APPENDIX A – COURSE SYLLABI

1. **Course number and name**: 0915321 Chemical Engineering Thermodynamics 1
2. Course Prerequisite: 0905212 Chemical Engineering principles II

3. **Credits, contact hours, and categorization of credits in Table 5-1** (math and basic science, engineering topic, and/or other): (3 Cr. – Required Course)
4. **Syllabus URL**: http://elearning.ju.edu.jo

5. **Instructor's or course coordinator's name**: Dr. Ali Khalaf Al-Matar. Office: ChE307, Telephone: 06/5355000 ext 22890, Email: aalmatar@ju.edu.jo .

6. **Textbook, title, author, and year**: Yunus A. Çengel and Michael A. Boles, 'Thermodynamics: An Engineering Approach', 8th edition, McGraw-Hill, 2014.
   a) S Moran, M. J., Shapiro H. N., Boettner, D. D., Bailey, M. B., 'Principles of Engineering Thermodynamics', 7th edition, John Wiley & Sons Inc., 2012
   b) Smith, J. M. Van Ness, H. C. and Abbott, M. M. 'Introduction to Chemical Engineering Thermodynamics', 7th edition, McGraw-Hill, 2004.
   c) Sandler, S.I., 'Chemical, Biochemical, and Engineering Thermodynamics', 4th edition, John Wiley & Sons Inc., 2006.
7. **Live stream platform**: Microsoft Teams
   Live Stream URL: https://web.microsoftstream.com/video/e671b758-d51c-4d1e-8f8a-305a705cb387
   YouTube: https://www.youtube.com/channel/UC2aLJ_dDpSM-pQjuOh1R9cw

8. **Specific course information**
   a. **Catalog description** (2010 ChE Curriculum): Introduction to engineering thermodynamics. Analytical and generalized equations of state. Applications of the first law of thermodynamics: Conservation of energy, flow and nonflow processes, work calculations. Applications of the second law of thermodynamics: reversible and irreversible processes, entropy relations. Departure functions based on analytical and generalized relationships. Thermodynamic cycles for common energy systems.
   b. **Prerequisite**: 0905212 Chemical Engineering principles II
   c. **Indicate whether a required, elective, or selected elective** (as per Table 5-1) course in the program: required course.

9. **Specific goals for the course**
   a. Specific outcomes of instruction (e.g. The student will be able to explain the significance of current research about a particular topic.)
      i. Appreciate the role of thermodynamics to society and the need to energy.
      ii. Study the properties of pure substance.

iii. Analyze systems with control volumes and control masses.
iv. Analyze processes of steady and un-steady flow.
v. Derive the second law of thermodynamics: reversible and irreversible processes; entropy and entropy generation expressions.
vi. Analyze vapor, gas and combined power cycles and refrigeration cycles.
vii. Derive thermodynamic property relations.

10. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

i. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.[1]
ii. 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.[2]
iii. 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.[4]

11. Brief list of topics to be covered:

a. Introduction to thermodynamics and basic concepts
b. Energy, energy forms and general energy analysis
c. Properties of pure substance
d. Energy analysis of closed system
e. Energy analysis of open system
f. Second law of thermodynamics
g. Entropy and entropy balance
h. Gas, vapor and combined power cycles and refrigeration cycles
i. Thermodynamic property relations