

**Western Washington University**  
**Science Education 201: Matter and Energy in Physical Systems**  
**Spring Quarter 2020**  
**CRN 21413 MWF 12 – 1:50 pm**

**Instructor information**

Name: Kate Sandelin (I invite you to call me Kate.)  
Pronouns: she, her, hers  
E-mail: sandelk2@wwu.edu  
Office Hours: Available via videoconference during our regular class times MWF 12:00 – 1:50 pm PDT. I am happy to schedule other times to meet with you. Send me an email with some suggested times.

**Teaching assistant information**

Name: Victoria Ng-Breckwoldt (Please just call me Victoria)  
Pronouns: She, her, hers  
Email: ngbrecv@wwu.edu  
Office Hours: Available via zoom during scheduled class times (MWF 12-1:50) or by appointment. Always available by email.

**Course information**

Website: <http://www.wwu.edu/canvas>  
Time: Mondays, Wednesdays, and Fridays from 12:00 – 1:50 PM, PDT  
Location: Online – **Zoom Link:** <https://zoom.us/j/660082479>  
**Participating in class synchronously on Mondays is required. On Wednesdays and Fridays you may choose to participate synchronously or asynchronously.**  
Credits: 4  
Prerequisite: Math 112 or equivalent

**Textbook information**

Title: Next Generation Physical Science and Everyday Thinking (Lecture Style)  
Authors: F. Goldberg, S. Robinson, & V. Otero  
Units: EM: Energy-based Model for Interactions  
PEF: Potential Energy and Fields  
FM: Force-based Model for Interactions  
CF: Combinations of Forces

We will be using the Lecture Style Class material, which is not the version stocked in the Bookstore. **Do not purchase the text at the Bookstore.** Due to the emergency move to online, the publisher has agreed to allow us to post the materials on our Canvas site. You need to be able to record your work throughout the quarter on these documents. There are multiple ways to make this happen. We will work together to ensure each person has a way to do this.

Movies, simulations, and extensions used throughout the curriculum can be found at:  
<http://nextgenpetstudent.activatelearning.com//lc/index.html>

**Technology and Access Information**

Required: Computer or other device with internet access (Canvas, videos, simulations)  
Ability to edit documents, and upload and download to Canvas.  
Desirable: Web camera and microphone for video conferencing (probably via Zoom)

## Learning Goals

This is a student-centered physics course intended for students pursuing a career in K-8 teaching. The course has two major learning goals:

- 1) *Physics content.* Students develop an understanding of energy and force, and apply these concepts to explain real world, everyday phenomena.
- 2) *Learning about learning.* Students develop awareness of how learning happens by monitoring how their own ideas change as they learn and reflecting on specific ways the curriculum and instruction facilitates these changes.

This course also fulfills the following LSCI GUR competency: Use quantitative and scientific reasoning to frame and solve problems

## A Note to Prospective Teachers

The physical science topics covered in the Next Gen PET course are closely aligned with those for elementary, middle school, and some high school grades in *Next Generation Science Standards* (NRC, 2013), as well as the *Science Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas* from the National Research Council (2011). These standards call for science instruction at **all** levels to be inquiry based, and to engage students in applying scientific and engineering practices and crosscutting concepts as they learn the core ideas of physical science. Research clearly shows that this is the most effective way to learn science concepts. Having experienced some aspects of the inquiry-based approach in a Next Gen PET class, you'll be better prepared to implement it in your own classroom.

## Course Components

- Whether or not you've ever taken a physics class, by virtue of having grown up in the physical world, you know stuff about physics. **Initial Ideas activities** are short assignments that ask you to think about what you already know and record your ideas prior to studying a topic. **Initial ideas activities are completed individually.**
- After recording your initial ideas, it's time to engage in the process of science! The **Explorations** are written guides that ask you to make predictions based on your own ideas, then test those through observations of experiments and simulations. (Normally you'd do your own experiments, but this quarter relevant videos will be provided.) You'll use logic and creativity to explain results and alter the way you think about the physical world. Through this process, you'll refine your knowledge, develop new knowledge, and find new ways to organize your knowledge. **Science is a collaborative process, and these explorations are designed to be completed by groups of 2 or 3 people. However, this quarter you may also complete these individually.**
- Most Explorations are followed by **Extensions**, which ask you to apply what you've learned to new situations, and sometimes present new information to extend your knowledge. These are intended to be frequent, low-stakes situations in which you can assess your current understanding. **Ideally, Extensions are completed individually.**
- Science is collaborative and requires coming together to communicate and critique our ideas. Monday classes are set aside for **Small Group and Class Discussions**. For this to be useful, each person is responsible for bringing ideas to the discussion and giving feedback to ideas from others in class. I am still working out how these will look in the online setting. **Plan on videoconference class discussions during our required synchronous meetings on Mondays, and asynchronous assignments related to feedback and discussions.**
- We will have **Midterm Assignments and a Final Assignment** instead of midterm and final exams. At the end of each of our units, and at the end of the course, you will be asked to demonstrate your understanding, but not in a testing situation. You will have opportunity to collaborate, and refine your thinking, and organize your ideas.

