1. Course number and name - CHBE 4515 – Chemical Process Safety *(required)*

2. Credits and contact hours - 1 credit hours, 1 lecture hour (1-0-0-1)

3. Instructor’s or course coordinator’s name – Dr. Chris Jones

4. Textbook, title, author, and year

5. Specific course information
   a. Catalog Description – Fundamental sources of chemical hazards and degree of risk. Process design and hazard avoidance are used to reduce risk.
   b. Prerequisites or co-requisites – CHBE 3210 Transport Phenomena II (grade “C” or better); CHBE 3225 Separations Processes (grade “C” or better); CHBE 4300 Kinetics and Reactor Design (grade “C” or better).
   c. Required, elective, or selected elective course (as per Table 5-1) – Required

6. Specific goals for the course
   a. Specific outcomes of instruction:
      By the end of this course, a student should be able to:
      1) Develop an awareness of safety culture
      2) Evaluate effect of toxicants and other hazards
      3) Quantitatively analyze release and dispersion rates of liquids and vapors
      4) Analyze fire and explosion hazards
      5) Integrate safety concepts into chemical process design
   b. Connection with Student Outcomes
      | CHBE 4515 | Student Outcomes |
      |-----------|------------------|
      | Course Outcome 1 | (1) (2) (3) (4) (5) (6) (7) |
      | Course Outcome 2 | X X |
      | Course Outcome 3 | X X X |
      | Course Outcome 4 | X X X |
      | Course Outcome 5 | X X X |

**Student Outcomes**
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
(3) an ability to communicate effectively with a range of audiences
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies
7. **Brief list of topics to be covered**
   a. Accident process/loss statistics, inherent safety, safety culture, ethics
   b. Toxicology
   c. Industrial hygiene
   d. Source models
   e. Toxin release and dispersion
   f. Fires and explosions
   g. Relief and safety devices
   h. Hazard identification and risk analysis
   i. Case studies