# ACADEMIC PROGRAM REVIEW

REV. 10-05-2017

**PROGRAM NAME: COMPUTER SCIENCE**
**PHONE: 972-881-5838**

**PROGRAM REVIEW CONTACT: TEBRING DALY**
**EMAIL: TDALY@COLLIN.EDU**

## GUIDELINES

**Time Frames:**

1. **Scope**:
   The time frame of program review is five years, including the year of the review.
   Data being reviewed for any item should go back the previous four years, unless not available.
2. **Deadline Dates**:
   January 15th – Program Review Document due to Department Dean for review
   February 1st – Program Review Document due to Program Review Steering Committee
3. **Years:**
   Years 1 & 3 – Implement Action Plan of (CIP) and collect data
   Years 2 & 4 – Analyze data and findings, Update Action Plan
   Year 5 – Write Program Review of past 4 years; Write Continuous Improvement Plan (CIP) and create new Action Plan

**LENGTH OF RESPONSES:** Information provided to each question may vary but should be generally kept in the range of 1-2 pages.

**EVIDENCE GUIDELINES:** In the following sections, you will be asked to provide evidence for assertions made.

a. **Sources**: This evidence may come from various sources including professional accreditation reviews, THECB, Texas Workforce Commission's CREWS, Institutional Research Office, National Student Clearinghouse, IPEDS, EMSI Analyst or EMSI Career Coach, and may be quantifiable and/or qualitative. If you are unfamiliar with any of these information sources, contact David Liska (dliska@collin.edu, 972.985.3714) for details. You are welcome to use additional data sources of which you are aware.

b. **Examples of Evidence Statements**:
   1. Poor example: Core values are integrated into coursework. (Not verifiable)
   2. Good example: Core values are integrated into coursework through written reflections. (Verifiable, but general)
   3. Better example: Core values are integrating into coursework through written reflections asking the student to describe how s/he will demonstrate each of the core values in his or her professional life and demonstrated through service learning opportunities. (Replicable, Verifiable)

**FOR MORE INFORMATION:** Any questions regarding this review, including forms, calendars & due dates, should be addressed to Scott Parke (sparke@collin.edu, 972.599.3117) or David Liska (dliska@collin.edu, 972.985.3714) in Policy & Planning/Institutional Effectiveness.

# Section I. *Are We Doing the Right Things?*

## 1. WHAT DOES YOUR ACADEMIC PROGRAM DO?

**A. What is the academic program and its context?**

This section is used to provide an overview description of the academic program, its relationship to the college and the community it serves. Keep in mind the reviewer may not be familiar with your area. Therefore, provide adequate explanation as needed to ensure understanding.

*Requested points to address, but not limited to:*

- *Program purpose and objective(s)*
- *Brief explanation of who the program serves*
- *What regulatory standards must the program meet (THECB, Workforce, external accreditation)*
- *Program outcomes*

The purpose and goal of the Associate of Science degree with Computer Science coursework is to prepare students for transfer to a college or university where they can specialize in such disciplines as computer science and computer software engineering. Texas Higher Education Coordinating Board (THECB) (http://www.thecb.state.tx.us/) approves fields of study in accordance with Texas Education Code, Section 61.823 with the assistance of an advisory committee of content experts. Computer Science Field of Study (FOS) curriculum (See Appendix I) is a set of courses that will satisfy the lower division requirements for a bachelor's degree in a specific academic area at a baccalaureate institution. If a student successfully completes the Field of Study curriculum, that block of courses may be transferred to a baccalaureate institution (http://www.sacs.org/). The FOS must be substituted for that institution's lower division requirements within the degree program for the Field of Study into which the student transfers. Within the Computer Science FOS there are courses listed which will satisfy requirements for both the AS General Education Core and the FOS. There are two tracks offered in the FOS (C++ Track and Java Track). Both tracks cover the same fundamental theory and content, but uses different languages. An outline of our degrees is provided in Appendix I.

Program Outcomes:

The purpose of this program is to set the pathway with the foundational skills needed to transfer to a college or university and specialize in computer science and computer software engineering. All of our computer science courses are listed in the Lower Division Academic Course Guide Manual (http://www.thecb.state.tx.us/AAR/UndergraduateEd/WorkforceEd/acgm.htm). Our computer science program is a field of study program which transfers to colleges and/or universities in the state of Texas. The

students will learn how to design, code, and document programming projects in C++ and/or Java. They will learn how to break their programs in methods/functions, pass data between their methods/functions, use precedence and associativity operators, code logical control structures (sequence, selection, and iteration), use input and output, manipulate one dimensional and multidimensional arrays, code data structures (linked list, stack, queue, binary tree, and sorting algorithms), use error-handling mechanisms, use object-oriented methodology (inheritance, polymorphism, and encapsulation), and read and write to sequential data files.

**B. Executive summary: Briefly summarize the topics that are addressed in this self-study, including areas of strengths and areas of concern.** (Information to address this Executive Summary may come from later sections of this document; therefore, this summary may be written after these sections have been completed.) Using the questions in the template as headings in the Executive Summary can provide structure to the overview document.

## Executive Summary

The purpose of this self-study was to evaluate the Computer Science program in order to assess whether the program is meeting the goals for which it was established. For this purpose the evaluators used program data that is available. The accomplishment of goals may be measured through various means including student data such as enrollment trends, persistence trends, and completion trends. This study revealed several positives for the program and some areas needing improvement. They are broadly classified into the following section as strengths and weaknesses.

