FLORIDA POLYTECHNIC UNIVERSITY

Communications & Humanities Courses

Spring 2023 General Education Offerings

Dept	Course ID	Course Name	Credits
AMH	2020	American History since 1877	3
AMH	2010	American History to 1877	3
CHM	2045	Chemistry 1	3
CHM	2045L	Chemistry 1 Lab	1
ECO	2023	Principles of Microeconomics	3
ECO	2013	Principles of Macroeconomics	3
ENC	1101	English Composition 1: Exp & Arg Writing	3
ENC	2210	Technical Writing	3
EVR	1001	Environmental Science	3
IDS	2144	Legal, Ethical, and Management Issues in Technology	3
LIT	2000	Intro to Literature	3
MAC	2311	Analytic Geometry and Calculus 1	3
MUL	2010	Music Appreciation	3
PHY	2048	Physics 1	3
STA	2023	Statistics 1	3

Schedule and Faculty Assignments (as of 11/14/2022)

Code	Crs #	Sct #	Course Name	CR	Days	Start Time	End Time	Room	Faculty FN	Faculty LN
AMH	2010	1	American History to 1877	3	MWF	12:00PM	12:50PM	1123	Patrick	Luck
AMH	2020	1	American History Since 1877	3	MWF	2:00PM	2:50PM	1158	Patrick	Luck
CHM	2045	1	Chemistry 1	3	MWF	1:00PM	1:50PM	1044	Tracy	Olin
CHM	2045	2	Chemistry 1	3	MWF	8:00AM	8:50AM	1065	Ajeet	Kaushik
CHM	2045	3	Chemistry 1	3	MWF	9:00AM	9:50AM	1044	Ajeet	Kaushik
CHM	2045	5	Chemistry 1	3	MWF	11:00AM	11:50AM	1060	Tracy	Olin
CHM	2045	4	Chemistry 1	3	MWF	12:00PM	12:50PM	1003		STAFF
CHM	2045	6	Chemistry 1	3	MWF	2:00PM	2:50PM	1003	Tracy	Olin
CHM	2045L	1	Chemistry 1 Laboratory	1	T	10:00AM	11:50AM	2207	Tracy	Olin
CHM	2045L	2	Chemistry 1 Laboratory	1	T	1:00PM	2:50PM	2207	Tracy	Olin
CHM	2045L	3	Chemistry 1 Laboratory	1	T	3:00PM	4:50PM	2207	Ajeet	Kaushik
CHM	2045L	4	Chemistry 1 Laboratory	1	T	10:00AM	11:50AM	2209	Tracy	Olin
CHM	2045L	5	Chemistry 1 Laboratory	1	W	1:00PM	2:50PM	2207		STAFF
CHM	2045L	6	Chemistry 1 Laboratory	1	F	3:00PM	4:50PM	2207		STAFF
CHM	2045L	7	Chemistry 1 Laboratory	1	R	8:00AM	9:50AM	2207	Ajeet	Kaushik
CHM	2045L	8	Chemistry 1 Laboratory	1	T	1:00PM	2:50PM	2209	Tracy	Olin
CHM	2045L	9	Chemistry 1 Laboratory	1	W	1:00PM	2:50PM	2209		STAFF
CHM	2045L	10	Chemistry 1 Laboratory	1	F	3:00PM	4:50PM	2209		STAFF
CHM	2045L	11	Chemistry 1 Laboratory	1	R	8:00AM	9:50AM	2209	Ajeet	Kaushik
ECO	2013	1	Principles of Macroeconomics	3	TR	8:00AM	9:15AM	1049	Brian	Hornung
ECO	2023	1	Principles of Microeconomics	3	TR	9:30AM	10:45AM	1012	Brian	Hornung
ENC	1101	1	English Comp. 1: Expository and Argumentative	3	TR	12:30PM	1:45PM	1142	Sarah	Pearsall
ENC	1101	2	English Comp. 1: Expository and Argumentative	3	TR	12:30PM	1:45PM	1159	Kathleen	Hardesty
ENC	1101	3	English Comp. 1: Expository and Argumentative	3	TR	11:00AM	12:15PM	1158	Sarah	Pearsall
ENC	2210	1	Technical Writing	3	TR	9:30AM	10:45AM	1158	Kathleen	Hardesty
ENC	2210	2	Technical Writing	3	TR	11:00AM	12:15PM	1159	Kathleen	Hardesty
ENC	2210	3	Technical Writing	3	TR	2:00PM	3:15PM	1060	Sarah	Pearsall
ENC	2210	4	Technical Writing	3	TR	3:30PM	4:45PM	1060	Elisabeth	Rupp
ENC	2210	5	Technical Writing	3	MWF	10:00AM	10:50AM	1142	Elizabeth	Kelly
ENC	2210	6	Technical Writing	3	MWF	11:00AM	11:50AM	1159	Elizabeth	Kelly
ENC	2210	7	Technical Writing	3	MWF	2:00PM	2:50PM	1159	C. Wylie	Lenz

