Student Handbook

for

Computer Engineering
B.S.

2012-2013
FOREWORD

Welcome to the CENG program!

This student handbook is intended to serve as a supplement to the 2012-2013 UHCL catalog for students in the Computer Engineering (CENG) Bachelor of Science program. It contains additional useful information for CENG students not available from the UHCL catalog.

This handbook is an informal document. In the unlikely event that there are any discrepancies between the handbook and the UHCL catalog, consult your academic advisor or faculty advisor. Furthermore, although the handbook is updated annually, some information in the handbook may unavoidably be dated. Consult your advisors for the most up-to-date information.

Additional information can be found in the home page of the School of Science and Computer Engineering:

http://www.uhcl.edu/sce/ceng_bs

George C. Collins,
Ph.D. Chair, CENG
1. INTRODUCTION

1.1. The Computer Engineering (CENG) program

The Computer Engineering (CENG) program at the University of Houston- Clear Lake (UHCL) offers a Bachelor of Science (BS) degree. The CENG program is one of three undergraduate computing related programs and the only undergraduate engineering program offered in the Division of Engineering in the School of Science and Computer Engineering.

1.2. Mission Statement

The Computer Engineering program provides students instruction and research experience in the pragmatic application of core knowledge by which they can specify, design, and develop large and small computer systems for industrial and scientific purposes. There is an emphasis on microcomputer-based control, real-time systems, and embedded systems. Curricula include support areas in telecommunications and software engineering.

1.3. Program objectives, Outcomes and Assessment measures

The Computer Engineering program supports the missions of the University and the school and its program by providing students with appropriate curricula and educational experiences. The curricula remain current through continuing assessment by students, employers, alumni and faculty.

To accomplish these missions the computer engineering faculty, with advice from its constituents endorse the following program educational objectives.

- Computer Engineering graduates will have gainful employment in industry, academia or government.
- Computer Engineering graduates will have assumed additional responsibilities at their place of employment greater than those normally evidenced by entry level engineers.
- Computer Engineering graduates that chose to pursue higher education opportunities or certificate programs, have been accepted and are on track for a timely graduation.
- Computer Engineering graduates who have an interest in registration have passed the Fundamentals of Engineering exam.
- Computer Engineering graduates participate in and are considered valuable resources in their service to the community.

1.4. Program Outcomes

Computer Engineering graduates are expected to have:

a) an ability to apply knowledge of mathematics, science, and engineering

b) an ability to design and conduct experiments, as well as to analyze and interpret data

c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability and sustainability

d) an ability to function on multidisciplinary teams
e) an ability to identify, formulate and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a
global, economic, environmental, and societal context
i) a recognition of the need for, and an ability to engage in life long learning
j) a knowledge of contemporary issues
k) an ability to use techniques, skills, and modem engineering tools necessary for
engineering practice

1.5. Career Opportunities

The CENG program prepares students for career tracks in a wide spectrum of engineering or
technical positions related to computing.

Many CENG students work in the surrounding high technology companies in the Clear
Lake area after their graduation. Companies such as United Space Alliance, Loral, IBM,
Lockheed, McDonnel-Douglas, NASA JSC and Unisys, have hired many of our CENG graduates.

In a recent survey of UHCL CENG alumni, CENG graduates held jobs with titles
including computer engineer, systems engineer, programmer analysts, senior R&D engineer,
engineering manager. A high percentage of the respondents rated their education
at UHCL better than that of colleagues of the same rank.

1.6. Organization of the Handbook

Each section of the handbook addresses a separate issue that is potentially interesting to CENG students. It is not necessary to read the handbook in order. However, it is recommended that new incoming CENG students read the whole handbook to get an overall idea of what processes and resources they can expect in their duration of study. They may then refer to the particular topics when needs arise.

2. ADMISSIONS

Any general questions about the CENG program can be directed to one of the CENG faculty members (see Appendix A for contact information). Applicants interested in knowing the status of their applications may contact Ms. Becky Morton, secretary of the School of Science and Computer Engineering.

2.1. Undergraduate Admissions

Students applying for admission to the CENG program are expected to have completed at least 30 semester hours at another institution, with a grade point average of at least 2.5 (4.0 scale), consisting of the university core curriculum and the following program prerequisites. These courses as well as all additional courses that are required to complete the CENG degree must be completed with a grade of C- or better. The equivalent UHCL courses are listed where applicable.

- N/A Calculus 1,118 hours
- MATH3231 Calculus III 3 hours
- MATH 3131 Linear Algebra 3 hours
- MATH 4131 Ordinary Differential Equations 3 hours
- CSCI 3133 Computer Programming in C (CSI) 3 hours
- PHYS 3031/3011 University Physics I 4 hours
- PHYS 3032/3012 University Physics II 4 hours
- N/A Inorganic Chemistry I 4 hours

The academic advisors review all admission applications using many criteria. Applicants are notified of the decision of acceptance into the Computer Engineering program by mail by the Dean's office. Although each applicant will be considered on an individual basis, the following criteria are usually heavily weighted:

(I) the applicant's preparation in the above prerequisite courses, especially the grades in
mathematics.

