# Computer Aided Graphics and Design

EML2023 Sections: Section 221G (18173), 825S (23803)
***Class Periods:*** MWF 7th, 9th period
***Location:*** CSE-E222 CSE-A101
***Academic Term:*** Spring 2026

***Instructor:***
Ashok V. Kumar
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Office Phone Number: 352-392-0816
Office Hours: MWF 10:45 – 11:45 AM

***Teaching Assistant/Peer Mentor/Supervised Teaching Student:***
TBD

***Course Description***
Credit hours: 3; Solid and assembly modeling, computer aided design, geometric dimensioning and tolerancing, and design projects.

***Course Pre-Requisites / Co-Requisites***
None

***Course Objectives***
The primary objective of the course is to educate students on the main concepts of computer-aided design: solid modeling, assembly design, engineering drawing conventions, dimensioning and tolerance specification. In addition, conceptual design skills such as creative thinking and idea illustration by sketching are taught.

***Relation to Program Outcomes (ABET):***
The table below is an example. Please consult with your department's ABET coordinator when filling this out.

| **Outcome** | **Coverage*** |
|---|---|
| 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics | Low |
| 2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors | Medium |
| 3. An ability to communicate effectively with a range of audiences | High - Assessed |
| 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts | Low |
| 5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives | Low |
| 6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions | |

| | |
|---|---|
| 7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies | Medium |

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

***Required Textbooks and Software***

**Text**: No required textbook
**Software**: SolidWorks (Instructions for downloading will be provided in class)
**Canvas**: https://elearning.ufl.edu/ (E-learning system) for additional reading material.
**Online resource**: LinkedIn learning tutorial - Solidworks Essential Training

***Recommended Materials (optional)***

- Title: Graphics Technology
  Author: James H. Earle; Publisher: Prentice Hall
  Edition: 2nd edition; ISBN: 9780131476431
- Title: Geometric Dimensioning and Tolerancing Workbook
  Author: Neumann, A.; Available at Target Copy Center, 1412 W University Ave.

***Required Computer***

All MAE students are required to have a laptop/mobile computer in accordance with HWCOE policy.
- Use a computer that natively runs Windows. (Mac or MacBook machines not recommended).
- Use a computer with plenty of RAM. 16 GB of RAM or more is preferred.
- Use a solid state hard drive with at least 250 GB and preferably 500 GB or more capacity.
- A quad-core processor is desired.
- Please see the system requirements for SolidWorks here: (https://www.solidworks.com/support/system-requirements)

***Course Content***

(i) Introduction to Mechanical Design
(ii) 3D visualization and sketching: Isometric, oblique and perspective views
(iii) 6-view orthographic projections
(iv) Constrained sketching in CAD software
(v) Feature based Solid Modeling: Extrude, Revolve, Loft, and Sweep features
(vi) Modification features: Fillet, Chamfer, Draft, Shell, Patterns
(vii) Assembly modeling
(viii) Drawing generation in CAD software
(ix) Dimensioning and tolerances
(x) Hole basis and Shaft basis ANSI and ISO Tolerances
(xi) Clearances and Fits
(xii) Threaded fasteners
(xiii) Geometric Dimensioning and Tolerances (GDT)
(xiv) Introduction to rapid prototyping

***Course Schedule:***

| | |
|---|---|
| 12-Jan | Introduction |
| 14-Jan | 6-view Orthographic projections |
| 16-Jan | Isometric drawings; Example problems |
| 19-Jan | *MLK Day Holiday* |
| 21-Jan | Sectional Views |
| 23-Jan | Intro to CAD |
| 26-Jan | Class Activity - 1 Constrained sketch |

| | |
|---|---|
| 28-Jan | Class Activity - 2 Constrained sketch |
| 30-Jan | Class Activity - 3 Multi-extrude part |
| 2-Feb | Class Activity - 4 Multi-extrude part |
| 4-Feb | Drawing generation |
| 6-Feb | Class activity - 5 Thin Extrude |
| 9-Feb | Class activity - 6 Revolve part |
| 11-Feb | Class activity - 7 Revolve Pattern |
| 13-Feb | Class activity - 8 Reference Plane |
| 16-Feb | Class activity - 9 Shell |
| 18-Feb | Class activity - 10 Reference Geometry |
| 20-Feb | Class activity - 11 Assembly-1 |
| 23-Feb | Class activity - 12 Assembly Chain |
| 25-Feb | Assembly drawing |
| 27-Feb | ClassActivity-13 Loft Sweep |
| 2-Mar | Class activity - 14 Loft sweep |
| 4-Mar | Class activity - CSWA-1 |
| 6-Mar | Class activity - CSWA-2 |
| 9-Mar | Class activity - CSWA-3 |
| 11-Mar | Class activity - CSWA-4 |
| 13-Mar | Class activity - CSWA-5 |
| 16-Mar | *Spring Break* |
| 18-Mar | *Spring Break* |
| 20-Mar | *Spring Break* |
| 23-Mar | Project concept |
| 25-Mar | CSWA Exam |
| 27-Mar | Class activity - Helix |
| 30-Mar | Screw Threads |
| 1-Apr | Machine Tools |
| 3-Apr | Rapid Prototyping |
| 6-Apr | Clearance Fits |
| 8-Apr | GDT-1 |
| 10-Apr | GDT-2 |
| 13-Apr | GDT-3 |
| 15-Apr | GDT-4 |
| 17-Apr | GDT-5 |
| 20-Apr | GDT-6 |
| 22-Apr | Final GDT-Quiz |

***Attendance Policy, Class Expectations, and Make-Up Policy***

Attendance is mandatory and you are responsible for the knowledge of all scheduling and policy announcements in class. Please respect the rights of other students in the class and do not engage in activities that disturb or distract the class. Late assignments will receive 75% credit if submitted within the time allowed on Canvas and will not be graded thereafter. Make up exams will be given for students with medical reasons for missing the exam. Documentation in the form of a doctor's note must be provided for make-up exams and homework.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

***Evaluation of Grades***

| Assignment | Percentage of Final Grade |
|---|---|
| Homework | 50% |
| Quizzes and Class Activity | 20% |
| Exam | 15% |
| Final Project | 15% |
| | 100% |

***Grading Policy***

The following is given as an example only.

| Percent | Grade | Grade Points |
|---|---|---|
| 93 - 100 | A | 4.00 |
| 90 - 93 | A- | 3.67 |
| 86 - 90 | B+ | 3.33 |
| 83 - 86 | B | 3.00 |
| 80 - 83 | B- | 2.67 |
| 76 - 80 | C+ | 2.33 |
| 73 - 76 | C | 2.00 |
| 70 - 73 | C- | 1.67 |
| 66 - 70 | D+ | 1.33 |
| 63 - 66 | D | 1.00 |
| 60 - 63 | D- | 0.67 |
| 0 - 60 | E | 0.00 |

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

***Academic Policies & Resources***

The university-wide student resources to academic policies and campus resources can be found at:
https://go.ufl.edu/syllabuspolicies.

***Commitment to a Positive Learning Environment***

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.
If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
• Your academic advisor or Graduate Coordinator • HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu • Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu