# Unit Outline

## FOUNDATIONS OF PHYSICS

<table>
<thead>
<tr>
<th><strong>Unit Number:</strong></th>
<th>PH101</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mode of Study:</strong></td>
<td>Internal</td>
</tr>
<tr>
<td><strong>Credit:</strong></td>
<td>3 credit points</td>
</tr>
<tr>
<td><strong>Pre-requisites/Co-requisites:</strong></td>
<td>Academic Writing; Essential Academic Skills for the Sciences</td>
</tr>
<tr>
<td><strong>Location:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Classes:</strong></td>
<td></td>
</tr>
<tr>
<td>Sheridan College</td>
<td></td>
</tr>
<tr>
<td>18/7 Aberdeen St, Piccadilly Square West, Perth WA 6000</td>
<td></td>
</tr>
<tr>
<td><strong>Labs:</strong></td>
<td></td>
</tr>
<tr>
<td>Quinns Baptist College</td>
<td></td>
</tr>
<tr>
<td>8 Salerno Drive, Mindarie WA 6030</td>
<td></td>
</tr>
<tr>
<td>Austin Cove Baptist College</td>
<td></td>
</tr>
<tr>
<td>Inlet Boulevard, South Yunderup WA 6208</td>
<td></td>
</tr>
<tr>
<td><strong>Student Workload:</strong></td>
<td>168 hours (12 hours per week over 14 weeks)</td>
</tr>
<tr>
<td>- Lectures/Seminars</td>
<td>24 hours (2 hours per week over 12 teaching weeks)</td>
</tr>
<tr>
<td>- Tutorials</td>
<td>24 hours (2 hours per week over 12 teaching weeks)</td>
</tr>
<tr>
<td>- Labs</td>
<td>24 hours (2 hours per week over 12 teaching weeks)</td>
</tr>
<tr>
<td>- Private Study</td>
<td>96 hours (6 hours per week over 12 teaching weeks + 12 hours per week over 2 non-teaching weeks)</td>
</tr>
<tr>
<td><strong>Learning Management System:</strong></td>
<td>Canvas (canvas.sheridan.edu.au)</td>
</tr>
<tr>
<td><strong>Unit Coordinator:</strong></td>
<td>Dr Crosby Chang</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:cchang@sheridan.edu.au">cchang@sheridan.edu.au</a></td>
</tr>
<tr>
<td><strong>Course Coordinator:</strong></td>
<td>Dr Maya Krayneva</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:mkrayneva@sheridan.edu.au">mkrayneva@sheridan.edu.au</a></td>
</tr>
</tbody>
</table>
Introduction
Welcome to PH101: Foundations of Physics. This unit aims at introducing the student to the fundamentals of Physics in three key areas:


The Unit is designed to:

- Provide the necessary background knowledge and practice of scientific skills for students who wish to enrol in intermediate units of study in physics, in life or environmental sciences, or in engineering.
- Help students develop creative thinking, problem solving skills and appropriate methods of study that will allow them to become independent learners, capable of organizing new information into a coherent conceptual framework and applying it in a wide range of practical applications.
- Allow students to develop basic experimental skills in the measurement of physical quantities and analysis of experimental data.

Diploma of Science Learning Outcomes
The Sheridan College Diploma of Science has been accredited by the Tertiary Education Quality and Standards Agency (TEQSA) as meeting the standards set by the Australian Qualifications Framework (AQF).

A Diploma qualifies individuals who apply integrated technical and theoretical concepts in a broad range of contexts to undertake advanced skilled or paraprofessional work and as a pathway for further learning.

Upon completing a Diploma of Science, you will be able to:

- Demonstrate your theoretical and technical knowledge of the scientific consensus in specialised learning areas within mathematics, physical sciences and life sciences
- Exercise your cognitive skills successfully to search for, identify, and carefully analyse scientific and mathematical evidence.
- Plan, propose and evaluate potential solutions to problems relating to specialised learning areas within mathematics, physical sciences and life sciences
- Communicate your understanding of knowledge and skills relating to specialised learning areas within mathematics, physical sciences and life sciences to others in various learning contexts.
- Apply learned technical and creative tools from one or more specialised learning areas within mathematics, physical sciences and life sciences to interpret and resolve unpredictable problems in a range of scenarios.
- Demonstrate your capacity to seek scientific and mathematical knowledge and truth with persistence, independence, rigour, and integrity.
- Evaluate the relevance of Christian faith and practice to the pursuit of scientific knowledge.
- Model self-discipline, servant leadership and respect for the dignity of individuals and groups in various settings.