(2) the applicant's GPA.

Notes and recommendations:

(1) Once admitted, students who do not have the recommended preparation will be required to take additional courses to fulfill the requirements.

3. ENTRY TO THE PROGRAM

Upon entry to the program, the student should file a Candidate Plan of Study (CPS) as soon as possible in the first semester. The CPS is the most important document related to a student's study at UHCL. It defines the precise set of conditions that a student must meet in order to graduate successfully from a program. The School of Science and Computer Engineering has the following policy on the CPS:

*In general, no more than twelve hours of course work for an undergraduate degree and nine hours for a graduate degree taken at University of Houston - Clear Lake prior to completion of a CPS may be applied toward any degree in the School.*

3.1. Academic and Faculty Advisors

Students should schedule an appointment with the academic advisor as soon as possible. Currently, the CENG academic advisor is Dorothy Hogg (281-283-3712). Refer to the SCE home page for current information. The academic advisor helps the students in the following ways:

- Assists students to set up draft CPS.
- Co-approves the CPS.
- Partially evaluates the academic records of the students.
- Advises undergraduate students on all lower level courses as well as some upper level courses.
- Processes lower level course waiver requests.
- Assigns a faculty advisor to every student.

Each student will be assigned a *faculty* advisor. The CENG faculty advisor is a faculty member in the CENG program. Currently, the faculty members serving as faculty advisors are:

Mr. Vernon Bryant (281-283-3733)
Dr. George Collins (281-283-3879)  
Dr. Hakduran Koc (281-283-3877)  
Dr. Mary Randolph-Gips (281-283-3859)

The faculty advisor assists the students in the following manner:

- Approves elective course selection. 
- Co-approves the CPS. 
- Evaluates the academic records of the student, if needed. 
- Assists students to set up an individual study plan. 
- Provides advice on course selection. 
- Advise on requests to transfer courses. 

Students are encouraged to seek the advice of the faculty on any matters concerning their studies in the CENG program.

4. CANDIDATE PLAN OF STUDY

The academic and faculty advisors assist CENG students to set up their candidate plan of study (CPS). It is required that a student set up their CPS during their first semester of attendance at UHCL. All forms related to CPS are available from the academic advisor or the secretary in the School of Science and Computer Engineering (Bayou 3611).

The CPS addresses the following issues. 
(1) the university's core curriculum  
(2) the prerequisite courses for the degree  
(3) the transfer of credits from other universities  
(4) the CENG program core and  
(5) the actual courses a student selects to fulfill the elective requirements

Students should first arrange a meeting with the academic advisor to set up a draft of the CPS. They should then meet with the assigned faculty advisor to complete the CPS. After the faculty and academic advisor approve the CPS, the student may request a copy of it from the School of Natural and Applied Sciences.

After completing the CPS, a student may still change their selected elective courses by filling out the elective worksheet form (available from the School of Natural and Applied Sciences) and obtaining the approval of the faculty advisor.

4.1. Undergraduate CPS and the 2+2 plan
If you come to UHCL from a local area community college which has a 2+2 plan agreement, you may be eligible to use the CPS based on the year when you entered the community college, instead of the CPS of the current year. Consult the academic advisor to find out which base year's CPS you may use and select the one that best fits your need.

4.2. Transfer of Credit

The University of Houston Clear Lake is an upper division and graduate university, therefore all students are transfer students. Students entering the CENG program from a Texas community college that participates in the Texas Common Course Numbering (TCCN) system will find the acceptable transfer courses listed with the curricular requirement in section 5. Curriculum.

Students that transfer from other institutions receive credit during the admissions process. The CENG program faculty admissions committee reviews the transcripts and makes the decisions regarding the applicability of credit. When necessary, students are asked to provide additional documentation from the previous institution such as syllabi, text, assignments and catalog descriptions.
5. CURRICULUM

