

## CEE 2105 Syllabus Fall 2017

<b>Class Meetings</b>	<p><u>Section 001:</u> MWF CEER 205 8:30 AM - 9:20 AM; R CEER 205 11:30 AM - 2:15 PM *</p> <p><u>Section 002:</u> MWF CEER 205 9:30 AM - 10:20 AM; R CEER 205 2:30 PM - 5:15 PM *</p> <p>* Thursday class meetings may be held in locations other than CEER 205. Consult the course calendar for information on each specific Thursday meeting. A few Thursday class meetings will be held in the Structural Engineering Teaching &amp; Research Laboratory (SETRL), which is located at the corner of Ithan Ave &amp; County Line Rd.</p>		
<b>Instructors</b>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;">           Dr. David W. Dinehart            154 Tolentine            (610) 519-4962  <a href="mailto:david.dinehart@villanova.edu">david.dinehart@villanova.edu</a> </td> <td style="width: 50%; vertical-align: top;">           Dr. Frank P. Hampton            145 Tolentine            (610) 519-7396  <a href="mailto:francis.hampton@villanova.edu">francis.hampton@villanova.edu</a> </td> </tr> </table>	Dr. David W. Dinehart 154 Tolentine (610) 519-4962 <a href="mailto:david.dinehart@villanova.edu">david.dinehart@villanova.edu</a>	Dr. Frank P. Hampton 145 Tolentine (610) 519-7396 <a href="mailto:francis.hampton@villanova.edu">francis.hampton@villanova.edu</a>
Dr. David W. Dinehart 154 Tolentine (610) 519-4962 <a href="mailto:david.dinehart@villanova.edu">david.dinehart@villanova.edu</a>	Dr. Frank P. Hampton 145 Tolentine (610) 519-7396 <a href="mailto:francis.hampton@villanova.edu">francis.hampton@villanova.edu</a>		
<b>Office Hours</b>	MW 10:30 – 12:00, or by appointment		
<b>Prerequisites</b>	PHY 2400 or 2410 (Physics I – Mechanics) and MAT 1505 (Calculus II)		
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. Apply selected vector operations to two or more vectors.</li> <li>2. Solve various types of 2-D and 3-D equilibrium problems.</li> <li>3. Analyze statically determinate trusses.</li> <li>4. Calculate selected properties of an area or volume including centroid and moment of inertia about a given axis.</li> <li>5. Calculate internal normal and shear stresses.</li> <li>6. Develop the stress-strain relationships for and discuss key characteristics of various steels.</li> <li>7. Compute elongations in axially loaded members.</li> <li>8. Calculate the buckling load for axially loaded columns.</li> <li>9. Solve simple particle dynamics problems involving dry friction.</li> <li>10. Produce professional quality calculations that are neat and well organized.</li> </ol>		
<b>Course Calendar</b>	The course calendar may be viewed using the link on the Blackboard course site. The calendar will be updated frequently to contain the most up-to-date information and should be consulted regularly.		
<b>Course Format</b>	This course will utilize an <i>inverted classroom</i> format. The format is designed to improve learning and maximize the value of time spent in the classroom. Most of the lecture material (i.e. theory) will be covered via recorded lectures outside of the classroom, while the overwhelming majority of the time in class will be spent solving problems (i.e. application).		
<b>Recorded Lecture Videos</b>	Lectures present the background theory that needs to be understood before solving problems. They reiterate or build upon concepts from earlier course work. In this course, most lectures will be recorded for viewing outside of class prior to the actual class meeting periods. Students are required to watch video lectures and review lecture notes prior to coming to class to work on problem sets, and lecture viewing will be considered as part of the course grade. Lectures vary in length from about 5 to 20 minutes (with an average of 15 minutes), depending on the topic. All recorded lecture videos are accessible for viewing by following the link in each specific lecture folder on the Blackboard course site.		