Each unit you take in the Diploma of Science program will contribute towards the fulfilment of these broader learning outcomes.
Foundations of Physics Learning Outcomes

On successful completion of the unit, you will be able to:

A. Apply the basic laws of physics in the areas of classical mechanics, electromagnetism, and thermodynamics.
B. Convert a basic physical situation to a mathematical formulation, then analyse it quantitatively using mathematical and computational tools commonly used in physics, and recognize whether or not the result of a calculation makes physical sense.
C. Demonstrate competency in experimental design and scientific data collection and analysis, including distinguishing the various types of errors and representing data graphically.
D. Demonstrate independent learning and research skills, making use of a variety of academic sources.
E. Communicate scientific information orally and in writing by making appropriate use of current presentation techniques.
F. Engage in team and group work for learning processes and scientific investigations.
G. Apply acquired scientific and technical knowledge and skills to other disciplines and areas of study.

Graduate Attributes

Study does more than equip you with knowledge in a specific academic discipline. It can also have a transformational effect on your own nature.

Moreland and Craig write:

“Study itself is a spiritual discipline, and the very act of study can change the self. One who undergoes the discipline of study lives through certain types of experiences where certain skills are developed through habitual study: framing an issue, solving problems, learning how to weigh evidence and eliminate irrelevant factors, cultivating the ability to see important distinctions instead of blurring them, and so on. The disciplines of study also aids in the development of certain virtues and values; for example, a desire for the truth, honesty with data, an openness to criticism, self-reflection and an ability to get along nondefensively with those who differ with one.”


The higher education sector in Australia describes these kinds of outcomes as “Graduate Attributes” (GAs). GAs don’t necessarily follow in a direct line from learning outcomes (LOs) but are shaped by the learning process itself. Sheridan College’s GAs, displayed in the table on the next page, are integrated into the College’s assessments and cultivated in all the College’s learning activities. They describe the kind of personal characteristics we hope you will exhibit when you graduate. If in future your referees use these kinds of descriptors when writing about you, we will consider this a sign of a successful higher education.
### College Vision Statement

To offer higher education to those who are seeking to live an extraordinary life. To this end, the College will inspire its students to...

### College Graduate Attributes

<table>
<thead>
<tr>
<th>COLLEGE GRADUATE ATTRIBUTES</th>
<th>METHODS OF EVALUATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheridan College graduates will be...</td>
<td>See unit assessment schedule for alignment with specific assessments.</td>
</tr>
</tbody>
</table>

#### ... love truth...

1. **Lovers of truth who:**
   a. Pursue knowledge, understanding and insight with persistence, independence, rigour, critical thinking and academic integrity.
   b. Attain a comprehensive understanding of the body of knowledge and professional skills within a specialised learning area or discipline.
   c. Identify and analyse the pre-theoretical assumptions that underpin the relevant theoretical frameworks and perspectives within a specialised learning area or discipline.

#### ... seek wisdom...

2. **Seekers of wisdom who:**
   a. Recognise the limits of their knowledge and understanding, receiving and evaluating correction or advice with grace and humility.
   b. Exercise sound, fair and ethical judgment in study and workplace learning environments.
   c. Carefully consider their life’s purpose and make the most of opportunities as they emerge.

#### ... embrace innovation...

3. **Innovative thinkers who:**
   a. Identify research gaps and make original contributions that extend the body of knowledge, both independently and in collaboration with others.
   b. Synthesise, analyse and interpret information drawn from diverse sources using diverse mechanisms.
   c. Adapt effectively to changing circumstances, take appropriate risks, and solve problems in new situations.

#### ... and become instruments of peace in the world.

4. **Effective communicators who:**
   a. Demonstrate the ability to communicate clearly and effectively to a range of audiences and across a range of mediums/technologies.
   b. Build classmates and colleagues up according to their needs and for their benefit. Avoid slanderous speech.
   c. Promote respect, hospitality and understanding towards cultures and groups.

