DBA 298C Advanced Broadcast Internships (3)
9 hours laboratory
Prerequisite: *A minimum grade of 'C' in DBA 298B*
Note: *Cross listed as ENTT 298C; may not be taken for Pass/No Pass grading*
Transfer acceptability: *CSU*
Work on advanced television production including individual research, work on advanced college produced programs, or internships at local Network affiliate broadcast stations, radio stations, cable companies, and other professional communications facilities.

Disability Resource (DR)

Contact the Disability Resosurce Center for further information.
(760) 744-1150, ext. 2375
Office: DSPS

COURSE OFFERINGS

Courses numbered under 50 are non-degree courses.
Courses numbered under 100 are not intended for transfer credit.

DR 15 English Essentials for Students with Disabilities (3)
3 hours lecture
Note: *Pass/No Pass grading only; Students must have the ability to learn in a group setting. Students must be able to produce computer generated work by using the keyboard or other assistive technology.*
Non-degree Applicable
Provides special assistance for students with disabilities to develop basic skills in written communication. Working with computers is part of the class format.

DR 18 Phonics for Students with Disabilities (3)
3 hours lecture
Non-degree Applicable
This course is designed to meet the needs of students with disabilities. It teaches the use of phonics as a spelling and reading strategy.

DR 20 Pre-Algebra Support (3)
3 hours lecture
Note: *Pass/No Pass grading only*
Non-degree Applicable
Provides programmed instruction on an individual and/or small group basis to students with disabilities. Practice in understanding and performing basic arithmetic tasks necessary for successful functioning in society.

DR 25 Algebra Support (1.5,3)
1½ or 3 hours lecture
Recommended preparation: *MATH 15 or eligibility for MATH 50*
Note: *Pass/No Pass grading only*
Non-degree Applicable
Provides personalized instruction in basic study management techniques for the support of students with disabilities in mainstream classes. The course will help students with disabilities to develop specialized study techniques and interpersonal skills needed for success in mainstream classes.

DR 26 Composition Skills and Strategies for the Intermediate Writer (3)
3 hours lecture
Recommended preparation: *ENG 10 or eligibility for ENG 50*
Non-degree Applicable
This class is designed to help students with disabilities improve their intermediate composition skills through methods and strategies specific to their disabilities.

DR 40 Adapted Computer Skills (3)
3 hours lecture
Non-degree Applicable
Provides computer training using specialized software and hardware adaptations to assist students with disabilities to develop skills in word processing and Internet research.

DR 41 Advanced Adapted Computers for Students with Disabilities (3)
3 hours lecture
Recommended preparation: *DR 40*
Non-degree Applicable
Provides training in more advanced software for students with disabilities by using their prescribed access technology.

DR 43.1 Software for Students with Vision Loss I (3)
3 hours lecture
Recommended Preparation: *Keyboarding skills with a minimum of 15 words per minute*
Non-degree Applicable
Provides training using specialized software and hardware adaptations to assist students with blindness/low vision to develop computer skills.

DR 43.2 Software for Students with Vision Loss II (3)
3 hours lecture
Recommended Preparation: *Keyboarding skills with a minimum of 15 words per minute along with prior experience with a screen reading or magnification application*
Non-degree Applicable
Provides training using specialized software and hardware adaptations in combination with Microsoft Office, Internet Explorer, and other academic applications.

DR 44 Study Skills with Technology (0.5)
0.5 hours lecture
Improve study skills through the use of software and other assistive technologies.

DR 45L Adapted Computer Laboratory (1)
3 hours laboratory
Note: *Pass/No Pass grading only*
Non-degree Applicable
Provides supervised hands on opportunities to acquire and reinforce skills on computer equipment adapted for students with disabilities.

DR 47 Topics in Disability Resource (.5-3)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Non-degree Applicable
Topics in disability resource. See Class Schedule for specific topic offered. Course title will designate subject covered.