<p><b>Problem Sets</b></p>	<p>Problem sets have been developed for each lecture. These problem sets consist of multiple calculation-based problems. The majority of time in the classroom will be spent working on these problem sets. Some problems will be solved completely during class, others will be partially solved and finished by students outside of class, and some will be solved entirely outside of class.</p>
<p><b>Problem Solution Format</b></p>	<p>All problems must be solved in a professional manner. Unless otherwise noted, all assignments must be completed on the course standard computation paper supplied in the course binders. Extra copies of this paper may be printed using the PDF file posted on Blackboard course site, and calculation pads are also available in the University Bookstore.</p> <p>All sheets must have complete headings including name, date, problem number, and page number.</p> <p>Work should be done in pencil, and a straightedge should be used for all figures.</p> <p>Each problem submission must include the following components:</p> <ul style="list-style-type: none"> <li>❖ <b>Required:</b> Identify what information (variables) you are asked to solve for as the answer to the problem.</li> <li>❖ <b>Solution:</b> Show all work in a clear logical manner. Where appropriate, include equations and descriptions of the steps you use to solve the problem.</li> <li>❖ <b>Answer:</b> The answer(s) must be boxed or underlined and include the correct unit(s).</li> </ul> <p>An example of a solved problem that meets the course standards is attached at the end of this syllabus.</p>
<p><b>Submission and Grading of Problem Sets</b></p>	<p>Students are responsible for turning in complete problem sets (including problems solved in class and those solved outside of class) on the due date posted on the course calendar, which unless otherwise noted will be the date of the next class meeting. <u>Late submissions will not be accepted.</u></p> <p>Each problem set submission must be placed in one of the report cover folders provided at the beginning of the course. Individual sheets should not be stapled together, but rather must be placed in the clips in the middle of the folder. Place the folder in the box at the front of the classroom prior to the beginning of the class period.</p> <p>Each problem will be graded out of a specific number of points, with problems solved entirely outside of class weighted more heavily. Points will be deducted for a lack of professionalism. Instructors also reserve the right to reject outright any assignments that fall excessively short of meeting the minimum problem format standards.</p> <p>All problem sets will be returned to students in a timely manner, and solutions to problems solved outside of class will be posted on the BlackBoard course site.</p>

<p><b>Grading</b></p>	<p>The course grade will be comprised of the following:</p> <p>45% Examinations 1-3 (counted equally)  25% Final Examination  15% In-class Quizzes (13 planned quizzes, lowest grade dropped, others count 1.25% each)  15% Problem Sets and Related Submissions (In-class activities, out-of-class assignments, laboratory activities, group projects, lecture viewing <u>prior</u> to class (each lecture is equivalent to one homework problem), etc.)</p> <hr/> <p><b>100% TOTAL</b></p> <p>Minimum requirements for final letter grades are as follows:</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>A</td><td>≥93.00</td> <td>A-</td><td>≥90.00</td> <td>B+</td><td>≥87.00</td> <td>B</td><td>≥83.00</td> </tr> <tr> <td>B-</td><td>≥80.00</td> <td>C+</td><td>≥77.00</td> <td>C</td><td>≥73.00</td> <td>C-</td><td>≥70.00</td> </tr> <tr> <td>F</td><td>&lt;70.00</td> <td></td><td></td> <td></td><td></td> <td></td><td></td> </tr> </table> <p>Note: As indicated above, a minimum course grade of 70.00 is required to pass this course.</p>	A	≥93.00	A-	≥90.00	B+	≥87.00	B	≥83.00	B-	≥80.00	C+	≥77.00	C	≥73.00	C-	≥70.00	F	<70.00						
A	≥93.00	A-	≥90.00	B+	≥87.00	B	≥83.00																		
B-	≥80.00	C+	≥77.00	C	≥73.00	C-	≥70.00																		
F	<70.00																								
<p><b>Attendance</b></p>	<p>Unless a student is excused <i>with prior permission of the instructors</i> (for athletic activities, other university-sponsored events, certain medical conditions, etc.), attendance is mandatory at <u>all</u> class meetings. The form for requesting an <i>excused</i> absence can be found here (<a href="http://www1.villanova.edu/villanova/engineering/resources/policies/forms/studentAbsence.html">http://www1.villanova.edu/villanova/engineering/resources/policies/forms/studentAbsence.html</a>). Students are expected to be attentive and cell phones and similar devices should be turned off before the beginning of the class period.</p> <p>Quizzes will be given at the beginning of selected class periods. Students who are not in attendance when the quiz is distributed will receive a grade of zero and will <u>not</u> be permitted to make up the quiz. Students missing a quiz due to an excused absence will have the quiz waived and other quizzes will count proportionally more as part of the total 15% quiz grade.</p> <p>Students must be in attendance in order to submit problem sets. Students who are not in attendance may <u>not</u> have other students submit their problem set unless prior permission is obtained from the instructor due to an excused absence.</p>																								
<p><b>Course Materials</b></p>	<p>Course notes will be posted on Blackboard in PDF files under the appropriate Lecture folder prior to class. Students are responsible for printing the PDF file and having it for reference in class. It is highly recommended that the materials for class be printed in <u>color</u>. Notes may be double sided, but problems must be one sided. Students should purchase two 2" binders to use for organizing these course notes. Use one binder for the first half of the course (up to Fall break), and the second binder for the second half of the course. Each binder should be capable of holding approximately 400 pages. The appropriate course binder should be brought to each class meeting. Students are expected to keep their binders organized at all times to facilitate the learning process.</p>																								
<p><b>Lab Safety</b></p>	<p>Each student will be provided with a hard hat and safety glasses at the beginning of the course. For class periods meeting entirely or partially in SETRL, lab safety requirements must be followed. On these days, students must wear closed-toed shoes (not moccasins), a hard hat, and safety glasses. Additional safety requirements may be discussed for specific experiments. Students not following these safety requirements will be asked to leave the laboratory and will not be given an opportunity to make up any work missed as a result.</p>																								

