

	<p align="center"><b>School of Nuclear Engineering</b>  Purdue University  West Lafayette, IN 47907</p>		<p align="center"><b>NUCL 50400</b>  <b>Spring 2024</b></p>																																
<b>COURSE INFORMATION</b>	<p><b>Title:</b> Nuclear Engineering Experiments</p> <p><b>Course description:</b> Experimental study of the properties of radiation, radioactive material, and radiation detectors. The hazards of radiation and safe handling techniques are emphasized. Experiments with gas detectors, single and multichannel analyzers, scintillation detectors, neutron detectors, and the reactor will be performed. Measurements will be made to demonstrate beta and gamma attenuation, error propagation analysis techniques, dead time corrections, neutron activation analysis techniques, neutron slowing down, neutron flux distributions, and the effects of control rods on neutron fluxes least-squares and half-life determination.</p> <p><b>Schedule:</b> Lecture (Mondays 9.30-11.20 am; GRIS 125)  Laboratory (Wednesday 8:30-11:20 am; EE B073)</p> <p><b>Credit Hours:</b> 3.00</p> <p><b>Instructional modality:</b> Face-to-face</p>																																		
<b>INSTRUCTORS &amp; CONTACT INFORMATION</b>	<table border="0"> <thead> <tr> <th></th><th><b>Office</b></th><th><b>Phone</b></th><th><b>Email</b></th></tr> </thead> <tbody> <tr> <td>Stylianios Chatzidakis</td><td>LMBS 5281K</td><td>496-9698</td><td><a href="mailto:schatzid@purdue.edu">schatzid@purdue.edu</a></td></tr> <tr> <td>Office hours: TR 9.30-10.30 am</td><td></td><td></td><td></td></tr> <tr> <td>Webex: <a href="https://purdue.webex.com/meet/schatzid">https://purdue.webex.com/meet/schatzid</a></td><td></td><td></td><td></td></tr> <tr> <td>Hannah Pike (TA)</td><td>EE B073</td><td>N/A</td><td><a href="mailto:pikeh@purdue.edu">pikeh@purdue.edu</a></td></tr> <tr> <td>Kostas Vasili (TA)</td><td>EE B073</td><td>N/A</td><td><a href="mailto:vasilik@purdue.edu">vasilik@purdue.edu</a></td></tr> <tr> <td>Office hours: TBD</td><td></td><td></td><td></td></tr> <tr> <td>Webex: TBD</td><td></td><td></td><td></td></tr> </tbody> </table> <p>Email is the best way to reach either the instructor or the TA. When sending an email about the class, please make your subject line, “<b>NUCL 50400 – &lt;???</b>” where &lt;???</p>				<b>Office</b>	<b>Phone</b>	<b>Email</b>	Stylianios Chatzidakis	LMBS 5281K	496-9698	<a href="mailto:schatzid@purdue.edu">schatzid@purdue.edu</a>	Office hours: TR 9.30-10.30 am				Webex: <a href="https://purdue.webex.com/meet/schatzid">https://purdue.webex.com/meet/schatzid</a>				Hannah Pike (TA)	EE B073	N/A	<a href="mailto:pikeh@purdue.edu">pikeh@purdue.edu</a>	Kostas Vasili (TA)	EE B073	N/A	<a href="mailto:vasilik@purdue.edu">vasilik@purdue.edu</a>	Office hours: TBD				Webex: TBD			
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<b>LEARNING RESOURCES</b>	<p><b>REQUIRED:</b></p> <ol style="list-style-type: none"> <li>Knoll, <u>Radiation Detection &amp; Measurement</u>, Fourth Edition, Wiley, 2010</li> <li>Lockheed Martin, <i>Chart of the Nuclides</i>.</li> </ol> <p><b>OPTIONAL:</b></p> <ol style="list-style-type: none"> <li>Tsoufanidis, <u>Measurement and Detection of Radiation</u>, Second Edition, Taylor &amp; Francis, 1995</li> <li>Taylor, <u>An Introduction to Error Analysis</u>, Second Edition, University Science Books, 1997</li> </ol>																																		
<b>ONLINE COURSE INFO</b>	<p>Course materials can be obtained on Brightspace: <a href="https://purdue.brightspace.com/">https://purdue.brightspace.com/</a></p> <p><b><u>You are responsible</u> for any and all course material posted on the website.</b></p>																																		

