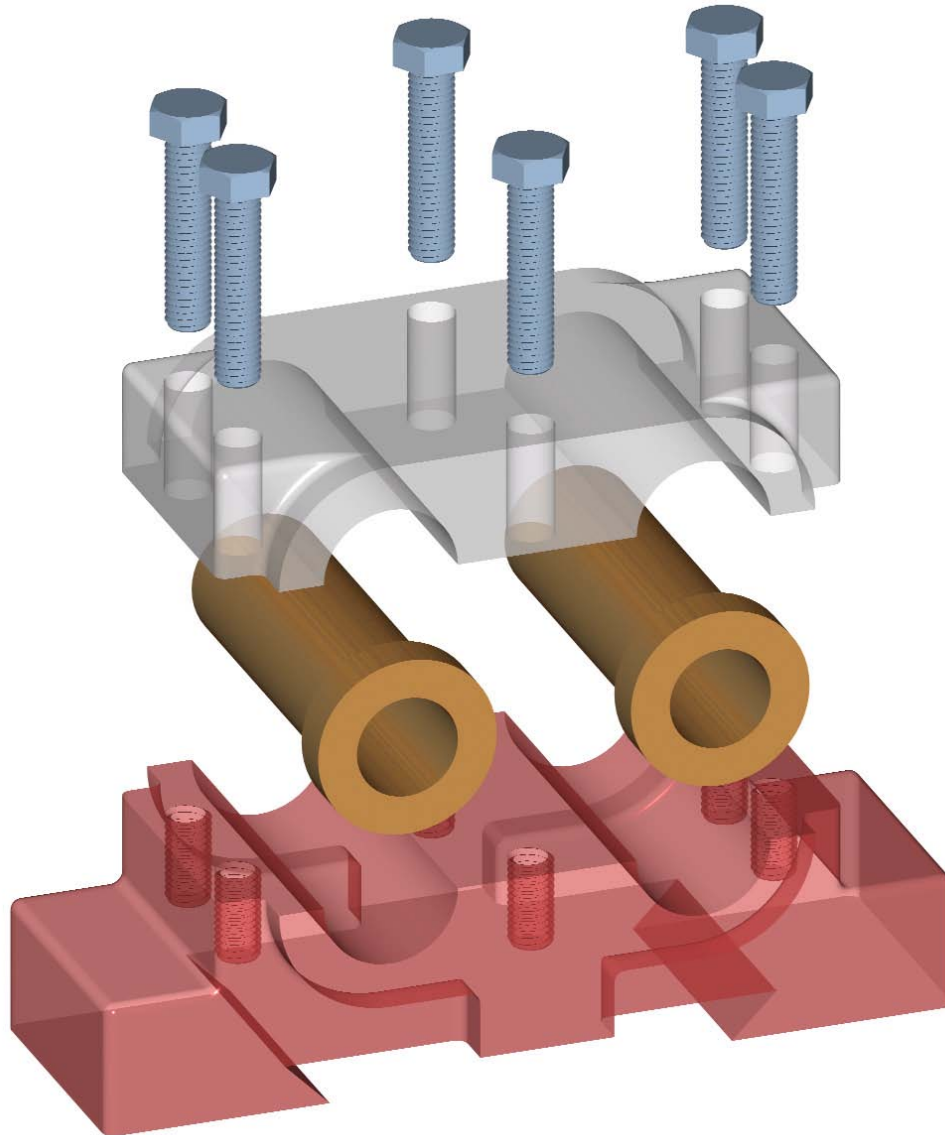




Computer-Aided Drafting and Design Technology

Department of Information Technology



Learn using AutoCAD LT 2009[®] for 2D drawing, and SolidWorks 2008[®] for 3D parametric solid modeling. Our students and graduates are ready to tackle the demands of today's highly technical engineering workplace.

2008-2009 Academic Year Edition

K E L L O G G C O M M U N I T Y C O L L E G E

Thank you for considering the Computer-Aided Drafting and Design Technology program at KCC. The following information and attachments are intended to help you make an informed choice about your future. If you have more specific questions about the CAD program after reading this, or would like to know what to do next, please contact:

Randy Kopf, at 269.965.3931 x2267 or kopfr@kellogg.edu
Doug Mann, at 269.965.3931 x2268 or mannd@kellogg.edu

or stop by and visit us on the second floor of the Ohm Information Technology building. You can also check out our program on the web at:

<http://academic.kellogg.edu/cad> (CAD academic site)

<http://www.kellogg.edu/infotech/cadd> (KCC web site)

Computer-Aided Drafting and Design (or CAD) is an exciting career area that will challenge you, and is more hands-on than traditional engineering programs that have become very theory-oriented. Most of your CAD class time will be spent **doing drawings and models**, as we believe that a hands-on approach is important. Local employers who serve on our advisory board have encouraged this, asking that we give you as much time at the computer as possible. In addition to the CAD classes, there are a number of support courses intended to refine your abilities in engineering design, mathematics, science, writing and communications.