Code	Crs #	Sct #	Course Name	CR	Days	Start Time	End Time	Room	Faculty FN	Faculty LN
ENC	2210	8	Technical Writing	3	MWF	1:00PM	1:50PM	1159	C. Wylie	Lenz
EVR	1001	1	Environmental Science	3	MWF	9:00AM	9:50AM	1060	Jun	Kim
EVR	1001L	1	Environmental Science Lab	1	M	1:00PM	2:50PM	1052	Jun	Kim
EVR	1001L	2	Environmental Science Lab	1	W	1:00PM	2:50PM	1052	Jun	Kim
IDS	2144	1	Legal, Ethical, and Management Issues in Technology	3	MWF	10:00AM	10:50AM	1015	Susan	LeFrancois
IDS	2144	2	Legal, Ethical, and Management Issues in Technology	3	MWF	1:00PM	1:50PM	1017	Susan	LeFrancois
LIT	2000	1	Introduction to Literature	3	MWF	11:00AM	11:50AM	1158	C. Wylie	Lenz
MAC	2311	1	Analytic Geometry and Calculus 1	4	MTWF	9:00AM	9:50AM	1002	Jaeyoun	Oh
MAC	2311	2	Analytic Geometry and Calculus 1	4	MTWF	11:00AM	11:50AM	1048	Jaeyoun	Oh
MAC	2311	3	Analytic Geometry and Calculus 1	4	MTWF	1:00PM	1:50PM	1002	Adam	Rumpf
MAC	2311	4	Analytic Geometry and Calculus 1	4	MTWF	10:00AM	10:50AM	1002	Adam	Rumpf
MUL	2010	1	Music Appreciation	3	MWF	1:00PM	1:50PM	1142	Maryann	Brilleslyper
MUL	2010	2	Music Appreciation	3	MWF	2:00PM	2:50PM	1060	Maryann	Brilleslyper
PHY	2048	1	Physics 1	3	MWF	9:00AM	9:50AM	1003	Sesha	Srinivasan
PHY	2048	2	Physics 1	3	TR	9:30AM	10:45AM	1065	Emadelden	Fouad
PHY	2048	3	Physics 1	3	MWF	12:00PM	12:50PM	1045	Dhiraj	Maheswari
PHY	2048	5	Physics 1	3	MWF	1:00PM	1:50PM	1003	Dhiraj	Maheswari
PHY	2048	6	Physics 1	3	MWF	10:00AM	10:50AM	1003	Dhiraj	Maheswari
PHY	2048	4	Physics 1	3	TR	11:00AM	12:15PM	1067	Emadelden	Fouad
PHY	2048L	1	Physics 1 Laboratory	1	M	1:00PM	2:50PM	1051	Sesha	Srinivasan
PHY	2048L	2	Physics 1 Laboratory	1	W	1:00PM	2:50PM	1051	Sesha	Srinivasan
PHY	2048L	3	Physics 1 Laboratory	1	M	3:00PM	4:50PM	1051	Emadelden	Fouad
PHY	2048L	4	Physics 1 Laboratory	1	W	3:00PM	4:50PM	1051	Manimegalai	Ramamourty
PHY	2048L	5	Physics 1 Laboratory	1	T	10:00AM	11:50AM	1051	Manimegalai	Ramamourty
PHY	2048L	6	Physics 1 Laboratory	1	T	1:00PM	2:50PM	1051	Manimegalai	Ramamourty
PHY	2048L	8	Physics 1 Laboratory	1	W	10:00AM	11:50AM	1051	Manimegalai	Ramamourty
PHY	2048L	9	Physics 1 Laboratory	1	R	10:00AM	11:50AM	1051	Manimegalai	Ramamourty
PHY	2048L	10	Physics 1 Laboratory	1	R	1:00PM	2:50PM	1051	Manimegalai	Ramamourty
PHY	2048L	7	Physics 1 Laboratory	1	F	1:00PM	2:50PM	1051	Sesha	Srinivasan
STA	2023	03GH	Statistics 1	3	MW	4:00PM	5:15PM	1015	Kevin	Calkins
STA	2023	2	Statistics 1	3	MWF	9:00AM	9:50AM	1062	Shawn C.	Hedman
STA	2023	1	Statistics 1	3	MWF	10:00AM	10:50AM	1064	Shawn C.	Hedman

CHM 2045 Chemistry 1

Spring semester 2023

Welcome to CHM 2045 – Chemistry 1
This course is part of the STEM core, a set of six critical and foundational courses consisting of mathematics, chemistry, physics, programming, and STEM applications. These courses build the skills and conceptual understanding you need to succeed in all degree programs. Data show that completing these courses in your freshman (first) year is the ticket to a high-powered STEM degree and an on-time graduation.

The STEM core courses, while not the same, share a similar feel and similar course policies. Moreover, the courses strive to set consistent expectations of what it means to take responsibility for your own learning and how to do university-level work. The courses are designed to be fair and reasonable. They are challenging, but they will set you up for success in your chosen degree program.

As a sign of the importance Florida Poly places on these courses, key department chairs and faculty have come together to form a Freshman Council that collectively manages course standards and delivery. We recognize the enormous impact these courses have on your future academic success. Please note the various resources that are available if you find yourself struggling in any way. Make these courses a priority!

Course Information

Course Number and Title: CHM 2045 Chemistry 1

Credit Hours: 3

Current Academic Term: Spring 2023

Official Catalog Course Description: This course introduces the principles of chemistry and their applications based upon the study of physical and chemical properties of the elements. Topics covered in this class includes stoichiometry, atomic and molecular structure, the states of matter, chemical bonding, thermochemistry, and gas laws.

Gordon Rule (6A-10.030): No

Prerequisites: N/A

Co-Requisite: CHM 2045L – Chemistry 1 Laboratory

Required Text: Brown, T.E.; LeMay, H.E.; Bursten, B.E.; Murphy, C.; Woodward, P.; Stoltzfus, M.E. Chemistry: The Central Science (15th edition); Pearson: New York, NY. ISBN: 9780137542970

Equipment and Material:

- Scientific Calculator capable of scientific notation (Texas Instruments TI-30Xa recommended) Please note: On exams you will not be permitted to use a programmable (or wifi enabled) calculator of any kind.
- Access to the course Canvas LMS website and University Email System

Communication: Florida Polytechnic University email is the official method of communication for the University. Students are required to check their email frequently. The subject of your emails must start with “CHM 2045 Section X” followed by the topic. Failure to provide the correct subject, will result in

ignoring the email. Any email received from an address other than the one with the floridapoly.edu domain will not be replied to. Emails will typically be answered within 24-48 hours, Monday-Friday.

