Computer Aided Drafting and Design

Degrees:

AAS	Computer Aided Drafting and Design	60-63
Diploma:	Computer Aided Drafting and Design	48-51
Certificates:	Computer Assisted Drafter	30-36
	Detailer	25-28
	Drafter Assistant	13-16
	Civil Drafter	27-33

Description:

A computer aided drafter and designer is a technical specialist with broad-based skills for architectural, civil, mechanical, and manufacturing fields. In this program, the students are taught manual drafting techniques and 2D and 3D CAD. Specific skills taught include, but are not limited to, lettering, geometric construction, orthographic projections, dimensioning and tolerancing, and related technical processes. These skills are required to transform specifications and instructions of architects, designers, and engineers into complete and precise drawings. The drafter is a skilled technician with a thorough understanding of the graphic language and is an indispensable contributor to the engineering design team.

Progression in the Computer Aided Drafting and Design program is contingent upon achievement of a grade of "C" or greater in each technical and mathematics course with maintenance of a 2.0 cumulative grade point average or above (on a 4 scale).

Implementation: Fall 2011

Competencies:

AAS: Computer Aided Drafting and Design

General Education Competencies:

I. Communicate Effectively
   1. Read and listen with comprehension.
   2. Speak and write clearly using standard English.
   3. Interact cooperatively with others using both verbal and non-verbal means.
   4. Demonstrate information processing through basic computer skills.

II. Think Critically
   1. Make connections in learning across the disciplines and draw logical conclusions.
   2. Demonstrate problem solving through interpreting, analyzing, summarizing, and/or integrating a variety of materials.
   3. Use mathematics to organize, analyze, and synthesize data to solve a problem.

III. Learn Independently
   1. Use appropriate search strategies and resources to find, evaluate, and use information.
   2. Make choices based upon awareness of ethics and differing perspectives/ideas.
   3. Apply learning in academic, personal, and public situations.
   4. Think creatively to develop new ideas, processes, or products.

IV. Examine Relationships in Diverse and Complex Environments
   1. Recognize the relationship of the individual to human heritage and culture.
   2. Demonstrate an awareness of the relationship of the individual to the biological and physical environment.
   3. Develop an awareness of self as an individual member of a multicultural global community.

Technical Core Competencies:

Upon completion of this program, the graduate can:

1. Make drawing modifications.

2. Create freehand technical sketches.
3. Create an initial drawing using appropriate drafting standards.
4. Demonstrate the use of Cartesian Coordinate system with CAD software.
5. Create orthographic (multiview) drawings using manual and computer aided drafting techniques.
6. Verify drawing accuracy.
7. Perform geometric constructions.
8. Identify, create, and place appropriate section views (e.g., full, half, offset, removed, aligned).
9. Identify, create, and place appropriate auxiliary views.
10. Identify and create pictorial drawings.
11. Identify and create axonometric, oblique, and perspective drawings.
12. Locate points and lines in space using descriptive geometry techniques.
13. Determine bearings, azimuths, grade, and slope of lines.
14. Identify types of planes.
15. Create sheet metal drawings using revolution and development theories.
16. Create an assembly drawing from existing part data.
17. Apply dimensions to drawings using various units.
18. Calculate and apply dimension tolerances to drawings.
19. Demonstrate knowledge of geometric dimensioning and tolerancing.
20. Create three-dimensional models from two-dimensional drawings.
21. Use reference books, manufacturer's manuals, and trade publications for information.
22. Perform basic mathematical concepts.
23. Demonstrate knowledge of geometry.
24. Demonstrate knowledge of trigonometry.
25. Calculate volume, mass, and area.
26. Demonstrate computer knowledge and file management.
27. Operate and adjust input and output devices.
28. Create working drawings.
29. Plot scaled drawings.
30. Participate as a member of a team.

Technical Electives:
The technical elective competencies will vary according to courses completed.

Diploma: Computer Aided Drafting and Design

Upon completion of this program, the graduate can:

Competencies will be met at the level appropriate to the credential.

General Education Competencies:

I. Communicate Effectively
   1. Read and listen with comprehension.
   2. Speak and write clearly using standard English.
   3. Interact cooperatively with others using both verbal and non-verbal means.
   4. Demonstrate information processing through basic computer skills.

II. Think Critically
   1. Make connections in learning across the disciplines and draw logical conclusions.
   2. Demonstrate problem solving through interpreting, analyzing, summarizing, and/or integrating a variety of materials.
   3. Use mathematics to organize, analyze, and synthesize data to solve a problem.

III. Learn Independently
   1. Use appropriate search strategies and resources to find, evaluate, and use information.
   2. Make choices based upon awareness of ethics and differing perspectives/ideas.
   3. Apply learning in academic, personal, and public situations.
   4. Think creatively to develop new ideas, processes, or products.

