NUCL 501, Nuclear Engineering Principles

1. **3 Credit Hours:**
   Class Time: T, Th 9:00-10:15 – Classroom WANG 2579

2. **Instructor:**
   Hany Abdel-Khalik, Ph.: 69718, abdelkhalik@purdue.edu
   Office hours: By appointments only.

3. **Textbook(s):**

4. **Course Description:**
   A first course for graduate students desiring a nuclear engineering sequence and an elective for students in science and engineering. The course is structured in four parts: (1) Nuclear structure and radiation interactions, biological radiation effects and radio isotope applications, (2) Basics of neutron and reactor physics, neutron diffusion and reactor criticality, (3) Reactor systems, heat generation, heat transfer and safety, and (4) Nuclear materials, reactor licensing and waste.


5. **Required tools:**
   Students may need to MATLAB for this course. Purdue University MATLAB Portal

6. **Classification:**
   Required

7. **Learning Objectives:**
   a. Students expected to develop cornerstones of nuclear engineering in a graduate level.
   b. Students to learn radioactive decay, radiation interactions with matters, basics of neutron and reactor physics, neutron diffusion, reactor criticality, reactor systems, heat generation, heat transfer and safety, biological radiation effects, shielding, reactor licensing and waste.
8. **ABET Student Outcomes:**
   An ability to identify, formulate, and solve complex engineering problems by applying principles of Nuclear engineering, science, and mathematics.

**Grading:**
- Mid-term examination: 25%
- Final Examination: 25%
- Assignments/Projects: 30%
- Classroom interactions: 10%
- Oral Examination: 10%
- Bonus Assignments: 10%

No makeup assignments, and No grade curving. Following Code of Integrity (PASS or FAIL).

**Grades:**
- A+ >= 96, A >= 90, B >= 80, C >= 70, D >= 60, F < 60

**Exams:**
All exams are take-home, one mid-term exam, and one final-term exam (during the exams week).

**Assignments:**
Excluding the two exams, all assignments/projects/bonuses are to be typed electronically and submitted via Brightspace. Hand-written assignments will receive ZERO grade. Don’t send me your assignments electronically unless I request/approve that (PDF format only).

**Class Structure:**
The class will adopt a hybrid model, wherein some classes will be in-person and some will be given in an online mode. By default, all classes will be in-person unless otherwise instructed, adapting to the evolving/uncertain pandemic-related circumstances. Should a class be scheduled in an online mode, students will be provided with a 24-hr-notification. All in-person classes will be captured in audio/video for students electing to receive the instructions in an online only mode.

Each class consists of three segments, revision of previous class material (be ready for quizzes), new material will be presented following a problem-based learning approach (students discussion/interactions required), and wrap-up on material presented and directions for next class.

**Disability:**
If you have disability requiring special attention, please notify me immediately to take appropriate measures

**Expectations:**
All assignments, including exams, projects, and bonuses, should state clearly any references you may have used. **No references cited implies the work is your OWN.** Return assignments on time. Late assignments will be subjected to 20% penalty for each day after due date without a valid excuse (up to two days only). **Cheating/Copying/Plagiarism will be severely punished.** Any assignment (including HW, projects, exams, etc.) containing a SINGLE cheating incident will receive zero grade for entire assignment. More than two cheating incidents will be reported to your academic advisor and student conduct office and will receive an F grade in the course. Take pride in your work. SILENCE your cell phones and other electronics while you are in class and when you come see me in the office.

**Class Material:**
The required text for this class is “Introduction to Nuclear Engineering” by J. Lamarsh and A. Baratta. The class notes, assignments, class schedule, examinations, etc., will be posted via Brightspace. You will receive emails from Brightspace system automatically when announcements are made. Make sure your spam-filter is functioning properly. ‘My-email-is-not-working’, or ‘I-have-not-received-this-email’ type excuses will not be accepted. Check your Brightspace regularly.

**Questions:**
Post your questions on Piazza. Link to the course Piazza, [NUCL501 piazza](#)