1.0 Purpose

A. The following guideline provides information for various lighting designs for all non-classroom spaces. Classroom spaces are included as a separate guideline.

2.0 General Requirements

A. Interior Lighting

1. Follow recommendations and recommended lighting levels in the latest editions of the North Carolina Commercial Energy Code, the Illuminating Engineering Society of North America (IESNA), and the lighting levels listed within this document.

2. Design for a minimum of 38 FC and a maximum of 50 FC for all office areas.

3. Meet and do not exceed minimum code lighting level requirements.

4. The use of incandescent lighting is not permitted.

5. Fluorescent lighting fixtures shall use electronic ballasts and 4-foot linear T-8 lamps. 8-foot lamps are not permitted. T-8 lamps general specifications are as follows: 25W; 4100K Color Temperature; Minimum 75 Color Rendering Index (CRI), Low Mercury.

6. Ballast General Specifications – Total Harmonic Distortion (THD) <10%, Current Crest Factor (CCF) < 1.7, Power Factor > 0.98, Operating Frequency > 42 to 52 kHz. Ballast factor of approximately 0.87. Ballasts selected shall be labeled by the manufacturer to operate with 25 W lamps.

7. Instant start ballasts shall be used in all common areas (hallways, stairwells, etc.) and where operating time is expected to be greater than 3 hours per start. Programmed start ballasts shall be used for other areas.

8. Down lights shall be compact fluorescent or LED. Down lights shall not be installed in a gypsum wall board ceiling.

9. Occupancy sensors shall be required in all of the following spaces: Conference/Meeting Rooms; Break Rooms; Private Offices; Storage Rooms over 100 SF; Computer Rooms over 100 SF.

10. Use occupancy sensor systems (ultrasonic) to control general lighting in restrooms. Provide a minimum of one fixture in restrooms on emergency circuit to provide minimum light levels at all times.

11. Lighting fixtures in similar programmable spaces shall be of the same style and type.
B. Emergency Lighting
1. All exit lights are to be the LED type.
2. All emergency exit lighting shall be powered by batteries. Unless the building emergency exit lighting is supported by generator power.

C. Exterior Lighting – All lighting shall use LED luminaires.
1. Design Standards for Pedestrian Areas - campus walkways and activity areas within courtyards and plazas including bus stops, bike racks, and other pedestrian areas.
   a) Average light levels shall be 1.0 foot-candles;
   b) Uniformity of not more than 4:1;
   c) No area less than 0.25 foot-candle;
   d) See preferred manufacturers list for fixture and pole requirements.
2. Design Standards for Campus Streets
   a) Average light levels shall be 2 foot-candles;
   b) Uniformity of not more than 5:1;
   c) No area less than .04 foot-candle.
   d) See preferred manufacturers list for fixture and pole requirements.
3. Design Standards for Campus Parking Lots
   a) Average light levels shall be 1 foot-candles;
   b) Uniformity of not more than 3:1;
   c) No area less than .03 foot-candle.
   d) See preferred manufacturers list for fixture and pole requirements.
4. Design Standards for Pole Bases
   a) Pole bases shall be constructed using one of the following two options:
      (1) Poured–in-place concrete – Poured in-place concrete bases shall have the following design parameters: Top of concrete 3” above grade; Chamfered edges; Conduit into bases shall be 90 degree rigid PVC or metal; Ground rod integral to the base; Bolt circle 9-14” in diameter depending on pole height; ¾” diameter anchor bolts
      (2) Auger-type screw foundation – Auger-type bases shall have the following design parameters: 6” minimum hot dipped galvanized steel; 5’ long minimum; Hand hole approximately 18” below the pole anchor plate; bolt circle 9 - 14” in diameter depending on pole size; 3/4” diameter anchor bolts
   b) Pole bases shall be 2’ to 3’ beyond edge of pavement (sidewalk, streets, or parking surfaces) and in softscape. Placement in grassy areas shall be avoided or limited.
5. All luminance intensity (candela) measurements shall be made on the horizontal plane with a certified light meter calibrated to NIST standards using traceable
light sources. The calibration source shall be a color corrected CIE Illuminant A (2856 degrees Kelvin).

6. All exterior lighting shall comply with the NC State Preferred Manufacturer’s List. The Holophane Utility Series Granville Luminaire may be used in the older parts of campus and shall be approved by the Office of the University Architect. The Holophane Series shall also comply with the NC State’s Preferred Manufacturer’s List.

7. Free standing bollard, cheek wall, step lights, or below grade fixtures are not acceptable.

8. 4000 Degree Kelvin lights are required.

9. Night lighting of front building facades of major hearth buildings and their architectural detailing is acceptable.

10. Wall mounted lighting fixtures may be used in service areas where pole mounted lights are not possible. Fixtures shall be full cut off and standardized.

11. Campus courtyards and greens shall be lighted at perimeters.

12. Cast iron fluted poles and fixtures shall be salvaged for use by NC State.

13. Electrical components and ballasts shall be a tray-mounted module that can be completely replaced by unplugging one connector and installing a new module.

14. Site lighting shall be connected on separate circuits and photocells or on a contactor installed on a building. Wiring shall be continuous between poles and contain no splices except at junction boxes located near the base of each pole. Conduits for lighting circuits shall be Schedule 40 PVC and continuous from pole to pole, hand hole, or junction vault. Conduit size shall be a minimum of 1” for single circuits or 2” minimum for multiple circuits. Each pole shall have a metal or composite hand hole to provide access to wiring connections. Junction boxes shall be metal or Quazite Composolite or equal with the top labeled “ELECTRICAL.”

15. The photocell for the exterior lighting that is not mounted on poles shall be located not higher than 10 feet in an accessible exterior location for maintenance and in an area that receives adequate sunlight. Photocells shall be mounted in such a position that “light spill” from adjacent lights will not affect operation. Where photocells are not practical, timers shall be incorporated to control the operation of the lighting circuits.

16. Lighting poles shall be numbered. Each pole number shall be labeled on the pole with a permanent 1” x 8” aluminum label securely attached to the pole with an adhesive 60” above the finished grade (+/- 6”). The numbering schedule shall be provided by NC State to coordinate with existing numbering methods.