IV. Examine Relationships in Diverse and Complex Environments
   1. Recognize the relationship of the individual to human heritage and culture.

2. Demonstrate an awareness of the relationship of the individual to the biological and physical environment.
3. Develop an awareness of self as an individual member of a multicultural global community.

Technical Competencies:

1. Make drawing modifications.
2. Create freehand technical sketches.
3. Create an initial drawing using appropriate drafting standards.
4. Demonstrate the use of Cartesian Coordinate system with CAD software.
5. Create orthographic (multiview) drawings using manual and computer aided drafting techniques.
6. Verify drawing accuracy.
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26. Demonstrate computer knowledge and file management.
27. Operate and adjust input and output devices.
28. Create working drawings.
29. Plot scaled drawings.
30. Participate as a member of a team.

Technical Electives

The technical elective competencies will vary according to courses completed.

Certificates:

Computer Assisted Drafter

Upon completion of this program, the graduate can:

1. Make drawing modifications.
2. Create freehand technical sketches.
3. Create an initial drawing using appropriate drafting standards.
4. Demonstrate the use of Cartesian Coordinate system with CAD software.
5. Create orthographic (multiview) drawings using manual and computer aided drafting techniques.
6. Perform geometric constructions.
7. Identify, create, and place appropriate section views (e.g., full, half, offset, removed, aligned).
8. Identify, create, and place appropriate auxiliary views.
9. Identify and create pictorial drawings.
10. Identify and create axonometric, oblique, and perspective drawings.
11. Apply dimensions to drawings using various units.
12. Apply dimensions to drawings using various units.
13. Perform basic mathematical operations.
14. Demonstrate knowledge of geometry.

15. Demonstrate knowledge of trigonometry.
16. Calculate volume, mass, and area.
17. Demonstrate computer knowledge and file management.
18. Operate and adjust input and output devices.
19. Create working drawings.
20. Plot scaled drawings.
21. Participate as a member of a team.

Detailer

Upon completion of this program, the graduate can:

1. Make drawing modifications.
2. Demonstrate the use of Cartesian Coordinate system with CAD software.
3. Create orthographic (multiview) drawings using manual and computer aided drafting techniques.
4. Perform geometric constructions.
5. Apply dimensions to drawings using various units.
6. Make plots and copies of scaled drawings.
7. Perform basic mathematical operations.
8. Demonstrate computer knowledge and file management.
9. Operate and adjust input and output devices.

Drafter Assistant

Upon completion of this program, the graduate can:

1. Make drawing modifications.
2. Create orthographic (multiview) drawings.
3. Perform geometric constructions.
4. Apply dimensions to drawings using various units.
5. Make plots and copies of scaled drawings.
6. Perform basic mathematical operations.
7. Demonstrate computer knowledge and file management.
8. Operate and adjust input and output devices.

Civil Drafter

Upon completion of this program, the graduate can:

1. Make drawing modifications.
2. Create orthographic (multiview) drawings.
3. Perform geometric constructions.
4. Apply dimensions to drawings using various units.
5. Make plots and copies of scaled drawings.
6. Perform basic mathematical operations.
7. Demonstrate computer knowledge and file management.
8. Operate and adjust input and output devices.
9. Apply drafting techniques to surveying drawings using manual and computer aided drafting.
10. Define the terms associated with surveying.
11. Identify the equipment used in surveying.

Outlines:

AAS

Computer Aided Drafting and Design

General Education:

ENG	101	Writing I	3
		Quantitative Reasoning (MAT 105 excluded)	3
		Natural Sciences	3
		Social/Behavioral Sciences	3
		Heritage/Humanities	3
		Oral Communications	3

		Subtotal	**18**

Technical Core:

		Computer /Digital Literacy course OR demonstrated competency	0-3
CAD	100	Introduction to Computer Aided Design	3
CAD	102	Drafting Fundamentals	4
CAD	112	Engineering Graphics	4
CAD	130	Descriptive Geometry	4
CAD	200	Intermediate Computer Aided Design	4
CAD	201	Parametric Modeling	4
		Subtotal	**23-26**

NOTE: Computer Literacy must be demonstrated either by competency exam or by completing a computer literacy course.

Technical Electives:

		Choose 19 credits from the technical electives list.	19
		Subtotal	**19**
		Total Credits	**60-63**

Technical Electives: (This list is not all inclusive, other courses may be taken as approved by the program coordinator such as courses with prefix ACH, BRX, CAR, SMT, and PLW.)

