# Course Outline

**Course Code and Number:** ENGR 113  
**Number of Credits:** 4  
**Course Full Title:** Engineering Physics - Statics & Dynamics  
**Course Short Title (if title exceeds 30 characters):** Statics & Dynamics

### Faculty and Department
- **Faculty:** Faculty of Science  
- **Department (or program if no department):** PHYSICS

### Calendar Description
This course emphasizes solution techniques and proper documentation for problems involving practical applications of Newton's laws to engineering situations.

### Prerequisites (or NONE):
- MATH 111 and PHYS 111.

### Corequisites (if applicable, or NONE):
- NONE

### Pre/corequisites (if applicable, or NONE):
- NONE

### Equivalent Courses (cannot be taken for additional credit)
- **Former course code/number:** PHYS 113
- **Cross-listed with:** PHYS 113
- **Equivalent course(s):** PHYS 113

**Note:** Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.

### Transfer Credit
- Transfer credit already exists: ☑ Yes  ☐ No
- Transfer credit requested (OReg to submit to BCCAT): ☑ Yes ☐ No
- Resubmit revised outline for articulation: ☑ Yes ☐ No
- To find out how this course transfers, see [bctransferguide.ca](https://bctransferguide.ca).

### Total Hours: 90
**Typical structure of instructional hours:**
- **Lecture hours:** 45
- **Seminars/tutorials/workshops:** 45
- **Laboratory hours:**
- **Field experience hours:**
- **Experiential (practicum, internship, etc.):**
- **Online learning activities:**
- **Other contact hours:**

**Total:** 90

### Special Topics
- **Will the course be offered with different topics?**
  - ☑ Yes  ☐ No

  If yes, different lettered courses may be taken for credit:
  - ☐ No  ☑ Yes, repeat(s) ☐ Yes, no limit

  **Note:** The specific topic will be recorded when offered.

### Maximum enrolment (for information only): 36

### Expected frequency of course offerings (every semester, annually, every other year, etc.): Once/year, possibly twice

### Department / Program Head or Director
- **Jeff Chizma**

### Date approved
- **May 2017**

### Faculty Council approval
- Date approved: May 26, 2017

### Campus-Wide Consultation (CWC)
- Date of posting: n/a

### Dean/Associate VP
- **Lucy Lee**

### Undergraduate Education Committee (UEC) approval
- Date approved: May 26, 2017

### Date of meeting
- August 31, 2017
Learning Outcomes
Upon successful completion of this course, students will be able to:

- Accurately make free body diagrams for single objects and structures
- Use Newton's Laws to model and analyze practical situations in statics and dynamics
- Properly choose from multiple co-ordinate systems to simplify the analysis
- Use kinematics, energy, or momentum as appropriate for a situation
- Properly document a solution in the standard format for engineering/industrial applications

Prior Learning Assessment and Recognition (PLAR)

- Yes
- No, PLAR cannot be awarded for this course because

Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department’s discretion)
The course will be presented using lectures and tutorials. Approximately ten problems per week will be handed in and marked. During the tutorial the marked assignments will be discussed, additional problems in the same general area will be dealt with, and help will be given for those needing it for the next assignment set. There will be a close coordination between the lecture topics and the tutorials.

Grading system: Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)

<table>
<thead>
<tr>
<th>Author (surname, initials)</th>
<th>Title (article, book, journal, etc.)</th>
<th>Current ed.</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
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</table>

Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)
Engineering Grade Paper and simple drawing instruments.

Typical Evaluation Methods and Weighting

<table>
<thead>
<tr>
<th>Final exam: 40%</th>
<th>Assignments: 15%</th>
<th>Midterm exam: 25%</th>
<th>Practicum: %</th>
<th>Field experience: %</th>
<th>Total: 100%</th>
</tr>
</thead>
</table>

Details (if necessary):

Typical Course Content and Topics

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>TEXT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to mechanics, fundamental concepts and principles, systems of units, solution methods and numerical accuracy. Vectors.</td>
<td>Ch 1, 1.1-1.6 Ch 2.1-2.3</td>
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<tr>
<td>2-2.5</td>
<td>Newton’s laws, forces as vectors, free body diagrams and Equilibrium of.</td>
<td>Ch 3, 3.1-3.4 Ch 4, 4.1-4.5</td>
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<tr>
<td>2.5-3</td>
<td>Rigid body equilibrium, torques as vector cross products, equivalent forces and couples. Loadings and distributed forces.</td>
<td>Ch 4, 4.4-4.10</td>
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<tr>
<td>4</td>
<td>Rigid body equilibrium in two and three dimensions.</td>
<td>Ch 5, 5.1-5.7</td>
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<tr>
<td>5</td>
<td>Analysis of structures (trusses and frames).</td>
<td>Ch 6, 6.1-6.4</td>
</tr>
<tr>
<td>6</td>
<td>Friction-wedges, square threaded screws, journal bearings, thrust bearings, and belt friction.</td>
<td>Ch 8, 8.1-8.3</td>
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<td>7-8</td>
<td>Particle kinematics – rectilinear and curvilinear motion (radial and tangential components).</td>
<td>Ch 12, 12.1-12.9</td>
</tr>
<tr>
<td>9</td>
<td>Newton’s second law on dynamic systems.</td>
<td>Ch 13, 13.1-13.6</td>
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<tr>
<td>11</td>
<td>Impulse and momentum.</td>
<td>Ch 15 15.1-15.4</td>
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