

# *Student Handbook*

*Engineering Technology &  
Semiconductor Manufacturing Technology*

**Richland College**  
Dallas County Community Colleges

[www.richlandcollege.edu](http://www.richlandcollege.edu)

## INTRODUCTION

Welcome to the School of Engineering & Technology at Richland College.

Engineering technology involves the application of scientific and engineering principles to solve real world problems. Engineering technology places the emphasis on hardware usage, instrumentation, and problem solving rather than design. The School of Engineering & Technology is committed to providing accessible, affordable, and quality technical education opportunities. One-year certificates and Associate in Applied Sciences (A.A.S.) degrees are offered in Computer-Aided Design, Electronics, Integrated Circuit Layout, and Semiconductor Manufacturing Technology.

### Engineering Technology – Computer-Aided Design

The Engineering Technology – Computer-Aided Design (CAD) program not only focuses on understanding how to work with various software tools, such as AutoCAD, Inventor, and MasterCAM, but also emphasizes the basic principles of design and design intent. In addition to the CAD instruction, courses in electronics, hydraulics and pneumatics, manufacturing processes, quality, and geometric dimensioning and tolerancing prepare graduates to become a valuable asset to any design team.

### Engineering Technology – Electronics

The Engineering Technology – Electronics program is designed to meet the needs of the electronics industry. The program combines theory and laboratory experience, which can be applied to many electronics related fields. The electronics core is complemented by instruction in CAD, hydraulics and pneumatics, manufacturing processes, and quality assurance to prepare graduates for

technician level employment in the electronics and related industries.

### Engineering Technology – Integrated Circuit Layout

The Engineering Technology – Integrated Circuit Layout program is designed to prepare graduates with the skills necessary to prepare layout drawings of integrated circuits (IC) using specialized computer-aided design tools. The curriculum includes hands-on instruction in digital layout, analog layout, and design verification. The layout core is complemented by instruction in computer applications / programming, electronics, and semiconductor manufacturing processes.

### Semiconductor Manufacturing Technology – Equipment Technician

The Semiconductor Manufacturing Technology – Equipment Technician program is designed to meet the demand for skilled technicians and manufacturing specialists in the semiconductor industry. The curriculum includes theory and laboratory experience in the areas of electronics, electromechanical systems, automation, cleanroom protocol and safety, quality assurance, and semiconductor manufacturing processes. Graduates are prepared for employment in equipment or other related technician positions.

## DEGREE PLANS

Official degree plans and course descriptions are available online at: [www.dccd.edu](http://www.dccd.edu)

Copies of the degree plans and course descriptions are also available from the School of Engineering & Technology office.

