Practical work to be conducted using electronic spreadsheet / EXCEL/ Statistical Software Package/ SPSS/ calculators.

ESSENTIAL READINGS:

- Balagurusamy (2017): Reliability Engineering; Wiley
- Sinha, S.K(1986): Reliability and Life testing; Wiley Eastern.

SUGGESTIVE READINGS:
- Barlow, R.E. and Proschan F. (1981): Statistical Theory of Reliability and Life Testing; Holt, Rinehart and Winston. (Reprint)
- Lawless, J.F. (2011): Statistical Models and Methods for Life Time Data, 2nd edition; John Wiley.
- Bain L.J. and Max Engelhardt (1991): Statistical Analysis of Reliability and Life Testing Models; Marcel Dekker.
- Nelson, W (2003): Applied Life Data Analysis; John Wiley.
- Rand M and Hoyland A (2020): System reliability theory, Models, Statistical methods and its applications 3rd edition; Wiley.
- Zacks, S (2011 softcover published and 2012 eBook published): Introdcution to Reliability Analysis, Springer Verlag

Note: Examination scheme and mode shall be as prescribed by the Examination Branch University of Delhi, from time to time.

DISCIPLINE SPECIFIC ELECTIVE COURSE-6C: GENERALIZED LINEAR MODELS

CREDIT DISTRIBUTION, ELIGIBILITY, AND PRE-REQUISITES OF THE COURSE

Course title &code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lectures	tutorials	practical		
Generalized Linear Models	4	3	0	1	Class XII Pass with Mathematics	Knowledge of general linear models

Learning Objectives:
Learning objectives include:

- Provide the ability to learn and use linear and non-linear models for normal data
- Developingabilitytolearngeneralizedlinearmodelsfornormalandnon-normal responses.

Learning Outcomes:
After completion of this course, students should be able to:

- Use linear and Non-linear models, apply data transformations, and appreciate the need and uses of generalized linear models.
- Use logistic and Poisson regression models.
- Understand deviance, analysis of deviance, Lack-of-Fit tests in Logistic and Poisson regression, and the concept of overdispersion.
- Use Log linear models for contingency tables, and likelihood ratio tests for various hypotheses including independence, marginal and conditional independence, and partial association.
- Understand graphical and non-graphical models.
- Use the concepts of Generalized Linear Models in real life problems.

SYLLABUS OF DSE - 6C

UNIT I   (11 Hours)
Nonlinear Regression Models
Review of linear regression models, Nonlinear regression models, Origins of Nonlinear Models, Transforming to a Linear Model, Estimation of parameters and Statistical Inferences in nonlinear regression.

UNIT II   (12 Hours)
Logistic regression models
Logistic regression models, Estimation of parameters, Statistical Inferences on model parameters, Confidence Intervals, Lack-of-Fit tests, and Diagnostic checking in Logistic regression.

UNIT III   (12 Hours)
Poisson Regression Models
Poisson regression models, Estimation of parameters in Poisson regression, Applications in Poisson regressions. Overdispersion in Logistic and Poisson regression models. Link function.

UNIT IV   (10 Hours)
Log-Linear Models
Log-linear models for contingency tables: interpretation of parameters, Estimation of parameters, likelihood ratio tests for various hypotheses, Graphical and decomposable models.

PRACTICAL/LABWORK-30Hours

List of Practical

1. Fitting of non-linear regression model.
2. Fitting of logistic regression model.
3. Tests of hypotheses about parameters.
4. Analysis of deviance.
5. Lack-of-Fit tests in Logistic regression.

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6. Fitting of Poisson regression model.
7. Log-linear models for contingency tables.
8. Tests for independence,
9. Tests for marginal and conditional independence,
10. Tests for partial association.

Practical work to be conducted using electronic spreadsheet /EXCEL/Statistical Software Package/ SPSS/ calculators.

ESSENTIAL READINGS
- Dobson, A.J. and Barnett, A.G. (2018): Introduction to Generalized Linear Models, 4th ed., Chapman and Hall/CRC. London.
- Myers, R.H., Montgomery, D.C., Vining, G.G. and Robinson, T.J. (2010): Generalized Linear Models with Applications in Engineering and the Sciences, 2nd ed., John Wiley & Sons.

SUGGESTED READINGS:
- McCullagh, P. and Nelder, J.A. (1989): Generalized Linear Models, 2nd ed., Chapman and Hall.
- Montgomery, D. C., Peck, E. A., & Vining, G. G. (2021). Introduction to Linear Regression Analysis (6th ed.). John Wiley and Sons.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch University of Delhi, from time to time.

DISCIPLINE SPECIFIC ELECTIVE COURSE–6D: ADVANCED STOCHASTIC PROCESSES

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Advanced Stochastic Processes	4	3	0	1	Class XII Pass with Mathematics.	Advanced Knowledge of Probability Theory and Probability distributions

Learning Objectives:
The learning objectives include:
- To define, design and build stochastic models
- To model and analyze transitions through Markov chains