.1 System Description

.1 The use of central low voltage lighting controls provides the University with energy management capabilities, which enhance its sustainability and reduce greenhouse gas emissions. The central control systems are programmable and tied to the overall campus energy management system.

.2 Central low-voltage controls systems are to be provided with low-voltage relays, switches, photoelectric daylighting sensors, programmable scanners, timeclocks, occupancy sensors, vacancy sensors. The preferred vendor for this system is Douglas Controls.

.3 In video conferencing spaces and spaces which are provided with dimming fluorescent and/or incandescent lighting, central relay controls with low-voltage switching shall be provided in addition to local incandescent or fluorescent dimmer controls.

.4 In classrooms, provide sufficient relays and control switches to accommodate full lighting level, 50% lighting levels, whiteboard illumination, front and back of classroom illumination. The use of luminaires with T5HO fluorescent lamps and stepped ballasts may be appropriate in these spaces.

.5 For LEED® projects, special attention to controllability of lighting must be considered in the control system design.

.2 Dimming Switches

.1 Incandescent dimmers shall be full range dimmer designed to produce 0 to 100% brightness control by means of single slider. Dimmers shall be advanced solid-state circuitry with silicon symmetrical switch, LED push button switch separate from slide to turn dimmer on/off, rated 1000 watts at 120V.

.2 Electronic low voltage dimmers shall be full range dimmers designed to produce 0 to 100% brightness control by means of single slider. They shall be provided with advanced solid-state circuitry with silicon symmetrical switches, LED push button switch separate from slide to turn dimmer on/off. Rated at 425 watts.

.3 Fluorescent line voltage dimmers shall be full range dimmer designed to produce 0 to 100% brightness control by means of single slider. These shall be provided with advanced solid-state circuitry with silicon symmetrical switch and line voltage control interfaces to work with Advance Mark X or Lutron Hi-Lume/Eco-10 T5 and T8 electronic ballasts. Units are to have LED push button switch separate from slide to turn dimmer on/off, rated at 1000 watts at 120V.

.4 Fluorescent low voltage dimmers shall be full range dimmer designed to produce 0 to 100% brightness control by means of single slider. These dimmers shall be advanced solid-state circuitry with silicon symmetrical switch with low voltage (0-10VDC) control signal to interface to Advance Mark VII or Motorola Helios T5 and T8 dimming ballasts.

.5 All dimmers shall have LED push button switch separate from slide to turn dimmer on/off and be complete with 120V power supply where required, have multi-location capability, be equipped with radio/TV interference filter. Accepted manufacturers: Lightolier Sunrise ZP425QE or Lutron Equivalent

.3 Occupancy Sensor Lighting Control

.1 Wall mounted wall switch style PIR occupancy sensors shall have adjustable delayed-off time setting 30 seconds to 30 minutes, and 180° field of view. Product shall be Wattstopper or Sensor Switch equal.

.2 Ceiling mounted PIR occupancy sensors with 120V controls shall have adjustable delayed-off time setting 20 seconds to 15 minutes, 360° field of view, and built-in isolated relay. Product shall be Leviton #ODC0S-I1W or Sensor Switch equal.

.3 Ceiling mounted PIR occupancy sensors with 24Vcontrols shall have adjustable delayed-off time setting 15 seconds to 30 minutes, 360° field of view, 24VDC supply, and built-in isolated relay. Product shall be Wattstopper 'CI' series with range suitable for coverage area and complete with Wattstopper power pack or Sensor Switch equal.

.4 Photosensitive Daylighting Control

.1 Light Level Switch shall be accomplished with indoor ceiling or wall mounted photo conductive cell that switches a circuit for a stepped ballasts off when sufficient daylight is sensed, resulting in a 50% lighting output for the luminaires being controlled Acceptable product: Wattstopper #LS-100 with range suitable for sensing area and complete with Wattstopper power pack.