Course Objectives:

At the end of this course, you should be able to:

1. Apply appropriate scientific methods (unit/dimensional analysis/vocabulary/etc.) in problem solving exercises.
2. To enable students to interpret chemical equations make chemical calculations.
3. Relate atomic and molecular structure to explain chemical and physical properties of elements.
4. Understand types of chemical bonding, Lewis Structures and apply the knowledge to predict molecular geometry of the molecules
5. Correlate basic chemistry to explore the fundamental of advanced technologies useful for real-life problems of societal, global, environmental, and economic consequence.
6. Making students aware to understand and execute processes and methods solve the issues of engineering required to for understanding the improving the performance.
7. Active engagement needed for professional success through cultivating collaboration with multidisciplinary teams-based approaches which will help to improve technical knowledge, communication abilities, and leadership skills.

Course Learning Outcomes:

Students who pass CHM-1 are expected to demonstrate:

1. Ability to understand the concept of engineering systematically based on chemistry (formula, equations, units, scientific vocabulary, and process).
2. Use stoichiometric methods to convert between mass, moles, and concentration.
3. Relate the quantum numbers and electron configurations of atoms to the periodicity in chemical and physical properties of elements as represented in the periodic table.
4. Predict the bonding and resulting geometry of atoms in molecules.
5. Determine enthalpy change in chemical reactions-First Law of Thermodynamics.
6. Employ the kinetic theory of gases and the ideal gas laws to determine pressure, volume, temperature, and/or amount of a gas.
7. Ability to execute lecture learning to develop and conduct appropriate experiments, analyze, and interpret data, and use engineering judgment to draw conclusions.
8. An ability to correlate the knowledge of chemistry with the improved performance emerging smart materials, sensing, environmental safety & monitoring, and healthcare.
9. An ability to communicate effectively with a range of audiences.

Grading Scale

Grade	A	B+	B	B-	C+	C	D	F
Percentage	90%	87%	83%	80%	77%	70%	60%	< 60%
GPA	4.0	3.33	3.0	2.67	2.33	2.0	1.0	0.0

Assignment/Evaluation Methods

Attendance and In-class activities	5%*
Homework:	25%
Exams (three at 15% each)	45%**
Final Exam	25%
Total	100%

*Up to 2 unexcused absences are permitted. Each subsequent unexcused absences will result in a 1% penalty.

**Students may approach the instructor if they score between a 60-69% on an exam for a grade improvement plan. Students may utilize this plan for only ONE midterm exam per semester.

Midterm Exams: Midterm exam dates will be finalized early in the semester and those dates/times will be posted to our Canvas course site once available. Exam dates are subject to change and you should refer to the Academic Calendar website for the most up-to-date exam schedules. Exam dates will also be announced in class at least one week prior to the scheduled event.

Homework: The homework will be through Canvas and will be due each week on Sunday by 11:59 pm. The assignments will open on the Wednesday prior to the Sunday they are due.

Schedule of Topics by Week

Week	Topics	Chapter/Sections
1/9 – 1/13	Syllabus, Basic definitions/concepts of matter, measurements and units, uncertainty and significant figures	Ch 1.1-1.3, 1.5-1.6
1/16 – 1/20	Dimensional analysis, atomic theory, structure, atomic symbols, isotopes **NO CLASS 1/16**	Ch 1.7, 2.1-2.3
1/23 – 1/27	Atomic weight, the periodic table, molecules, ions and Ionic formulas, octet rule, polyatomic ions, naming compounds	2.4-2.8
1/30 – 2/3	Balancing chemical equations, chemical reactions, formula weights, percent composition, the mole concept **Midterm #1 – February 3**	3.1-3.4
2/6 – 2/10	Molar mass, empirical formulas, limiting reactant and reaction yields, Intro to aqueous reactions	3.4-3.7
2/13 – 2/17	Aqueous solutions, precipitation reactions, solubility rules Net ionic equations, acid-base reactions, neutralization, oxidation-reduction reactions **NO CLASSES 2/14**	4.1-4.4
2/20 – 2/24	Molarity and solution concentrations, dilution, titrations, energy, heat transfers, enthalpy, enthalpy of reaction	4.5-4.6, 5.1-5.4
2/27 – 3/3	Heat capacity/specific heat, Hess's law, formation enthalpy, bond enthalpies, Lewis symbols and the octet rule	5.5-5.8, 8.1
3/6 – 3/10	**SPRING BREAK NO CLASSES 3/6-3/10**	
3/13 – 3/17	Bond polarity, Lewis structures, ionic and covalent bonding, formal charge, resonance structures, octet exceptions	8.2-8.7
3/20 – 3/24	Strengths and lengths of bonds, VSPER model, molecular polarity, covalent bonding and hybrid orbitals	8.8, 9.1-9.5
3/27 – 3/31	Multiple bonds, molecular orbitals, MO diagrams, properties of gases, gas laws, ideal gas law	9.6-9.8, 10.1-10.2
4/3 – 4/7	Ideal gas law, volumes in reactions, gas mixtures/partial pressures, real gases, EM radiation, frequency and wavelength	10.3-10.5, 10.7, 6.1
4/10 – 4/14	Atomic emission, line spectra, Bohr model, uncertainty principle, quantum theory, atomic orbitals **Midterm #3 – April 14**	6.1-6.4
4/17 – 4/21	Electronic structure of atoms, quantum numbers and electron configurations, effective nuclear charge	6.5-6.9, 7.1
4/24 – 4/28	Periodic table trends – atomic size, ionization energy and electron affinity, electronegativity **Reading Days-NO CLASS 4/27-4/28**	7.2-7.4
5/1 – 5/4	**Finals Week**	

CHM 2045L Chemistry 1 Laboratory

Spring semester 2023

Welcome to CHM 2045L – Chemistry 1 Laboratory
This course is part of the STEM core, a set of six critical and foundational courses consisting of mathematics, chemistry, physics, programming, and STEM applications. These courses build the skills and conceptual understanding you need to succeed in all degree programs. Data show that completing these courses in your freshman (first) year is the ticket to a high-powered STEM degree and an on-time graduation.