Sabine Building  
Room S150

## PROGRAM FLOWCHARTS AND GUIDES

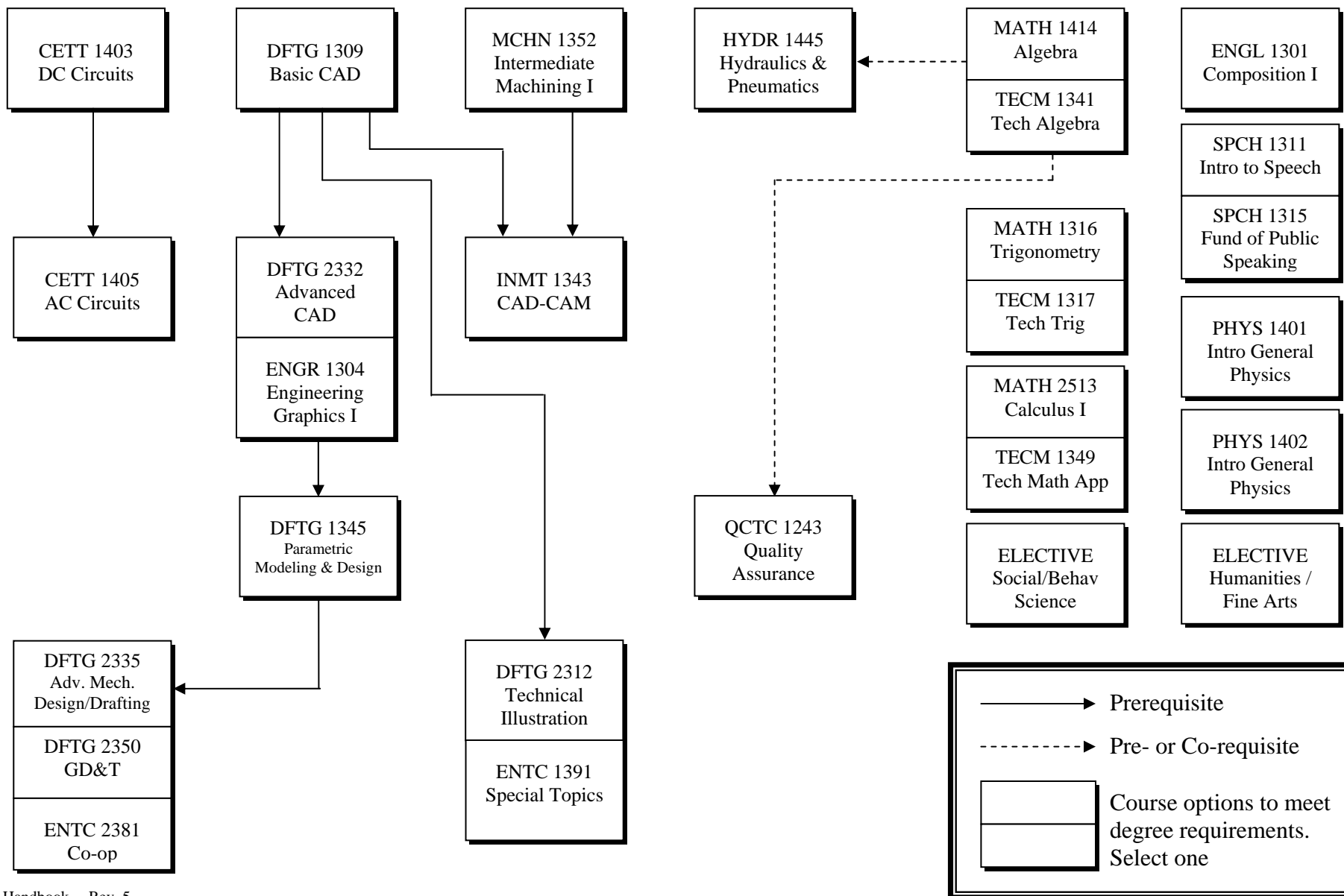
The following program guide and flowcharts are provided as a resource to help you successfully complete your degree program. Typical semester offerings are provided but are subject to change. It is recommended that you work with an advisor or the engineering technology staff for degree planning.

Course #	Course Name	Prerequisite or Co-Requisites		Typical Semester Offerings	Suggestions or Comments
CETT 1403	DC Circuits			Fall – Day and Evening Spring – Day and Evening	Algebra based. Not required but recommended to take Algebra prior to or concurrently
CETT 1405	AC Circuits	CETT 1403	P	Fall – Day and Evening Spring – Day and Evening	Trig based. Not required but recommended to take Trig prior to or concurrently
CETT 1425	Digital Fundamentals			Fall – Day Spring – Day	Can be used as an intro class but basic electronics knowledge /skills recommended (i.e. circuit breadboard, basic test equip)
CETT 1429	Solid State Devices	CETT 1405	P P/C	Fall – Day Spring - Day	
CETT 1457	Linear ICs	CETT 1429	P	Fall – Day Spring – Day	
CETT 2337	Microcomputer Control	CETT 1425	P	Fall – Day Spring – Day	Microcontroller, Assembly language. No programming experience required. Basic computer knowledge helpful.
DFTG 1309	Basic Computer Aided Design			Fall – Day and Evening Spring – Day and Evening	Course uses AutoCAD software. Basic computer knowledge helpful.
DFTG 1345	Parametric Modeling and Design	DFTG 2332	P	As needed - Evening	Course uses Inventor CAD software.
DFTG 2312	Technical Illustration	DFTG 1309	P	Fall – Day or Evening Spring – Day or Evening (Saturday classes sometimes offered)	Course uses 3-D Studio software. Course is concurrent with ARTV 1345
DFTG 2313	Basic Integrated Circuit Design			Spring – Day and Evening Fall – Day and Evening	Digital layout using Cadence design tools. Basic computer and UNIX knowledge helpful. SMFT 1343 and CETT 1425 would be helpful taken prior to or concurrently.
DFTG 2332	Adv Computer Aided Design	DFTG 1309	P	Fall – Evening Spring – Day	Course uses AutoCAD software.
DFTG 2333	Advanced Integrated Circuit Design	DFTG 2313	P	Spring –Evening Fall –Evening	Analog layout using Cadence design tools. CETT 1429 would be helpful taken prior or concurrently.
DFTG 2335	Adv. Tech. in Mechanical Design/Drafting	DFTG 1345 DFTG 2332 INMT 1343	P	Fall – Day or Evening	Advanced mechanical design course using AutoCAD, Inventor, and MasterCAM