- All Other Assignments – There will be a variety of other assignments that support the learning goals of the class. Depending on the nature of the assignment, these may be individual or group work.

The kinds of assignments you may see: writing up your ideas for our full-class discussions; evaluating work of your peers and giving meaningful feedback; problems to practice applying the concepts and skills we develop in class; revising work; reflections on your learning, or ideas of how you could help others learn this material; commentaries on ideas about teaching and learning in the context of this class; surveys of how the course is going.

## Course Grades

*On the recommendation of the Academic Coordinating Council Executive Council and the Faculty Senate Executive Council and with the approval of the Provost, the University will move to a Pass/No Pass (P/NP) quarter for all students, with the student option of requesting letter grades at the quarter's conclusion. This temporary grading policy effective for Spring Quarter 2020 only can be found here: <https://provost.wvu.edu/spring-2020-covid-19-grading-policy>*

**Requesting letter grades:** Faculty will maintain rank grading (ABCDF) records during the quarter, but the default reporting of grades for students will be to receive either a P or a NP. Students will have until 6/5/2020, Friday of Finals Preparation Week, to request their letter grade be reported to their transcript, rather than their P/NP grade. Students may be advised to request their letter grade if required for accreditation or other purposes.

**The handling of D grades and F grades:** *For this spring 2020 quarter, all grades of D+ and above will receive a P unless a student requests their letter grade. A grade of D or D- will be recorded as a NP, which will not earn credits or be reflected in the GPA.*

So, what does this mean? As required, I will maintain course scores and grades. By default, I will assign P/NP grades. A course average of 67.0 and above earns P, below earns NP. If you request a letter grade by the following scale will be used to compute that grade:

Course Average	Grade	Course Average	Grade	Course Average	Grade
93.0 – 100	A	80.0 – 82.9	B-	67.0 – 69.9	D+
90.0 – 92.9	A-	77.0 – 79.9	C+	63.0 – 66.9	D
87.0 – 89.9	B+	73.0 – 76.9	C	60.0 – 62.9	D-
83.0 – 86.9	B	70.0 – 72.9	C-	Below 60.0	F

Grades are determined by a simple addition of points.

- Initial ideas – Full credit for thoughtful completion. About 20 assignments, 5 points per assignment (~100 points total)
- Explorations – Full credit for thoughtful completion. About 20 assignments, 15 points per assignment. (~300 points total)
- Extensions – Graded for accuracy. About 20 assignments, point values vary, but likely average out to around 10 points per assignment. (~200 points total)
- Midterm and Final Assignments – Graded for content and quality. Three or four assignments, variable point values (~100 points total)
- All other assignments – About equal combination of thoughtful completion and accuracy. A number of 5- and 10-point assignments (~100 points total)

Adding these up, this is about 800 points, a little more than half of which are based on thoughtful completion.

**Note: We will not meet during final exams week.** Your final assignment will be due sometime during the Finals Preparation Week (6/1 – 6/5).

## Course Policies

*Attendance:* **During our required online classes on Mondays, attendance will be taken, but not assigned points.** There will often be assignments during class Mondays that are worth points. If you need to miss a Monday class, please notify the instructor or TA, and we'll make alternate arrangements for you to participate in the Monday discussions and feedback sessions. There are many reasons why you may need to miss class, and you are not obligated to provide me with an excuse or a reason. But you do need to initiate communication. Joining our class online on Wednesdays or Fridays is optional, and attendance will not be taken.

*Inclusive classroom environment:* I am firmly committed to diversity and equity in all areas of campus life. **This is true for our online classroom just as it would be for our physical classroom.** In this class I will work to promote an anti-discriminatory environment where everyone feels safe and welcome. The success of this policy relies on the support and understanding of the entire group. It is therefore the responsibility of every member of the class to not participate in or condone harassment or discrimination of any kind. Please show respect to each other. Listen to each other. Support each other.

*Late Work:* This is an online class, but not a self-paced class. The schedule is designed to help you structure your learning, keep you on working on a reasonable schedule, and allow for timely feedback from other students, the TA, and the instructor. So there need to be due dates. But I also recognize there will be many challenges, so there also needs to be flexibility. By default, Canvas is set to assign a zero to late assignments. There is great flexibility in this if you communicate with the instructor or TA.

*Syllabus:* This syllabus is subject to change. This Quarter, changes are more likely than not! Changes will be posted on Canvas. Both students and the instructor are responsible for all changes, and responsible for being patient with each other!