The STEM core courses, while not the same, share a similar feel and similar course policies. Moreover, the courses strive to set consistent expectations of what it means to take responsibility for your own learning and how to do university-level work. The courses are designed to be fair and reasonable. They are challenging, but they will set you up for success in your chosen degree program.

As a sign of the importance Florida Poly places on these courses, key department chairs and faculty have come together to form a Freshman Council that collectively manages course standards and delivery. We recognize the enormous impact these courses have on your future academic success. Please note the various resources that are available if you find yourself struggling in any way. Make these courses a priority!

Course Information

Course Number and Title: CHM 2045L Chemistry 1 Lab
Meeting time:
Credit Hours: 1
Current Academic Term: Spring 2023
Official Catalog Course Description: Students will participate in laboratory experiments designed to reflect the topics presented in CHM 2045.

Gordon Rule (6A-10.030): Yes: This course meets communication/writing-intensive requirements (W)
Co-Requisite: CHM 2045 – Chemistry 1

Required Lab Manual:
Chemistry 2045L Chemistry Lab Manual, **Publisher:** Xanedu, Code for manual available from the Florida Polytechnic Online Bookstore (https://floridapoly.edu/bookstore/index.php).

******Each week you must print the pre-lab assignment sheets, datasheets, and post-lab sheets for the correct experiment from the manual. ******

Equipment and Material:

- Safety goggles, lab coat, and gloves (University provided)
- Scientific Calculator capable of scientific notation
  (Texas Instruments TI-30Xa recommended)
- Access to the course Canvas LMS website and University Email System
- Access to the lab manual (through the bookstore)

Communication: Florida Polytechnic University email is the official method of communication for the University. Students are required to check their email frequently. The subject of your emails must start with "CHM 2045L Section X" followed by the topic. Failure to provide the correct subject, will result in

ignoring the email. Any email received from an address other than the one with the floridapoly.edu domain will not be replied to. Emails will typically be answered within 24-48 hours, Monday-Friday.

Course Objectives:

1. Design and perform a chemistry experiment safely and systematically.
2. Understanding and follow laboratory work practices.
3. Demonstrate ability to generate systematic data.
4. Achieve professional success to analyze an experimental data correctly.
5. Achieve ability to articulate laboratory report based experimental outcomes using professional English, technical details, and scientifical explanation.

Course Learning Outcomes:

1. Ability to understand the process of a chemical change.
2. Ability to demonstrate safe laboratory skills.
3. Learning-based ability to apply problem solving skills to perform any experiment which involve processing.
4. Ability to engage constructively and work in a team.
5. Ability to communicate and articulate a laboratory process report.
6. Ability to utilize scientific methodology including quantitative data analysis and interpretation.
7. An ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions.
8. An ability to execute process-based learning to improve engineering processes involving surface science, materials science, analytics science, environmental science, and technology of sensors and biomedical applications.

Grading Scale

Grade	A	B+	B	B-	C+	C	D	F
Percentage	90%	87%	83%	80%	77%	70%	60%	< 60%
GPA	4.0	3.33	3.0	2.67	2.33	2.0	1.0	0.0

Assignment/Evaluation Methods

Attendance	5%*
Lab Experiments (Best 6 of 7, 7% each)	45%**
Full Lab Reports (2 at 15% each)	30%**
Final Exam	20%
Total	100%

*See Attendance Policy below

**See Lab Experiments and Reports section below

Schedule of Topics by Week

Dates	**Title of Experiment**	**Lab # in Manual**	**Assignment (due at the beginning of class)**
Week 1 1/9 – 1/13	Syllabus and check in		*Get access to the online lab manual
Week 2 1/16 – 1/20	Mandatory Safety Training and Online Quiz	Exp 0	-**Complete**: Online Safety Training and Safety Quiz prior to the start of Week 2

			*****Students may not work in the laboratory until they have viewed the Lab Safety video and passed (≥80%) the Safety Quiz*****
Week 3 1/23 – 1/27	Glassware and Uncertainty	Not in manual (Worksheet posted on Canvas)	-Bring the Signed copy of the Lab Safety agreement and submit in person (hard copy) -Submit the pre-lab work for Glassware and uncertainty
Week 4 1/30 – 2/3	Identifying Materials by Density	Experiment 1	-Submit Data/post lab –for Glassware and uncertainty -Submit the pre-lab work for Exp. 1
Week 5 2/6 – 2/10	Determining the Limiting Reagent and Theoretical Yield (Full lab report due for this expt)	Experiment 3 Part A	-Submit Data/post lab work –Exp. 1 -Submit the pre-lab work Exp. 3
Week 6 2/13 – 2/17	**No Labs this Week**		
Week 7 2/20 – 2/24	Limiting Reagent Lab (Full lab report due for this expt)	Experiment 3 Part B	
Week 8 2/27 – 3/3	Stoichiometry Concept Discussion and Making a Stock Solution (Dilution concept)	Experiment 5	-Submit Full lab Report and corresponding Data Sheets for Experiment 3 -Submit the pre-lab work Exp. 5
Week 9 3/6 – 3/10	**No Labs this Week – Spring Break**		
Week 10 3/13 – 3/17	Acid-base Titration 1 (Full lab report due for this expt)	Experiment 6 Part A	-Submit Data/post lab work–Exp. 5 -Submit the pre-lab work Exp. 6
Week 11 3/20 – 3/24	Acid-base Titration 2 (Full lab report due for this expt)	Experiment 6 Part B	
Week 12 3/27 – 3/31	Determination of the Enthalpy of Combustion: Magnesium	Experiment 9	-Submit Full lab Report and corresponding Data sheets for Experiment 6 -Submit the pre-lab work Exp. 9
Week 13 4/3 – 4/7	VSEPR Theory	Experiment 8	-Submit Data/post lab work – Exp 9 -Submit the pre-lab work Exp. 8
Week 14 4/10 – 4/14	Calculating the Molar Volume of Carbon Dioxide	Experiment 4	-Submit Data/post lab work – Exp. 8 -Submit the pre-lab work Exp.4
Week 15 4/17 – 4/21	Final Exam for Lab		-Submit Data/post lab work – Exp. 4