Drafting Technology (DT)

Contact the Trade and Industry Department for further information.
(760) 744-1150, ext. 2545
Office: T-102A

Associate in Science Degrees -

AS Degree requirements are listed in Section 6 (green pages).
- Computer Assisted Drafting
- Drafting Technology - Multimedia
- Drafting Technology - Technical
- Electro-Mechanical Drafting and Design
- Interactive Media Design - Emphasis in 3D Modeling and Animation
- Interactive Media Design - Emphasis in Multimedia Design

Certificates of Achievement -

Certificate of Achievement requirements are listed in Section 6 (green pages).
- Computer Assisted Drafting
- Drafting Technology - Multimedia
- Drafting Technology - Technical
- Electro-Mechanical Drafting and Design
- Interactive Media Design - Emphasis in 3D Modeling and Animation
- Interactive Media Design - Emphasis in Multimedia Design

PROGRAMS OF STUDY

Computer Assisted Drafting

Prepares students in the skills necessary for employment as a computer assisted drafting operator.

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
DDT/ENGR 101	AutoCAD Introduction to Computer Aided Drafting	3
DT/ENGR 102	Advanced AutoCAD	3
DT/ENGR 103	SolidWorks Introduction to 3D Design and Presentation	3
DT/ENGR 104	SolidWorks Advanced 3D Design and Presentation	3
IT/WELD 108	Technical Mathematics	3
	or	
MATH 50	Beginning Algebra	4
	or	
MATH 50A	Beginning Algebra Part I	2
	and	
MATH 50B	Beginning Algebra Part II	2
	or	
MATH 56	Beginning/Intermediate Algebra	6
	or	
MATH 60	Intermediate Algebra	4

Electives (Select 15 units)

ARCH 200	Advanced Computer Aided Architectural Drafting	4
CE 100	Cooperative Education	1 - 4
DT/ENGR 110	Technical Drafting I with AutoCAD	3
DT/ENGR 111	Technical Drafting II with AutoCAD	3
DT/WELD/ ENGR 117	Geometric Dimensioning and Tolerancing	2
DT 196	Special Problems in Computer Aided Drafting	1 - 3
DT 197	Drafting Technology Topics	0.5 - 4
ARCH 202	Introduction to Revit Architecture	3
DT/ENGR 226	Printed Circuit Board Design	3
MATH 110	College Algebra	4
	or	
MATH 115	Trigonometry	3
TOTAL UNITS		**30 – 33**

Drafting Technology - Multimedia

Prepares students in the skills necessary for employment in the multimedia presentation field.

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
DT/ENGR 101	AutoCAD Introduction to Computer Aided Drafting	3
DT/ENGR 102	Advanced AutoCAD	3
DT/ENGR 103	SolidWorks Introduction to 3D Design and Presentation	3
DT 180	3D Studio Max - Introduction to 3D Modeling and Animation	3
DT 182	3D Studio Max-Advanced 3D Modeling and Animation	3
DT 184	Real Time 3D Technical/Game Animation	2
IT/WELD 108	Technical Mathematics	3
	or	
MATH 50A	Beginning Algebra Part I	2
	and	
MATH 50B	Beginning Algebra Part II	2
	or	
MATH 50	Beginning Algebra	4

Electives (Select 9 units)

ARTD 150	Digital Concepts and Techniques in Art	3
ARTD 220	Motion Design	3
ARTI 246	Digital 3D Design and Modeling	3
ARTI 247	Digital 3D Design and Animation	3
COMM 100	Introduction to Mass Communication	3
DT/ENGR 104	SolidWorks Advanced 3D Design and Presentation	3
DT 196	Special Problems in Computer Aided Drafting	3
ARCH 202	Introduction to Revit Architecture	3
GCIP 140	Digital Imaging/Photoshop I	3
GCMW 101	Multimedia I	3
GCMW 201	Multimedia II	3
MATH 110	College Algebra	4
	or	
MATH 115	Trigonometry	3
MUS 180	Computer Music I	3
CE 100	Cooperative Education	1 - 4
TOTAL UNITS		**29 - 30**

Drafting Technology - Technical

Prepares students in the skills necessary for employment as a drafter in machine, mechanical, electrical, aeronautical, civil, and other related engineering fields.

