

Traffic Signal Design: Engineering Concepts (TE-02)

COURSE OUTLINE

Day One

8:00 AM - 8:15 AM Introductions, Outline, and Overview (BJS)

8:15 AM - 10:00 AM Module 1: Overview of Traffic Signal Design Process (CS)

- Justification, warrants, and alternative analysis
- Consideration of context (street design, land use, and future use)
- Ownership, operation, and maintenance responsibilities
- Applicable design references
- *Interactive Engagement Exercise:* Go over an example of intersection/street improvement plan, with traffic volumes, then examine and discuss options

10:00 AM - 12:00 NN Module 2: Signal Phasing, Operation, and Detection (CS)

- Relationship between signal phasing and operations
- Relationship between signal phasing and intersection design
- Detection- purpose and alternatives
- Detection- technology alternatives and selection process
- *Interactive Engagement Exercise:* Give trainees example(s) of turn templates and lane geometry, and have them determine signal phasing.

12:00 NN - 1:00 PM Lunch (on your own)

1:00 PM - 3:00 PM Module 3: Controllers and Cabinets (BJS)

- Relationship between signal phasing and controller
- Relationship between controller and cabinet
- Controller hardware and software
- Cabinet hardware
- *Interactive Engagement Exercise:* Give trainees example(s) of signal phasing diagram(s), and have them determine conflict monitor breakout(s) and cabinet output files.

3:00 PM - 5:00 PM Module 4: Signal Heads and Poles (BJS)

- Signal heads- where do they go? Visibility cones and use of PV heads, louvers, and visors. Also relationship to signal cabinet circuit breakers.
- Poles- where do they go? Consideration for pole placement- ADA, utilities, maintenance, and lighting considerations

- Mast arms- height, length, wind-load
- Signage installations on mast arms and signal poles- considerations
- *Interactive Engagement Exercise:* Give trainees an example of geometric striping plan, and have them select appropriate mast arms, signal poles, and pole foundations.

Day Two

8:00 AM - 10:00 AM Module 5: Conduit and Wiring (BJS)

- Conductor Schedule
- Conduit and pull boxes- why, where, size, type, conduit fill
- Signal interconnect- hardware
- *Interactive Engagement Exercise:* Given a basic signal phasing, ask trainees to complete a conductor schedule

10:00 AM- 12:00 NN Module 6: Intersection's Highway Safety Lighting (CS)

- Purpose
- Lighting measurements, standards, and guidance
- Typical light contours and pole placement
- Wiring, circuiting and service cabinets
- *Interactive Engagement Exercise:* Go over lighting of an intersection, give assumptions, and have trainees determine light locations and wiring

12:00 NN - 1:00 PM Lunch (on your own)

1:00 PM – 3:00 PM Module 7: Specifications and Estimates (BJS)

- Purpose- what is included?
- Key points- materials, execution, and payment
- Format- APWA, Caltrans, CSI, AIA, agency, etc
- Cost estimates- relationship to specifications, format, examples.
- Project delivery- design/bid/build, design-build, etc.
- *Interactive Engagement Exercise:* Use the trainees' drawings in Module 8, determine an engineer's cost estimate based on unit-price cost structure

3:00 PM – 4:45 PM Module 8: Drawing a Signal Design Plan (CS)

- *Interactive Engagement Exercise:* Hands-on, this is all interactive. Take information from past modules and design the traffic signals for an intersection. We will deliver blank sheets, then walk trainees through the design of a traffic signal based on information given in previous modules.

4:45 PM - 5:00 PM Wrap-Up, Course Evaluation, and Certificates (BJS)