

# SEC – Heavy Equipment Operation Blueprints

This document contains the blueprints for the concentration areas in secondary Heavy Equipment Operation.

Course Code(s)	Test Code	Program Name	Supplemental Materials/Notes
997400 997402 997403	10227Y1-2016	Heavy Equipment Operation	
997401 997404 997405	10227Y2-2016	Heavy Equipment Operation	

Curriculum	Perkins Assessment 2016-17		Teacher Evaluation Pilot 2016-17			
	Y1 Post-Test	Y2 Post-Test	Y1 Baseline	Y1 Post-Test	Y2 Baseline	Y2 Post-Test
Heavy Equipment Operation	MS-CPAS2*	MS-CPAS2*	NA*	NA*	NA*	NA*

\* These assessments are subject to change based on funding and policy changes/updates. Information for test coordinators will be disseminated on the ordering process for the national certification by the Research and Curriculum Unit at Mississippi State University.



# MS-CPAS2 Blueprint Summary

**Assessment:** Heavy Equipment Operation  
**Test Code:** 10227Y1-2016  
**CIP Code:** 490202  
**Course Codes:** 997400 997402 997403  
**Type:** CP

The MS-CPAS2 Blueprint Summary indicates the number of assessment questions related to each unit on the assessment and indicates the relative emphasis placed on each unit. All of the listed competencies will appear on the assessment, but because of the length of the assessment, not every competency will be equally represented in the assessment.

The MS-CPAS2 Blueprint Summary includes a variety of information, which is explained below:

Terms and Definitions	
<b>Assessment:</b>	This signifies the name of the assessment, which corresponds with the name of the pathway or program.
<b>CIP Code:</b>	Developed by the U.S. Department of Education's National Center for Education Statistics (NCES), CIP codes are a federal coding system utilized for assessment and reporting of fields of study and program completions activity tracking.
<b>Test Code:</b>	A unique code that serves to numerically identify a specific assessment
<b>DOK Levels:</b>	Based on Webb's Depth of Knowledge (DOK), this signifies the assessment item difficulty factor to be expected in each unit. The three levels are as follows: <i>1 = Recall and Reproduction, 2 = Skills and Concepts, 3 = Short-term Strategic Thinking</i> <b>Some postsecondary programs will not use DOK levels until the next revision.</b>
<b>Instructional</b>	The total number of hours assigned to a unit per the pathway's curriculum
<b>Total Items:</b>	The total number of items assigned to each unit on the assessment. It is calculated as follows: <i>(Unit Instructional Hours / Total Instructional Hours) * Total Active Items</i>
<b>Active Items:</b>	The number of items on the assessment that will be graded
<b>Field-test Items:</b>	The number of items that are being field-tested, or piloted, to determine their eligibility for inclusion as an Active Item on future assessments. These items are not graded and, thus, will not impact the student's final score.
<b>Total Assessed Items:</b>	The total number of items on the given assessment. It is calculated as follows: <i>Active Items + Field-test Items</i>

For more information regarding this MS-CPAS2 Blueprint Summary, please contact the Mississippi Assessment Center by phone at 1.866.901.7433 or by e-mail at [helpdesk@rcu.msstate.edu](mailto:helpdesk@rcu.msstate.edu).



Assessment: Heavy Equipment Operation					
Test Code: 10227Y1-2016					
CIP Code: 490202				DOK Level(s)	Instructional Hours
Total Hours: 173					Total Items
<b>Unit 1: Introduction, Orientation, Employability and Communication Skills</b>	1	2		20	9
1. Not on CPAS. 2. Describe employment opportunities and responsibilities. 3. Not on CPAS. 4. Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations.					
<b>Unit 2: Basic Safety</b>	1	2		20	9
1. Describe, define, and illustrate general safety rules for working in a shop/lab and how they relate to the construction industry. 2. Identify and apply safety around Heavy Equipment Operation operations. 3. Display appropriate safety precautions to take around common jobsite hazards. 4. Demonstrate the appropriate use and care of personal protective equipment (PPE). 5. Explain fall protection, ladder, stair, and scaffold procedures and requirements. 6. Explain the material safety data sheet (MSDS). 7. Display appropriate safety procedures related to fires. 8. Explain safety in and around electrical situations.					
<b>Unit 3: Introduction to Construction Math</b>	1	2	3	20	9
1. Apply the four basic math skills using whole numbers, fractions, decimals, and percentages, both with and without a calculator.					
<b>Unit 4: Hand and Power Tools</b>	1	2	3	20	9
1. Demonstrate the use and maintenance of hand and power tools.					
<b>Unit 5: Introduction to Construction Drawings</b>	1	2		10	5
1. Read, analyze, and understand basic components of a blueprint.					
<b>Unit 6: Introduction to Materials Handling</b>	1	2		20	9
1. Safely handle and store materials.					
<b>Unit 7: Rigging and Signaling</b>	1	2		8	4
1. Explain and identify safe signaling, rigging, and equipment. 2. Describe and apply procedures and equipment for rigging and lifting.					
<b>Unit 8: Orientation to Trade</b>	1	2		10	5
1. Explain the basic terminology, types, and uses of equipment. 2. Identify career opportunities available to heavy equipment operators and explain the purpose and objectives of an apprentice training program. 3. Explain the responsibilities and characteristics of a good operator. 4. Explain the importance of heavy equipment safety.					
<b>Unit 9: Heavy Equipment Safety I</b>	1	2		12	6
1. Explain the importance of safety when working with heavy equipment. 2. State the purposes of signs, tags, barricades, and lockout/tagout devices used on construction sites. 3. Describe the long- and short-term health effects, first-aid measures, handling and storage and/or required personal protective equipment (PPE) for a chemical using a material data safety sheet (MSDS).					