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
DT/ENGR 101	AutoCAD Introduction to Computer Aided Drafting	3
DT/ENGR 103	SolidWorks Introduction to 3D Design and Presentation	3
DT/ENGR 104	SolidWorks Advanced 3D Design and Presentation	3
DT/ENGR 110	Technical Drafting I with AutoCAD	3
DT/ENGR 111	Technical Drafting II with AutoCAD	3
DT/ WELD/ ENGR 117	Geometric Dimensioning and Tolerancing	2
DT /WELD/ ENGR 151	CAD/CAM Machining	3
IT/WELD 108	Technical Mathematics	3
	or	
MATH 50A	Beginning Algebra Part I	2
	and	
MATH 50B	Beginning Algebra Part II	2
	or	
MATH 50	Beginning Algebra	4
	or	
MATH 60	Intermediate Algebra	4

Electives (Select 4 units)

CE 100	Cooperative Education	1 - 4
DT 100	Basic Mechanical Drawing	3
DT/ENGR 102	Advanced AutoCAD	3
DT 180	3D Studio Max - Introduction to 3D Modeling and Animation	3
DT 182	3D Studio Max-Advanced 3D Modeling and Animation	3
DT 184	Real Time 3D Technical/Game Animation	2
DT 196	Special Problems in Computer Aided Drafting	1 - 3
	or	
DT 197	Drafting Technology Topics	0.5 - 4
ARCH 202	Introduction to Revit Architecture	3
MATH 110	College Algebra	4
	or	
MATH 115	Trigonometry	3
TOTAL UNITS		**27-28**

Electro-Mechanical Drafting and Design

Drafts detailed working drawings of electro-mechanical equipment and devices. Indicates dimensions, tolerances, materials, and manufacturing procedures for electro-mechanical drafting industry.

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
DT/ENGR 101	AutoCAD Introduction to Computer Aided Drafting	3
DT/ENGR 103	SolidWorks Introduction to 3D Design and Presentation	3
DT/ENGR 110	Technical Drafting I with AutoCAD	3
DT/ENGR 111	Technical Drafting II with AutoCAD	3
DT/WELD/ ENGR 117	Geometric Dimensioning and Tolerancing	2
DT/ENGR 226	Printed Circuit Board Design	3
DT/ENGR 227	Advanced Printed Circuit Board Design	3
IT/WELD 108	Technical Mathematics	3
	or	
MATH 50A	Beginning Algebra Part I	2
	and	
MATH 50B	Beginning Algebra Part II	2
	or	
MATH 50	Beginning Algebra	4
	or	
MATH 60	Intermediate Algebra	4
Electives (Select 3 units)		
CE 100	Cooperative Education	1 - 4
DT/ENGR 102	Advanced AutoCAD	3
DT/WELD/ ENGR 151	CAD/CAM Machining	3
DT/ENGR 104	SolidWorks Advanced 3D Design and Presentation	3
DT 196	Special Problems in Computer Aided Drafting	1 - 3
MATH 110	College Algebra	4
TOTAL UNITS		**26-27**

Interactive Media Design

Prepares students with specific skills necessary for employment in the field of multimedia design and production. Students may choose an emphasis in either 3D modeling and animation, which emphasizes production skills and authoring systems, or multimedia design, which emphasizes content development and visual design of multimedia productions. Both areas of emphasis collaborate on an actual multimedia production.

Emphasis in 3D Modeling and Animation

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
ARTI 100	Introduction to Illustration	3
ARTI 246	Digital 3D Design and Modeling	3
ARTI 247	Digital 3D Design and Animation	3
DT 180	3D Studio Max – Intro to 3D Modeling/Animation	3
DT 182	3D Studio Max – Adv 3D Modeling/Animation	3
GCIP 141	Digital Imaging/Photoshop II	3
GCMW 204	Motion Graphics for Multimedia	3
GCMW 206	Motion Graphics Production and Compositing	3
Electives (Select two courses)		
ARTD 150	Digital Concepts/Techniques in Art	3
ARTD 220	Motion Design	3
ARTI 248	Digital 3D Design and Sculpture	3
DT/ENGR 103	SolidWorks Intro 3D Design and Presentation	3
DT 184	Real Time 3D Technical/Game Animation	2
ENTT/DBA 120	Digital Television Production	3
GCIP 150	3D Product Development and Marketing	3
GCIP 240	Digital Imaging/Photoshop III	3
GCMW 100	History of Multimedia	3
TOTAL UNITS		**29 – 30**

