Subject Description Form

Subject Code	**BSE2101**
Subject Title	**Electrical Installations I**
Credit Value	3
Level	2
Pre-requisite Co-requisite Exclusion	BSE1101 Electrical Fundamentals Nil Nil
Objectives	Aims: 1. To provide basic understanding of the power supply distribution in buildings. 2. To introduce the requirements of the local electricity supply rules, regulations and codes of practice. 3. To explain the design approaches and the means of safety protection for low voltage power distribution in buildings.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) identify and interpret the relevant codes, standards and regulations for electrical power distribution system; b) identify the procedures/methods of electrical installation design; c) perform basic calculations and apply the results for the design of an electrical installation system;
Subject Synopsis/ Indicative Syllabus	Distribution in buildings: Schematic diagram for a typical commercial building, transformer room, main LV switchroom, circuit arrangement. Local Legislation and others: Electricity Ordinance CAP 406, Code of Practice for Electricity (wiring) Regulations, Supply rules by power companies, IEE Wiring Regulations, other local COPs, such as COP for Energy Efficiency, COPs of FSD, etc. Loading estimation: Power density method, allowance for diversity, calculation of maximum current demand, power factor correction, capacitor banks. 3-phase transformers - Construction and principles. Auto-transformer, current transformers, and operating principle, efficiency Synchronous generators – Principle, size, rating, application. Synchronous performance and characteristics. Effects of load changes. Standby and emergency supplies: Statutory requirements for essential power supplies. FSD's requirement. Standby generator selection, sizing, starting and control. UPS system. Selection of cables: Cable sizing, different types of cable and their characteristics, factors affecting the current carrying capacity of cables, voltage drop calculation. Overcurrent protection: Protection principles and requirements. Overload and short circuit protection, short circuit current calculation, breaking capacity sizing of protective device Protection against electric shock: Earthing system, earth leakage and earth fault protection. Automatic disconnection and equipotential bonding. Protective conductor sizing.

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<td>Teaching/Learning Methodology</td>
<td>Approach:
A systematic approach is to be taken. Firstly, students will be introduced to the basic concept of building power distribution system. Explanation with the electrical schematic diagram will help them understand the overall picture of an electrical installation system. Then they will be led to understand the key components like transformer, generator, the low-voltage supply system, electricity distribution system and safety protection of the power supply system. Individual equipments and devices will be discussed for each system. Circuit theories will be introduced wherever necessary for the explanation of the principles. A site visit to electrical plant rooms will be arranged to arouse students' interest as well as to consolidate their understanding in electrical installation systems. Engineering practices will be discussed through plant room visit.

Coursework assessment:
The continuous assessment work is made up of in-class assessment, lab reports and fieldwork reports.

Examination: 60%</td>
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<td>Assessment Methods in Alignment with Intended Learning Outcomes</td>
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<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td>Laboratory reports</td><td>15</td><td>✓</td><td></td><td>✓</td></tr>
<tr><td>In-class assessment</td><td>20</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Fieldwork reports</td><td>5</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>End-of-semester examination</td><td>60</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td colspan="3"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assessment of students' performance in the subject will comprise coursework (40%) and examination (60%).

The coursework will include:
• in-class assessment; and
• laboratory reports and fieldwork reports.
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Student Study Effort Expected	Class contact:	
	▪ Lecture	20 Hrs.
	▪ Tutorial	10 Hrs.
	▪ Laboratory	6 Hrs.
	▪ Site visit	2 Hrs.
	▪ Assessment	1 Hrs.
	Other student study effort:	
	▪ Self study	40 Hrs.
	▪ Fieldwork report	5 Hrs.
	▪ Assessment preparation	10 Hrs.
	▪ Exam preparation	20 Hrs.
	Total student study effort	121 Hrs.
Reading List and References	Hughes Electrical Technology, revised by I. Mckenzie Smith, Longman Scientific & Technical, 1995 Laws of Hong Kong, Electricity (Cap. 460) Laws of Hong Kong, Emergency Powers (Extension and Amendment Incorporation) (Cap.251) EMSD Code of Practice for the Electricity (Wiring) Regulations, 2009 Supply Rules, the latest edition, CLP, HK. IEE Wiring Regulations, the 17th edition, 2001 ASEE illustrated Guide to the IEE Regulations for electrical installation, Surrey: ASEE, 1992 The Electrician's Guide to the 17th edition of the IEE Wiring Regulations: BS7671:2008 and building regulations, J. Whitfield, 2008	