OFFICIAL COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.

Shaded headings are subject to change at the discretion of the department and the material will vary - see course syllabus available from instructor

<table>
<thead>
<tr>
<th>FACULTY/DEPARTMENT:</th>
<th>Faculty of Science, Health &amp; Human Services/Physics</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICS 311</td>
<td></td>
</tr>
<tr>
<td>COURSE NAME/NUMBER</td>
<td>FORMER COURSE NUMBER</td>
</tr>
<tr>
<td>Statistical Physics</td>
<td>Statistical Physics</td>
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</tbody>
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CALENDAR DESCRIPTION:

This course introduces students to the advanced methods of statistical physics. Connections with thermodynamics are emphasized. Topics include canonical ensembles, partition functions, and quantum statistics.

PREREQUISITES: Physics 231

COREQUISITES:

SYNONYMOUS COURSE(S)

(a) Replaces: n/a

(b) Cannot take: n/a for further credit.

SERVICE COURSE TO:

TOTAL HOURS PER TERM: 75

STRUCTURE OF HOURS:

Lectures: 75 Hrs
Seminar: Hrs
Laboratory: Hrs
Field Experience: Hrs
Student Directed Learning: Hrs
Other (Specify): Hrs

TRAINING DAY-BASED INSTRUCTION

LENGTH OF COURSE: HOURS PER DAY:

MAXIMUM ENROLLMENT: 24

EXPECTED FREQUENCY OF COURSE OFFERINGS:

Once every two years

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)

☐ Yes ☐ No

WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)

☐ Yes ☒ No

TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:

☐ Yes ☒ No

COURSE IMPLEMENTATION DATE: January 1995

COURSE REVISED IMPLEMENTATION DATE: September 2006

COURSE TO BE REVIEWED: November 2009 (Four years after UPAC final approval date)

AUTHORIZED SIGNATURES:

Course Designer(s): Rob Woodside
Chairperson: Gillian Mimmack (Curriculum Committee)

Department Head: Norm Taylor
Dean: Jackie Snodgrass

UPAC Approval in Principle Date: UPAC Final Approval Date: December 14, 2005
LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:
To introduce the student to the methods of statistical physics.
To enable the student to solve various problems in each of the topic areas listed in the Calendar Description section.

METHODS:
This course will be taught using lectures, demonstrations, seminars and student projects. Problems will be assigned and marked on a regular basis.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):
Credit can be awarded for this course through PLAR (Please check:) ☑ Yes ☐ No

METHODS OF OBTAINING PLAR:
Departmental Review and/or Course Challenge

TEXTBOOKS, REFERENCES, MATERIALS:
[Textbook selection varies by instructor. An example of texts for this course might be:]

TEXTS:

REFERENCES:
Fundamentals of Statistical and Thermal Physics, F. Reif, McGraw Hill (1965)

Thermal Physics, Kittel

Statistical Mechanics, Huang

SUPPLIES / MATERIALS:

STUDENT EVALUATION:
[An example of student evaluation for this course might be:]

Assignments 25%
Midterm Examination 30%
Final Examination 45%

COURSE CONTENT:
[Course content varies by instructor. An example of course content might be:]

(An example taken from 'Reif':)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reif Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>Introduction to statistical methods (Random Walk)</td>
<td>1</td>
</tr>
<tr>
<td>3 - 4</td>
<td>Statistical description of systems of particles</td>
<td>2</td>
</tr>
<tr>
<td>5 - 6</td>
<td>Brief review of thermodynamics</td>
<td>4 - 5</td>
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<tr>
<td></td>
<td>Basic methods - microcanonical and grand canonical ensembles and connection with thermodynamics</td>
<td>6</td>
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<tr>
<td>9-10</td>
<td>Applications - partition functions, ideal gases, conduction electron theory, equipartition theorem, paramagnetism, equilibrium of dilute gases</td>
<td>7-8</td>
</tr>
<tr>
<td>11-12</td>
<td>Quantum statistics</td>
<td>9</td>
</tr>
</tbody>
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Legendre Transformation; Thermodynamic Potentials; Gibbs Phase Rule; Partition Function; Lagrange Multipliers; Boltzmann Statistics and Ensembles; Distributions (Boltzman, Fermi-Dirad and Bose-Einstein); Gases (Maxwell-Boltzmann, Fermi-Dirad and Bose-Einstein); Information theory.