Emphasis in Multimedia Design

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
ARTD 100	Graphic Design I	3
ARTD 220	Motion Design	3
ARTI 247	Digital 3D Design and Animation	3
GC/ MCS 115	Graphics and Media: A Multicultural Perspective	3
GCIP 240	Digital Imaging/Photoshop III	3
GCMW 101	Multimedia I	3
GCMW 201	Multimedia II	3
GCMW 204	Motion Graphics/Multimedia	3
Electives (Select two courses)		
ART 197G	Topics in Art – Computer Art	3
ARTD 150	Digital Concepts and Techniques in Art	3
ARTI 246	Digital 3D Design/Modeling	3
DT 180	3D Studio Max–Intro to 3D Modeling/Animation	3
DT 182	3D Studio Max–Adv 3D Modeling/Animation	3
GC 100	Graphic Communications	3
GCIP 140	Digital Imaging/Photoshop I	3
GCIP 152	Digital Publishing/Illustrator I	3
GCMW 100	History of Multimedia	3
GCMW 102	Web Page Layout I	3
GCMW 203	Web Multimedia	3
MUS 180	Computer Music I	3
TOTAL UNITS		**30**

Interactive Media Design A.S. Degree or Certificate of Achievement is also listed in Art and in Graphic Communications – Multimedia and Web.

COURSE OFFERINGS

DT 101 AutoCAD Introduction to Computer Aided Drafting (3)

1½ hours lecture - 4½ hours laboratory

Note: *Cross listed as ENGR 101.*

Transfer acceptability: *CSU; UC – DT/ENGR 101 and 102 combined: maximum credit, one course*

An introduction to computer aided drafting using AutoCAD software and IBM compatible computers. Hands on experience with AutoCAD to include the following operations: preparing and editing drawings, storage and retrieval of drawings, and production of commercial quality drawings on a plotter. Introductory computer terminology and techniques in Windows.

DT 102 Advanced AutoCAD (3)

1½ hours lecture - 4½ hours laboratory

Prerequisite: *A minimum grade of 'C' in DT/ENGR 101*

Note: *Cross listed as ENGR 102.*

Transfer acceptability: *CSU; UC – DT 101 and 102 combined: maximum credit, one course*

Advanced theory and hands on operation of a CAD system. Emphasis is placed on large scale drawings, three dimensional software techniques, orthographic projections, and complex computer aided manufacturing applications.

DT 103 SolidWorks Introduction to 3D Design and Presentation (3)

1½ hours lecture - 4½ hours laboratory

Note: *Cross listed as ENGR 103.*

Transfer acceptability: *CSU*

Advanced theory and hands on operation of three-dimensional software techniques. Emphasis is placed on wireframe, surface, solid, and parametric three-dimensional modeling.

DT 104 SolidWorks Advanced 3D Design and Presentation (3)
1½ hours lecture - 4½ hours laboratory
Prerequisite: *A minimum grade of 'C' in DT/ENGR 103*
Note: *Cross listed as ENGR 104*
Transfer acceptability: *CSU*
Advanced theory and hands-on operation of solid and parametric three-dimensional models. Emphasis is placed on creating molds, advanced sheet metal design and developing dynamic assemblies.

DT 110 Technical Drafting I with AutoCAD (3)
1½ hours lecture - 4½ hours laboratory
Prerequisite: *A minimum grade of 'C' in DT/ENGR 101, or concurrent enrollment in DT/ENGR 101*
Transfer acceptability: *CSU*
Note: *Cross listed as ENGR 110.*
Fundamentals of drafting including lettering, sketching, geometric constructions, orthographic projections, basic dimensioning, sectional views and auxiliary views. Drafting will be performed on the computer using AutoCAD, SolidWORKS, and Creo software.

DT 111 Technical Drafting II with AutoCAD (3)
1½ hours lecture - 4½ hours laboratory
Prerequisite: *A minimum grade of 'C' in DT/ENGR 110*
Note: *Cross listed as ENGR 111.*
Transfer acceptability: *CSU*
Advanced drafting practices using customized AutoCAD software. Basic studies will include pictorial drafting, descriptive geometry, and revolutions. Working/shop drawings in topography, developments, cabinet/millwork, structural steel, and welding will be performed. Emphasis is placed on increased productivity by customizing AutoCAD to the student's requirements.

