Subject Description Form

Subject Code	BRE204
Subject Title	Structure I
Credit Value	3
Level	2
Pre-requisite	AMA1110
Objectives	a) Encourage an appreciation of the structure of buildings. b) Develop concepts of structural action, leading to an ability to model, analyse and design common elements and structural frames, by understanding simple structural framing.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Use mathematical modelling to explain the behaviour of building materials and structures. b) Apply the concepts of structural mechanics to solve structural problems involving beams, columns and statically determinate frames. c) Quantify and analyse the internal and external forces (i.e. internal moments/stresses and external loads) acting within and upon a structural component under various anticipated loading conditions. d) Design simple structural elements to withstand these forces in their respective loading conditions.
Subject Synopsis/ Indicative Syllabus	*Identification of forces and their effects on structures*: Point and distributed static loading, (quasi-static) wind loading, load transfer in common building structures of various forms. Reaction of structural materials to imposed loads (with induced stresses and deformation). *Statically determinate truss*: Computation of internal forces using the Method of Joints and Method of Section. *Stresses*: The induced stresses as a combination of tension, compression, flexural bending moment and shear. *Beams*: Simple flexural theory, computation of bending stresses, shearing force and bending moment distribution, deformation and deflection of beams, sizing of simple steel beams to current codes. *Columns and walls*: Simple buckling theory of columns, effective length and slenderness ratio in relation to fixity conditions, combined stresses as subjected to eccentric axial load, sizing of steel columns to current Hong Kong Standard.
Teaching/Learning Methodology	Interactive Lectures will enable students to: 1. analyse the internal forces of truss members, beams and columns; 2. analyse the strength of the materials for axial, bending and shear loadings. 3. apply the structural concept to design simple beams, columns and connections.

Tutorial will enable students to:

1. consolidate the structural mechanics and analysis concepts through problem-solving assignments and discussions.

Laboratory will enable students to:

1. identify the structural behaviour of simple truss, beams, and columns.

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	d
1. Problem-solving assignment	10.5	√	√	√	√
2. Laboratory report	4.5		√	√	
3. Mid-term test	15	√	√		
4. Final examination	70	√	√	√	√
Total	100 %				

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

The problem –solving assignments are used to assess students' ability to solve structural engineering problems with good numerical accuracy based on the theories and concepts studied in the lectures.

The laboratory report is used to assess students' ability to observe and verify the structural behaviour of model beams, truss and columns and to present the experimental results in a logical and clear format.

The mid-term test and the final examination are used to assess students' i) understanding of the structural engineering theories and concepts learned in the lectures and ii) ability to solve structural engineering problems with good numerical accuracy.

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial and Laboratory	13 Hrs.
Other student study effort:	
▪	96 Hrs.
▪	Hrs.
Total student study effort	135 Hrs.

Reading List and

1. Alexander Chajes "Structural Analysis", Prentice Hall 1990.

References	2. Aslam Kassimali “Structural Analysis”, PWS publishing 2010. 3. Hibbeler, R.C. “Mechanics of Materials”, Prentice Hall 2011. 4. James M. Gere and Barry J Goodno “Mechanics of Materials” 8th edition, Cengage Learning, 2009. 5. T.J. MacGinley “Structural Steelwork Design to Limit State Theory” 6. Code of practice for Structural Use of Steel 2011, Buildings Department, the Government of HKSAR 7. F. P. Beer and R. Johnson, “Mechanics of Materials”, 4nd edition, McGraw Hill, 2006.