LEARNING OUTCOMES	1. Understand radiation protection and handling radioactive materials. 2. Proper use of radiation detectors. 3. Understand radiation interactions with matter. 4. Develop experimental techniques and lab notebook usage. 5. Introduce probability, statistics and error analysis.	
ASSIGNMENTS	The course assignments will consist of: 1. Homework (2-3) 2. Laboratory Experiments and Lab Reports 3. Midterm and Final Examinations  All assignments (homework and lab reports) are due one week after the experiment or after homework is distributed. Pre-lab reports are due before the experiment starts.  All assignments (homework and lab reports) should be uploaded on Brightspace to be graded. You are responsible for ensuring that assignments are uploaded correctly and on time; late submissions due to incorrect file upload are not accepted. Rubrics for the laboratory reports will be provided in advance to help you understand how they will be graded.	
GRADING SCALE	A: A-[90-93), A[93-100), A+>[>100) B: B-[80-83), B[83-87), B+[87-90) C: C-[70-73), C[73-77), C+[77-80) D: D-[60-63), D[63-67), D+[67-70) F: <60 Any disputes over grades must be addressed in <b>writing</b> to the instructor within <b>one week</b> of return. Late <b>assignments</b> will be docked <b>10% per day up to 50%</b> . For lab reports, due when your lab section begins, the first “penalty” day is the day they are due if not submitted on time.	HW 10% Midterm Examinations 10% Final Examination 20% Lab reports 60%  <b>All laboratory reports must be turned in to pass the course.</b>
ATTENDANCE POLICY	This course follows the University <a href="#">Academic Regulations regarding class attendance</a> , which state that students are expected to be present for every meeting of the classes in which they are enrolled. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, you should inform me of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification to is not possible, contact me as soon as possible by email or phone. For absences that do not fall under excused absence regulations (see below), this course follows the following procedures:  1. Do not come to class or lab if you are feeling ill, but DO email me. I do not need details about your symptoms. Just let me know you are feeling ill and cannot come to class. If it is an emergency situation, please follow the University regulations on emergent medical care (see below).  2. Unless it falls under the University excused absence regulations (see below), any lab missed must be completed during make up week and any missed lab report or assignment due should be submitted on time via our course Brightspace.  3. If that day’s class involves lab or a test or presentation, you and I will plan if and how you can make up the work, following the assignment guidelines. This plan must	

	<p>be done before the next class period, so again, email me immediately when you know that you will miss class.</p> <p>4. The most important consideration in any absence is how it will affect your achievement of the assignment objectives and the course learning outcomes. For cases that fall under excused absence regulations, you or your representative should contact or go to the Office of the Dean of Students (ODOS) website to complete appropriate forms for instructor notification. Under academic regulations, excused absences may be granted by ODOS for cases of grief/bereavement, military service, jury duty, parenting leave, or emergent medical care. The processes are detailed, so plan ahead.</p>
<b>CLASSROOM GUIDANCE REGARDING PROTECT PURDUE</b>	<p>Any student who has substantial reason to believe that another person is threatening the safety of others by not complying with Protect Purdue protocols is encouraged to report the behavior to and discuss the next steps with their instructor. Students also have the option of reporting the behavior to the <a href="#">Office of the Student Rights and Responsibilities</a>. See also <a href="#">Purdue University Bill of Student Rights</a> and the Violent Behavior Policy under University Resources in Brightspace.</p>
<b>ACADEMIC INTEGRITY</b>	<p><b>Purdue honors pledge: “As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue.”</b> <a href="https://www.purdue.edu/provost/teachinglearning/honor-pledge.html">https://www.purdue.edu/provost/teachinglearning/honor-pledge.html</a></p> <p><b>Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing <a href="mailto:integrity@purdue.edu">integrity@purdue.edu</a> or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.</b></p> <p>Incidents of academic misconduct in this course will be addressed by the course instructor and referred to the Office of Student Rights and Responsibilities (OSRR) for review at the university level. Any violation of course policies as it relates to academic integrity will result minimally in a failing or zero grade for that particular assignment, and at the instructor’s discretion may result in a failing grade for the course. In addition, all incidents of academic misconduct will be forwarded to OSRR, where university penalties, including removal from the university, may be considered.</p>
<b>PLAGIARISM</b>	<p>Plagiarism is defined in “Academic Integrity: A Guide for Students” as follows: “Plagiarism is a special kind of academic dishonesty in which one person steals another person's ideas or words and falsely presents them as the plagiarist's own product. This is most likely to occur in the following ways:</p> <ul style="list-style-type: none"> <li>• using the exact language of someone else without the use of quotation marks and without giving proper credit to the author</li> <li>• presenting the sequence of ideas or arranging the material of someone else even though such is expressed in one's own words, without giving appropriate acknowledgment</li> <li>• submitting a document written by someone else but representing it as one's own”</li> </ul> <p>Any document that includes plagiarized materials <b>will receive a grade of zero.</b></p>
<b>NON-DISCRIMINATION</b>	<p>Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic</p>