EVR 1001 Environmental Science

SUBJECT TO CHANGE

Course Information

- **Course Number and Title:** EVR 1001 Environmental Science
- **Credit Hours:** 3 (3 lecture)
- **Current Academic Term:** Fall 2022

Course Details

- **Course Modality:** The learning sequence is as follows
    - Prepare for classes
    - Attend lecture classes and participate in active learning
    - Demonstrate skill acquisition by completing after-class exercises (homework)
    - Practice self-learning through debate & defend sessions
    - Evaluate learning outcomes by exams

- **Official Catalog Course Description:** From the perspective of sustainability, linking humans and the environment through introducing interactions of population, ecosystems, biodiversity, resources, climate, pollution, and environmental management.
    - **Course Pre and/or Co-Requisites:** No
    - **Communication/Computation Skills Requirement (6A-10.030)**: No

- **Required Texts:** *Environmental Science*, 16th edition by G. Tyler Miller & Scott Spoolman, Cengage: Boston, MA, 2018, ISBN: 978-1337569613.

- **Equipment and Materials**: Canvas, Microsoft Office, calculator, FL Poly email

- **Course Objectives**: The objective of this course is to provide an introduction to an interdisciplinary concept and approach exploring the environment that are comprised of both human and non-human elements. Students will be introduced to understand the physical, chemical, and biological principles underlying today's global environmental problems. Environmental topics include population, ecosystems, biodiversity, resources, climate, pollution, and environmental management. Emphasis will be placed on sustainable development and human influences in the environment.

- **Course Learning Outcomes**:
  Students who successfully complete this course should be able to:
    a) Remembering: *Recognize* common environmental pollutants from human activities and *identify* their effects on the environment;
    b) Understanding: *Explain* how the ecosystems provide humanity and biodiversity with a diverse array of ecological services;
    c) Applying: *Apply* interdisciplinary approaches to evaluating and proposing solutions for environmental problems, taking into account the natural, social, technological, and political constraints;
    d) Analyzing: *Differentiate* between non-renewable, exhaustible, and inexhaustible material and energy resources, the physical and biological processes through which they are created, and associated environmental constraints;
    e) Evaluating: *Discuss* the complex and diverse relationships between humans and the environment from local to global scales and *appraise* environmental impacts of behaviors, choices, and activities in students' personal lives;

f) Overall: Clearly *communicate* related concepts as they apply to current environmental issues through careful and organized work.

- **Alignment with Program Outcomes**:

Course Learning Outcome	Learning Level (Bloom's / ABET Assessment Example)	Program Learning Outcome (ABET, GenEd, Other)
a) Students will *recognize* common environmental pollutants from human activities and *identify* their effects on the environment.	**Knowledge** – ability to recall previously learned material **ABET Assessment** – homework, exams	ABET 1 – an ability to identify formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
b) Students will *explain* how the ecosystems provide humanity and biodiversity with a diverse array of ecological services.	**Knowledge** – ability to recall previously learned material **ABET Assessment** – homework, exams	ABET 1 – an ability to identify formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
c) Students will *apply* interdisciplinary approaches to evaluating and proposing solutions for environmental problems, taking into account the natural, social, technological, and political constraints.	**Application** – ability to use learned material in new situations. **ABET Assessment** – homework, debate and defend	ABET 1 – an ability to identify formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
d) Students will *differentiate* between non-renewable, exhaustible, and inexhaustible material and energy resources, the physical and biological processes through which they are created, and associated environmental constraints.	**Comprehension** – ability to grasp meaning, explain, and restate ideas **ABET Assessment** – homework, exams	ABET 7 – an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
e) Students will *discuss* the complex and diverse relationships between humans and the environment from local to global scales and *appraise* environmental impacts of behaviors, choices, and activities in students' personal lives.	**Comprehension** – ability to grasp meaning, explain, and restate ideas **ABET Assessment** – homework, debate and defend	ABET 7 – an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. ABET 4 – 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.
f) Students will clearly *communicate* related	**Application** – ability to use learned material in new	ABET 3 – an ability to communicate effectively with a

concepts as they apply to current environmental issues through careful and organized work.	situations. **ABET Assessment** – debate and defend	range of audiences. ABET 5 – an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Course Schedule

- Subject to change per course policies.