5. **Independent learners who:**
   a. Perform tasks to the best of their own abilities and strive for a high academic standard.
   b. Set reasonable goals, determine personal boundaries and drive set tasks to completion.
   c. Take responsibility for their own learning and research.

6. **Servant leaders who:**
   a. Model respectful and ethical behaviour in team environments.
   b. Serve the local, national and global community.
   c. Understand and support Australian democratic traditions, including pluralism, freedom of speech, freedom of association, and equality of opportunity.
Course Structure

Academic Calendar
Diplomas are 1-year programs at Sheridan College. Units are delivered in 15-week trimesters. Each trimester comprises 12 weeks of teaching, two non-teaching study weeks, and an examination week.

Trimesters 1 and 3 are dedicated coursework trimesters. If you are enrolled full-time, you will take 3-4 core or elective units during this trimester.

Trimester 2 is a dedicated research trimester. Whether you are enrolled full-time or part-time, your only formal study during Trimester 2 will be a single research-related unit relevant to your field of study. The schedule provides a focused opportunity to acquire valuable research skills, and to practise applying those skills under the direction of the College faculty.

The Trimester 2 schedule also offers you some freedom to pursue personal, professional and learning goals outside of your formal coursework. The College provides a range of informal extra-curricular programs during this trimester for you to gain life experience and enhance your employability. A description of these programs can be found on the College website at http://sheridan.edu.au/index.php/home/academic-calendar.

In the table below, the student will complete the minimum requirements for the Diploma of Science.

### SAMPLE DIPLOMA OF SCIENCE PROGRAM

**Pre-Trimester Module: Academic Writing**

<table>
<thead>
<tr>
<th>TRIMESTER 1</th>
<th>TRIMESTER 2</th>
<th>TRIMESTER 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential Academic Skills for the Sciences (3cp)</td>
<td>Research Project 1: Problem Definition and Experimental Design (3cp)</td>
<td>Linear Algebra and Calculus (3cp)</td>
</tr>
<tr>
<td>Biology: Diversity of Life (3cp)</td>
<td><em>Extra-curricular activities and programs</em></td>
<td>Foundations of Physics (3cp)</td>
</tr>
<tr>
<td>Foundations of Chemistry (3cp)</td>
<td></td>
<td>Fundamentals of Physical Geography (6cp)</td>
</tr>
<tr>
<td>Introduction to Christianity (3cp)</td>
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</tbody>
</table>

Unit Organisation

Seminars
You will meet with the lecturer for two 3-hour sessions per week. The purpose of this time is for you to ask questions, clarify issues, and receive assistance with your assignments, for the lecturer to highlight areas of special focus, and to conduct minor assessments, evaluating your understanding of the course material to date.

Please arrive with a willingness to learn, reflect and contribute to class discussions. It is essential that you prepare thoroughly for each class by reading the assigned chapters.

Private Study Expectations
You should expect to spend an additional 6 hours per week of private study, immersing yourself in the course material and completing the assessment requirements. There is a significant amount of reading to get through in a short period of time.

Reading and preparation for each course week should be done prior to or during the early part of each course week. Students may choose to begin reading over the weekend prior to each course week, keeping a notebook of insights and questions to contribute during the week’s discussion.
Consultation
At Sheridan College, lecturers make themselves available during office hours for individual consultations for a minimum of 25% of the total time spent teaching the unit. For this unit, the lecturer will nominate an additional 1.5 hours per week either before or after class to be available for individual student queries. The specific times will be set after discussions with the class on the first day.

IT Resources
The internet is an extraordinary resource for students and using it effectively contributes to the nurturing of the College’s graduate attributes in each student. We encourage you to bring your electronic devices (college-supplied or personal tablets, mobile phones, laptops) into the class as a learning resource. As a courtesy to your classmates, please keep these learning devices on “silent” and do not take phone calls during class hours.

Wireless internet access will be available for all students at the Piccadilly Square West campus, if you wish to meet there in study groups or for private study. You can also access printers, scanners and photocopiers at the office.