CAD	108	Introduction to Surveying	3
CAD	120	Introduction to Architecture	4
CAD	150	Programming in CAD	4
CAD	212	Industrial Drafting Processes	4
CAD	222	Mechanical Design	4
CAD	220	Architectural Design	4
CAD	230	Construction Techniques	4
CAD	240	Advanced Dimensioning and Measurement	4
CAD	252	Commercial Detailing	4
CAD	262	Working Drawings	4
CAD	292	Industrial Applications	4
CAD	293	Special Problems	1-4
CAD	298	Practicum	1-3
CAD	299	Cooperative Experience	1-3

Diploma
Computer Aided Drafting and Design

General Education:

Area 1:	Written Communication, Oral Communications, or Humanities/Heritage	3
Area 2:	Quantitative Reasoning (MAT 105 excluded)	3
	Subtotal	**6**

Technical Core:

		Computer/Digital Literacy course or Demonstrated competency	0-3
CAD	100	Introduction to Computer Aided Design	3
CAD	102	Drafting Fundamentals	4
CAD	112	Engineering Graphics	4
CAD	130	Descriptive Geometry	4
CAD	200	Intermediate Computer Aided Design	4
CAD	201	Parametric Modeling	4
		Subtotal	**23-26**

NOTE: Computer/Digital Literacy must be demonstrated either by competency exam or by completing a computer/digital literacy course.

		Technical Electives:	
		Choose 19 credits from the technical electives list.	19
		Subtotal	**19**
		Total Credits	**48-51**

Technical Electives: (This list is not all inclusive, other courses may be taken as approved by the program coordinator such as courses with prefix ACH, BRX, CAR, SMT, and PLW.)

CAD	108	Introduction to Surveying	3
CAD	120	Introduction to Architecture	4
CAD	150	Programming in CAD	4
CAD	212	Industrial Drafting Processes	4
CAD	222	Mechanical Design	4
CAD	220	Architectural Design	4
CAD	230	Construction Techniques	4
CAD	240	Advanced Dimensioning and Measurement	4
CAD	252	Commercial Detailing	4
CAD	262	Working Drawings	4
CAD	292	Industrial Applications	4
CAD	293	Special Problems	1-4
CAD	298	Practicum	1-3
CAD	299	Cooperative Experience	1-3

Certificate
Computer Assisted Drafter

General Education:

		Written Communication, Oral Communications, or Humanities/Heritage	3
		Quantitative (MAT 105 excluded)	3
		Subtotal	**6**

Technical Core:

		Computer/Digital Literacy course or Demonstrated competency	0-3
CAD	100	Introduction to Computer Aided Design	3
CAD	102	Drafting Fundamentals	4
CAD	112	Engineering Graphics	4
CAD	130	Descriptive Geometry	4
CAD	200	Intermediate Computer Aided Design	4
CAD	201	Parametric Modeling	4
		Technical Elective	1-4
		Subtotal	**24-30**
		Total Credits	**30-36**

NOTE: Computer/Digital Literacy must be demonstrated either by competency exam or by completing a computer/digital literacy course.

Certificate
Civil Drafter

General Education:			
		Quantitative Reasoning (MAT 105 excluded)	3
		Subtotal	**3**
Technical Core:			
		Computer/Digital Literacy or	
		Demonstrated competency	0-3
CAD	100	Introduction to Computer Aided Design	3
CAD	102	Drafting Fundamentals	4
CAD	112	Engineering Graphics	4
CAD	130	Descriptive Geometry	4
		Subtotal	**15-18**
Surveying Core:			
		Choose 9-12 hours from the following courses:	
CAD	108	Introduction to Surveying	3
SMT	110	Principles of Surveying	3
SMT	130	Land Surveying Graphics	3
SMT	160	Construction Surveying	3
SMT	210	Advanced Surveying Measurement	3
SMT	220	Surveying Lab	3
SMT	230	Land Boundary Location	3
SMT	250	Mine Surveying	3
		Subtotal	**9-12**
		Total Credits	**27-33**

Certificate
Detailer

General Education:			
		Written Communication, Oral Communications, or	
		Humanities/Heritage	3
		Quantitative Reasoning (MAT 105 excluded)	3
		Subtotal	**6**
Technical Core:			
		Computer/Digital Literacy course OR	
		Demonstrated competency	0-3
CAD	100	Introduction to Computer Aided Design	3
CAD	102	Drafting Fundamentals	4
CAD	112	Engineering Graphics	4
CAD	130	Descriptive Geometry	4
CAD	200	Intermediate Computer Aided Design	4
		Subtotal	**19-22**
		Total Credits	**25-28**

Certificate
Drafter Assistant

General Education:

		Written Communication, Oral Communications, or Humanities/Heritage	3
		Quantitative Reasoning (MAT 105 excluded)	3
		Subtotal	**6**
		Computer/Digital Literacy course OR Demonstrated competency	0-3
CAD	100	Introduction to Computer Aided Design	3
CAD	102	Drafting Fundamentals OR	4
CAD	112	Engineering Graphics	(4)
		Subtotal	**7-10**
		Total Credits	**13-16**

Dates of Actions:
Approved:
Revised: May 2004, December 2006, February 2011