Week	Lecture Topic	Reading
1	Sustainability: Overview	Chapter 1
2	Sustainability: Environmental systems, Ecosystems	Chapter 2-3
3	Sustainability: Biodiversity	Chapter 4
4	Sustainability: Species interaction	Chapter 5
5	Sustainability: Human population; **Exam #1**	Chapter 6
6	Sustainability: Climate; **Debate and Defend #1**	Chapter 7
7	Biodiversity: Saving species, Saving ecosystems	Chapter 8-9
8	Resources: Food production; **Exam #2**	Chapter 10
9	Resources: Water resources	Chapter 11
10	Resources: Mineral resources; **Debate and Defend #2**	Chapter 12
11	Resources: Energy resources	Chapter 13
12	Environmental quality: Environmental hazards; **Exam #3**	Chapter 14
13	Environmental quality: Air pollution, Climate change	Chapter 15
14	Environmental quality: Solid waste	Chapter 16
15	Human societies: Environmental economics and politics	Chapter 17
16	Final Review; **Debate and Defend #3**	
Final	**Exam #4 - Final Exam**	

PHY2048- Physics I

Spring semester 2023

Welcome to PHY2048 – Physics I

This course is part of the STEM core, a set of six critical and foundational courses consisting of mathematics, chemistry, physics, programming, and STEM applications. These courses build the skills and conceptual understanding you need to succeed in all degree programs. Data show that completing these courses in your freshman (first) year is the ticket to a high-powered STEM degree and an on-time graduation.

The STEM core courses, while not the same, share a similar feel and similar course policies. Moreover, the courses strive to set consistent expectations of what it means to take responsibility for your own learning and how to do university-level work. The courses are designed to be fair and reasonable. They are challenging, but they will set you up for success in your chosen degree program.

As a sign of the importance Florida Poly places on these courses, key department chairs and faculty have come together to form a ***Freshman Council*** that collectively manages course standards and delivery. We recognize the enormous impact these courses have on your future academic success. Please note the various resources that are available if you find yourself struggling in any way. Make these courses a priority!

Academic Integrity

All students are expected to adhere to the highest standards of academic integrity. Violations of academic integrity include actions such as cheating, plagiarism, use of unauthorized resources, illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. It is critical that students take a professional approach to their academic work. The faculty and administration take academic integrity very seriously. Suspected violations will be fully investigated, possibly resulting in an academic integrity hearing and sanctions against the accused student if found in violation. Sanctions range from receiving a zero on the exam or assignment, to expulsion from the university. Repeat offenders are subject to more severe sanctions and penalties. Do not compromise your integrity for a perceived short-term gain. More information about Florida Poly's academic integrity policies and procedures can be found here:https://floridapoly.edu/wp-content/uploads/2017/07/FPU-5.005-Academic-Integrity-7.29.14.pdf#search=academic%20integrity

Instructor Information

Instructor: xxxxxxx
Email: xxxxxx@floridapoly.edu
Office Hours: xxxxxx xxxxxxx

Course Information

Course Number and Title: PHY2048 – Physics I
Meeting time: xxxxxxxxxxxxxx

Credit Hours: 3
Current Academic Term: Spring 2023

Course Description: This is the first of a two-semester sequence of physics for technology and engineering. The course covers Newtonian mechanics and includes motion, vectors, Newton's laws, work and conservation of energy, systems of particles, collisions, equilibrium, oscillations, thermodynamics, and waves.

Gordon Rule (6A-10.030): No

Prerequisites: N/A

- Course Pre-Requisites: High-School Physics, PHY 2020 or equiv. MAC2311– Analytic Geometry and Calculus I.
- Course Co-Requisite or Pre-requisite: MAC 2312 – Analytic Geometry and Calculus 2
- Course Co-Requisite: PHY 2048L – Physics 1 Laboratory
- **Communication/Computation Skills Requirement (6A-10.030)**: N

- **Required Texts:** Physics for Scientists and Engineers: A Strategic Approach by Randall D. Knight, 4th Edition, ISBN 9780136780632.
- **Recommended Text**: University Physics Volume 1 by OpenStax, https://openstax.org/details/books/university-physics-volume-1
  - **Equipment and Materials**: (e.g. supplies and software)- Scientific calculator (graphing ability NOT necessary), University CANVAS LMS system & University e-mail system, Instructor Lectures, Videos, Notes and Handouts

- **Course Objectives**: Upon successful completion of this course, you should be able to:
  Define motion, work, energy, power, momentum, equilibrium, and oscillations.
  Develop skills for converting from one-unit system to other unit system.
  Demonstrate the ability to derive units from known formulae.
  Solve problems systematically using Physics laws and principles.

- **Course Learning Outcomes (CLO)**
  Demonstrate mathematical skills required to manipulate and solve physics equations.
  Apply physics concepts to solve problems based on real-world situations.
  Connect figures, diagrams, graphs, and data to underlying physics concepts.
  Connect physics concepts to each other and to the real-world

- **Metacognitive Learning Outcomes (MLO)**
  Decode the fundamental laws, theories, and principles central to Physics by describing how an example or practice problem illustrates a specific law, theory or principle in concept checks and conceptual test problems.
  Apply correct formula and equation for obtained/provided solution in numerical practice problem set, and concept-based text questions to predict a system's initial and final conditions.
  Compare and contrast figures, diagrams, graphs, texts, data, scientific formula, and solution strategies with respect to underlying Physics concepts.
  Evaluate a multi-step description of a problem to determine assumptions inherent in the unknown and known parameters, choose the correct formula in a given set, and systemic solving of a problem with appropriate significance.
  Infer the functioning of the Physics laws and principles from agreement between measured macroscopic values and predicted values of idealized systems through the demonstrations, calculations, and conceptual exercises and through interpretation of numerical problems.
  Construct the right formula for a numerical problem by deriving it from the first principles, successfully **synthesize** the solution to the problem based on the derived formula and use in a systematic manner.