## University-wide policies

University-wide policies can be found at <https://syllabi.wvu.edu/>. **Though we are not on campus, this online course is a Western Washington University course, and these policies apply.** You are encouraged to review them. Specific policies are highlighter below.

*Academic integrity and honesty:* Plagiarism and other forms of academic dishonesty may result in your failing the course or more serious consequences: Examples of plagiarism include cutting-and-pasting text from a paper or the internet, even with a few wording changes, without citing it properly or treating it as a direct quotation. If you are unsure about whether something constitutes plagiarism, please ask me! More information about academic integrity and honesty can be found at <https://provost.wvu.edu/integrity> and <https://catalog.wvu.edu/content.php?catoid=15&navoid=3367>.

*Civil rights:* Western is committed to an environment free of discrimination and harassment. Federal and State laws, as well as University policies, protect students, faculty and staff against discrimination based on the following legally protected characteristics: Race, Color, Creed, Religion, National Origin, Sex, (including pregnancy and parenting status), Age, Disability, Marital Status, Sexual Orientation, Gender Identity and Expression, Genetic Information and Veteran Status. ([www.wvu.edu/eoo/](http://www.wvu.edu/eoo/)). For more information, contact the Equal Opportunity Office (360-650-3307) or <http://www.wvu.edu/eoo/>. If you feel the classroom climate does not reflect this commitment, you are encouraged to discuss this with your instructor. Instructors can also provide you with information about reporting options and confidential support resources. Like other Western employees (except counselors and medical staff), instructors are required to report instances of discrimination or sexual violence to the Title IX Coordinator <http://www.wvu.edu/eoo/titleix.shtml>. For confidential support, contact CASAS or the Counseling Center. These services, and many more can be found at <https://pws.wvu.edu>.

*Religious accommodations:* Western provides reasonable accommodation for students to take holidays for reasons of faith or conscience or for organized activities conducted under the auspices of a religious denomination, church, or religious organization. Students seeking such accommodation must provide written notice to their faculty within the first two weeks of the course, citing the specific dates for which they will be absent.

*Special needs accommodations:* Western is committed to equal opportunity and non-discrimination in all programs and activities. Requests for accommodation or assistance should be directed to Disability Access Center located in Wilson Library 170; additional information is available at: <https://disability.wvu.edu/> Telephone: 360-650-3083 / Email: [drs@wvu.edu](mailto:drs@wvu.edu)

## Student Services

Western encourages students to take care of their physical and mental health and well-being, and to seek assistance and support at the onset of an illness, difficulty or crisis. Below is a list of resources.

**Most of these resources are still available during our distance-learning quarter. Please use the websites to contact these services.**

- In the case of a medical concern or question, please contact the Health Center (360-650-3400) or the visit Student Health website <https://studenthealth.wvu.edu/>.
- In the case of an emotional or psychological concern or question, please contact the Counseling Center (360-650-3164) or visit the Counseling Services website <https://counseling.wvu.edu/>.
- In the case of a health and safety concern that is not emergency in nature, please contact the University Police (360-650-3555) or visit the University Police website <http://www.wvu.edu/ps/police/index.shtml>. In the case of an emergency, dial 360.650.3911, or simply 911.
- In the case of a family or personal crisis or emergency, please contact the Office of Student Life (360-650-3706) or visit the Office of Student Life website <https://wp.wvu.edu/officeofstudentlife/>.
- To seek confidential support related to sexual violence, please contact CASAS (360-650-3700) or visit their website <https://pws.wvu.edu/consultation-and-sexual-assault-support-casas>, the Student Health Center, and/or the Counseling Center.
- To report sexual violence, please contact University Police, Bellingham Police, and/or the Title IX Coordinator in Western's Equal Opportunity Office (360-650-3307) and website [www.wvu.edu/eoo/](http://www.wvu.edu/eoo/). Faculty are responsible employees who are required to report sex discrimination, including sexual violence that they learn about to the Title IX Coordinator.
- Western is committed to equal opportunity and non-discrimination in all programs and activities. For accommodation or assistance, contact the Disability Access Center (360-650-3083) or visit them in Wilson Library 170, or at their website <https://disability.wvu.edu>.
- Resources to support LGBTQ+ students can be found at <https://lgbtq.wvu.edu/>.
- The nearest gender neutral restrooms that are ADA accessible are CB 192 and 193. There is a closer gender neutral restroom in ES 521 which is not ADA accessible. A map for gender neutral restrooms can be found at <https://lgbtq.wvu.edu/locating-gender-neutral-restrooms-on-campus/>
- Student Outreach Services offers academic support for all students, with a focus on first-generation, multicultural, and non-traditional students. They can be found at <https://wp.wvu.edu/sos/>.
- Links to many other campus services can be found on Western's Prevention and Wellness website at <https://pws.wvu.edu>.