DT 117 Geometric Dimensioning and Tolerancing (2)
1 hour lecture - 3 hours laboratory
Note: *Cross listed as ENGR/WELD 117*
Transfer acceptability: *CSU*
An introduction to geometric dimensioning and tolerancing ASME Y14.5-2009. Students will learn to identify, use appropriate geometric symbols and techniques of geometric dimension, and produce industrial quality drawings. Students will also learn to measure and verify geometric dimensions and tolerances of manufactured items.

DT 151 CAD/CAM Machining (3)
1½ hours lecture - 4½ hours laboratory
Note: *Cross listed as as ENGR/WELD 151*
Transfer acceptability: *CSU*
Hands-on operation of importing three-dimensional solid and parametric three-dimensional models into CAD/CAM operations.

DT 180 3D Studio Max – Introduction to 3D Modeling and Animation (3)
1½ hours lecture - 4½ hours laboratory
Transfer acceptability: *CSU*
An overview of 3D Studio Max. Hands-on operation of the software to produce basic three-dimensional models and basic technical animations.

DT 182 3D Studio Max – Advanced 3D Modeling and Animation (3)
1½ hours lecture - 4½ hours laboratory
Prerequisite: *A minimum grade of 'C' in DT 180*
Transfer acceptability: *CSU*
Advanced 3D Studio Max applications to create special visual effects for high-end image production. Advanced keyframing, time-based editing, controllers, and video post will be employed to master state-of-the-art rendering and animation. The class is structured to help students start using 3D Studio Max in a production environment.

DT 184 Real Time 3D Technical/Game Animation (2)
1 hour lecture - 3 hours laboratory
Transfer acceptability: *CSU*
Students will create interactive 3D applications using a direct X base real time engine for the game industry, computer based training and product visualization.

DT 196 Special Problems in Computer Aided Drafting (1, 2, 3)
3, 6, or 9 hours laboratory
Transfer acceptability: *CSU*
An advanced course designed to aid the student in the enrichment of an area of concentration in AutoCAD and third party drafting software and is of a research nature. Content to be determined by the need of the student under signed contract with the instructor.

DT 197 Drafting Technology Topics (.5 - 4)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Transfer acceptability: *CSU*
Topics in Drafting. See class schedule for specific topic covered. Course title will designate subject covered.

DT 226 Printed Circuit Board Design (3)
1½ hours lecture - 4½ hours laboratory
Note: *Cross listed as as ENGR 226*
Transfer acceptability: *CSU*
Instruction in printed circuit board design generally required for entry level positions in the electronic industry. Includes artwork and complete documentation for analog and digital multi-layer, flexible and high-speed boards using current IPC standards. Drafting will be performed on the computer using high-end printed circuit board software.

DT 227 Advanced Printed Circuit Board Design (3)
1½ hours lecture - 4½ hours laboratory
Prerequisite: *A minimum grade of 'C' in DT/ENGR 226*
Note: *Cross listed as as ENGR 227*
Transfer acceptability: *CSU*
Advanced problems and instruction in printed circuit board design generally required for entry-level position in the electronic industry. Special emphasis will be placed on advanced applications including surface mount technology. Includes artwork and complete documentation for analog and digital multi-layer, flexible and high-speed boards using current IPC standards. Drafting will be performed on the computer using AutoCAD and PADS software.

Earth Sciences (ES)

Contact the Earth, Space, and Aviation Sciences Department for further information.
(760) 744-1150, ext. 2512
Office: NS-110G

COURSE OFFERINGS

ES 100 The Earth as a System: Case Studies of Change in Space and Time (3)
3 hours lecture
Transfer acceptability: *CSU; UC*
C-ID GEOL 120
An overview of the fields of geology, geography, oceanography, and astronomy that approach Earth as a system. Areas of study include those related to plate tectonics, earthquakes, volcanoes, geologic time, landscape evolution, weather systems, ocean circulation, climate change, and exploration of the solar system.

ES 100L Earth Systems Laboratory (1)
3 hours laboratory
Prerequisite: *Completion of, or concurrent enrollment in ES 100*
Transfer acceptability: *CSU; UC*
C-ID GEOL 120L
Laboratory and field investigations of the Earth as a system including the geosphere, atmosphere, hydrosphere, and exosphere (solar system) as well as an assessment of society's role in Earth's processes. Focuses on the physical and chemical systems of the Earth such as the tectonic cycle, rock cycle, hydrologic cycle, weather, and climate.

See Catalog addendum at http://www.palomar.edu/catalog