b>Recommended Courses</b>
Area I. English Composition Area II. Mathematics Area III. Arts & Humanities Area IV. Social Sciences Area V. Natural & Physical Science	3 sem. / 5-6 qtr. 3 sem. / 3 qtr. 6 sem. / 9 qtr. 6 sem. / 9 qtr. 6 sem. / 9 qtr.	College Algebra and Pre Calculus  General Physics I (Algebra based). Full sequence may be required by some institutions.
Additional courses beyond the minimum required hours, from any of the disciplines listed above, will count toward the completion of the OTM (36-40 semester hours or 54-60 quarter hours).		
Advising Note: Students should consult with receiving institution to ensure courses are completed in proper sequence. Students wanting cooperative education programs should consult with target institution as soon as possible.		
<b>Major Courses – Hours/courses listed below that count toward the major or pre-major requirements.</b>		
<b>a. Architectural Drafting – OET014</b>	Credits: 3-4 semester hours / 3-5 quarter hours	
Advising Notes:		
<b>b. Construction Estimating and Scheduling - OET020</b>	Credits: 2-3 semester hours / 2-4 quarter hours	
Advising Notes:		
<b>c. Construction Materials Testing – OET018</b>	Credits: 2 semester hours / 2-3 quarter hours	
Advising Notes:		
<b>d. Construction Methods and Materials - OET016</b>	Credits: 3-4 semester hours / 3-5 quarter hours	
Advising Notes:		
<b>e. Soils – OET017</b>	Credits: 2-3 semester hours / 2-4 quarter hours	
Advising Notes:		
<b>f. Surveying - OET015</b>	Credits: 2-3 semester hours / 2-4 quarter hours	
Advising Notes:		
<b>Transfer Assurance Guides Total Guaranteed Credits (Range)</b>		
• Ohio Transfer Module	36 – 40 sem.	54 – 60 qtr.
• Pre-major / Major	0 – 14 to 19 sem.	0 - 14 to 25 - qtr.

**Institutional Requirements:** For entrance and graduation, a transfer student must meet all institutional requirements which would include, but may not be limited to: minimum grade point average, residency requirements, upper division credits attained, minimum grades in specific courses, performance requirements (ex. dance, music): and, other requirements of native students from the same institution.

## **COLLEGE ALGEBRA (3-4 hours) – Learning Outcomes –OMT001**

### **Text Topics:**

**Recommendation:** This course should significantly reflect the Mathematical Association of America's Committee on the Undergraduate Program in Mathematics recommendations.

### **Prerequisites:**

### **Learning Outcomes:**

The successful College Algebra student should be able to:

- 1) Represent functions\* verbally, numerically, graphically, and algebraically.
- 2) View a function as a set of ordered pairs or a correspondence between two sets.
- 3) Find the domain and range of functions\*.
- 4) Perform translations and dilations of functions\*.
- 5) Perform operations (addition, subtraction, multiplication, division, composition) with functions\*.
- 6) Use functions\* to model a variety of situations.
- 7) Solve equations, including application problems.
- 8) Solve systems of linear equations, including systems and application problems.
- 9) Solve nonlinear inequalities.
- 10) Apply the factor theorem, the remainder theorem, and the rational roots theorem, including application problems.
- 11) Find inverses of functions\* and relate the graph of a function to the graph of its inverse.
- 12) Analyze the graph of a function\* to answer questions about the function (such as intercepts, domain, range, intervals where the function is increasing or decreasing, possible algebraic definitions, etc.)

\* This course should consider the following types of functions:

- polynomial
- rational
- root/radical/power
- exponential and logarithmic
- piece-wise defined

## **PRE-CALCULUS – Learning Outcomes –OMT002**

### **Text Topics:**

**Recommendation:** This course should significantly reflect the Mathematical Association of America's Committee on the Undergraduate Program in Mathematics recommendations.

### **Prerequisites:**

### **Learning Outcomes:**

The successful Pre-Calculus student should be able to:

1. Represent functions\* verbally, numerically, graphically, and algebraically.
2. View a function as a set of ordered pairs or a correspondence between two sets.
3. Find the domain and range of functions\*.
4. Perform translations and dilations of functions\*.
5. Perform operations (addition, subtraction, multiplication, division, composition) with functions\*.
6. Solve equations, including application problems.
7. Find inverses of functions\* and relate the graph of a function to the graph of its inverse.
8. Analyze the graph of a function\* to answer questions about the function (such as intercepts, domain, range, intervals where the function is increasing or decreasing, possible algebraic definitions, etc.)
9. Use functions\* to model a variety of situations.
10. Express angles in both degrees and radians.
11. Define the six trigonometric functions in terms of right triangles and the unit circle.
12. Solve right triangles, including application problems.
13. Solve oblique triangles, including application problems.
14. Algebraically manipulate trigonometric expressions using fundamental trigonometric identities.

