ABET Course Syllabi for IND E 426: Reliability Engineering and System Safety

1. **Course number and name:** IND E 426: Reliability Engineering and System Safety

2. **Credits and contact hours:** 4 credit hours, 4 hours per week

3. **Instructor’s name:** Kailash C. Kapur

4. **Text book, title, author, and year**
   - Reference books, journals and technical manuals

5. **Specific course information**
   5a. **Brief description of the content of the course (catalog description):**
       Reliability and system safety measures. Life distributions and their applications in reliability. System reliability models. Design by reliability and probabilistic design. Reliability and safety analysis through FMECA and FTA. Reliability estimation and measurement by testing for binomial, exponential, and Weibull distributions.
   5b. **Prerequisites:** IND E 315
   5c. **Required, elective, or selected elective (as per Table 5-1) course in the program:** ELECTIVE

6. **Specific goals for the course**
   6a. **Specific outcomes of instruction**
       - Students will be able to define and develop measures for reliability and safety
       - Students will be able to model reliability by various life distributions
       - Students will be able to compute system reliability
       - Students will be able to relate reliability and safety factor
       - Students will be able to estimate reliability by product testing
       - Students will be able to understand design and management of reliability programs

   6b. **explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.**

   a) an ability to apply knowledge of mathematics, science and engineering (through homework, exams and lectures)
   c) an ability to design a system, component, or process to meet desired needs (in terms of reliability – design for reliability)
   e) an ability to identify, formulate, and solve engineering problems (through homework, exams and lectures)
   f) an understanding of professional and ethical responsibility (through lectures and examples in class)
h) the broad education necessary to understand the impact of engineering solutions in a global and societal context (through lectures and examples in class)
i) a recognition of the need for, and ability to engage in life-long learning (through lectures and examples in class)
j) a knowledge of contemporary issues (through lectures and examples in class)
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (through homework, exams and lectures)
l) an understanding of the integrated nature of the discipline (through homework, exams and lectures) and (through lectures and examples in class)

7. Brief list of topics to be covered

- Intro to Reliability & Safety Engineering and Design
- Life Distributions
- Complex System Models & Reliability Block Diagrams
- Design by Reliability & Probabilistic Approach
- Relationship between reliability and Safety Factor
- Failure Modes, Effect and Criticality Analysis [FMECA]
- Fault Tree Analysis [FTA]
- Reliability Estimation – Binomial Distribution
- Reliability Estimation – Exponential Distribution
- Reliability Estimation – Weibull Distribution
- Management of Reliability Programs