When you have completed the degree program at KCC you may go to work full-time, transfer to a four-year school like Ferris State University, or do both at the same time. Most employers require an Associate Degree for entry level applicants unless you have extensive work experience, and may ask you to continue your education after you are hired.

Recent years have been an exciting time in the field of Drafting and Design. 3D models are beginning to replace 2D drawings, and now we can create plastic parts directly from our 3D models with our 3D printer. At KCC, our program is designed to give you the kind of solid foundation you can build upon.

We look forward to the opportunity to talk with you, and hope you can visit us in the Ohm Information Technology Center here in the heart of our Battle Creek campus. There has never been a better time to enter this career field, so come join us and see what it's all about.

Following are a few of the most common questions that are asked during the advising process:

Do I have to complete the entire program? Yes, it is in your best interest to complete the program. Most employers are looking for an Associate degree as a minimum requirement for entry level positions.

What are starting salaries? Starting salaries vary depending on the employer's size, and the nature of the position, but can be as much as \$40,000 per year. Advancement opportunities are good for degree holders, and improve for those who continue their education.

When are classes? The Computer-Aided Drafting and Design degree program is a daytime program, with the majority of classes held in the fall and spring semesters. There are a limited number of courses offered at night, and the general education courses are also offered during the summer.

What are classes at KCC like? Most classes are relatively small in size; 40 maximum in lecture classes, and approximately 24 maximum in lab classes. The rule of thumb for lecture classes is one and a half hours of homework for each hour of lecture. Lab classes vary in terms of homework, some are similar to lecture classes, others may have little or no homework at all. There are two full-time CAD instructors at KCC, and we get to know our students very well. It is the personal attention you receive at KCC that sets us apart from most other schools.

Must I have taken drafting in High School? No. Many of our students start without any previous drafting education. All we ask for is your interest and enthusiasm.

Can I transfer my degree? Yes, we currently have transfer agreements to a number of four-year schools, including Ferris State University (Product Design Engineering Technology and Mechanical Technology) and Siena Heights (Industrial Technology in Battle Creek).

What will I do on the job? As a drafter, detailer, designer, or CAD operator you will spend your time on a variety of tasks including CAD drawing, 3D modeling, sketching, research, lab testing, taking field measurements, problem solving and report writing. A large percentage of our graduates will be working with mechanical drawings and a few with architectural. Some of our graduates have chosen careers in other related fields like Technical Education, Technical Illustration, Quality Assurance, Sales Engineer and other various management positions.

Are jobs available? Yes. Recently demand has exceeded supply for CAD related positions in western Michigan, and most of our students place locally (Battle Creek, Hastings, Coldwater, Kalamazoo, Jackson, Grand Rapids, Holland and Zeeland).

I have been away from school for a few years, can I still compete? Yes, you can. The average age of a KCC graduate is 29 years. We recently had a Drafting and Design graduate in his 50's and a 72 year old CAD student who could show the younger students a thing or two. Skill assessment and developmental courses are available in math, writing, and study skills to prepare you for the curriculum, and tutoring is available for many classes.

Can I do it? Absolutely! At KCC we excel at giving you the attention and care you need to sharpen your skills, and challenge you to do your best.

Where do I begin? Fill out an application, take the compass test, see a KCC academic advisor, or contact one of the instructors in the Computer-Aided Drafting and Design Program:

Randy Kopf, CAD Instructor

269.965.3931 x2267 or kopfr@kellogg.edu

<http://academic.kellogg.edu/kopfr>

Doug Mann, CAD Instructor

269.965.3931 x2268 or mannd@kellogg.edu

Our offices are on the second floor of the Ohm Information Technology Center on the Battle Creek campus. You can also stop by the CAD lab for an informal tour most any weekday or evening, please call ahead to make sure one of us will be present to show you around. The CAD lab is also located in the Ohm Information Technology Center, room 204.

