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## Course Information

Course number and title: **AAE 64800 – Modeling Damage and Strengthening Mechanisms in Materials**

CRN: **16320 - AAE 64800 – 001**

Meeting time: **Tuesday and Thursday at 10:30 to 11:45 am in ARMS 1021**

Course credit hours: **3.000**

A web page for this course will be available through Brightspace

Prerequisites: An entry-level class in solid mechanics (such as elasticity or continuum mechanics) that covers indicial notation and basic equilibrium/compatibility conditions.

## Instructor(s) Contact Information

- **Name of the instructor: Michael Sangid**
- **Office Location: 2027 ARMS**
- **Office Phone Number: 765-494-0146**
- **Email: msangid@purdue.edu**
- **Instructor Office/Consultation:** This is small class, so it is expected to discuss any items during class. If you'd like to talk immediately after class attends on Tuesdays and Thursdays, please let the instructor know as soon as class ends (if not prior).

## Course Description

This course is intended to be a graduate level course, which focuses on modeling at the microstructure level of primarily metals but also composites. The course topics and modules are defined as follows:

- I. Eshelby inclusion problem (1/4 Class)
  - Advanced micromechanics analysis of modern engineering materials with emphasis on relating elastic microstructural phenomena to the mechanics of material behavior.

*Project 1: Application to fiber reinforced composites – Mori-Tanaka implementation*

- II. Overview of classical plasticity (1/4 Class)
  - Phenomenological and mathematical formulation of the constitutive laws of plasticity.
  - Yielding, yield surface; von Mises, Tresca yield criteria; Drucker's stability postulate; strain or work hardening, normality rule, perfect plasticity, and stress-strain law
- III. Crystal plasticity (1/4 Class)
  - Physical and mathematical foundation for plasticity in crystalline materials, with application to deformation processes.

*Project 2: Bishop and Hill implementation in Taylor problem for deformation of polycrystals*

- IV. Concepts of dislocations leading to strengthening mechanisms in metals (1/4 class)
  - Study of anisotropy of material and elastoplastic properties at crystal level, microstructural basis for deformation in metals, polymers, and ceramics.
  - Failure mechanisms and toughening in metals, with primary emphasis on work/strain hardening, solid solution hardening, precipitate hardening, and grain boundaries.

*Project 3: The topic of this project must be relevant to this class and discussed with the instructor. Students are required to give a class presentation (see note above concerning projects) and turn in a report. Although it is helpful to choose a topic relevant to your research, this work cannot be completed prior to this semester or used to satisfy another requirement.*

**CS&E Program:** This class is listed as a Relevant Course to count towards the requirements of the CS&E Program.

## Learning Resources, Technology & Texts

- **Required Text:**
  - None
- **Recommended Text:**
  - *Micromechanics of Defects in Solids*, by T. Mura, Springer, 2nd Edition, ISBN – 9024732565 ([link](#))
- **Supplemental Texts** (for reference):
  - *The Mechanics of Crystals and Textured Polycrystals*, William F. Hosford, Oxford
  - *Micromechanics: Overall Properties of Heterogeneous Materials*, by S. Nemat-Nasser, M. Hori, Elsevier
  - *Crystals, Defects, and Microstructure*, Rob Phillips, Cambridge
  - *The Mathematical Theory of Plasticity*, R. Hill, Oxford
  - *Introduction to Texture Analysis*, O. Engler, V Randle, CRC Press
  - *Strengthening Mechanisms in Crystal Plasticity*, A.S. Argon, Oxford
  - *Mechanical Behaviour of Engineering Materials: Metals, Ceramics, Polymers, and Composite*, Roesler, Joachim, Harders, Harald, Baeker, Martin; Springer ([link](#))
  - *Theory of Elasticity*, S.P. Timoshenko, N. Goodier, McGraw
  - Material Modeling with the Visco-Plastic Self-Consistent (VPSC) Approach: Theory and Practical Applications, Tome, Lebensohn, Elsevier.
- **Brightspace Page:**
  - You can access the course via Brightspace. It is strongly suggested that you explore and become familiar not only with the site navigation, but with content and resources available for this course. Additional handouts and course notes will be available via Brightspace.