Location
Classes:
Sheridan College
18/7 Aberdeen St, Piccadilly Square West, Perth WA 6000

Labs:
Quinns Baptist College
8 Salerno Drive, Mindarie WA 6030

Austin Cove Baptist College
Inlet Boulevard, South Yunderup WA 6208

Learning Resources
Prescribed Reading(s)

The unit will closely follow the material in the primary text. The course material will include large parts of some chapters approximately in the order that the text covers it. The lectures will not cover the material in the same depth as the text, but instead will briefly cover the material and then concentrate on conceptual issues and problem-solving. Reading the appropriate material from the text in advance of the lecture is highly recommended. This will allow the student to participate effectively in the class discussion.

Supplementary Reading(s)
You may find some of the texts listed below useful for additional explanation and for assistance in homework. Copies of these texts have been placed in the Reserve Section of the Sheridan College Library.

College Library Resources

In 2017, Sheridan College students will have direct access to four (4) major academic database collection providers, granting Sheridan College students direct onsite (IP) and remote access to:

1. **Academic OneFile** from Cengage Gale (now active)
2. **Oxford University Press Arts and Humanities Collection** (now active)
3. **EBSCO collections** (to be activated from 1 February 2017), including:
   - Business Source Premier
   - Academic Search Premier
   - Humanities International Complete
   - Science and Technology Collection
4. **Informit collections** (to be activated from 1 February 2017), including:
   - Business Collection
   - HSS Collection

Cunningham Library

Sheridan College is an institutional member of the Australian Council of Educational Research’s Cunningham Library.

Cunningham Library is a unique, comprehensive collection of Australian educational research material dating from the early 1900s to the present day. The vast resources of Cunningham Library offer the researcher a complete and up to date collection of educational research documents in Australia, including:

- books with over 50,000 titles, both Australian and overseas publications
- journals with over 400 titles, both Australian and overseas publications
- e-journals
- government reports & conference proceedings
- bibliographic database of educational theses
- audio, video & CD-ROM material
- educational and psychological tests
- databases, directories and research discovery tools
- web documents & e-books


Aberdeen Street Campus Reserve Collection

A growing physical reserve library of books will be maintained at the Aberdeen St campus for resources specifically chosen by lecturers for individual units. These resources will be nominated by the lecturers and purchased if there are no online options available.

Public Libraries

You will have signed up with the State Library of WA (SLWA) and the National Library of Australia (NLA) when you enrolled at Sheridan College. It takes about one week from the date of enrolment for your subscription to SLWA to become active.
The e-resources of SLWA and NLA are available online for library members (free to members of the public with an Australian residential address), including thousands of peer-reviewed journals across the full range of academic disciplines.

Other Free Resources
Access to free full-text journals can also be found through the following sites, among many others:

- VOCEDplus (www.voced.edu.au/journalbrowse)
- Stanford University’s Highwire site (http://highwire.stanford.edu/lists/freeart.dtl)
- Directory of Open Access Journals (http://www.doaj.org/)
- Open Directory Project (http://www.dmoz.org/Reference/Education/Journals

Community Memberships
If those are insufficient for research purposes, community memberships are also available at Perth higher education institutions. Research students wishing to join the libraries of Perth’s universities will be fully reimbursed by Sheridan College for their membership costs.

Community memberships are available at the following university and other higher education libraries:

- Curtin University: ($70.40) https://library.curtin.edu.au/borrowing/non-curtin-borrowers/community-borrowers.cfm
- Murdoch University: ($99) http://library.murdoch.edu.au/Our-services/Community-members/
- University of Notre Dame ($40) http://library.nd.edu.au/content.php?pid=50125&sid=642804
- UWA http://www.is.uwa.edu.au/about/visitors-friends/visitors#community

Please note: For some universities, community members may only be able to access online resources while logging in from a terminal within the university library itself.

Learning Support
Any student who feels they may need special provisions for any type of disability should see a lecturer during regular office hours or contact the Registrar, Mrs Christa Smith, who will help you make any necessary accommodations for academic support.