Course #	Course Name	Prerequisite or Co-Requisites		Typical Semester Offerings	Suggestions or Comments
DFTG 2350	GD&T	DFTG 2332	P	As needed	
DFTG 2376	Automation Techniques in IC Layout	DFTG 2333	P	Spring –Evening Fall –Evening	An advanced course for automated IC layout techniques. Emphasis on place and route, scripting, and other topics.
ENTC 1380/1381	COOP	Instructors Approval	P	Fall and Spring	Must have a job in a related field and instructor’s approval prior to registering. 1380 – Semiconductor, Electronics, or IC Layout 1381 – CAD
ENTC 1291/1391 /1491	Special Topics	TBD		As needed	Topics vary but are focused on emerging technology. Some require prerequisites.
ENTC 1491	Special Topics	DFTG 2333		Summer	Cadence SKILL Programming (IC Layout)
ENTC 2380/2381	COOP	Instructors Approval	P	Fall and Spring	Must have a job in a related field and instructor’s approval prior to registering. 2380 – Semiconductor, Electronics, or IC Layout 2381 – CAD
HYDR 1445	Hydraulics & Pneumatics	MATH 1414 or equiv.	P/C	Fall – Day and Evening Spring – Day and Evening	Algebra based. Algebra not required but recommended
INMT 1343	CAD – CAM	DFTG 1309	P	Fall – Day Spring – Evening	Course uses MasterCAM software.
INMT 1417	Industrial Automation	CETT 1405	P	Fall – Day Spring – Day	Physics would be helpful taken prior or concurrently
INTC 1307	Electronic Test Equipment	CETT 1405	P/C	Fall – Day Spring – Day	
MCHN 1352	Intermediate Machining I			Fall – typically Day Spring – typically Day	
QCTC 1343	Quality Assurance	MATH 1414 or equiv.	P/C	Fall – Evening (Wed) Spring – Evening (Wed)	
SMFT 1343	Semiconductor Manufacturing I			Fall – Evening Spring – Day	Introduction to the processes used to manufacture an integrated circuit. Not math intensive
SMFT 2343	Semiconductor Manufacturing II	SMFT 1343 CETT 1429	P P	As Needed	Not a direct continuation of SMFT 1343. Course should be taken in the final semester prior to graduation. Topics include vacuum technology, advanced processes, & manufacturing.
TECM 1317	Technical Trigonometry	TECM 1341	P	Spring ONLY – Evening	Course will not transfer to a university.
TECM 1341	Technical Algebra			As Needed	Course will not transfer to a university.
TECM 1349	Technical Math Applications	TECM 1317	P	Spring ONLY – Evening	Technical calculus. Course will not transfer to a university.

