**BME 120: Introduction to Computer-Aided Engineering Design (3 Credits)**

**West Chester University, Spring 2022**

**Lecture**  
Tuesday 11:00 – 11:50 am  
Science & Engineering Center 108

**Lab**  
**51** = W 6 – 8:45pm; **53** = W 8 – 10:45am; **52** = Th 9:30am – 12:30pm  
Ruby Jones Hall 006

# Instructor Information:

Professor: Dr. Nicole Ramo (BME120-01, BME120-51, BME120-53)

Email: [nramo@wcupa.edu](mailto:nramo@wcupa.edu) (include “BME120” in the subject line of any emails)

Office Phone: 610-436-2492

Office: SECC 353

Office Hours: Monday 3 – 5 pm, Thursday 10 – 11 am, Friday 2 – 4 pm

Also available by appointment; o*ffice hours may be attended in person or* [*via Zoom*](https://wcupa.zoom.us/my/office.hours.nramo?pwd=WDNvOS9EdVl1ZTRBamVQT2p0elJjQT09)

Professor: Dr. Jesse Placone (BME120-52)

Email: [jplacone@wcupa.edu](mailto:jplacone@wcupa.edu) (include “BME120” in the subject line of any emails)

Office Phone: 610-436-2832

Office: SECC 352

Office Hours: Tuesday 1 – 3 pm, Wednesday 1 – 3 pm, Thursday 2 – 3pm

[Appointments](https://outlook.office365.com/owa/calendar/JessePlaconeOfficeHours@WCUPA.onmicrosoft.com/bookings/) are encouraged; o*ffice hours may be attended in person or online*

# Course Description:

This course introduces modern computational tools used for engineering design and analysis. Topics include the principles of SolidWorks (an industry-standard software package), simple and advanced part modeling approaches, assembly modeling, engineering drawings, configurations/design tables and surface modeling, the applications of SolidWorks in manufacturing processes, mechanical systems, and engineering analysis.

# Course Pre-requisites:

There are no prerequisites for BME120

# **Required Materials:**

* **Textbook:** *Engineering Graphics Essentials* by K. Plantenberg; SDC Publications; 5th edition; 2016
* **Workbook:** *Design Workbook Using SolidWorks 2020* by R.E. Barr et al.; SDC Publications
* **Pencil, Eraser,** and **Ruler (with both inches and millimeters)**
* [**Ability to access SolidWorks software via RamCloud**](https://www.wcupa.edu/infoServices/ramCloud/)
  + If you have issues with RamCloud, submit an [IS&T ServiceNow Ticket](https://www.wcupa.edu/infoServices/serviceNow/default.aspx)

# Important Dates:

* First day of class: 1/25/2022
* Add/Drop deadline: 1/31/2022
* **Spring Break (no classes): 3/14/2022 – 3/20/2022**
* Withdrawal deadline: 3/28/2022
* **Final Project (in place of final exam): 5/10/2022 10:30 am**

# **D2L Usage:**

All course materials including homework assignments, feedback files, grades, and important communications will be posted on [WCU’s D2L website](https://d2l.wcupa.edu) for the course. ***You are strongly encouraged to set D2L to notify you when new content is posted and when an announcement is made.***

# Communication Expectations:

Emails, with BME120 in the subject line, are the preferred way to contact the instructor in this course. Your instructor intends to respond to all student emails within one business day. If you are still waiting on a response after this time frame, please send a follow-up message. **Please note that if you email a question within 24 hours of an assignment deadline, you are not guaranteed a response before your assignment is due; plan accordingly.**

# **Course Student Learning Outcomes:**

After successfully completing the BME 120 course, you will be able to:

1. Create and interpret orthographic projections, both by hand and via computer software (As assessed by: Homework Assignments, Exams)
2. Apply the principles of dimensioning and tolerancing to create and interpret professional engineering drawings (As assessed by: Homework Assignments, Exams)
3. Create 3D models and assemblies using computer software (As assessed by: Homework Assignments, Exams, Final Project)
4. Describe the role of threads and fasteners in engineering; interpret fastener definitions and thread tables (As assessed by: Homework Assignments, Exams)
5. Apply the process of reverse engineering to model a commercially available product (As assessed by: Final Project)

# Applicable Programmatic / ABET Student Learning Outcomes:

This course will contribute to your *ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics* (Student Outcome 1).

# Meeting & Assessing Student Learning Outcomes:

The following learning activities will help you meet the course learning goals staying engaged during lectures and in-class examples; contributing to and learning from group work; viewing homework assignments as learning opportunities that are important to your success; asking for help early and often if you need it. Your achievement of these learning goals will be assessed primarily by homework assignments and exam performance as described below.