Assessment Schedule

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Value (%)</th>
<th>Due Date</th>
<th>LOs Assessed</th>
<th>GAs Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments and class discussion</td>
<td>20%</td>
<td>Weeks 1-12</td>
<td>A,B,D,E,F,G</td>
<td>1,2,3,4,5,6</td>
</tr>
<tr>
<td>Lab/Workshop</td>
<td>20%</td>
<td>Weeks 1-12</td>
<td>A,B,C,E,F</td>
<td>1,2,3,4,5,6</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>20%</td>
<td>Week 5</td>
<td>A,B,E,G</td>
<td>1,2,3,5</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
<td>Week 13</td>
<td>A,B,E,G</td>
<td>1,2,3,5</td>
</tr>
</tbody>
</table>
Explanation of Assessments

Sheridan College assessments are designed both to measure your successful demonstration of the full range of learning outcomes in the unit, and to cultivate the Sheridan College graduate attributes.

You must submit all assessments to satisfy the course requirements.

1. Assignments and Class Discussions

Solving problems systematically on a regular basis is an important part of success in physics. You will be assigned homework problems on a weekly basis to develop proficiency in problem solving. The point of the homework is to learn how to think through problems and arrive at the solution by a valid method. The homework problems will serve as examples of exam problems. All homework assignments are due on the dates specified. Students are also required to be actively involved in the process of learning. Science in general, Physics specifically, cannot be learned by listening to a lecturer explaining concepts and solving problems on a board. During the class discussion period, students are strongly encouraged to talk to other students, explain their reasoning and understanding of a specific physics situation, argue to defend their answer, and ask questions. They should feel free to ask questions any time during class.

LOs assessed: A,B,D,E,F,G

2. Lab/Workshop

Students will also build their capacity to solve problems systematically in a practical context, in dedicated labs and workshops. These assessable lab/workshop sessions are scheduled across the first four weeks of the unit.

LOs assessed: A,B,C,E,F

<table>
<thead>
<tr>
<th>Category/Grade</th>
<th>Fail (&lt;50)</th>
<th>Pass (50-64)</th>
<th>Credit (65-74)</th>
<th>Distinction (75-84)</th>
<th>High Distinction (85+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose of experiment</td>
<td>No understanding of the purpose</td>
<td>Evidences a basic understanding of the purpose</td>
<td>Has begun to understand and define the purpose</td>
<td>Evidences understanding and ability to define the purpose</td>
<td>Evidences sound understanding and ability to define the purpose</td>
</tr>
<tr>
<td>Description of the experiment (materials and methods)</td>
<td>No description of materials and methods used</td>
<td>Some description of materials used and method applied</td>
<td>Many aspects of the experiment are understood and defined</td>
<td>Most aspects of the experiment are understood and defined</td>
<td>All aspects of experiment are clearly described is clearly understood and well defined</td>
</tr>
<tr>
<td>Experiment outcomes</td>
<td>No understanding of outcomes</td>
<td>Some outcomes are mentioned</td>
<td>Many outcomes are defined and understood</td>
<td>Most outcomes are defined and understood</td>
<td>Clear understanding and complete definition of outcomes</td>
</tr>
<tr>
<td>Conclusion</td>
<td>Wrong or no conclusion</td>
<td>Some aspects of conclusion are covered</td>
<td>Most aspects of conclusion are covered</td>
<td>Conclusion is correct but not clearly defined</td>
<td>Conclusion is clear, correct and clearly defined</td>
</tr>
</tbody>
</table>
3. Midterm Exam and Final Exam
Exams will be given in class during the preannounced class periods. The final exam will be comprehensive and is required to pass the course. The exam format is a mix of conceptual questions (either multiple-choice questions, or questions requiring short written answers) and problems requiring numerical solutions, with a 2-hour midterm exam having 5 to 8 conceptual questions and 4 to 5 problems and a 3-hour final exam having about 10 conceptual questions and 6 to 8 problems. A scientific calculator with trig functions, square roots, and logs is essential for the course and for the examination. Graphing calculators are fine but this feature is not necessary. The exams will be "closed book" but necessary constants and formulas will be provided and you will receive information about bringing in a page of your own notes.

LOs assessed: A,B,E,G
Guidelines for Written Assignments

These general guidelines will assist you in preparing and writing your assignments. Your lecturer will discuss these in greater detail before you commence your assignment. If you have any questions please ask your lecturer to assist you. Do not ask other students, as they may not give you the correct information.