## Learning Outcomes

Learning Outcomes	Assessment Methods
Ability to express displacement field for an arbitrary elliptical inclusion via a Green's function.	<ul style="list-style-type: none"> <li>Class discussion and HW#1.</li> </ul>
Ability to prove the stress/strain fields within inclusion is uniform.	<ul style="list-style-type: none"> <li>Class discussion and HW#1.</li> </ul>
Ability to calculate Eshelby interaction tensor for arbitrary shape inclusion.	<ul style="list-style-type: none"> <li>Class discussion and HW#1.</li> </ul>
Ability to express the stress/strain fields external to the inclusion.	<ul style="list-style-type: none"> <li>Class discussion.</li> </ul>
Ability to implement Eshelby problem via Mori-Tanaka approach and apply to stiffness of composites.	<ul style="list-style-type: none"> <li>Individual Project #1.</li> </ul>
Ability to express interaction energy of inclusion.	<ul style="list-style-type: none"> <li>Class discussion.</li> </ul>
Ability to understand physical basis of plasticity.	<ul style="list-style-type: none"> <li>Class discussion.</li> </ul>
Ability to express yield surface and associated criteria via stress invariants and on the Pi-plane.	<ul style="list-style-type: none"> <li>Class discussion and HW#2.</li> </ul>
Ability to express flow rules for evolution of the yield surface and implement into principal of virtual velocities.	<ul style="list-style-type: none"> <li>Class discussion and HW#2.</li> </ul>
Ability to express convexity and normality constraints.	<ul style="list-style-type: none"> <li>Class discussion and HW#2.</li> </ul>
Ability to express crystal orientation as a series of rotations and express via a pole figure representation.	<ul style="list-style-type: none"> <li>Class discussion and HW#3.</li> </ul>
Ability to identify texture of materials	<ul style="list-style-type: none"> <li>Class discussion</li> </ul>
Ability to resolve shear stress on slip systems during deformation of single crystals and calculate the velocity gradient.	<ul style="list-style-type: none"> <li>Class discussion and HW#4.</li> </ul>
Ability to apply equilibrium and compatibility constraints to plastic flow of polycrystalline materials.	<ul style="list-style-type: none"> <li>Class discussion and HW#4.</li> </ul>
Ability to calculate the Taylor factor, geometric hardness of a polycrystalline material.	<ul style="list-style-type: none"> <li>Class discussion and HW#4.</li> </ul>
Ability to express grain orientation evolution, via an exponential mapping.	<ul style="list-style-type: none"> <li>Individual Project #2.</li> </ul>
Ability to implement the Taylor model within a Bishop and Hill implementation to express texture evolution of polycrystalline materials.	<ul style="list-style-type: none"> <li>Individual Project #2.</li> </ul>

Ability to understand and express kinetics (strain rate and temperature) into deformation via thermodynamic expressions.	<ul style="list-style-type: none"> <li>• Class discussion and HW#5.</li> </ul>
Ability to model work hardening in crystalline materials.	<ul style="list-style-type: none"> <li>• Class discussion and HW#5.</li> </ul>
Ability to understand the physical origins and model incompatibilities.	<ul style="list-style-type: none"> <li>• Class discussion and HW#5.</li> </ul>
Ability to define grain boundary structure and their affect on mechanical behavior.	<ul style="list-style-type: none"> <li>• Class discussion and HW#5.</li> </ul>
Ability to apply concepts learned from this class into a research project of the student's choice.	<ul style="list-style-type: none"> <li>• Individual Project #3.</li> </ul>

## Assignments

### *Lectures:*

The lectures will be handled in class during the course period. The instructor will work with the students to schedule two 2-hour lectures in the first few weeks of the course, in a manner to 'front-load' the course material, so the students have the background material and ample time to do each project. Students are encouraged to ask questions during lecture and engage in discussion. All students are expected to keep up with the course materials and homework/project assignments and to live up to the highest standards of honesty and integrity. Lectures will include presentation of concepts and methods and working of examples. Any notes written during the lecture will not be provided, as it is expected that the students will take notes during the video lecture, including relevant points discussed by the instructor, as a means of active learning.

### *Homework:*

There will be roughly 5 HW assignments given during the semester. You may work in teams of 1 to 3 on the HW. Please indicate each of your names on the HW assignment that you turn in. HW will be assigned via Brightspace. HW must be turned in via Brightspace by the due date (each student must turn in the HW assignment, although please indicate when working in groups). HW submitted by other means (emailed directly to the instructor, slipped under the door, in a mailbox) will not be accepted, unless prior consent is given. Please start early on the assignment and check your solutions and files before submitting. Late HW will not be accepted.

The HW is for your own benefit and is necessary to properly learn the material. It is expected that each student put forward an honest effort in solving each problem. Working together is not a means to 'divide up' the work. If you turn in an assignment with more than one name on it; each person must have put forth their best effort on every problem and discussed this problem with the group. Any abuse of this policy and we will go back to individual assignments.

Lastly, the purpose of homework assignments is for students to gain further understanding of classroom principles through application to practical problems. A critical aspect is problem solving and thinking about strategies to solve each question. This training is important to your overall understanding of the material and the ability to do well on the exams. HW will be graded based on approach, demonstration of work, and effort (not necessarily on the answer). Full credit will be given if the student has demonstrated that thought and effort has been put into the solution and the student is on the right track. If the question is not attempted, minimal effort is given, the student gives a flippant response, or the trajectory towards the solution is completely off path, then no credit will be given for this question. The grades will be posted on blackboard. The individual HW will not be marked up to identify where the student deviated from the path and give partial credit, as we would rather dedicate this time to put into spending time with students a priori and towards teaching. Instead, a detailed HW solution will be given to the students after the HW is submitted.

**Projects:**

Each student is expected to turn in his/her own project, containing a written report with figures, tables, equations, codes, references, etc. Students will not be permitted to work together on the projects. For Projects 1 and 2, the entire class will work toward the same project: (i) Mori-Tanaka implementation of the Eshelby inclusion model and (ii) Bishop and Hill implementation of a Taylor crystal plasticity model. For the third project, each student must choose his/her own topic, which must be relevant to this class and discussed with the instructor. Additionally, for the third project, students are required to give a presentation (10 min – but this may be variable based on class size). Although it is helpful to choose a topic relevant to your research, this work cannot be completed prior to this semester or used to satisfy another requirement.

**Exams:**

*There will be no exam or finals, as part of this class.*

**Grading Scale**

Your learning will be assessed through a combination of homeworks and three projects spread throughout the semester. Details on these homeworks and projects (and associated due dates) will be provided, while being assigned to the students. The percentage breakdown is as follows:

- 25%: Homework – 5 HW assignments
- 25%: Project I
- 25%: Project II
- 25%: Project III

In this class grades reflect the sum of your achievement throughout the semester. You will accumulate points as described in the assignments portion above, with each assignment graded according to a rubric. At the end of the semester, final grades will be calculated and translating into the following letters (there will be no partial points or rounding). Depending on how the class performs on its assignments and projects, the instructor reserves the right to curve the scale in the favor of the class, if necessary, based on his discretion. Grades will never be curved downward.

- A+: 96.5-100.0%
- A: 93.1-96.4%
- A-: 89.5-93.0%
- B+: 86.4-89.4%
- B: 83.1-86.4%
- B-: 79.5-83.0%
- C+: 76.4-79.4%
- C: 73.1-76.4%
- C-: 69.5-73.0%
- D+: 66.4-69.4%
- D: 63.1-66.4%
- D-: 59.5-63.0%
- F: 59.4% or below

**Attendance Policy**

The course will hold regular meetings, during the scheduled class time. Regular attendance will not be taken, but if you must miss a video lecture, you are responsible for the lecture material, assignments and/or announcements made.

Students are expected to attend all classes in-person unless they are ill or otherwise unable to attend class. Classroom engagement is extremely important and associated with your overall success in the course. If they feel ill, have any

symptoms associated with COVID-19, or suspect they have been exposed to the virus, students should stay home and contact the Protect Purdue Health Center (496-INFO). **In the event that you contract COVID-19 and are unable to meet the deadlines and expectations of the course, please contact me as soon as possible to work out alternative options.**

Only the instructor can excuse a student from a course requirement or responsibility. When conflicts can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency conflicts, when advance notification to an instructor is not possible, the student should contact the instructor/instructional team as soon as possible by email, through Brightspace, or by phone. In cases of bereavement, quarantine, or isolation, the student or the student's representative should contact the Office of the Dean of Students via [email](#) or phone at 765-494-1747. Our course Brightspace includes a link to the Dean of Students under 'Campus Resources.'

## Course Schedule

Breakdown of course topics.

I.	Elasticity and Eshelby Inclusion Problem	
A.	Mechanics Preliminaries	
1.	Indicial notation (optional)	1 hour
2.	Elasticity basics	1.5 hours
B.	Eshelby inclusions	
1.	Description of Eshelby formulation	1.5 hours
2.	Interior stress/strain fields of inclusion	1.5 hours
3.	Example for spherical inclusion	1.5 hours
4.	Exterior stress/strain fields of inclusion	1.5 hours
5.	Mori-Tanaka implementation	1.5 hours
6.	Application to composites	1.5 hours
7.	Energy of inclusion	1.5 hours
II.	Plasticity	
A.	Classical Plasticity	
1.	Introduction to plasticity	1.5 hours
2.	Pi-plane and yield surface	1.5 hours
3.	Yield conditions	1.5 hours
4.	Flow rules	1.5 hours
5.	Normality and convexity	1.5 hours
B.	Crystal Plasticity	
1.	Texture introduction	2 hours
2.	Single crystal plasticity	1.5 hours
3.	Polycrystalline plasticity	3 hours
4.	Exponential mapping of grain rotation	1.5 hours
5.	Bishop-Hill deformation modeling	3 hours
III.	Strengthening Mechanisms	
1.	Kinetics	3 hours
2.	Work hardening	1.5 hours
3.	Strain incompatibility	3 hours
4.	Grain boundaries	1.5 hours
5.	Special topics (based on student interest)	3 hours
6.	Project III consultation/presentations	8 hours

An approximate schedule is provided below will be updated throughout the semester. When the schedule is updated, an announcement will be made via Brightspace, and the new schedule will be available for download.