<p><b>Reference Texts</b></p>	<p>There are no required textbooks for this course, as all necessary materials will be provided. However, students may wish to consider the following as reference materials:</p> <ul style="list-style-type: none"> <li>• Hibbeler, R.C., <u>Engineering Mechanics - Statics</u>, 14<sup>th</sup> Edition, Prentice Hall, 2016.</li> <li>• Beer, F.P., Johnston, E.R. Jr., Dewolf, J.T., and Mazurek, D.F., <u>Mechanics of Materials</u>, 7<sup>th</sup> Edition, McGraw Hill, 2014.</li> </ul> <p>Since these will not be used directly in class, older editions may also be considered as references.</p>
<p><b>Academic Integrity</b></p>	<p>Academic integrity is critical for a healthy learning environment, and thus must be maintained throughout the duration of this course. You are <u>strongly</u> encouraged to review the Villanova Academic Integrity Code (VAIC), which is available online and in the Student Handbook, and will be strictly enforced in this course. While all sections of the Code are important, please pay particular attention to Sections A (Cheating), C (Assisting in or contributing to academic dishonesty), and F (Unsanctioned collaboration).</p> <p>The College of Engineering has adopted the following exam guidelines:</p> <ul style="list-style-type: none"> <li>• Students must arrive before the start of the exam. Under exceptional circumstances a student may need to arrive late, but he/she can enter the exam no later than 5 minutes after the start of the exam.</li> <li>• All cell phones must be turned off and stored away until the student exits the exam room.</li> <li>• The official Villanova class attendance policy must be followed when requesting excuses for absences or lateness to an exam.</li> <li>• Each student must <u>write and sign</u> the following statement, <i>“I have neither given nor received any unauthorized assistance in the completion of this exam.”</i></li> </ul> <p>The penalty for an academic integrity violation on any quiz or exam will be a zero on that quiz or exam and a formal complaint of an academic integrity violation to the Dean’s office.</p> <p><u>Discussion</u> of individual problem set assignments in groups is encouraged in this course, as we feel that this can, for some students, positively contribute to the learning environment. However, every student must perform their <u>own</u> work in actually solving problems; i.e. a problem is not to be worked by a group of students and then simply <u>copied</u>. Submission of directly copied assignments will be considered a violation of the Academic Integrity Code. Sharing of a solution with other students online or through social media platforms is also a violation. A student will be given a warning and a grade of zero for the problem set upon the first offense. A second offense will result in another grade of zero and a formal complaint of an academic integrity violation to the Dean’s office. If you have any questions or need clarification of these policies, it is your responsibility to contact the instructors.</p>
<p><b>Learning Disabilities</b></p>	<p>It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability (non-physical) please register with the Learning Support Office by contacting Learning.support.services@villanova.edu or 610-519-5176 as soon as possible. Registration is needed in order to receive accommodations.</p>
<p><b>Physical Disabilities</b></p>	<p>The Office of Disability Services collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact Gregory Hannah, advisor to students with disabilities @ 610-519-3209 or visit the office on the second floor of the Connelly Center.</p>



### GENERAL GUIDELINES

- For general emergencies and to report a crime:
  - Get to a safe place if possible
  - Call (610) 519-4444
- In an emergency evacuation (including but not limited to a fire alarm):
  - Move quickly and safely to the nearest exit
  - Close doors and windows if time permits
  - Do not use elevators
  - Assist disabled individuals who cannot evacuate themselves by proceeding with them
    - Proceed with them to the nearest fire stairway or safe haven and wait inside with the doors closed until rescue personnel arrive to assist. Immediately get word to rescue personnel of the exact location of the disabled individual
  - Remain a safe distance from the building and be aware of responding emergency vehicles

### MEDICAL EMERGENCIES

- Do not move a seriously injured or ill person unless the situation is life threatening
- Call Public Safety at (610) 519-4444
- Give the dispatcher your name, location, and telephone number and as much information as possible regarding the nature of the injury or illness
- Do not hang up until the dispatcher ends the call
- Administer first aid if you are trained to do so. Otherwise remain with the victim until Public Safety or medical personnel arrive