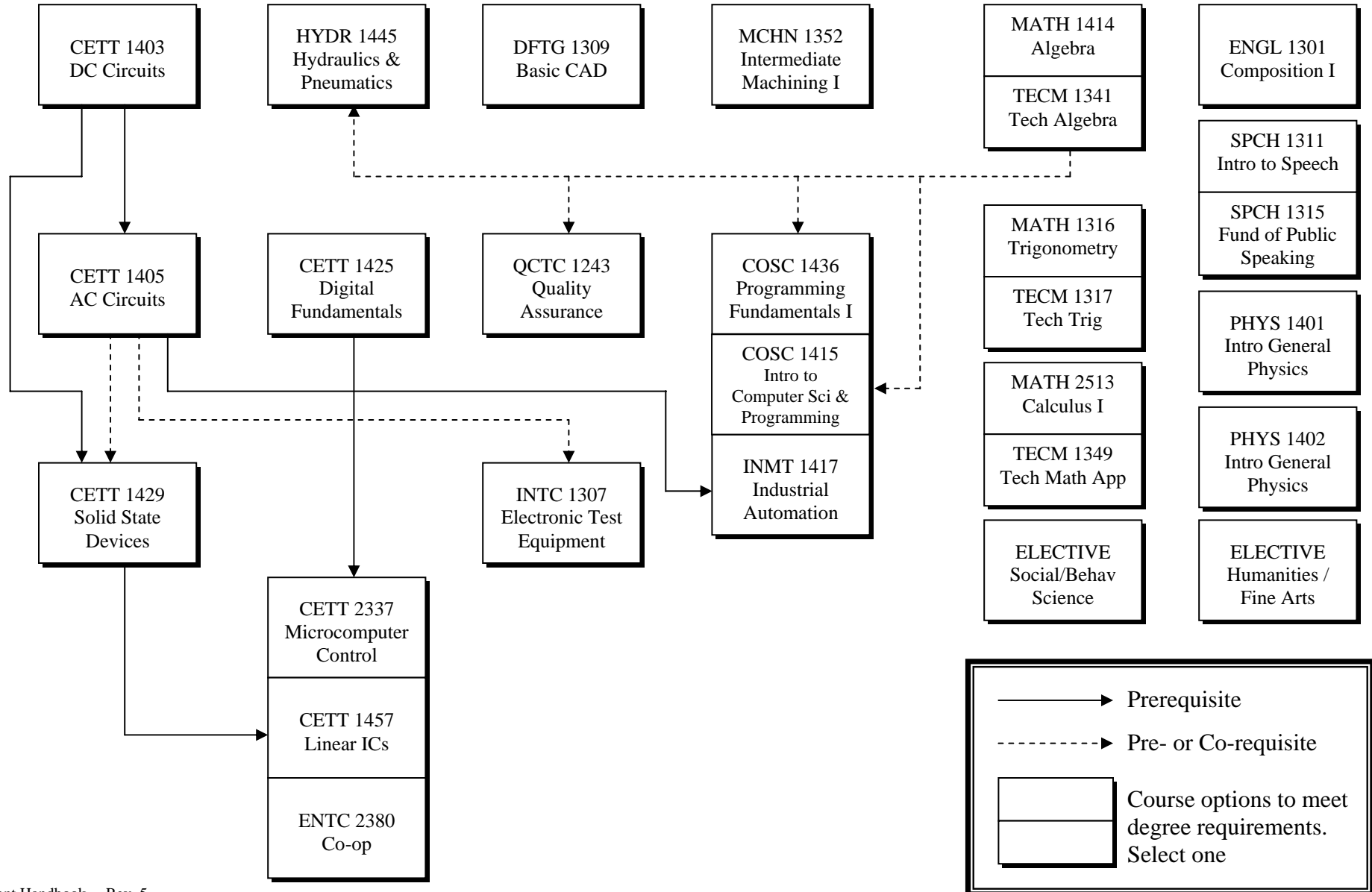
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## Engineering Technology – Computer-Aided Design A.A.S.



