PART 1: GENERAL

1.01 Luminaires

A. This standard is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design for new construction and renovations. The responsibility of the engineer is to apply the principles of this section such that the University may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be justified through Life Cycle Cost (LCC) analysis and submitted to the University for approval.

B. Lighting design shall meet the requirements of the currently adopted revision of ASHRAE 90.1 and meet the recommended illumination levels of the current edition of the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.

C. Unless specifically approved by Owner, the lighting design shall yield lighting power densities a minimum of 25% below the values allowed in the current ASHRAE 90.1 standard. For fluorescent lighting systems in new construction (or renovations with fixture replacements) and with typical ceiling heights of approximately 9 feet, this can be accomplished by using light colored wall finishes and 2-lamp high efficiency fixtures with the components specified below. Variations in lighting levels resulting from finish color, fixture spacings and height are accommodated by specifying the appropriate ballast factor.

D. For renovations where fixture replacements are not desirable, high efficiency retrofit kits are available from fixture manufacturers and third party sources that provide efficiencies equal to new high efficiency fixtures.

PART 2: PRODUCTS:

2.01 Interior Luminaires

A. All fluorescent lamps installed within conditioned spaces shall be 4-foot straight tube, F28T8, 28-watt, high lumen output energy saving type or 2-foot linear tube, F17T8 high lumen output type. All fluorescent lamps installed in unconditioned or refrigerated spaces shall be 4-foot straight tube, F32T8, 32-watt, high lumen output energy savings type. All linear 17, 28 and 32 watt fluorescent lamps shall have a minimum rated life of 24,000 hours at 3 hours/start (instant start ballast), 95% or higher lumen maintenance and have a color temperature of 4,100 K. No eight-foot lamps allowed. Use combination of 4-foot lengths in 8 foot fixtures.

B. Prismatic acrylic diffusers for fluorescent fixtures shall be A12 pattern and at least 1/8” thick. Do not use styrene lenses.

C. The following light fixtures are selected to establish examples of design intent and to set a standard of quality. Equivalent products from other manufacturers may be available and may be submitted for approval. The PSP must closely review the features and performance parameters of any alternate fixtures against the fixtures specified herein.

1. Lensed fluorescent: Energy Planning Associates F2042WT8S series with 28 watt T8 lamps, high efficiency ballast and pattern A12 lens.
2. Parabolic louvered fluorescent (decorative) – Paragon PBT24 Parabolic Troffer with two, 800 series 28W T8 lamps, normal ballast factor and a specular reflector.
3. Surface mounted lensed fluorescent: Energy Planning Associates FWC1042ET8S series with 28 watt T8 lamps, high efficiency ballast.
4. High bay fluorescent: Energy Planning Associates High Five One for One series FH5/OFO six lamp fixture equipped with 800 series T8 lamps.
5. Recessed incandescent downlight: Halo H7600T series or equal by Gotham.
6. Recessed compact fluorescent downlight: Kurt Versen Quadlite series
7. Track Lighting: Lightolier or Staff.
8. Exit Lighting: LED (light emitting diode) type only. TCP 20743DRM Series.

D. Ballasts: Fluorescent ballasts shall be high frequency, U.L. approved, CBM certified to operate as specified one, two or three T8 lamps; shall be integrated circuit type electronic constant wattage, constant light output instant start; shall have a power factor greater than 95%; shall have Class A sound rating; shall be Class P thermally protected with automatic reset; shall have a crest factor less than 1.5; shall have a total harmonic content less than 10%. Where not separately switched three or four lamp fixtures may contain 3 and 4 lamp ballasts.

Ballast factor shall be 0.77 or 0.78 for Low Powered ballasts, between 0.85 and 0.90 for Normal Powered ballasts, and greater than 1.12 for high output ballasts. All ballasts shall have a total harmonic distortion (THD) <10%.

All fluorescent ballasts shall be instant start and classified as NEMA premium efficiency. Ballasts shall designed to accommodate multiple voltage input, shall have built in anti-striation technology and utilize parallel lamp operation circuitry. Ballasts shall further be designed such that the output frequency to the lamps does not interfere with common infrared devices (typically 40kHz or greater)..