	<p>excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in our course Brightspace under University Policies.</p>
<b>ACCESSIBILITY</b>	<p>Purdue University is committed to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: <a href="mailto:drc@purdue.edu">drc@purdue.edu</a> or by phone: 765-494-1247. More details are available on our course Brightspace under Accessibility Information.</p>
<b>MENTAL HEALTH STATEMENT</b>	<p><b>If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed</b>, try <a href="#">Therapy Assistance Online (TAO)</a>, a new web and app-based mental health resource available courtesy of Purdue Counseling and Psychological Services (CAPS). TAO is available to students, faculty, and staff at any time.</p> <p><b>If you need support and information about options and resources</b>, please contact or see the <a href="#">Office of the Dean of Students</a>. Call 765-494-1747. Hours of operation are M-F, 8 a.m.- 5 p.m.</p> <p><b>If you find yourself struggling to find a healthy balance between academics, social life, stress, etc.</b>, sign up for free one-on-one virtual or in-person sessions with a <a href="#">Purdue Wellness Coach at RecWell</a>. Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is free and can be done on BoilerConnect.</p> <p><b>If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students.</b> If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact <a href="#">Counseling and Psychological Services (CAPS)</a> at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours.</p>
<b>UNIVERSITY POLICY ON VIOLENT BEHAVIOR</b>	<p>Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promote educational and career goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activity. See the Student Widget on our course Brightspace for more information on the Violent Behavior Policy.</p>
<b>DIVERSITY &amp; INCLUSION</b>	<ol style="list-style-type: none"> <li>1. In our discussions, structured and unstructured, we will explore a variety of challenging issues, which can help us enhance our understanding of different experiences and perspectives. This can be challenging, but in overcoming these challenges we find the greatest rewards. While we will design guidelines as a group, everyone should remember the following points: <ul style="list-style-type: none"> <li>• We are all in the process of learning about others and their experiences. Please speak with me, anonymously if needed, if something has made you uncomfortable.</li> </ul> </li> </ol>

	<ul style="list-style-type: none"> <li>• Intention and impact are not always aligned, and we should respect the impact something may have on someone even if it was not the speaker's intention.</li> <li>• We all come to the class with a variety of experiences and a range of expertise, we should respect these in others while critically examining them in ourselves.”</li> </ul> <p>2. This course, as with every course offered at Purdue, plays a part in creating and sustaining a welcoming campus where all students can excel. There are many initiatives in NE department and supported by the university focused on this goal, and this course is designed to take advantage of those resources. Learning experiences and assignments address diversity and inclusion, not because they are “topics,” but because they are necessary to prepare students to be successful in a diverse, global environment.</p> <p>3. We strive for equity, providing equal access and opportunity, and working to maximize student potential. This requires both instructor and students to identify and remove barriers that may prevent someone from full access or full participation. You can help by:</p> <ul style="list-style-type: none"> <li>• Contacting me, anonymously if needed, if you see a potential barrier for someone or yourself in participating fully in the class. This might be a physical barrier such as access to technology or a personal situation.</li> <li>• Suggesting ways in which members of our class can support each other. Virtual study groups and discussion boards are examples, but I encourage you to be creative in your ideas.</li> <li>• Getting to know each other as contributing members of our learning community. Everyone has something to contribute, and while I designed the course to take advantage of the wealth of knowledge, expertise, and experience we bring together, I cannot do it well without your participation. There are many opportunities built into this course for this type of work. It is important we do it together.</li> </ul>
<b>BASIC NEEDS SECURITY</b>	Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday.
<b>EMERGENCY PREPARATION</b>	<p>In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Changes in this course will be posted to the class Brightspace page and, if possible, sent out by email to all students.</p> <p>It is recommended that students regularly visit the Purdue Emergency Preparedness website at <a href="http://www.purdue.edu/emergency_preparedness/">http://www.purdue.edu/emergency_preparedness/</a></p>
<b>DISCLAIMER</b>	This syllabus is subject to change. You will be notified of any changes as far in advance as possible via an announcement on Brightspace. Monitor your Purdue email daily for updates.

## **EMERGENCY PREPAREDNESS SYLLABUS ATTACHMENT**

**EMERGENCY NOTIFICATION PROCEDURES** are based on a simple concept – if you hear a fire alarm inside, proceed outside. If you hear a siren outside, proceed inside.

- **Indoor Fire Alarms** mean to stop class or research and immediately **evacuate** the building.
  - Proceed to your Emergency Assembly Area away from building doors. **Remain outside** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.
- **All Hazards Outdoor Emergency Warning Sirens** mean to immediately seek shelter (**Shelter in Place**) in a safe location within the closest building.
  - “Shelter in place” means seeking immediate shelter inside a building or University residence. This course of action may need to be taken during a tornado, a civil disturbance including a shooting or release of hazardous materials in the outside air. Once safely inside, find out more details about the emergency\*. **Remain in place** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.

*\*In both cases, you should seek additional clarifying information by all means possible...Purdue Emergency Status page, text message, Twitter, Desktop Alert, Albertus Beacon, digital signs, email alert, TV, radio, etc....review the Purdue Emergency Warning Notification System multi-communication layers at [http://www.purdue.edu/ehps/emergency\\_preparedness/warning-system.html](http://www.purdue.edu/ehps/emergency_preparedness/warning-system.html)*

### **EMERGENCY RESPONSE PROCEDURES:**

- Emergency Preparedness web site:  
[https://www.purdue.edu/ehps/emergency\\_preparedness/](https://www.purdue.edu/ehps/emergency_preparedness/)
- Review the **Emergency Procedures Guidelines**  
[https://www.purdue.edu/emergency\\_preparedness/flipchart/index.html](https://www.purdue.edu/emergency_preparedness/flipchart/index.html)
- Review the **Building Emergency Plan** (available on the Emergency Preparedness website or from the building deputy) for:
  - evacuation routes, exit points, and emergency assembly area
  - when and how to evacuate the building.
  - shelter in place procedures and locations
  - additional building specific procedures and requirements.