1. This section provides guidelines for light fixture selection and design.

2. Selection of materials, colors, means, and methods must be approved by Facilities Management (FM) project representative. Unless otherwise approved, the design intent would be to select materials that blend with adjacent campus building features.

3. When working on or adjacent to existing areas, match existing materials, profiles, sizes, and color as closely as possible. Older light fixtures on campus may be different than current industry standards.

4. General requirements
   a. Provide adequate, high quality, low maintenance, and energy efficient lighting.
   b. Separate wiring raceways from communication raceways by one foot (12”) minimum, where run parallel, to avoid electrical 'noise' to computer work stations caused by EMI.
   c. Install lighting in locations so that it is readily accessible using maintenance equipment that is already in use on campus.
   d. Confirm and show evidence that the existing panel capacity is capable of supporting any new loads.
   e. Design lighting systems to accommodate multiple lighting levels. Consider the use of dual level lighting designs where possible.
   f. Footcandle levels shall be in accordance with the latest Illuminating Engineering Society (IES) recommendations.
   g. Connect egress and exit lighting to the building emergency power system. Where an emergency power system is not available or is at capacity, provide battery packs with FM representative's approval.

5. Interior light fixtures
   a. Provide LED fixtures for all new construction and substantial renovations with performance as indicated below unless otherwise agreed upon with the project manager.
      i. Color temperature shall be 3500K with a minimum color rendering index (CRI) of 80. Special exemptions to color spectrum must have WWU electrical engineer approval.
      ii. Fixtures shall be tested in accordance with LM-79 for photometric measurements and LM-80 for light depreciation. Projected lumen maintenance shall be a minimum of 80% at 60,000 hours per TM-21.
      iii. Coordinate dimming requirements with WWU project manager.
      iv. Fixtures shall have a minimum 5-year warranty on the entire luminaire including the driver.
   b. Provide green, LED exit signs.
   c. Provide lensed light fixtures in food service areas.
   d. Where existing fluorescent fixtures must remain due to small scale project or budget, provide 3500K, low mercury T8 with minimum CRI 80 fluorescent lamps.

6. Exterior light fixtures
   a. Provide LED fixtures for all new construction and substantial renovations with performance as indicated below unless otherwise agreed upon with the project manager.
i. Color temperature shall be 4000K with a minimum color rendering index (CRI) of 70. Coordinate alternate solutions with the WWU project manager if the scale of the work will lead to distracting high color contrast between adjacent sources.

ii. Fixtures shall be tested in accordance with LM-79 for photometric measurements and LM-80 for light depreciation. Projected lumen maintenance shall be a minimum of 92% at 60,000 hours per TM-21.

iii. Fixtures shall have a minimum 5-year warranty on the entire luminaire including the driver.

iv. Match existing “historic” style light fixtures in the area of Old Main Quad. The fixture is mounted on a 13’high cast aluminum pole that is 3” in diameter, black in color.

v. Coordinate pole top fixtures in central and south campus with project manager. Poles shall be aluminum equal to Sterner RTA series, 10’ high with hinged base, flat base cover with rounded corners and anodic dark bronze finish.

vi. Provide shoebox style fixtures with cut-off light distribution along pathways away from central campus. Mount fixtures on 10’ high hinged, round, tapered aluminum poles. The size of the fixture differs between areas, and the designer shall match the surrounding fixtures. In all cases, consult Western project representative for more information.

b. Outdoor fixtures which are mounted so that they are recessed in the ground or recessed in concrete are unacceptable even when rated for that application.

c. Design pathway lighting to 1 footcandle, maintained, with a uniformity ratio of 4:1. Use a light loss factor (LLF) of 0.85 in lighting calculations. Provide lighting calculations during design period. Consider surrounding vegetation when locating fixtures and require trimming and pruning of existing vegetation where necessary.

d. Do not mount light fixture on walls of buildings without approval of WWU project manager.

e. All new fixtures to be installed to meet LEED “Dark Sky” requirements.

7. General university classroom and computer lab lighting

a. Provide direct/indirect fixtures for all new lighting installations.

b. For remodel projects the existing light fixtures and switching should be reviewed with university project representative and staff of Academic Technology and User Services (ATUS) for compatibility with media and computer display. At a minimum, existing lighting must provide switching and markerboard lighting as designated under “Classroom and Computer Lab Lighting Control” listed below.

8. Lighting control

a. Prefer control stations to vary illumination levels to accommodate varying space uses and available daylight.

b. Locate control stations conveniently with the front of room.

c. Control exterior lighting through the campus DDC system except for unique circumstances. Coordinate with mechanical engineer to assure correct number of points are available. Two points are generally needed: one for on/off and the other for verification.

i. Isolate exterior lighting control from general lighting control (avoid 3rd party integration to central BACS).

ii. Provide building specific photo-cell tied into local exterior lighting control.

iii. Exterior lighting must have override control through BACS for troubleshooting.

d. Light switches shall be rated 20 amperes (minimum).
e. Control building corridor lighting via addressable networked lighting control system. Lighting control system shall match that of existing building system for integration. If new installation, system shall be either ILC, Douglas Controls or Encelium, coordinate with WWU project manager for system selection.

f. Occupancy sensors
   i. In small independent spaces, use line voltage wall mounted occupancy sensor switches configured in a manual on automatic off configuration. Primary application: closets, offices, single occupant restrooms, etc.
   ii. Provide ceiling mounted occupancy sensors integrated into lighting control panel system. Primary application: large classrooms, conference rooms, multi-stall restrooms, etc.
   iii. Provide dual technology sensors utilizing both ultrasonic and passive infrared.
   iv. The consulting electrical engineer shall determine the number of sensors needed and specify where these should be located on the drawings to cover all areas of the room.

9. Classroom and computer lab lighting control.
   a. Control lighting in the front one-third of the room (nearest the projection screens) by a separate control zone.
   b. Switch the rear two-thirds of the classroom/lab space a minimum of two levels (all-on or half-on).
   c. Label all light switches and control stations in a clear manner consistent with the most current classroom switch labeling. Switch labeling method to be provided by university project representative.
   d. Mount lights above all markerboards or chalkboards mounted on the front wall just above the boards for the entire horizontal length of the boards. Fixture type shall be approved by university project representative and ATUS staff. Where projection screens are installed, particular care must be taken to assure the light fixtures do not interfere with screen.
   e. Locate switches and lighting control stations for overhead lighting at both entrance ways and on the wall immediately behind the classroom/lab podium location.
   f. Locate switches for markerboard lights only on the bank of switches behind the classroom/lab podium location.

End