			Topic	Handouts	Assignments	Due Dates
	<b>Week 1</b>					
1	Tues	9-Jan	Class Introductions and Elasticity			
2	Thur	11-Jan	Eshelby Analysis	Eshelby / Han		
	<b>Week 2</b>					
3	Tues	16-Jan	Ellipsoidal Inclusion	Ellipse Formulation		
4	Thur	18-Jan	Interior of Inclusion / Spherical Ex.		HW1	
5	<b>TBD</b>		M-T Imp / Ext. & Energy of Inclusion	Tucker	P1	
	<b>Week 3</b>					
6	Tues	23-Jan	Intro to Plasticity / Stress-strain response			
	Thur	25-Jan	<b>Class Canceled - LANL</b>			
	<b>Week 4</b>					
7	Tues	30-Jan	Pi plane / Yield Condition	Hill		HW1
8	Thur	1-Feb	Plastic Work and Flow Rule			
9	<b>TBD</b>		Evolution of Yield Surface and State Dependent Variables		HW2	
	<b>Week 5</b>					
10	Tues	6-Feb	Texture Introduction	Rollett		
11	Thur	8-Feb	Texture Part II / Physical Basis of P	Hosford / Rollett		
	<b>Week 6</b>					
12	Tues	13-Feb	Single Crystal Deformation		HW3	P1
13	Thur	15-Feb	Polycrystalline Deformation I			
	<b>Week 7</b>					
14	Tues	20-Feb	Polycrystalline Deformation II	Kocks		HW2
15	Thur	22-Feb	Bishop-Hill Algorithm I	Bishop-Hill	HW4	
	<b>Week 8</b>					
16	Tues	27-Feb	Bishop-Hill Algorithm II			
17	Thur	29-Feb	Project II Description		P2	HW3
	<b>Week 9</b>					
	Tues	5-Mar	<b>Class Canceled - TMS Conference</b>			
	Thur	7-Mar	<b>Class Canceled - TMS Conference</b>			
	<b>Week 10</b>					
	Tues	12-Mar	<b>No Class - Spring Break</b>			
	Thur	14-Mar	<b>No Class - Spring Break</b>			
	<b>Week 11</b>					
	Tues	19-Mar	<b>No Class - CHESS</b>			
	Thur	21-Mar	<b>No Class - CHESS</b>			
	<b>Week 12</b>					
18	Tues	26-Mar	Kinetics I	McDowell		
19	Thur	28-Mar	Kinetics II			HW4
	<b>Week 13</b>					
20	Tues	2-Apr	Work Hardening	Mecking / Beaudoin		
21	Thur	4-Apr	Incompatibility I		HW5 / P3	
	<b>Week 14</b>					
22	Tues	9-Apr	Incompatibility II			P2
23	Thur	11-Apr	Grain Boundaries	Hirth / Sangid / Rittner		P3 Draft Topic
	<b>Week 13</b>					
24	Tues	16-Apr	Self Consistent Approaches	Lebensohn & Tome		
25	Thur	18-Apr	Diffraction Techniques			
	<b>Week 14</b>					
26	Tues	23-Apr	Review and Catch up			HW5 / P3 Topic
27	Thur	25-Apr	Project III Consultation			
	<b>Week 15</b>					
28	Tues	27-Apr	Project III Consultation			
29	Thur	29-Apr	Project III Consultation			
	<b>Week 7</b>					
30	<b>TBD</b>		Project III Presentations - TBD			P3

## Academic Integrity

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 [integrity@purdue.edu](mailto:integrity@purdue.edu) or by calling 765-494-8778. While information may be submitted anonymously, the more information is submitted the greater the opportunity for the university to investigate the concern. More details are available on our course Brightspace table of contents, under University Policies."

*The Honor Pledge Task Force, a student organization responsible for stewarding the mission of the Honor Pledge and encouraging a culture of academic integrity, has asked to prominently include the following student-initiated Purdue Honor Pledge on the syllabus, as well as exams and HW assignments:*

The [Purdue Honor Pledge](#) "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue"

In general, notes, exams, exam solutions, homework's, and homework solutions are considered to be 'derivative works' of the instructor's presentations and materials, and they are thus subject to the instructor's copyright in such presentations and materials. As such, they cannot be sold or bartered without express written permission of the instructor. Specifically, you are **not** allowed to post any course materials or derivative works of this class on commercial websites.

## Nondiscrimination Statement

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 potential. In pursuit of its goal of academic 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.

## Accessibility

**Purdue University strives 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: [drc@purdue.edu](mailto:drc@purdue.edu) or by phone: 765-494-1247."**

## Mental Health/Wellness Statement

**If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [WellTrack](#). Sign in and find information and tools at your fingertips, available to you at any time.**

**If you need support and information about options and resources, please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.**

**If you find yourself struggling to find a healthy balance between academics, social life, stress, etc. sign up for free one-on-one virtual or in-person sessions with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect. If you have any questions, please contact Purdue Wellness at [evans240@purdue.edu](mailto:evans240@purdue.edu).**

**If you're struggling and need mental health services:** Purdue University is committed to advancing the mental health and well-being of its students. 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 [Counseling and Psychological Services \(CAPS\)](#) 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.