5.1. University Core Curriculum

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Number of hours</th>
<th>Course Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition</td>
<td>6</td>
<td>ENGL 1301,2311</td>
</tr>
<tr>
<td>Cross Cultural Studies</td>
<td>3</td>
<td>select from: ANTH 2346, 2351; ENGL 2336; GEOG 1303; HIST 2321, 2322; SOCI 2319</td>
</tr>
<tr>
<td>US History (3 may be Texas History)</td>
<td>6</td>
<td>select from: HIST 1301, 1302, 2301, 2302, 2303, 2381</td>
</tr>
<tr>
<td>Literature</td>
<td>3</td>
<td>select from: ENGL 2321, 2322, 2323, 2326, 2327, 2328, 2331, 2332, 2333</td>
</tr>
<tr>
<td>Mathematics</td>
<td>8</td>
<td>MATH 2413, 2414</td>
</tr>
<tr>
<td>Physical and Life Science</td>
<td>8</td>
<td>PHYS 2425, 2426</td>
</tr>
<tr>
<td>Political Science (US and Texas)</td>
<td>6</td>
<td>GOVT 2301, 2302; or GOVT 2305, 2306</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>3</td>
<td>select from: ARTS 1301, 1303, 1304; Danc 2303; DRAM 1310, 2360, 2361, 2363, 2366, 2367; HUMA 1301, 1302; MUSI 1306,</td>
</tr>
</tbody>
</table>

5.2. Program Prerequisites

Several of these courses are also used to meet the university's core curriculum as listed above. *Indicates courses whose content can be fulfilled at UHCL.

MATH 2413 Calculus I
MATH 2414 Calculus II
MATH 2415 Calculus III *
MATH 2318 Linear Algebra *
MATH 2360 Ordinary Differential Equations *
PHYS 2425 University Physics I *
PHYS 2426 University Physics II *
CHEM 1401 Inorganic Chemistry
Programming with C *
5.3 Program Core Requirements

CENG 3112   Lab for Digital Circuits  
CENG 3113   Lab for Linear Circuits  
CENG 3114   Lab for Advanced Linear Circuits  
CENG 3132   Digital Circuits  
CENG 3133   Linear Circuits  
CENG 3134   Advanced Linear Circuits  
CENG 3311   Lab for Telecommunications and Networks  
CENG 3331   Introduction to Telecommunications and Networks  
CENG 3511   Lab for Computer Architecture  
CENG 3531   Computer Architecture  
CENG 3624   Introduction to Engineering  
CENG 4113   Lab for Microprocessor Interfacing  
CENG 4133   Microprocessor Interfacing  
CENG 4331   Analysis and Design of Linear Systems  
CENG 4534   Digital Systems Design  
CENG 4625,4625  Senior Projects  
CSCI 3331   Computer Organization & Assembly Language  
CSCI 3333   Data Structures  
MATH 3331   Discrete Mathematics  
MATH 3334   Probability & Statistics for Scientists & Engineers  
SENG 4130   Intro to Systems Engineering  
SWEN 4432   Software Engineering

Transfer credits awarded for the content of any of the courses listed above which are from lower level courses at your transfer institution may result in students needing to take additional course at UHCL to fulfill upper level course requirements. UHCL requires its undergraduate students to take a minimum of 54 credit hours at the upper level.

5.4. Required Technical Electives

Undergraduate CENG students need to take 12 hours of approved electives, which may be selected from the following rubrics. CSCIICENG/SWEN

5.5. Support area in Software Engineering

Students interested in software engineering should take the following courses for their required technical electives.

CSCI 3532   SWEN 4433  
CSCI 4534   SWEN 4435
5.6. Support Area in Telecommunications

Students interested in careers involving telecommunications and networks should take the following courses as their required technical electives.

- CENG4031: Telecom Systems Operation
- CENG4131: Telecom Networking Devices
- CENG4231: Telecom Switching Systems
- CSCI 4132: Network Protocols

6. STUDY PLAN

6.1. General Suggestions for Devising (And Updating) A Study Plan

The following rules of thumb are useful in devising a study plan for the CENG degrees.

1. Complete and set up the Candidate Plan of Study (CPS) as soon as possible.
2. Complete the foundation courses as soon as possible.
3. Do not rely on a course to be offered in the summer semester for your graduation. Do not rely on the offering of a course in the critical paths of your study plan in the summer.
semester.

(4) Courses are offered in fall semester or in the spring semester only.

(5) Meet with and consult your academic or faculty advisors on a regular basis.

6.2. Recommended Course sequencing starting in the first year

**COMPUTER ENGINEERING FOUR-YEAR PLAN**

The following provides a suggested four-year plan to complete the Computer Engineering B.S. degree in 136 to 137 hours. Course rubric and numbers are provided for those courses taken at UHCL. Generic course titles are provided for courses that are typically taken at a community college.