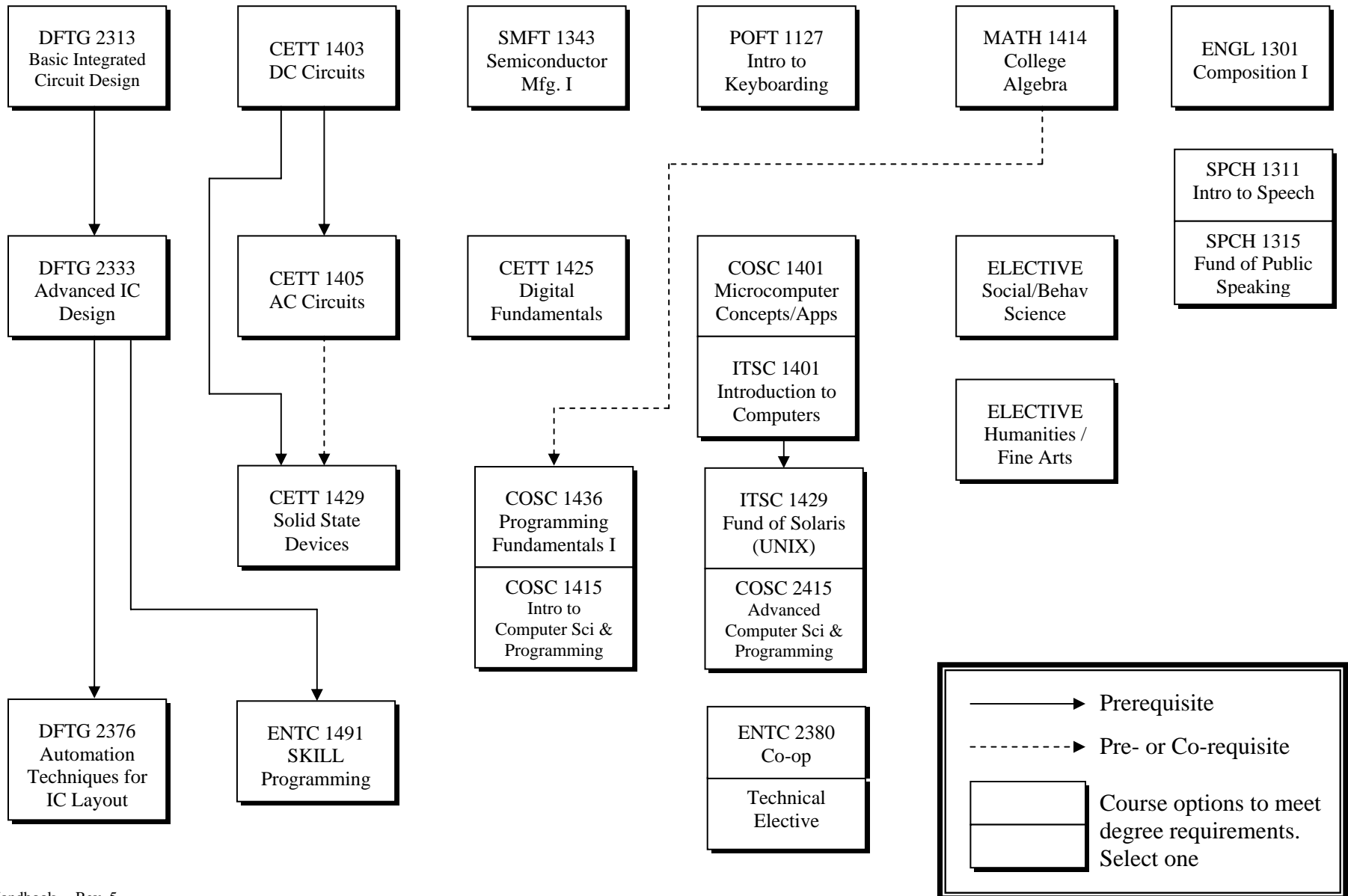
# RICHLAND COLLEGE

## Engineering Technology - Electronics A.A.S.



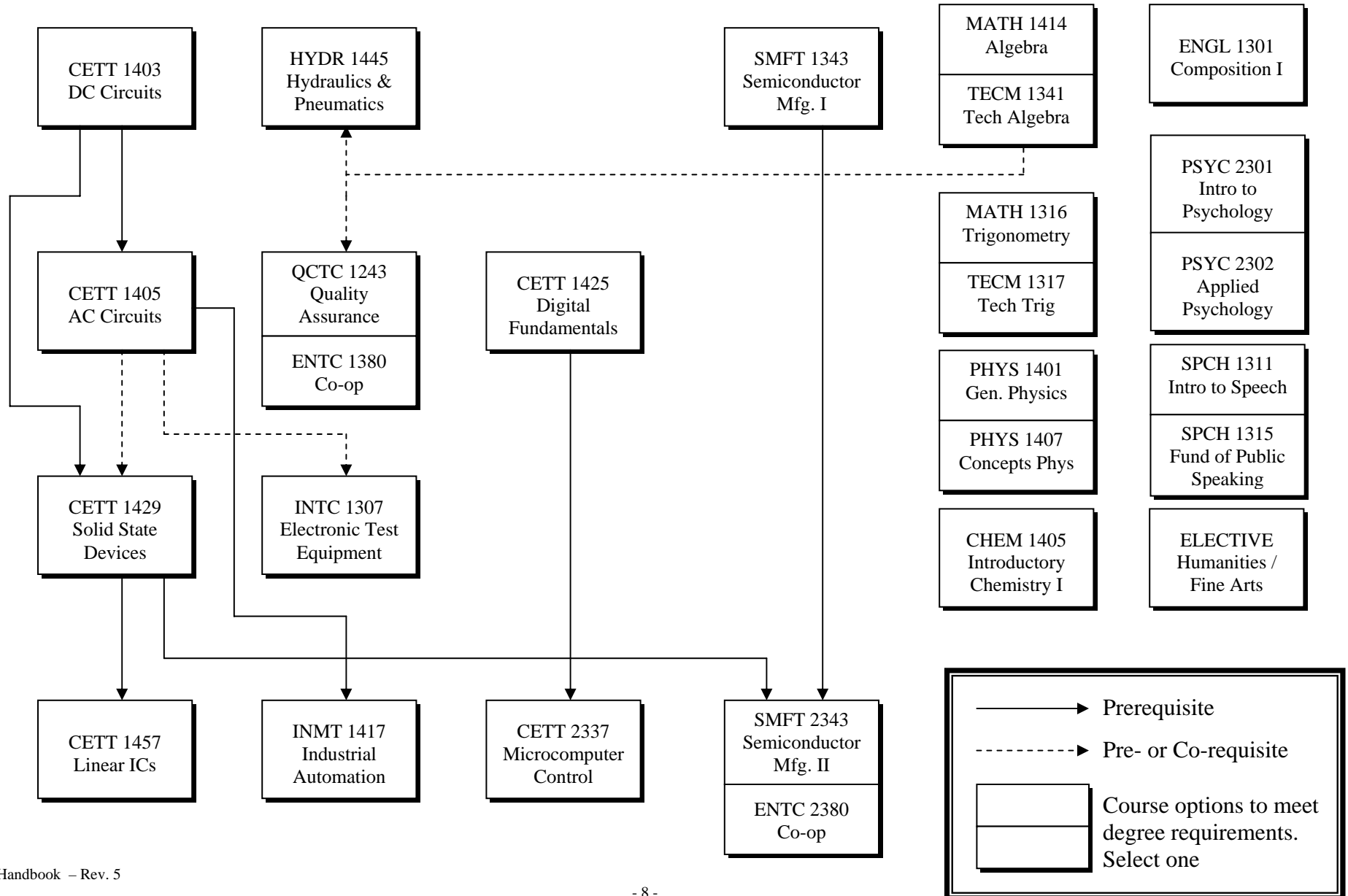
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## Engineering Technology – Integrated Circuit Layout A.A.S.



# RICHLAND COLLEGE

## Semiconductor Manufacturing Technology – Equipment Technician A.A.S.



## **FACULTY & STAFF**

Dr. Brent Donham  
Associate Vice President  
Room S150, (972) 238-3797  
bdonham@dcccd.edu  
Semiconductor Mfg., Nanotechnology

Brian Fleming  
Faculty  
Room S136, (972) 238-6321  
bfleming@dcccd.edu  
Computer-Aided Design, Manufacturing

John Horne  
Faculty  
Room S134, (972) 238-6934  
jhorne@dcccd.edu  
Engineering, Electronics

Stan Kohan  
Program Coordinator  
Room S235, (972) 238-6044  
skohan@dcccd.edu  
Semiconductor Manufacturing, Electronics

Bill Slonecker  
Faculty  
Room S138, (972) 238-6360  
bslonecker@dcccd.edu  
Electronics, Electromechanical Systems

Pat Zipper  
Instructional Associate  
Room S132, (972) 238-6325  
patenr@dcccd.edu  
Computer-Aided Design

## **ADVISING**

Richland College offers advising services to assist students to develop and achieve their educational and career goals. The advisors will assist you with degree program selection, course selection, determining

transferability of courses, and other areas related to your educational goals. It is recommended that you meet with an advisor periodically throughout your program to ensure that you meet all graduation requirements.

### Technical Education Advising

Technical Education Advising provides academic and career advising services for students majoring in Richland's technical education programs, including Engineering Technology.

Thunderduck Hall, Room T180  
(972) 238-6366 or (972) 238-6391

### Multicultural Center

The Multicultural Center is an advising center dedicated to the academic success of students who were born outside the United States or whose native language is other than English

Thunderduck Hall, Room T150  
(972) 238-6900

In addition, the Engineering Technology faculty and staff are available to provide academic and career guidance.

