IFoA Syllabus CT6	ISEG
(vii) 1. Be familiar with the principles of Multiple Linear Regression and the Normal Linear Model.	GLM – 1.1-1.7 Review of linear regression model.
2. Define an exponential family of distributions. Show that the following distributions may be written in this form: binomial, Poisson, exponential, gamma, normal.	GLM – 2.2 Exponential family of distributions: introduction. 4.1 The Normal model. 4.2 The Exponential and Gamma models. 5.1 The Binomial model. 5.2 The Poisson model.
3. State the mean and variance for an exponential family, and define the variance function and the scale parameter. Derive these quantities for the distributions in 2.	GLM – 2.3 Natural and scale parameters. Mean and variance. Variance function. 4.1 The Normal model. 4.2 The Exponential and Gamma models. 5.1 The Binomial model. 5.2 The Poisson model.
4. Explain what is meant by the link function and the canonical link function, referring to the distributions in 2.	GLM – 2.4 Introduction to Generalized Linear Models: link functions, canonical link function, linear predictor.
5. Explain what is meant by a variable, a factor taking categorical values and an interaction term. Define the linear predictor, illustrating its form for simple models, including polynomial models and models involving factors.	GLM – 2.5 Variables, factors, interactions. Parametrisation.
6. Define the deviance and scaled deviance and state how the parameters of a GLM may be estimated. Describe how a suitable model may be chosen by using an analysis of deviance and by examining the significance of the parameters.	GLM – 2.6 Deviance and scaled deviance. 3.1 Review of Maximum Likelihood theory. 3.2 Point and interval estimation. 3.3 Test of hypotheses on individual parameters. 3.4 Test of linear restrictions - nested models.
7. Define the Pearson and deviance residuals and describe how they may be used.	GLM – 2.7 Pearson and deviance residuals.
8. Apply statistical tests to determine the acceptability of a fitted model: Pearson's Chi-square test and the Likelihood ratio test.	GLM – 3.5 Model fit and model comparison.