The Kellogg Community College CAD Lab

- 24 networked workstations
- Hewlett-Packard® 5000 laser printer for 11 x 17 or 8½ x 11 inch output
- Hewlett-Packard® 1050C+ DesignJet plotter for black and white or color output up to 36 inches wide
- Hewlett-Packard® 5500 Color LaserJet printer
- ***NEW*** Dimension BST 3D Printer for ABS Plastic parts
- AutoCAD LT® for 2D Mechanical and Architectural drawing
- SolidWorks® for 3D modeling and assemblies

Every manufactured product in the world must be defined in the form of solid models and/or engineering drawings performed by a drafter or designer. In defining a product, an extensive process of design and evaluation must take place before it is ready to be manufactured. The drafter, who is a key link in the design engineering and manufacturing steps, must possess a working knowledge of design principles, material properties, and manufacturing processes to bring together the final product design using models and working drawings. The drafter uses CAD (Computer-Aided Drafting) technology to produce the necessary design models and detail drawings. At KCC, CAD technology is introduced at the very beginning of the curriculum and is used throughout the program for the completion of drawings and models. The Computer-Aided Drafting and Design program at KCC uses two of the most popular CAD packages in industry, AutoCAD® and SolidWorks®, to produce all drawings and models. As reflected in the curriculum, CAD majors are required to complete a variety of technical subjects relating to design including materials science, manufacturing processes, mathematics, and physics. This provides the student with the foundation of knowledge needed to successfully function in a engineering environment. The drafting and design curriculum leads to an associate in applied science degree, and the recommended high school units of study for the program are outlined in this catalog. Students interested in transferring to a four-year institution should see an advisor for information on transfer programs.

General Education

The following courses provide skills that are necessary in carrying out normal job-oriented functions, as well as helping to develop an articulate, healthy, well-informed citizen.

	CREDITS
English 151 , Freshman Composition	3
Math 118 , Applied Algebra & Trigonometry I	3
Math 119 , Applied Algebra & Trigonometry II	3

General Education Electives:

Communications 101 , Foundations of Interpersonal Communication or 111 , Business and Technical Communication . . .	3
Creativity , Group Elective	3
Global Awareness , Group Elective	3
Healthy Living , Group Elective	2

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Related Specialties

	CREDITS
Physics 111	
Introductory Physics I.	4
Office Information Technology 160 ,	
Applications Software	3
Computer Engineering Technology 110 ,	
Principles of Electricity and Electronics	3
Engineering Technology 160 ,	
Manufacturing Processes	3
Engineering Technology 215 ,	
Material Science	3
Engineering Technology 220 ,	
Statics and Strength of Materials	3
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Drafting and Design Technology Major

	CREDITS
Drafting 101 , Engineering Graphics	4
Drafting 120 , Machine Drafting	3
Drafting 141 , Descriptive Geometry	3
Drafting 181 , Applications in AutoCAD	3
Drafting 211 , Dimensioning and Tolerancing	3
Drafting 221 , Architectural Drafting	3
Drafting 234 , SolidWorks	3
Drafting 251 , Advanced Modeling and CAM	3
Drafting 261 , Manufacturing Design	3
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The four-semester sequence of courses recommended for the full-time student is:

I	II	III	IV
DRAF 101	DRAF 120	DRAF 141	DRAF 211
OIT 160	DRAF 181	DRAF 221	DRAF 261
CET 110	DRAF 234	DRAF 251	ENTE 220
ENGL 151	MATH 118	ENTE 215	PHYS 111
GEN ED	GEN ED	MATH 119	GEN ED

It is recommended that ENTE 160 and one General Education elective be taken during the summer semester of the first year.

Drafting 101 Engineering Graphics

4 credit hours

This course provides instruction and CAD-based laboratory practice in graphical communication principles used in industry. Topics include technical sketching, lettering, geometric constructions, multi-view drawings, sectional views, auxiliary views, dimensioning practices, and drawing notation.

Drafting 120 Machine Drafting

3 credit hours

Prerequisite: DRAF 101. This course advances the use of engineering graphics to produce functional drawings of machine mechanisms and basic machine elements. Included are fasteners, cams, gear trains, weldments, and fits. Dimensioning and tolerancing in accordance with ANSI standard Y14.5M is used throughout the course. CAD technology is used exclusively to complete lab assignments.

Drafting 141 Descriptive Geometry

3 credit hours

Prerequisite: DRAF 101. This course is designed to develop problem-solving skills in the area of spatial relationships. A graphical analysis of points, lines, planes and angles, intersections, revolutions, and developments is undertaken. CAD technology is used exclusively to complete lab assignments.

Drafting 181 Applications in AutoCAD

3 credit hours

Prerequisite: DRAF 101. This course is not intended as an introduction and students must have a basic understanding of AutoCAD prior to enrollment. This course is a study of AutoCAD and its applications as a continuation to DRAF 101. Students will be exposed to the depth of the AutoCAD system and the variables which control it. Advanced techniques will be taught to complement DRAF 101 in areas such as layer control, dimensioning, modifying geometry, text, blocks, symbol creation, attributes, xrefs, pictorial drawing, and three-dimensional drawing.