## **TUTORING**

Richland College offers a variety of tutoring services. It is recommended that you seek these services early in the semester.

Center for Tutoring & Learning Connections offers academic tutoring (e.g. math, writing) and general study skills. The center is located in Medina Hall, M-216.

The engineering technology faculty provides tutoring for engineering technology specific courses. Times and subject areas are posted each semester.

## **ACCEPTANCE OF CREDIT IN TRANSFER**

Credit for courses, in which a grade of “C” or better was earned, may be eligible for transfer if taken at an accredited college or university. You must submit all official transcripts from higher education institutions, file a degree plan, and request a degree evaluation before the evaluation takes place. Contact an advisor or the Registrar’s office for more details.

In some instances, credit may be granted for coursework from a non-accredited institution, military training, or related work experience. Contact an advisor or the registrar’s office to determine if you are eligible and what steps you must take to apply for this credit.

If you think that you have met the learning objectives of a given class through work experiences or other forms of training you may request a credit-by-examination for certain classes (e.g. DC Circuits, AC Circuits, etc.). The examination may be an approved subject examination or an instructor made test depending upon the class. There will be test administration service charge for each examination that is paid prior to taking the exam and is nonrefundable. Contact the Registrar’s office or the School of Engineering & Technology office for further information.

## **TECH PREP**

Tech Prep is a joint program between high schools and Richland College that allows approved high school courses to be transferred into college technical programs. If you have successfully completed approved high school courses (e.g. electronics 1 and electronics 2) with a grade of ‘B’ or higher you may be eligible to

receive college credit after enrolling at Richland. Contact Richland’s Tech Prep coordinator at (972) 238-6190 to see if you qualify.

## **GRADUATION**

You are required to meet all of the graduation requirements, including the course and credit hour requirements of the degree, outlined in the catalog in effect at the time of your entrance to the college. You, the student, have the ultimate responsibility to select and register for courses that meet graduation requirements.

If you are seeking an associate degree, a degree plan should be filed in the Registrar’s office by the end of your first year and preferably sooner. If you are seeking a one-year certificate, a degree plan should be filed in the Registrar’s office by the end of your first semester. The application for graduation or granting of the degree should be filed in the Registrar’s office prior to the deadline announced by the registrar. It is recommended that you contact the Registrar’s office prior to your final semester to ensure that you have or will meet all of the degree requirements.

A graduation ceremony is held at the end of the spring semester. Participation is ceremonial only and confers on a student no rights to a degree. You are eligible to participate if you graduated in December, at the end of the spring semester, or if you will graduate after the summer semesters. You must notify the Registrar’s office if you plan to participate in the commencement ceremony.

## **TRANSFERING CREDITS TO A UNIVERSITY**

Resources are available online at <http://www.dcccd.edu/trans/transfer.htm> to assist you if you plan to transfer to a university. Advisors can also assist you in preparing to transfer. It is your responsibility to verify the transfer requirements and it is recommended that you consult with the receiving institution.

Agreements have been developed with the following universities to transfer a portion or all of the credits in an engineering technology A.A.S. degree towards a baccalaureate program:

### Texas A&M Commerce

- Industrial Engineering & Technology
- Technology Management
  - Industrial Technology

Bachelor of Applied Arts and Sciences

### University of Texas at Arlington

Interdisciplinary Studies

Contact the School of Engineering & Technology office for more information on these transfer opportunities.

There are courses that meet the requirements for the A.A.S. degrees that typically will not transfer to a university. If you plan on transferring, it is recommended that the following course substitutions be made:

MATH 1414 rather than TECM 1341

MATH 1316 rather than TECM 1317

MATH 2513 rather than TECM 1349

PHYS 1401 rather than PHYS 1407

Students planning to transfer to a four-year institution should consult an advisor or the School of Engineering & Technology regarding requirements and the

transferability of engineering technology courses.

## **CAREER SERVICES**

Career Services serves as a resource for credit students, non-credit students, and alumni of Richland College. Resources include job placement assistance, resume writing assistance, occupational resource library, job listings, and computer guidance programs.

El Paso Hallway, Room E-093  
(972) 238-6921

The School of Engineering & Technology hosts recruiters from local companies and universities. Time, date, and location of the on-campus recruitment will be posted and announced in class.