### SHELTER IN PLACE

- Shelter in place is design to keep you safe while indoors if dangerous environmental conditions exist, such as extreme weather or a hazardous materials release. **If a shelter in place is ordered:**
  - If outside, seek shelter in the nearest building, preferably in an interior room with few windows
  - Close all exterior doors, windows and any other openings to the outside
  - Avoid overcrowding by selecting several rooms if necessary
  - Monitor Nova Alert and email for further instructions
  - Report any emergency or unusual condition to Public Safety
  - Do not leave the building until receiving the "all clear" from a police officer, Public Safety officer, Nova Alert, email or website communication

### UTILITY FAILURES AND ELEVATOR EMERGENCIES

- Report utility failures to Facilities Management by calling (610) 519-4420 during normal business hours. After hours, report utility failures to Public Safety by calling (610) 519-4444.

### ALCOHOL EMERGENCIES

- Consuming too much alcohol can result in serious injury or even death. Call Public Safety at (610) 519-4444 if a person:
  - Cannot be roused by shaking or shouting
  - Has cold, clammy or bluish skin
  - Is disoriented, incoherent, or cannot stand, walk or talk
  - Sustained a blow to the head or any injury that caused bleeding
  - Has shallow or irregular breathing
  - Drank alcohol in combination with other drugs

### IN AN ACTUAL FIRE

- Activate the fire alarm system by pulling a fire alarm station on your way out of the building
- Leave the building via the nearest exit
- Do not use elevators
- Feel doors before opening, and close doors and windows as you leave if safe to do so
- Report the fire to Public Safety by calling (610) 519-4444 once outside
- If trapped, keep the doors closed and place cloth under them to keep out smoke
  - Signal for help by hanging an object (e.g., such as a jacket or shirt) out window to attract attention

### LOCKDOWN

- An imminent threat of violence may be cause for a lockdown of all or part of campus. Some exterior doors will lock automatically. Emergency responders will lock others manually. The goal is to limit exposure of students, faculty and staff to danger by preventing dangerous persons from entering campus buildings. **If a lockdown is ordered:**
  - Stay Inside! Do not leave the building unless an imminently dangerous situation arises inside. If outside, seek shelter in the nearest building
  - Take shelter in a lockable room if possible
  - Close windows, shades and blinds, and avoid being seen from outside the room if possible
  - Monitor Nova Alert and email for updates and further instructions. A description of the actor will be disseminated as soon as possible using these methods
  - Report any emergency or unusual condition to Public Safety
  - Use discretion in admitting anyone into a secure building. Require that all backpacks and other bags be left outside at least 30 feet from the building. Require that the person seeking shelter open all outer garments for visual inspection before allowing entry
  - Once in a secure location, do not leave until receiving the "all clear" from a police officer, Public Safety officer, Nova Alert, email or website communication

Example of problem solution meeting minimum formatting requirements:

<b>VILLANOVA UNIVERSITY STRUCTURAL ENGINEERING</b>		Sheet <u>1</u> of <u>1</u>
Job: CEE 2104 HW1	Project No.: 3-5	Computed By: SPG Date: 8/25/04

GIVEN: THE MEMBERS OF A TRUSS ARE PIN-CONNECTED AT JOINT O.

REQUIRED:  $F_1$  &  $F_2$

SOLUTION:

$$\sum F_x = 0 \quad -5 \cos 30^\circ - \frac{4}{5}(7) + F_1 \cos 60^\circ + F_2 \sin 70^\circ = 0$$

$$\sum F_y = 0 \quad 5 \sin 30^\circ - \frac{3}{5}(7) - F_1 \sin 60^\circ + F_2 \cos 70^\circ = 0$$

REARRANGING EQUATIONS:

$$(1) \quad 0.500 F_1 + 0.940 F_2 = 9.930$$

$$(2) \quad -0.866 F_1 + 0.342 F_2 = 1.700$$

MULTIPLY (1) BY  $\left(\frac{0.866}{0.500}\right)$  AND ADD EQUATIONS

$$0.866 F_1 + 1.628 F_2 = 17.199$$

$$-0.866 F_1 + 0.342 F_2 = 1.700$$


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$$1.970 F_2 = 18.899$$

$$F_2 = 9.60 \text{ kN}$$

SUBSTITUTING INTO (1) GIVES  $F_1 = 1.83 \text{ kN}$

ANSWER:

$F_1 = 1.83 \text{ kN}$
$F_2 = 9.60 \text{ kN}$