E. Do not use low pressure sodium or mercury vapor lamps

2.02 Exterior Luminaires

A. Exterior luminaires including illumination sources shall be selected based on the following performance criteria unless specifically approved otherwise:
   1. Photometric performance and high fixture efficiency.
   2. Good to excellent color rendering and minimal color temperature variance.
   3. 4,100K fluorescent lamps and 4,000K metal halide lamps.
   4. Durable, corrosion resistant fixtures and very long life lamps - Minimal luminaire O&M costs
   5. Minimize energy usage of each lighting application
   6. Minimize light pollution
   7. Exterior lighting must be readily maintainable

B. The following luminaires are selected to establish design intent and to set a standard of quality. Equivalent products from other manufacturers may be available and may be submitted for approval. The PSP must closely review the features and performance parameters of any alternate fixtures against the fixtures specified herein. All luminaires shall be UL listed for wet or damp locations depending on the application.
   1. Wallpack Luminaires: RAB Lighting WP2 cutoff wallpack, bronze, equipped with a 42 watt compact fluorescent lamp.
   2. Surface Mounted Canopy Luminaires: Paragon Series PVT4 vapor tight equipped with two, high lumen output 32 watt T8 lamps, a Miro-4 reflector and a high efficiency low or normal ballast factor ballast.
   3. Area and Parking Lot Luminaires: Die-cast aluminum with nominal 1/8" wall thickness minimum cutoff luminaire equipped with a pulse-start metal halide lamp or induction fluorescent lamp. The finish shall be corrosion-resistant polyester powder coating.

PART 3: DESIGN/DRAWING REQUIREMENTS

3.01 Interior Lighting

A. Professional Service Provider (PSP) shall perform detailed calculations of illumination levels in design space. Provide room by room tabulation of calculation input (e.g. reflectivity, fixture height, light output depreciation) and output (min-max-avg footcandles). Also provide tabulated results of lighting power density calculations showing (per room) ASHRAE allowable watts/sqft, the value at 75% of allowable, and actual design watts/sqft.

B. Use compact fluorescent lamps instead of incandescent wherever practical.

C. Fluorescent lighting may be dimmed if specified with 5% dimming ballasts and wall dimmers as manufactured by Lutron.

D. Lay-in type fluorescent fixtures must have supports to structure at two opposing corners minimum. These supports are to be attached to the fixture housing. Ceiling supports are in addition to these supports.

E. Do not provide central building lighting control systems. Use low voltage switching only where there are more than 3 switch locations.

F. In rooms or lighting zones requiring bi-level switching, provide two ballasts per fixture and split the lamps between the two ballasts (e.g. for a 2-lamp fixture, wire the north lamp to circuit "A" and south lamp to "B"). Use low voltage switching only where there are more than 3 switch locations.

G. Stairwell light fixtures shall be located such that they may be reached safely with no more than a 10-foot ladder.

H. Require in-line fuses in fixtures, which are not locally switched, or where lighting circuit should not be turned off for safety reasons. (i.e. stairwells)

I. Use dual technology occupancy sensors. Do not use motion sensors in laboratories.

J. Lighting contactors shall be electrically actuated, mechanically held.

K. Where the opportunity exists, install lighting controls to take advantage of daylighting.

L. In buildings where emergency power circuits do not exist, install emergency fluorescent ballasts on an as required based. Ballasts shall provide a minimum of 90 minutes of code required emergency lighting at compliant illumination levels. Battery packs for emergency ballast shall be rated for high temperature operation.

3.02 Exterior Lighting

A. All walkways, sidewalks, and parking lots shall be illuminated to levels recommended by the IESNA or as required to meet the Universities security needs, whichever is higher.

B. All engineering calculations of illumination levels and lighting power density shall be presented in construction documents and made available to the Utilities – Electrical Distribution department upon request.

C. Design and location of exterior lighting shall always consider tree and landscaping locations.

D. Lighting Control: Exterior building lighting shall be controlled with an astronomical time clock with manual bypass switch. Outside area and street lighting may be controlled with photoelectric cells or an astronomical time clock.

E. Exterior and site lighting shall be shown on site plan.

F. Provide pole mounting height and pole base installation detail.

G. Pedestrian Walk, Plaza Light Pole: Concrete pole, 12 feet high, equal to Ameron VBS-3.7 (2R3) in Austin, Tan color, with area cut-off HID fixture equal to Spring Catalog #Washington-118 refractive globe with final luminaire. Lamp is to be metal halide, 175W, 277v. Color of luminaire metal shall be equal to Ameron #RAL 8019, Grey Brown.

END OF STANDARD