## Emergency Preparation

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. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

## Missed or Late Work

The student must notify me three business days before the due date if you need extra time to submit your assignment. Asking for an extension does not guarantee it will be granted. Without advance notice, late homework or project assignments will not be accepted without penalty unless there are extenuating circumstances beyond the student's control (e.g., illness, family emergency, bereavement, etc.). To ensure fairness in the class, the instructor will not make the solutions available until all students have turned in that assignment, including approved late submittals. If the solutions are posted, accepted late assignments will no longer be accepted.

## Incompletes

A grade of incomplete (I) will be given only in unusual circumstances. To receive an "I" grade, a written request must be submitted prior to December 1, and approved by the instructor. The request must describe the circumstances, along with a proposed timeline for completing the course work. Submitting a request does not ensure that an incomplete grade will be granted. If granted, you will be required to fill out and sign an "Incomplete Contract" form that will be turned in with the course grades. Any requests made after the course is completed will not be considered for an incomplete grade.

## Copyright

Online educational environments, like all learning environments, should provide opportunities for students to reflect, explore new ideas, post opinions openly, and have the freedom to change those opinions over time. Students enrolled in and instructors working in online courses are the authors of the works they create in the learning environment. As authors, they own the copyright in their works subject only to the university's right to use those works for educational purposes (Visit [Purdue University Copyright Office](#)). Students may not copy, reproduce or post to any other outlet (e.g., YouTube, Facebook, or other open media sources or websites) any work in which they are not the sole or joint author or have not obtained the permission of the author(s).

## Netiquette

Your instructor and fellow students wish to foster a safe online learning environment. All opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique an idea, but you are not to attack an individual. Our differences, some of which are outlined in the University's nondiscrimination statement below, will add richness to this learning experience. Please consider that sarcasm and humor can be misconstrued in online interactions and generate unintended disruptions. Working as a community of learners, we can build a polite and respectful course ambience. Please read the Netiquette rules for this course:

- Do not dominate any discussion. Give other students the opportunity to join in the discussion.
- Do not use offensive language. Present ideas appropriately.
- Be cautious in using Internet language. For example, do not capitalize all letters since this suggests shouting.

- Avoid using vernacular and/or slang language. This could possibly lead to misinterpretation.
- Keep an “open-mind” and be willing to express even your minority opinion.
- Think and edit before you push the “Send” button.
- Do not hesitate to ask for feedback.

## **Violent Behavior Policy**

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 [University’s full violent behavior policy](#) for more detail.

## **Diversity and Inclusion Statement**

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:

- **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.**
- **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.**
- **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.**

## **Basic Needs Security**

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 from 8:00 – 5:00, Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency funds. Click [here](#) for details and the request form. Primarily through the Dean of Students Office, Purdue has a range of ways to support students through times of struggle and insecurity. In addition to highlighting the availability of the Dean of Students, you can find additional resources in the following links:

- [ODOS overall resources portal](#)
- [Student of concern reporting](#)
- The [ACE Campus Food Pantry](#)

## **Course Evaluation**

During the last two weeks of the course, you will be provided with an opportunity to evaluate this course and your instructor. Purdue uses an online course evaluation system. You will receive an official email from evaluation administrators with a link to the online evaluation site. You will have up to two weeks to complete this evaluation. Your participation is an integral part of this course, and your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

## **Student Help and Success**

Your Brightspace course shell includes links to the following student resources under the Student Help and Success content, from here you may find links to the following student services.

- Registrar
- Financial Aid
- Academic Advising
- Veterans Success Center
- Student Employment
- Center for Career Opportunities.

## **Disclaimer**

This syllabus is subject to change. Relevant changes to this course will be announced and posted on the course website via Brightspace.