Drafting 211 Dimensioning and Tolerancing

3 credit hours

Prerequisite: DRAF 120 and DRAF 234. Use of engineering graphics and basic measurement techniques to explore the application and effects of dimensioning and tolerancing. Topics will include geometric dimensioning and tolerancing (GDT), fit analysis, tolerance stackups, metrology, and the effects of tolerancing in the manufacturing environment. Conformance to ANSI Y14.5M-1982 will be stressed throughout.

Drafting 221 Architectural Drafting

3 credit hours

Prerequisite: DRAF 101 or 190. An introduction to architectural drawing production and practice. The student will prepare portions of a set of house construction documents including a site plan, floor plan, elevations, foundation plan, wall section and details, and door and window schedules. CAD technology will be used to complete most lab assignments.

Drafting 234 Introduction to SolidWorks

3 credit hours

Prerequisite: DRAF 101. An introduction to SolidWorks, a popular 3D mechanical design tool. Topics will include modeling fundamentals, parametric constraints, associative part drawings, the relationship between 2D drawings and 3D models, design tables, assembly modeling, and visualization.

Drafting 251 Advanced Modeling and CAM

3 credit hours

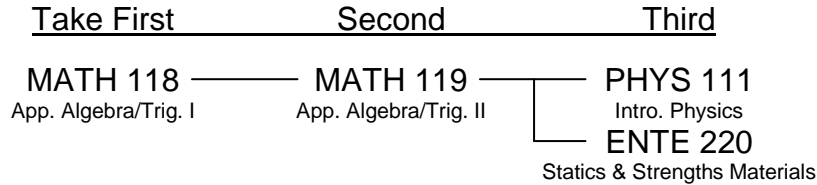
Prerequisite: DRAF 194 or 234. A study of advanced modeling techniques, computer-aided manufacturing, and product design. SolidWorks modeling topics including sweeps, lofts, surfaces, parting lines, mold cavities and sheet metal. Models will be used to generate rapid prototyping files and to create tool path files for CNC machining. A standard process for product design and problem solving will be used throughout including problem statements, preliminary ideas, refinement, analysis, decision and implementation.

Drafting 261 Manufacturing Design

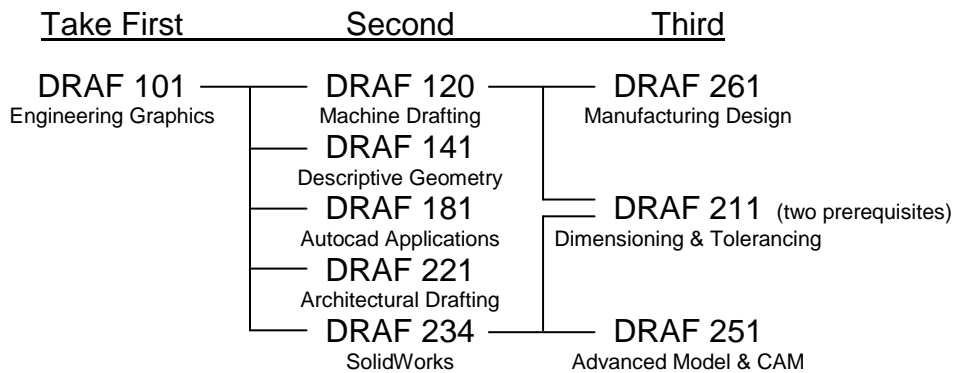
3 credit hours

Prerequisite: DRAF 120. The application of design principles in solving problems related to the manufacturing of simple work pieces. Students will be involved in the design of jigs, fixtures, gauges, and other work-holding devices along with the production of detail drawings of their designs.

Mathematics, Physics and Engineering Technology Sequence



Drafting/CAD Sequence



In order to build upon previous learning, it is necessary to sequence many of the classes in the CAD curriculum. The above flowcharts show the hierarchy for all courses in the CAD curriculum requiring prerequisites. Please note that many classes are only offered once per year. Offerings by semester are below, if a course is not listed, it is typically offered in the fall and spring, and possibly summer.