# Evaluation & Grading:

Your final course grade will be calculated as follows:

* Attendance (distributed evenly over every lecture and lab meeting) = 5%
* Homework = 25%
* Exams (15% each) = 45%
* Final Project = 25%

# Attendance Policy:

The content of the course builds on itself so consistent and engaged attendance is crucial to your success. Attendance will be taken during each lecture and lab session. You are allowed two *unexcused* absences before your grade is affected however if you miss a lab session for an unexcused reason, the instructor reserves the right to refuse assistance on the related lab assignment. Excused absences are limited to those due to participation in university-sanctioned events (see policy in the WCU undergraduate catalog) or those accompanied by written confirmation from a doctor, the Dean of Students, etc. If you are sick, you must obtain a doctor’s note. If you are absent or late (for excused or unexcused reasons), you will be responsible for any material covered and any announcements that were made in class that day.

# Homework:

Homework will be assigned on an approximately weekly basis. Assignments may consist of detailed hand sketches, computer exercises, or a design topic. Homework deadlines will be posted on D2L (there will be a time specified that your assignment must be successfully submitted by); your score will be reduced by 10% for every hour it is late. Unless previous arrangements have been made with the instructor, no homework assignments will be accepted after the questions are reviewed in class.

# ****Exam Policy:****

There will be three exams over the course of the semester. Exams may consist of all pencil/paper work (e.g., hand sketching), all computer work (e.g., creating SolidWorks parts), or a combination of the two. An unexcused absence on the day of an exam will result in a grade of zero for that test. In the case of a university-sanctioned event, please schedule a makeup exam with the instructor in advance of the exam date. If you miss an exam due to a certifiable emergency or illness, please notify the instructor as soon as possible, providing appropriate documentation; in these cases, a makeup exam will be arranged.

# Final Project:

In place of a final exam, you will work in a group to create a SolidWorks assembly of a commercially available product. Your group will create and submit all the required part, assembly, and drawing files. Your group will also present your work to the class during the scheduled final exam time.

# Grading Scheme:

A letter grade will be assigned based on performance in the course according to the following scale (refer to the [Undergraduate Catalog](https://catalog.wcupa.edu/undergraduate/academic-policies-procedures/grading-information/) for a description of NG (No Grade), W, Z, and other grades):

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade** | **Quality Points** | **Percentage Equivalents** | **Interpretation** |
| A | 4.00 | 93-100 | Excellent |
| A- | 3.67 | 90-92 |  |
| B+ | 3.33 | 87-89 | Superior |
| B | 3.00 | 83-86 |  |
| B- | 2.67 | 80-82 |  |
| C+ | 2.33 | 77-79 | Average |
| C | 2.00 | 73-76 |  |
| C- | 1.67 | 70-72 |  |
| D+ | 1.33 | 67-69 | Below Average |
| D | 1.00 | 63-66 |  |
| D- | 0.67 | 60-62 |  |
| F | 0 | < 60% | Failure |

# Bibliography (Additional resources that may be of interest):

* *Introduction to Graphics Communications for Engineers* by G. Bertoline; McGraw-Hill; 5th edition; 2022
* *Introduction to Solid Modeling Using SolidWorks 2021* by W. Howard & J. Musto; McGraw-Hill; 2022

# Tentative Course Outline:

The following schedule is subject to change at the discretion of the instructor. Every effort will be made to announce changes in advance, but you as a student are responsible for changes.

|  |  |  |
| --- | --- | --- |
| **Week** | **Lecture Date** | **Topics** |
| **1** | 1/25 | Course Introduction; Orthographic Projection; Line Types |
| **2** | 2/1 | Orthographic Projection: Auxiliary Views; Dimensioning Standards |
| **3** | 2/8 | Dimensioning; Section Views; Introduction to CAD |
| **4** | 2/15 | SolidWorks |
| ***5*** | *2/22* | *Exam #1 (Hand Sketching & Dimensioning)*; SolidWorks Parts |
| **6** | 3/1 | SolidWorks Sketching: Patterns, Offsets, Mirroring; Assigning Materials |
| **7** | 3/8 | Threads & Fasteners; SolidWorks Hole Wizard |
| **8** | **N/A** | **No Classes (Spring Break)** |
| **9** | 3/22 | Advanced Features: Loft, Shell, Sweep |
| ***10*** | *3/29* | *Exam #2 (Threads, Fasteners, SolidWorks Sketching, Advanced Features)* |
| **11** | 4/5 | Assemblies |
| **12** | 4/12 | Assemblies; Engineering Drawings |
| **13** | 4/19 | Engineering Drawings |
| **14** | 4/26 | Engineering Drawings: Assembly Drawings |
| **15** | 5/3 | *Exam #3 (Assemblies, Drawings)*; Introduction to FEA |
| **16** | **5/10** | **Final Project Presentations 10:30** |

# Statements Common to All WCU Undergraduate Syllabi:

## Academic & Personal Integrity

It is the responsibility of each student to adhere to the university’s standards for academic integrity. Violations of academic integrity include any act that violates the rights of another student in academic work, that involves misrepresentation of your own work, or that disrupts the instruction of the course. Other violations include (but are not limited to): cheating on assignments or examinations; plagiarizing, which means copying any part of another’s work and/or using ideas of another and presenting them as one’s own without giving proper credit to the source; selling, purchasing, or exchanging of term papers; falsifying of information; and using your own work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in the automatic failure and removal from this course. For questions regarding Academic Integrity, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to the Department Undergraduate Handbook, the Undergraduate Catalog, the Ram’s Eye View, and the [University website](http://www.wcupa.edu).