**YEAR 1 FALL (17 Hours)**
- Composition I
- Amer. History Before 1877
- Computer Science I
- General Inorganic Chem.
- Calculus I

**YEAR 1 SPRING (17 Hours)**
- Bus. and Prof. Speech
- Am. History Since 1877
- *Data Structures
- *University Physics I
- Calculus II

**YEAR 2 FALL (17-18 Hours)**
- Government I
- *University Physics II
- *Calculus III
- CENG 3132/3112 Digital Circuits & Lab
- *Linear Algebra

**YEAR 2 SPRING (16 Hours)**
- Government II
- Technical Communications
- *Ordinary Differential Equations
- CENG 3531/3511 Computer Architecture & Lab
- CSCI 3331 Computer Organization and Assembly Language

**YEAR 3 FALL (17 Hours)**
- CENG 3133/3113 Linear Circuits & Lab
- CENG 3331/3311 Intra to Telecom/Networks & Lab
- CSCI 3233 Object Oriented Design & Prog.
- SWEN 4432 Software Engineering
- Visual and Performing Arts Elective

**YEAR 3 SPRING (19 Hours)**
- CENG 4534 Digital System Design
- CSCI 3231 Numerical Methods
- MATH 3331 Discrete Mathematics
- CENG 3134/3114 Advanced Linear Circuits & Lab
- **Technical Elective
- Literature Elective

**YEAR 4 FALL (15 Hours)**
- CENG 4133 Interface Synthesis: Peripherals & Mem.
- CENG 4331 Design and Analysis of Linear Systems
- **Technical elective
- Cross Cultural Studies Elective

**YEAR 4 SPRING (15 Hours)**
- CENG 4431 Comp. Sys. Reliability & Safety
- CENG 4632 Real-Time Digital Control
- CENG 4636 Senior Projects
- **Technical Elective
- **Technical Elective

*Indicates courses that are available at UHCL.
**Indicates required technical electives that may be chosen from CENG/CSCI/SWEN courses. They also may be selected from the Support Area in Software Engineering or the Support Area in Telecommunications.
7. FINANCIAL OPPORTUNITIES

There are several opportunities for financial aid for CENG students. A student with a scholarship award of $1,000 or more is entitled to pay in-state tuition.

7.1. Scholarships

There are different types of scholarships with varying criteria. Interested students should explore all opportunities. The Office of Financial Aid at Room 1615 of the Bayou Building (281-283-2480) has the information and application materials for university, state and Federal level scholarships for different purposes.

The School of Natural and Applied Sciences has its own scholarships. The availability of scholarships varies from semester to semester. There may be scholarships specifically for incoming students, and interested applicants should request related materials while they are applying for entry to the program. All application forms and information are available from the SCE School Office at Bayou 3611 (283-3700).

8. RESOURCES

8.1. Computer Laboratories

Most computer resources at UHCL are located in the Delta Building. The University Computing Center manages a 5000 square foot computer laboratory (Delta Building Rooms 201-214) that supports different hardware templates, including PC, Macintosh and VAX.

Every CENG student will get a permanent account that includes Email and web hosting service from the SCE server. Graduating CENG students will keep their accounts indefinitely.

Besides the general computer laboratories, CENG students frequently use the following two specialized laboratories.

(1) The Advanced Workstations Laboratory (Delta 159) contains about 25 Sun workstations supporting X-Windows, Java, web servers, Perl, Oracle, Case tools, etc. A guide to the Sun laboratory can be found at http://turquoise.rocks.cl.uh.edu/yue/sun/index.html.

(2) The PC Unix Laboratory (Delta 119) contains NT and Unix workstations. The laboratory was set up with a grant from the National Science Foundation (NSF) to support courses in
operating systems, Unix system administration, databases and networking.

After hour access to the Delta Building can be requested by filling out a request form obtainable from the division secretaries, Ms. Jeanne Leslie (Delta 101) and Ms. Maxine Galloway (Delta 161).

Mr. David Webb (Delta 127, 281-283-3719) is the computer coordinator of SCE.

8.2. University Computing Center

The University Computing Center manages many computer laboratories and provides related services to its users including:

- Managing computer accounts: creating new accounts, renewing existing accounts, changing passwords, extending accounts.
- Offering training courses: several courses on using various application software and systems are usually offered at the beginning of every semester.
- Providing consultation in various computer laboratories.

The University Computing Center provides modem connection to the UHCL local area network (LAN): 283-2980. Any problem and comments to UCT computing resources can be addressed to the UCT Help Desk (281-283-2828).

8.3. Instructional Technology Center

The Instructional Technology Center (ITC) is located in the Bayou Building, Room 3604. It provides instructional and productivity tools. Its facilities include IBM and Macintosh workstations, electronic classrooms, Internet connection, a video production studio, etc.

8.4. University Writing Center

The University Writing Center is a facility, which may be useful for students, particularly those whose native language is not English. The center provides tutors at no charge to help students with their writing projects. The tutors can also help the students to address targeted writing weaknesses. The University Writing Center is located in Room 2106 of the Bayou Building and can be contacted at 281-283-2910.

8.5. University Bookstore

The University bookstore is located in room 1206 of the Bayou Building (281-283-2680).
Besides selling textbooks for all courses at UHCL, the bookstore also sells popular software at significant academic discount prices. Examples are Borland's C++ Builder and JBuilder, which may be used in many CSCI courses.