Subject Description Form

Subject Code	BRE2031
Subject Title	Environmental Science
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to: Equip students with a holistic understanding of the factors that contribute to the quality and performance of the built environment with respect to the technical knowledge learned in construction technology.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand the means of controlling the internal environment and provide standards of utility and comfort whilst utilizing principles of passive design to minimize the consumption of energy b. Review the causes of indoor air pollution and the means to provide a healthy environment. c. Consider the effect of building construction and operation on the environment and appraise the role of sustainable development in minimizing impact on the external environment – use of resources, waste generation, and pollution.
Subject Synopsis/ Indicative Syllabus	**Brief Syllabus Content:** Man and heat, heat transfer mechanisms, conduction, convection, radiation, thermal comfort. Climate and shelter, classification, global mechanisms, climatic data, micro-climatic building design. Design variables for energy efficient design and thermal performance of a building. Passive and active thermal controls, heating, refrigerators, ventilation and air conditioning. Principles of light, electromagnetic radiation, vision, luminance, glare, natural lighting and artificial lighting. Principles of sound, noise, noise transfer, insulation, acoustic design. Use of resources, energy efficiency, waste reduction, land use, damage to the environment, sustainable development. Environment assessment.

Indoor air quality.

Experimental work:

Environmental Science: 2 experiments each of 1 hour duration from the following list:-

1. Lamps – measurement of efficiency.
2. Visual environment - assessment of quality.
3. Light fittings - determination of intensity distribution.
4. Daylight – measurement of daylight factor.
5. Absorption - determination of sound absorption coefficient.
6. Oral environment - use of sound level meter to investigate.
7. Reverberation - measurement or reverberation time.
8. Thermal comfort - investigation using thermal comfort meter.
9. 'U' values - determination of 'U' value of a building element.
10. Thermal radiation - measurement of radiant temperature.

Teaching/Learning Methodology

Teaching periods will adopt a range of methods which could include lectures by staff, small group discussions, student presentations, project based and problem-solving tasks, laboratory and case study work. Where appropriate, the use of computer assisted learning techniques will be employed.

The intention is to create an environment that encourages active learning. Students will be encouraged to reflect on their learning activities to review what they have learned and to plan further action and activity.

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			
1. Coursework	40	√	√	√			
2. Examination	60	√	√	√			
Total	100						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Examination and coursework will constitute the 60% and 40% of the overall work of the subject respectively. The coursework mark will be based on the assessments of assignments projects, presentations, peer-group critiques and in-class tests. Assessment methods are intended to ensure the students achieve the learning objectives set, and assist learning through constructive feedback.

Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Tutorials including experiments	13 Hrs.
	Other student study effort:	
	▪ Independent Study including assignments and project works	81 Hrs.
	Total student study effort	120 Hrs.

Reading List and References

Reading List:

Burberry P. (1997) *Environment and Services*, Addision Wesley Longman.

Langston, C. (Ed.) (1997) *Sustainable Practices: ESD and the Construction Industry*. Envirobook, Sydney Aus.

Thomas, R. (Ed) (1996) *Environmental Design*, E & F N Spon, London & N.Y.

Hyde, R. and Woods, P. (2000) *Climate Responsive Design*, E & F N Spon, London & N.Y.

McMullan R. (1992) *Environmental Services in Building*. The Macmillan Press Ltd.

Wathern P. (1990) *Environmental Impact Assessment, Theory and Practice*. Routledge

Supplementary:

BRE (various) *Digests and Current Papers*. Building Research Establishment, Garston, Watford, U.K.

BSIRIA (1987) *Building Services Materials Handbook*, E & F N Spon, London & N.Y.