## Excused Absences Policy

Students are advised to carefully read and comply with the excused absences policy, including absences for university-sanctioned events, contained in the WCU Undergraduate Catalog. In particular, please note that the “responsibility for meeting academic requirements rests with the student,” that this policy does not excuse students from completing required academic work, and that professors can require a “fair alternative” to attendance on those days that students must be absent from class in order to participate in a University-Sanctioned Event.

## Reporting Incidents of Sexual Violence

West Chester University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to comply with the requirements of Title IX of the Education Amendments of 1972 and the University’s commitment to offering supportive measures in accordance with the new regulations issued under Title IX, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. **Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University Protection of Minors Policy.** [Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence can be found here](https://www.wcupa.edu/_admin/diversityEquityInclusion/sexualMisconduct/default.aspx).

## Inclusive Learning Environment and Anti-Racist Statement

Diversity, equity, and inclusion are central to West Chester University’s mission as reflected in our [Mission Statement](https://protect-us.mimecast.com/s/Kh8QCrk6x5SDqM24CQRU_b?domain=wcupa.edu),[Values Statement](https://protect-us.mimecast.com/s/XD1FCv2kB5Ty91Arswntb5?domain=wcupa.edu),[Vision Statement](https://protect-us.mimecast.com/s/XD1FCv2kB5Ty91Arswntb5?domain=wcupa.edu) and[Strategic Plan: Pathways to Student Success](https://protect-us.mimecast.com/s/ovVXCwplD5TRj6yghld0bL?domain=wcupa.edu). We disavow racism and all actions that silence, threaten, or degrade historically marginalized groups in the U.S. We acknowledge that all members of this learning community may experience harm stemming from forms of oppression including but not limited to classism, ableism, heterosexism, sexism, Islamophobia, anti-Semitism, and xenophobia, and recognize that these forms of oppression are compounded by racism. Our core commitment as an institution of higher education shapes our expectation for behavior within this learning community, which represents diverse individual beliefs, backgrounds, and experiences. Courteous and respectful behavior, interactions, and responses are expected from all members of the University. We must work together to make this a safe and productive learning environment for everyone. Part of this work is recognizing how race and other aspects of who we are shape our beliefs and our experiences as individuals. It is not enough to condemn acts of racism. For real, sustainable change, we must stand together as a diverse coalition against racism and oppression of any form, anywhere, at any time. Resources for education and action are available through WCU’s [Office for Diversity, Equity, and Inclusion](https://www.wcupa.edu/_admin/diversityEquityInclusion/changeBeginsHere.aspx) (ODEI), DEI committees within departments or colleges, the student [ombudsperson](https://www.wcupa.edu/_services/STU/studentOmbuds/), and centers on campus committed to doing this work (e.g., [Dowdy Multicultural Center](https://www.wcupa.edu/_services/multicultural/), [Center for Women and Gender Equity](https://www.wcupa.edu/_services/stu.wce/), and the [Center for Trans and Queer Advocacy](https://www.wcupa.edu/_services/transAndQueer/)). Guidance on how to report incidents of discrimination and harassment is available at the University’s [Office of Diversity, Equity and Inclusion](https://www.wcupa.edu/_admin/diversityEquityInclusion/).

## Emergency Preparedness

All students are encouraged to sign up for the University’s free [WCU ALERT service](http://www.wcupa.edu/wcualert), which delivers official WCU emergency text messages directly to your cell phone. To report an emergency, call the Department of Public Safety at 610-436-3311.

## Electronic Mail Policy

It is expected that faculty, staff, and students activate and maintain regular access to University provided e-mail accounts. Official university communications, including those from your instructor, will be sent through your university e-mail account. You are responsible for accessing that mail to be sure to obtain official University communications. Failure to access will not exempt individuals from the responsibilities associated with this course.

## Students With Disabilities

If you have a disability that requires accommodations under the Americans with Disabilities Act (ADA), please present your letter of accommodations and meet with me as soon as possible so that I can support your success in an informed manner. Accommodations cannot be granted retroactively. If you would like to know more about [West Chester University’s Services for Students with Disabilities (OSSD)](https://www.wcupa.edu/universityCollege/ossd/), please visit them at 223 Lawrence Center. Their phone number is 610-436-2564, their fax number is 610-436-2600, their email address is [ossd@wcupa.edu](mailto:ossd@wcupa.edu). In an effort to assist students who either receive or may believe they are entitled to receive accommodations under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, the University has appointed a student advocate to be a contact for students who have questions regarding the provision of their accommodations or their right to accommodations. The advocate will assist any student who may have questions regarding these rights. The Director for Equity and Compliance/Title IX Coordinator has been designated in this role. Students who need assistance with their rights to accommodations should contact them at 610-436-2433.