

University of Toronto, Department of Mechanical and Industrial Engineering

Winter session 2016

Graduate course MIE 1721S – Reliability

Instructors: D. Banjevic

Timing: Three hours/week, for 14 weeks, Thursdays 6-9 PM, room BA1240

Office hours: Thursday 5-6 and by appointment, room: BA8139

Course work: Two assignments (10%, first on February 4, due on February 11, second on March 24, due on March 31), mid-term test (35%, Feb. 25), final exam (55%, April 14).

Web-site: On Portal

COURSE OUTLINE

Textbook: John P. Bentley: Reliability and Quality Engineering, second ed., Addison-Wesley, 1999.

Recommended: An Introduction to Reliability and Maintainability Engineering, C.E. Ebeling, Waveland Press, Inc, 2005; lot of exercises (second edition).

Tentative list of topics that will be covered from the Bentley's book is given below. Additional topics and extensions will be considered. All exercises are recommended, except ones not covered. A moderate knowledge of probability and statistics is assumed as a requirement.

1. Principles of quality: 1.1, 1.2, 1.4 - self study
2. Principles of reliability: All.
3. Reliability of systems: All.
4. Failure rate data and models: 4.1-4.5, (4.6, 4.7 optional).
5. Quality and reliability in design and manufacture: some sections will be covered, such as 5.5-5.7, depending on timing.
6. Reliability and availability in maintenance: all.
7. Protective systems for hazardous process: general principles will be covered, details will depend on timing

Some additional material will be available on web-site.

List of some useful books:

Barlow, R.E., and Proschan, F. (1975). *Statistical Theory of Reliability and Life Testing: Probability Models*.

Kapur, K.C., and Lamberson, L.R. (1977). *Reliability in Engineering Design*.

Cox, D.R., and Oakes, D. (1984). *Analysis of Survival Data*.

Meeker, W.Q., and Escobar, L.A. (1998). *Statistical Methods for Reliability Data*.

Ross, S.M. (1988). *A First Course in Probability*.

Crowder, M.J., Kimber, A.C., Smith, R.L., and Sweeting, T.J. (1994). *Statistical Analysis of Reliability Data*.

Blischke, W.R., and Murthy, D.N.P. (2000). *Reliability: Modeling, Prediction, and Optimization*.

Jardine, A.K.S., and Tsang, A.H.S. (2012). *Maintenance, Replacement and Reliability*, second ed.