- **Alignment with Program Outcomes**: Include alignment with General Education Competency; ABET Student Outcomes; or another professional standard, if applicable, e.g. This course supports

General Education competency for scientific reasoning. Program Learning Outcomes and General Education Competencies may be found in the Academic Catalog (http://catalog.floridapoly.edu/). Additionally, outcomes may be aligned with level of difficulty per Bloom's taxonomy (see University's Institutional Effectiveness Manual for Academic programs).

SLO Table

Course Learning Outcome	**Learning Level (e.g. Bloom's, Anderson/ Krathwohl; Rogers/Hatfield (ABET Assessment Example)**	**Program Learning Outcome (ABET, GenEd, Other)**
Demonstrate mathematical skills required to manipulate and solve physics equations.	**Remember** Recognize Recall	1
Apply physics concepts to solve problems based on real-world situations.	**Apply and Analyze** Execute Implement Differentiate Organize	1
Connect figures, diagrams, graphs, and data to underlying physics concepts.	**Understand** Interpret Compare Explain	3
Connect physics concepts to each other and to the real-world	**Evaluate** Check Critique	1, 4

Academic Support Resources

- **Library**: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to Academic Success Center success@floridapoly.edu or by email, library@floridapoly.edu.
- **ASC**: The Academic Success Center, located in the IST and at ASC East, provides a range of services. Students may direct questions to success@floridapoly.edu.

Subject Learning Goals

CHAPTER 1: Concepts of Motion [Sections 1.1-1.8]

1. To understand and use the basic ideas of the *particle model*.
2. To analyze the motion of an object by using *motion diagrams* as a tool.
3. To differentiate between the concepts of position, velocity, and acceleration.
4. To recognize the relationship between *v* and *a* when an object is speeding up, slowing down, or at a turning point.
5. To gain initial experience with graphical addition and subtraction of vectors.
6. To begin the process of learning to analyze problem statements and to translate the information into other representations.
7. To learn about position-versus-time graphs and the sign conventions for one-dimensional motion.
8. To understand the proper use of significant figures.

CHAPTER 2: Kinematics in One Dimension [Sections 2.1-2.6]

1. To differentiate clearly between the concepts of position, velocity, and acceleration.
2. The interpret kinematic graphs.

3. To translate kinematic information between verbal, pictorial, graphical, and algebraic representations.
4. To learn the basic ideas of calculus (differentiation and integration) and to utilize these ideas both symbolically and graphically.
5. To understand free-fall motion.
6. To begin the development of a robust problem-solving strategy.
7. To solve quantitative kinematics problems and to interpret the results.

CHAPTER 3: Vectors and Coordinate Systems [Sections 3.1-3.4]

1. To understand the basic properties of vectors.
2. To add and subtract vectors both graphically and using components.
3. To be able to decompose a vector into its components and to reassemble vector components into a magnitude and a direction.
4. To recognize and use the basic unit vectors.
5. To work with tilted coordinate systems.

CHAPTER 4: Kinematics in Two Dimensions [Sections 4.1-4.6]

1. To identify the acceleration vector for curvilinear motion.
2. To compute two-dimensional trajectories.
3. To understand projectile motion.
4. To understand relative motion.
5. To understand the kinematics of uniform circular motion.
6. To understand angular acceleration and the kinematics of nonuniform circular motion.

CHAPTER 5: Force and Motion [Sections 5.1-5.7]

1. To recognize what does and does not constitute a force.
2. To identify the specific forces acting on an object.
3. To draw an accurate free-body diagram of an object.
4. To begin the process of understanding the connection between force and motion.
5. To begin learning how to explain an observation on the basis of physical principles.

CHAPTER 6: Dynamics I: Motion Along a Line [Sections 6.1-6.6]

1. To draw and make effective use of free-body diagrams.
2. To recognize and solve simple equilibrium problems.
3. To distinguish mass, weight, and gravity.
4. To learn and use simple models of friction and drag.
5. To apply the full strategy for force and motion problems to problems in single-particle dynamics.

CHAPTER 7: Newton's Third Law [7.1-7.5]

1. To learn how two objects, interact.
2. To identify action/reaction pairs of forces.
3. To understand and use Newton's third law.
4. To understand how to use propulsion forces and tension forces.

CHAPTER 8: Dynamics II: Motion in a Plane [Sections 8.1-8.5]

1. To compute two-dimensional trajectories.
2. To understand the dynamics of uniform circular motion.
3. To learn the basic ideas of orbital motion.
4. To answer, "How does the water stay in the bucket?" and related questions.

CHAPTER 9: Work and Kinetic Energy [Sections 9.1-9.6]

1. To explicitly use systems-based thinking to develop a model of energy—what it is, how
2. it is transformed, and how it is transferred.

3. To introduce the concepts of work and kinetic energy.
4. To learn Hooke's law for springs and the new idea of a restoring force.
5. To introduce a model of thermal energy and dissipative forces.

CHAPTER 10: Interactions and Potential Energy [Sections 10.1-10.7]

1. To expand the basic energy model by introducing potential energy.
2. To learn to use and interpret energy bar charts and energy diagrams.
3. To develop a complete statement of the energy principle and to apply the energy principle to isolated systems in which energy is conserved.

CHAPTER 11: Impulse and Momentum [Sections 11.1-11.5]

1. To understand interactions from the new perspective of impulse and momentum.
2. To learn what is meant by an isolated system.
3. To apply conservation of momentum in simple situations.
4. To understand collisions and explosions.

CHAPTER 12: Rotation of a Rigid Body [Sections 12.1-12.11]

1. To extend the particle model to the rigid-body model.
2. To understand the equilibrium of an extended object.
3. To understand rotation about a fixed axis.
4. To understand rolling motion.
5. To introduce the vector description of rotational motion and angular momentum.