Presentation

- The assignment must be typed on A4 paper with 1.5 or 2-line spacing and a 3cm margin at the top, bottom and right hand side to allow for marker's comments. Headings should be used to identify the main points in your discussion and may be underlined.

- Your assignment should be grammatically correct and well punctuated. A high standard of written English is expected and your assignments should be clear, concise, neatly presented and easy to read. Failure to comply with these requirements may result in a significant loss of marks.

Academic Integrity

- Your assignment must be your own original piece of work and not that of another student or previously submitted work for another subject. Please be aware that there are serious penalties for handing in assignments that have been copied from another source (plagiarism). Your lecturer will discuss this with you during your class. Please note also that Sheridan College deploys plagiarism-detection mechanisms. The Sheridan College Academic Integrity Policy is found at [http://sheridan.edu.au/index.php/home/policy-library](http://sheridan.edu.au/index.php/home/policy-library).

- You are expected to acknowledge the source of your ideas and expressions used in your written work. Students at Sheridan College are required to use the APA Referencing style ([http://www.apastyle.org/](http://www.apastyle.org/)).

Submission

- Your assignment should be submitted to your lecturer by the date specified. If you require an extension of time, it is your responsibility to contact your lecturer before the due date, and provide documentation from a medical practitioner, or the student counsellor as to why you cannot adhere to the stated due date.

- Any assignment submitted after the due date without the lecturer’s permission will be subject to a deduction of 10% of the original mark for each day (including weekends) for which it is late. Assignments submitted more than one week late will only be accepted with a current medical certificate, which must be dated on the day of the illness.

- You must keep a copy of the completed assignment when you submit the original document for marking.

- If you are in doubt about any of these requirements, you should discuss them with your lecturer who will clarify any misunderstanding.

- All assignments must be submitted to assignments@sheridan.edu.au.

Assessment Moderation

- Your major assessment may also be marked by an external examiner, in addition to your lecturer. This is common practice in higher education and is designed to ensure that your marks are equivalent to students being assessed at comparable higher education institutions.
# Unit Outline

<table>
<thead>
<tr>
<th>WEEK NO.</th>
<th>TOPICS COVERED</th>
<th>READINGS</th>
<th>ASSESSMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Welcome, Groups Assigned, Unit Outline &amp; Structure; Administration Procedures; Discussion on Assessments; Assignment dates agreed – Introduction; Kinematics</td>
<td>Giancoli, Ch. 2-3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Newton's Laws, Circular Motion</td>
<td>Giancoli, Ch. 4,5</td>
<td>Weeks 1-4 Assignments and class discussion (20%) Lab Work (20%)</td>
</tr>
<tr>
<td>3</td>
<td>Work and Energy; Linear Momentum</td>
<td>Giancoli, Ch. 6,7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rotational Motion; Periodic Motion</td>
<td>Giancoli, Ch. 8,11</td>
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<tr>
<td></td>
<td><strong>In-Trimester Study Week</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Electric Charge, Electric Fields, Electric Potential</td>
<td>Giancoli, Ch. 16,17</td>
<td>Week 5 Midterm Exam (20%)</td>
</tr>
<tr>
<td>6</td>
<td>Electric Currents, Electric Circuits</td>
<td>Giancoli, Ch. 18,19</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Magnetism</td>
<td>Giancoli, Ch. 20</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Electromagnetic Induction, Faraday's Law</td>
<td>Giancoli, Ch. 21</td>
<td>Weeks 5-12 Assignments and class discussion (20%) Lab Work (20%)</td>
</tr>
<tr>
<td>9</td>
<td>Temperature, Kinetic Theory</td>
<td>Giancoli, Ch. 13</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Heat, Internal Energy</td>
<td>Giancoli, Ch. 14</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>The Laws of Thermodynamics</td>
<td>Giancoli, Ch. 15</td>
<td></td>
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<tr>
<td>12</td>
<td>Review</td>
<td></td>
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<tr>
<td></td>
<td><strong>Pre-Exam Study Week</strong></td>
<td></td>
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</tr>
<tr>
<td>13</td>
<td>Examination (40%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lab sessions: Week 2; Week 4; Week 6; Week 8; Week 10; (and Week 12)