

Subject Description Form

Subject Code	BSE2301
Subject Title	Plumbing & Drainage
Credit Value	3
Level	2
Pre-requisite Co-requisite Exclusion	BSE1201 Thermofluids Nil Nil
Objectives	This subject aims at equipping students with the abilities required in designing basic water supply and drainage systems in buildings, taking into considerations of relevant water supply and drainage rules, regulations and other codes of practice.
Intended Learning Outcomes	Upon completion of the subject, students will be: <ul style="list-style-type: none"> a) able to apply relevant codes, standards and regulations pertaining to basic plumbing and drainage design and installation; b) able to appraise and select system components for basic plumbing and drainage systems in buildings; and c) able to perform plumbing and drainage calculations for design and installation.
Subject Synopsis/ Indicative Syllabus	<p>Fundamental Fluid Mechanics and Hydraulics: Steady flow in pipes; flow resistance in pipelines; resistance coefficients in pipelines; flow in pipe orifices; flow in open channels; Applications of Bernoulli equation, Chezy equation and Manning equation.</p> <p>Cold and Hot Water Systems: supply demand; pipe loss; pipe sizing; various water supply systems in buildings; system components; pipe materials; water heating; water heaters; hot water storage.</p> <p>Above- and Below-ground Drainage Systems: drainage loading; pipe and gutter sizing; various drainage systems in buildings; system components; pipe materials; pipe gradient and invert level.</p> <p>Pumps: pump performance curve; system characteristics curve; operating point; pump similarity laws; pump materials.</p> <p>Gas Distribution Systems: fuel gas gross calorific value; gas pipe sizing; flue pipe sizing; gas safety; compressed air system; sizing of compressed air system components.</p> <p>Rules and Regulations: building regulations; waterworks regulations; drainage regulations; technical memorandum; code of practices; practice notes; design guides.</p> <p>Special Topics: health concerns in plumbing and drainage systems; rainwater harvesting system; swimming pool filtration system; introduction to water and wastewater treatment systems; introduction to medical gas system.</p>
Teaching/Learning Methodology	A systematic approach is to be taken. Students will have the basic concept of the plumbing and drainage (P & D) systems and technologies first. Components and equipment are then discussed to reinforce student's understanding of the actual systems. Theories will be introduced wherever necessary to understand principles. Practices will be discussed in lectures and tutorial sessions as and when required.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			a	b	c			
	In-class assessment	40	✓	✓	✓			
	Assignment		✓	✓	✓			
	Laboratory reports			✓	✓			
	End-of-semester - examination	60	✓	✓	✓			
Total	100%							
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>The continuous assessment work is made up of in-class assessment, assignment and laboratory reports.</p>								
Student Study Effort Expected	Class contact:							
	▪ Lecture	22 Hrs.						
	▪ Tutorial	10 Hrs.						
	▪ Laboratory	6 Hrs.						
	▪ In-class assessment	2 Hrs.						
	Other student study effort:							
	▪ Self study	38 Hrs.						
	▪ Assignment	8 Hrs.						
	▪ Laboratory report	6 Hrs.						
	▪ In-class assessment preparation	8 Hrs.						
	▪ Examination preparation	20 Hrs.						
	Total student study effort		120 Hrs.					
Reading List and References	<p>CIBSE Guide G : Public Health Engineering, CIBSE (2014)</p> <p>Handbook on Plumbing Installation for Buildings, Water Supplies Department (2016)</p> <p>Technical Requirements for Plumbing Works in Buildings, Water Supplies Department (2018)</p> <p>Hot and Cold Water Supply, R.H. Garrett, Blackwell (2008)</p> <p>Plumbing Engineering Services Design Guide, Institution of Plumbing (2002)</p> <p>Environment and Services, Peter Burberry (1997)</p> <p>Water and Wastewater Technology, M.J. Hammer (2012)</p> <p>Building Services and Equipment, F. Hall, Longman (1994)</p> <p>Building Services Engineering, D.V. Chadderton, Routledge (2013)</p>							