CHAPTER 16: Traveling Waves [Sections 16.1-16.3]

1. To use the wave model and understand how it differs from the particle model.
2. To visualize wave motion and develop intuition about waves.

Grading Scale

Grade	A	B+	B	B-	C+	C	D	F
Percentage	90%	87%	83%	80%	77%	70%	60%	< 60%
GPA	4.0	3.33	3.0	2.67	2.33	2.0	1.0	0.0

Assignment/Evaluation Methods

Homework	15%
Projects	05%
Quizzes (class activities)	10%*
Attendance/Participation (pre- and post- tests)	05% **
Exams	45%
Final Exam	20% ***
Total	100%

*The lowest quiz grade will be dropped. Makeup quizzes will not be given.

**Up to 3 unexcused absences are permitted. Each subsequent unexcused absences will result in a 1% penalty.

***The final exam grade **may** replace the lowest exam grade if it benefits the overall grade in the course. Note: All the 3 exams (including midterm exam) are required. The final will NOT replace a 0 from a missed exam.

Schedule of Topics by Week

Week	Chapters/Topics	Assignments
Week 1 (Jan 09 - Jan 13)	Syllabus Concepts of Motion	**Pre-test (Online)**
Week 2 (Jan 16 - Jan 20)	Martin Luther King Jr. Holiday - No Classes Kinematics in 1D	Homework Assignment
Week 3 (Jan 23 - Jan 27)	Vectors and Coordinate Systems	Homework Assignment
Week 4 (Jan 30 - Feb 03)	Kinematics in Two Dimensions Exam 1	Homework Assignment
Week 5 (Feb 06 - Feb 10)	Force and Motion	Homework Assignment
Week 6 (Feb 13 - Feb 17)	Feb 14, career day no classes. Newton's Third Law	Homework Assignment
Week 7 (Feb 20 - Feb 24)	Dynamics I: Motion Along a Line	Homework Assignment
Week 8 (Feb 27 - Mar 03)	Dynamics II: Motion in a Plane Exam 2)	Homework Assignment
Week 9 (Mar 06 - Mar 10)	Spring Day Break - No Classes	Homework Assignment
Week 10 (Mar 13 - Mar 17)	Work and Kinetic Energy Interactions and Potential Energy	Homework Assignment
Week 11 (Mar 20 - Mar 24)	Impulse and Momentum	Homework Assignment
Week 12 (Mar 27 - 31)	Rotational Motion of Rigid Bodies Exam 3	Homework Assignment
Week 13 (Apr 03 - Apr 07)	Newton's Theory of Gravity	Homework Assignment
Week 14 (Apr 10 - Apr 14)	Oscillations	Homework Assignment
Week 15 (Apr 17 - Apr 21)	Extra topics (TBD) Final Review	Homework Assignment
Week 16 (Apr 24 – Apr 28)	Reading Days (Apr 27 & 28)	**Post-test (Online)**
Week 17 (Apr 29 – May 4)	Final Exam	

Homework

Your homework all on canvas and will be ready by day 1. Each chapter has one homework on canvas, the homework format is similar to your exams. Part 1, 8 multiple choices, part 2, 4 short calculations, part 3, 3 multiple step calculations. You usually have up to 5 attempts to get the correct answer. Solutions become available right after the due date/time. Make sure to upload a detailed work for questions 9 through 15.

Also, for each chapter students should study the solved examples and attempt these problems

Chapter No.	Solved Examples from Textbook	Additional Problems from the Knight 4th ed.
CH 1 – Concepts of Motion	EX1: 1.1, 1.3, 1.5, 1.7, 1.9, 1.10	HW1: 1.24, 1.28, 1.54, 1.56, 1.58

CH 2 – Kinematics in 1D	EX2: 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.10, 2.13, 2.15, 2.16	HW2: 2.3, 2.40, 2.42, 2.68, 2.70
CH 3 – Vectors and Coordinate Systems	EX3: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7	HW3: 3.4, 3.8, 3.16, 3.24, 3.32
CH 4 – Kinematics in 2D	EX4: 4.1, 4.2, 4.3, 4.4, 4.5, 4.7, 4.8, 4.9, 4.11, 4.12, 4.14	HW4: 4.6, 4.8, 4.18, 4.30, 4.32
CH 5 – Force and Motion	EX5: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6	HW5: 5.6, 5.10, 5.12, 5.14, 5.34
CH 6 – Dynamics I: Motion Along a Line	EX6: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.10	HW6: 6.3, 6.8, 6.24, 6.28, 6.36
CH 7 – Newton's Third Law	EX7: 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.8,	HW7: 7.6, 7.8, 7.10, 7.12, 7.14, 7.23
CH 8 – Dynamics II: Motion in a Plane	EX8: 8.1, 8.2, 8.3, 8.4, 8.5,	HW8: 8.2, 8.6, 8.16, 8.18, 8.28, 8.36
CH 9 – Work and Kinetic Energy	EX9: 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 9.11, 9.12	HW10: 9.2, 9.26, 9.32, 9.36, 9.45
CH 10–Interactions and Potential Energy	EX 10: 10.1, 10.2, 10.3, 10.4, 10.5, 10.7, 10.8, 10.10	HW11: 10.5, 10.9, 10.18, 10.37, 10.42
CH 11 – Impulse and Momentum	EX9: 11.1, 11.2, 11.5, 11.6, 11.8, 11.9	HW9: 11.8, 11.14, 11.18, 11.26, 11.32, 11.48
CH 12 – Rotation of a Rigid Body	EX 12: 12.1, 12.2, 12.3, 12.4, 12.5, 12.7, 12.8, 12.9, 12.11, 12.15, 12.16, 12.17, 12.19	HW12: 12.6, 12.12, 12.22, 12.26, 12.32