Fall Only

DRAF 141
Descriptive Geometry
DRAF 221
Architectural Drafting
DRAF 251
Advanced Modeling & CAM
ENTE 215
Material Science
MATH 119
App. Algebra/Trig. II

Spring

DRAF 120
Machine Drafting
DRAF 181
Applications in Autocad
DRAF 211
Dimensioning & Tolerancing
DRAF 234
SolidWorks
DRAF 261
Manufacturing Design
ENTE 220
Statics & Strengths of Materials

Program Information

Department of Computer-Aided Drafting & Design
Kellogg Community College

Degree Checklist 2008-2009

CAD Degree Program

<u>Take/When</u>	<u>Done</u>	Fall, first year	<u>Credit Hours</u>
_____	<input type="radio"/>	DRAF 101 Engineering Graphics	4
_____	<input type="radio"/>	OIT 160 Application Software	3
_____	<input type="radio"/>	CET 110 Principles of Electricity and Electronics . . .	3
_____	<input type="radio"/>	ENGL 151 Freshman Composition	3
_____	<input type="radio"/>	Global Awareness Group Elective	3
			Semester Total <u>16</u>
Spring, first year			
_____	<input type="radio"/>	DRAF 120 Machine Drafting	3
_____	<input type="radio"/>	DRAF 181 Applications in AutoCAD	3
_____	<input type="radio"/>	DRAF 234 SolidWorks	3
_____	<input type="radio"/>	MATH 118 Applied Algebra and Trigonometry I	3
_____	<input type="radio"/>	Creativity Group Elective	3
			Semester Total <u>15</u>
Summer, first year			
_____	<input type="radio"/>	ENTE 160 Manufacturing Processes	3
_____	<input type="radio"/>	Healthy Living Group Elective	2
			Semester Total <u>5</u>
Fall, second year			
_____	<input type="radio"/>	DRAF 141 Descriptive Geometry	3
_____	<input type="radio"/>	DRAF 221 Architectural Drafting	3
_____	<input type="radio"/>	DRAF 251 Advanced SolidWorks & CAM	3
_____	<input type="radio"/>	MATH 119 Applied Algebra and Trigonometry II	3
_____	<input type="radio"/>	ENTE 215 Material Science	3
			Semester Total <u>15</u>
Spring, second year			
_____	<input type="radio"/>	DRAF 211 Dimensioning and Tolerancing	3
_____	<input type="radio"/>	DRAF 261 Manufacturing Design	3
_____	<input type="radio"/>	ENTE 220 Statics and Strengths of Materials	3
_____	<input type="radio"/>	PHYS 111 Introductory Physics	4
_____	<input type="radio"/>	COMM 101 or 111 Communications	3
			Semester Total <u>16</u>
			Total Credit Hours <u>67</u>

General Education Requirements & Electives

CAD Degree Program

Requirement	Course Number	Course Name	Credit Hours
► Communication			
Required:	ENGL 151	Freshman Composition	3
Choose one:	COMM 101	Foundations of Interpersonal Communications	3
or:	COMM 111	Business and Technical Communications	3
► Critical Thinking			
Required:	MATH 118	Applied Algebra/Trigonometry I	3
Required:	MATH 119	Applied Algebra/Trigonometry II	3
Required:	PHYS 111	Introductory Physics I	4
► Global Awareness			
Choose one:	SOCI 201	Introduction to Sociology	3
	PHIL 201	Introduction to Philosophy	3
	PHIL 202	Introduction to Ethics	3
	POSC 200	American Systems of Government	3
	HIST 103	American Foundations	3
	HIST 104	Modern America	3
	HIST 151	Western Civilization: Early Western World	3
	HIST 152	Western Civilization: Modern Western World	3
	ANTH 200	Introduction to Anthropology	3
	COMM 241	Foundations of Mass Communications	3
		Any introductory Foreign Language Course	3
► Creativity			
Choose one:	ART 105	Contemporary Art Survey	3
	ART 211	Art Appreciation	3
	ART 212	Art History	3
	ART 213	Art History	3
	ENGL 203	Introduction to Creative Writing: Short Story	3
	ENGL 204	Introduction to Creative Writing: Poetry	3
	HUMA 150	Encounter with the Arts	3
	HUMA 205	Ethical Dilemmas in Modern Society	3
	LITE 105-240	Literature	3
	MUSI 211	Music Appreciation	3
	THEA 121	Theatre Appreciation I	3
	THEA 122	Theatre Appreciation II	3
► Healthy Living			
Choose one:	SCIE 100	Environmental Science	3
	SCIE 103	Field Investigation in Environmental Studies	3
	PSYC 201	Introduction to Psychology	3
	SOCI 202	Social Problems	3
	SOCI 203	Marriage and Family	3
	PEC 121	Healthy Lifestyle Practices.	3
	PEC 150-160	Wellness Activities	3

Note: Degree requirements are slightly different for Ferris State University transfer students. See one of the CADD instructors for more information.