<b>Unit 10: Heavy Equipment Safety II</b>	<b>1</b>	<b>2</b>		<b>33</b>	<b>15</b>
1. Identify safeguards used in a highway construction work zone.					
2. State general guidelines for safe operation, maintenance, and transportation of heavy equipment.					
3. Explain the dangers of working around an excavation area with heavy equipment.					
<b>Unit 11 Not on CPAS</b>					
<b>Unit 12 Not on CPAS</b>					
<b>Active Items</b>					<b>80</b>
<b>Field-Test Items</b>					<b>20</b>
<b>TOTAL ASSESSED ITEMS</b>					<b>100</b>



# MS-CPAS2 Blueprint Summary

**Assessment:** Heavy Equipment Operation  
**Test Code:** 10227Y2-2016  
**CIP Code:** 490202  
**Course Codes:** 997401 997404 997405  
**Type:** CP

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Assessment: <b>Heavy Equipment Operation</b>	DOK Level(s)		Instructional Hours	Total Items
Test Code: 10227Y2-2016				
CIP Code: 490202				
Total Hours: 188				
<b>Unit 13: Heavy Equipment Safety Review</b>	1	2	0	
Not tested on CPAS				
<b>Unit 14: Identification of Heavy Equipment and Basic Operational Techniques III</b>	1	2	85	35
1. Identify and describe the types and uses of earthmoving equipment. 2. Identify and explain earthmoving equipment terms and methods. 3. Describe how to safely set up and coordinate earthmoving equipment operations. 4. Identify and explain soil stabilization methods. 5. Identify the best equipment for performing a given earthmoving operation. 6. List, in the correct order, the steps involved in an earthmoving operation. 7. Describe basic safety measures associated with operating earthmoving equipment 8. Explain how to properly inspect, start, operate, shut down, and maintain the following types of heavy equipment: backhoes, dozers, compaction equipment, earthmoving, excavators, motor graders, and off-road dump trucks.				
<b>Unit 15: Grades</b>	1	2	15	6
1. Explain the terms used in grade work 2. Identify types of stakes and explain markings on grade stakes and benchmark (BM) stakes. 3. Identify equipment used by operators to check stakes. 4. Explain different types of slopes and slope ratio. 5. Check horizontal and vertical distance of cut and fill slope stakes. 6. Check finish subgrade on a cross slope.				
<b>Unit 16: Excavation Math</b>	1	2	18	8
1. Using information provided by the instructor, calculate the volume and weight of a given excavation project.				
<b>Unit 17: Interpreting Civil Drawings</b>	1	2	20	9
1. Determine the scale of different drawings. 2. Interpret a set of drawings to determine the proper type and sequence of excavation and grading operations needed to prepare the site.				



<b>Unit 18: Site Work</b>	<b>1</b>	<b>2</b>		<b>20</b>	<b>9</b>
1. Describe the safety practices associated with site grading work. 2. Describe the methods used to control water on job sites. 3. Explain how grades are established on a job site. 4. Describe grading and installation practices for pipe-laying operations.					
<b>Unit 19: Soils</b>	<b>1</b>	<b>2</b>		<b>10</b>	<b>4</b>
1. Identify five basic types of soils, and summarize their characteristics. 2. Read results from a field density test and explain what additional compaction effort is needed. 3. Compute shrinkage and relative compaction for two different types of soils.					
<b>Unit 20: Finish Grading</b>	<b>1</b>	<b>2</b>		<b>20</b>	<b>9</b>
1. Establish a finish grade after a rough grade has been performed, according to instructions.					
<b>Unit 21 Not on CPAS</b>					
<b>Active Items</b>					<b>80</b>
<b>Field-Test Items</b>					<b>20</b>
<b>TOTAL ASSESSED ITEMS</b>					<b>100</b>