

**NCEES Principles and Practice of Engineering Examination
 CIVIL–TRANSPORTATION CBT Exam Specifications**

Effective Beginning April 2024

- The exam is computer-based. It is closed book with electronic references. The NCEES *PE Civil Reference Handbook* is included in the exam along with the design standards shown on the last two pages.
- Examinees have 9 hours to complete the exam, which contains 80 questions. The 9-hour time includes a tutorial and an optional scheduled break. Examinees work all questions.
- The exam uses both the International System of units (SI) and the U.S. Customary System (USCS).
- The exam is developed with questions that will require a variety of approaches and methodologies, including design, analysis, and application.
- The examples specified in knowledge areas are not exclusive or exhaustive.

	Number of Questions
1. Project Management	6–9
A. Quantity and cost estimating	
B. Project schedules (e.g., activity identification and sequencing)	
C. Economic analysis (e.g., present worth, lifecycle costs)	
2. Traffic Engineering (Capacity Analysis, Transportation Planning, and Safety Analysis)	10–15
A. Uninterrupted flow (e.g., level of service [LOS], capacity)	
B. Street segment interrupted flow (e.g., level of service [LOS], running time, travel speed)	
C. Intersection capacity (e.g., at grade, signalized, roundabout, interchange)	
D. Traffic analysis (e.g., volume studies, peak hour factor, speed studies, modal split, trip generation, traffic impact studies)	
E. Traffic safety analysis (e.g., conflict analysis, crash rates, collision diagrams)	
F. Nonmotorized facilities analysis (e.g., pedestrian, bicycle)	
G. Traffic forecasts and monitoring	
H. Highway safety analysis (e.g., crash modification factors, <i>Highway Safety Manual</i>)	
3. Roadside and Cross-Section Design	7–11
A. Forgiving roadside concepts (e.g., clear zone, recoverable slopes, roadside obstacles)	
B. Barrier design (e.g., barrier types, end treatments, crash cushions)	
C. Cross-section elements (e.g., lane widths, shoulders, bike lane, sidewalks, retaining walls)	
D. Nonmotorized design considerations (e.g., shared-use paths, bicycle facilities, pedestrian facilities, ADA compliance, traffic-calming features)	

4. Horizontal Design	8–12
A. Basic circular curve elements (e.g., middle ordinate, length, chord definition, radius definition, centerline stationing)	
B. Sight distance considerations	
C. Superelevation (e.g., rate, transitions, method, components)	
D. Special horizontal curves (e.g., compound/reverse curves, curve widening, coordination with vertical geometry)	
5. Vertical Design	8–12
A. Vertical alignment (e.g., geometrics, vertical clearance)	
B. Stopping and passing sight distance (e.g., crest curve, sag curve)	
6. Intersection Geometry	7–11
A. Intersection sight distance	
B. Interchanges (e.g., freeway merge, entrance and exit design, horizontal design, vertical design)	
C. At-grade intersection layout, including roundabouts	
7. Traffic Signals	5–8
A. Traffic signal timing (e.g., clearance intervals, phasing, pedestrian crossing timing, railroad preemption)	
B. Traffic signal warrants	
C. Traffic signal design	
8. Traffic Control Design	5–8
A. Permanent signs and pavement markings	
B. Temporary traffic control	
9. Geotechnical and Pavement	6–9
A. Sampling, testing, evaluation, and soil stabilization techniques (e.g., soil classifications, subgrade resilient modulus, CBR, R-values, field tests, slope stability)	
B. Soil properties (e.g., strength, permeability, compressibility, phase relationships)	
C. Compaction, excavation, embankment, and mass balance	
D. Traffic characterization parameters, pavement design, and rehabilitation procedures (e.g., flexible and rigid pavement)	
10. Drainage	8–12
A. Hydrology, including runoff and water quality mitigation measures	
B. Hydraulics, including culvert and stormwater collection system design (e.g., inlet capacities, pipe flow, hydraulic energy dissipation, peak flow mitigation/detention, open-channel flow)	

**NCEES Principles and Practice of Engineering Examination
CIVIL–TRANSPORTATION Design Standards
Effective Beginning with the April 2024 Examination**

In addition to the NCEES *PE Civil Reference Handbook*, the following codes and standards will be supplied in the exam as searchable, electronic pdf files with links for easy navigation. This NCEES [YouTube video](#) shows how standards will be presented on the exam. Standards will be provided as individual chapters on the exam, and only one chapter at a time can be opened and searched. This ensures the exam software runs large files effectively. The handbook and design standards will be available the entire exam.

Solutions to exam questions that reference a standard of practice are scored based on this list and the revision year shown. Solutions based on other standards will not receive credit.

NCEES does not sell design standards or printed copies of the NCEES handbook. The NCEES handbook is accessible from your [MyNCEES](#) account.

ABBREVIATION	DESIGN STANDARD TITLE
AASHTO GDHS-7	<i>A Policy on Geometric Design of Highways and Streets</i> , 7th edition, 2018 (including October 2019 errata), American Association of State Highway & Transportation Officials, Washington, D.C., AASHTO PE Exam Collection .
AASHTO GDPS-4-M	<i>Guide for Design of Pavement Structures</i> , 4th edition, 1993 with 1998 supplement, American Association of State Highway & Transportation Officials, Washington, D.C., AASHTO PE Exam Collection .
AASHTO GPF-2	<i>Guide for the Planning, Design, and Operation of Pedestrian Facilities</i> , 2nd edition, 2021, American Association of State Highway & Transportation Officials, Washington, D.C., AASHTO PE Exam Collection .
AASHTO HSM-1	<i>Highway Safety Manual</i> , 1st edition, 2010, with 2014 Supplement (including September 2010, February 2012, and March 2016 errata), American Association of State Highway & Transportation Officials, Washington, D.C., AASHTO PE Exam Collection .
AASHTO MEPDG-3	<i>Mechanistic-Empirical Pavement Design Guide: A Manual of Practice</i> , 3rd edition, 2020, American Association of State Highway & Transportation Officials, Washington, D.C., AASHTO PE Exam Collection .
AASHTO RSDG-4	<i>Roadside Design Guide</i> , 4th edition, 2011 (including February 2012 and July 2015 errata), American Association of State Highway & Transportation Officials, Washington, D.C., AASHTO PE Exam Collection .
FHWA HIF-12-026	<i>Hydraulic Design of Highway Culverts</i> , Hydraulic Design Series Number 5, 3rd edition, April 2012, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., www.fhwa.dot.gov .

HCM *Highway Capacity Manual* (Volumes 1–4), 6th edition, 2016, Transportation Research Board, National Research Council, Washington, D.C., www.mytrb.org.

MUTCD *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009, including Revisions 1 and 2 dated May 2012, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., www.mutcd.fhwa.dot.gov.