.5 Exterior Lighting Electronic Time Clock/Photocell Control

.1 Electronic controls for exterior lighting shall consist of a microprocessor controlled low voltage lighting control panel with adjustments and indications built into face of controller. Douglas #WPC-5577 photometric controller. The system shall comprise of two output groups, each with three Douglas Relay outputs (max two 20Arelays per output) and two on/off momentary outputs, a master override buttons built into the control panel, memory backup (7 days), an astronomical clock and a remote photo sensor complete with weatherproof mounting package. Douglas #WPS-5527. Manufacturer: Douglas or Leviton equivalent.

.6 Exterior Lighting Combination Time Clock and Photocell Control

.1 Combination timeclosk and photocell controls shall comprise of recessed mounted adjustable photocell capable of switching 1500 watt load, a 365 day electronic timing control centre complete with photo control feature, a time clock controls 3 circuits independently, complete with manual bypass switch for each circuit and shall be complete with 24 hour reserve power timing mechanism. Manufacturer: Intermatic #ET70415CR or equivalent.

.2 Contactor to switch exterior lights to 40 Amp rated poles as required, electrically held controlled by 120 volts from photocell/time clock. Acceptable manufacturers: Square D, Cutler-Hammer

.7 Low Voltage Lighting Switching System

.1 Low voltage relays shall be mounted in lighting relay cabinet sized to hold relay groups complete with barriers for relays from different sources, sequencer/scanner/scheduler, nodes, modules, controls, and transformer. Each relay cabinet shall be provided with four spare relays minimum. Control relays for new cabinets to be 2 wire, latching, 20A, 1-pole HID type. Douglas #WR-6161 and control relays for KO type cabinets to be 2 wire, latching, 20A, 1-pole KO mount type. Douglas #WR-6221. Provide additional enclosures as required to house new relays.

.2 Transformer shall be 120V primary/24V secondary, 40VA steady draw. Douglas #WR-4075-120. Source of power to transformer shall be from emergency power distribution.

.3 Sequencers/Scanners shall provide programmable Douglas sequencers/scanners #WRS-2224.

.4 Systems shall have network nodes at each lighting control panel for communications between panels using LON Works protocol. Douglas#WNX-2624.

.5 Low voltage switches shall be Douglas low voltage switches complete with mounting brackets and brushed stainless steel cove plates. Provide filler plates in unused button sections. Switches shall be:

.1 2 Wire LED switches Élan Series capable of switching up to minimum (8) eight low oltage relays. Douglas #WR-8600 Series.

.2 2 Wire Mullion type #WN-3851/WN-38012 capable of switching up to minimum four (4) low voltage relays.

.3 2 Wire non-LED switches #WR-8001 capable of switching up to minimum (8) eight low voltage relays.

.4 Programmable data line switches to control groups of relays from anywhere in theW-2000 network (i.e. useful for master switching stations). Douglas #WNS-2300 Series.

.5 Key switches to be Douglas #WRK-8611.

.6 Provide LAN/web-based interface for remote monitoring by UVic Electrical Shop. Douglas Network Manager #WNP-2150. Provide data outlet at lighting controls location in Electrical Room and connect to network manager.

.7 Provide 120V relay connected to local lighting circuit. Connect this relay to a Delay Timer (Douglas #WTS-4181) and connect the delay timer output to the programmable scanner input to indicate power failure. In the event of a power failure, all lighting relays for circuits from Emergency Power Panel to be enabled.

.8 Interior Lighting Time Clock Control

.1 For University residence buildings, a central low-voltage control system may not be required and in such cases, time clock controlling 3 circuits independently, complete with manual bypass switch for each circuit shall be provided. Control of corridor lighting shall be such that emergency night lighting is left un-switched while the remaining lighting is controlled by timer to reduce energy consumption by turning parts of the corridor lighting off at late night hours. Manufacturer: TORK 'W' series.

.2 Interface the corridor lights to turn on when the fire alarm system is activated.

.9 Installation

.1 Locate and install equipment such that it is acceptable to maintenance staff and to keep noise away from teaching spaces.

.2 Provide complete system verification and commissioning including training to University Maintenance staff.