15. Determine the amplitude, period, and displacement of trigonometric functions.
16. Solve trigonometric equations, including applications.
17. Define inverse trigonometric functions and find their domains, ranges, and graphs.
18. Represent vectors graphically and in both polar coordinates and rectangular coordinates.
19. Perform basic operations with vectors.
20. Solve vector equations, including applications problems.
  
21. This course should consider the following types of functions:
  - a. polynomial
  - b. rational
  - c. root/radical/power
  - d. exponential and logarithmic
  - e. trigonometric and inverse trigonometric
  - f. piece-wise defined

**Algebra based Physics I (w/labs) (1 st semester, or 1 st and 2 st quarters) – Learning Outcomes – OSC014**

Algebra based Physics lecture and lab (4-5 semester hours or Physics I & II 8 – 10 quarter hours).

**Text Topics:**

**Co-requisites:** College Algebra and Pre-calculus.

**Learning Outcomes:**

Understanding and/application of the following topics using algebra concepts and methods where appropriate:

1. Kinematics – one and two dimensional
2. Vectors – vector Arithmetic
3. Force and Newton’s Laws of Motion
4. Work, Energy, Conservation of Energy
5. Linear momentum
6. Collisions
7. Rotational kinematics and dynamics

8. Angular momentum and rotational energy
9. Simple harmonic motion
10. Waves and sound
11. Solid and fluid properties
12. Heat and thermodynamics
13. Kinetic theory of gases

General Physics II (algebra based sequence)

**Algebra based Physics II (w/labs) (2 nd semester, or 2 nd and 3 rd quarters) – Learning Outcomes (B.A.) -OSC015**

Algebra based Physics lecture and lab (4-5 semester hours or Physics II & III 8 – 10 quarter hours).

**Text Topics:**

**Co-requisites:** College Algebra and Pre-calculus.

**Learning Outcomes:**

Understanding and/application of the following topics using algebra concepts and methods where appropriate:\

1. Electric field, potential, forces
2. Current, magnetic field integration over continuous charge/current distribution
3. Quantum physics
4. Atomic physics
5. Nuclear physics
6. Induction and Inductance
7. Resistance
8. Capacitance
9. Basic circuit analysis
10. Electric power

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11. EMF
12. Electromagnetic waves
13. Kirchhoff's Law
14. R-L-C circuits
15. Faraday's Law
16. Conductivity
17. Geometric optics
18. Diffraction
19. Interference
20. Polarization

**Architectural Drafting (3-4 semester hours) – OET014**

Ohio Articulation Number - OET 014

Prerequisite: none

Essential Outcomes:

1. Demonstrate proper use of drafting instruments
2. Demonstrate line quality and lettering skills
3. Exhibit neatness and accuracy
4. Apply accepted graphic standards
5. Demonstrate 3-D visualization
6. Complete working drawing for residential (wood frame) construction
7. Introduce Develop working drawings for commercial installation

**Construction Estimating and Scheduling (2 to 3 semester hours) - OET020**

Prerequisite: Computer literacy, Placement beyond basic math, Architectural blueprint reading

Essential Outcomes:

1. Develop the costs associated with labor, equipment, and materials
2. Apply the concepts of overhead and profit
3. Calculate bid quantities for common construction materials
4. Create bid packages

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5. Use a computer software package to develop construction schedules

**Construction Materials Testing (2 semester hours) – OET018**

Prerequisite: Placement beyond basic math

Essential Outcomes:

1. Employ sound testing procedures on construction materials
2. Understand the relevant properties of construction materials
3. Communicate scientific information in a proper format
4. Identify the literature available for development and testing of construction materials

**Construction Methods and Materials 3-4 semester hours) - OET016**

Prerequisite: none

Essential Outcomes:

1. Demonstrate basic understanding of architectural blueprints
2. Understand the terminology related to the building construction
3. Identify the people involved in the construction industry
4. Know the origin, development and use of common building materials
5. Compare methods of construction used in buildings and heavy and highway construction

**Soils (2 to 3 semester hours) - OET017**

Prerequisite: Statics, Construction Materials Testing

Essential Outcomes:

1. Compare soil classifications
2. Understand the relationship between soil strength characteristics and design of structures
3. Demonstrate soil testing procedures
4. Identify sub-surface exploration techniques
5. Prepare technical reports

**Surveying (2 to 3 semester hours) - OET015**

Prerequisite: Placement beyond basic math

Essential Outcomes:

1. Demonstrate proper use of surveying equipment
2. Use accurate measurement techniques to solve construction related problems and produce drawings from gathered information.

3. Apply basic mathematical relationships and their application to the surveying process and determine accuracy and precision.

### **Civil/Construction Engineering Technology Tag Participants**

<b>Name</b>	<b>Institution</b>
Janet Herron	Zane State College
Reed Knowles	Owens Community College
Carol Lamb	Youngstown State University
Bob Mergel	Columbus State Community College
Robert Stroup	Southern State Community College
Benjamin Uwakweh	University of Cincinnati
Al Wahle	Sinclair Community College
John Zeit	Stark State College of Technology