Strengths:

- Faculty do stay current in their discipline and are active in college service (see Appendix IV).
- Steady enrollment growth in the program (see Section 3B4).
- In the Fall 2016 and Spring 2017, the computer science courses were in the 80 and 90 percentile (see Section 6A).

Weaknesses:

- The average success rates in most of our courses is 60% (see Section 6A).
- Lack of a well-designed and comprehensive program web site that includes E-Business, Computer Systems, and Engineering to provide accurate information to prospective and current students (see Appendix II and III).
- Completion rates are low albeit increasing recently (see Section 3B4).
- Lack of a sustained method and/or practice to track student progress in order for timely intervention (see Section 6A).

As a result of the findings, the following goals are developed to address the gaps:

**Goal 1—Improve academic success rates in Computer Science courses**

The following is being considered to achieve Goal 1:

- Isolate courses where most students stop out. Faculty working together in order to see if any intervention is necessary pedagogically or otherwise to slow down and eventually stop student exodus.
- Teach as many of the COSC courses as possible in a computer lab encouraging live hands-on training as concepts are being taught. For this, instructors will be strongly encouraged to teach in a lab and involve students in multiple project-based and active learning exercises.

**Goal 2 - Create a departmental website for Computer Science**

The following are being considered for reaching Goal 2:

- Create a departmental website for Computer Science. Partner with E-Business Media, Computer Information Systems, and Engineering when developing the web site to meet the needs of our students. Students taking Computer Science courses could major in any of these fields. It makes sense to partner with these areas since our courses overlap.
- Model our departmental website off of the surrounding areas schools. This will allow for familiarity for students and easier navigability.
- Complete a comprehensive survey to get feedback on what information to include on the website.

**Goal 3 – Increase successful completion rates in Computer Science degree**

Our program is a transfer program which includes courses that are used in a variety university programs. Some students may take the first level computer science course in order to fulfill a requirement for their degree (i.e. – Engineering, Mathematics, Computer Systems, E-Business), they may intend to complete the Computer Science degree at their transferring college/university, or they may take a course to refresh or gain a skill for their job. We have been increasing enrollment in our courses, but the number of students completing the degree/certificate still remains relatively low.

- In order to address this gap, revise the courses include more effective strategy for teaching, assignment, and assessment practices following best practices. Track students by better sequencing of courses and only keeping appropriate pre-requisites.

- Not all the students registering for COSC1436 (first programming course) are Computer Science majors. Adding a programming course for engineering students (COSC1420), such as C-Programming would help to better keep track of which students are planning to major in Engineering separating them from students pursuing other tracks in Computer Science.
- Encourage major declaration after successful completion of entry-level courses as well as require students to complete a degree plan as they plan their degree progression.

## 2. WHY DO WE DO THE THINGS WE DO: PROGRAM RELATIONSHIP TO THE COLLEGE MISSION, CORE VALUES & STRATEGIC PLAN.

- **Provide program-specific evidence of actions that the program supports the college mission:** *"Collin County Community College District is a student and community-centered institution committed to developing skills, strengthening character, and challenging the intellect."*

The faculty strive to support the college mission by providing an environment which supports and guides students in gaining fundamental knowledge, concepts, and skills in Computer Science. Our faculty are involved in service to our college and the community (see Appendix I). College service ranges from serving on college-wide committees including the Online Advisory Board (OAB), and Program Review Steering Committee, and the Curriculum Advisory Board (CAB) to leadership in the Faculty Council by chairing the Technology Committee. Our faculty has been involved in the community by providing workshops in mobile development through collaboration with the Department of Labor (DOL) grant, along with presentations and workshops for our colleagues and surrounding colleges/universities through the National Science Foundation (NSF) grant (see Appendix IV).

In regards to "strengthening character", the computer Science department is dedicated to developing responsible citizens with personal integrity who have respect for those who come from different backgrounds and who have different perspectives. In our program we model professional behavior, fairness, and respect for our colleagues and our students.

The rigor of the program and expectation of high quality work from students challenges the intellect of our students. Addition of project-based assignments built around real world situations is aimed at not only stimulating the intellect but challenge as well.

- **Provide program-specific evidence of actions that support the case that the program and its faculty contribute to fulfillment of the college core values:** *"We have a passion for Learning, Service, Involvement, Creativity, Innovation, Academic Excellence, Dignity, Respect and Integrity."*

The content in Computer Science is rapidly changing and we must stay abreast of the changing technology/industry. This constant and dynamic nature of our field fuels our preparation in teaching our students to be adept in continual learning and applying what they have learned into the newer opportunities they face. This also calls for constant learning and re-learning new programming languages and technologies. Students are challenged to think logically and apply the skills that they learn in class to solve various complex problems. They may learn how to program in Java or C++, but they might be hired to program in C Sharp (C#) programming language. They will be hired for their ability to take what they learned in our courses and transfer it to a new environment. Our students must be prepared to continue learning and problem solving after they leave our program. Our commitment is to provide them with the ability to solve complex problems and the knowledge of how to learn new skills. Students will show mastery of the programming skills learned throughout the program in our third level programming courses. They will use data structures to solve complex problems. Students are given a variety of opportunities to be creative and innovative in the Computer Science courses, for example: we have added an objective into our first C++ course that students will "design, code, and debug a semester programming project". One of our associate faculty members that teaches our upper level computer science course has spent time researching and implementing collaborative teaching methods into his courses. He used team-based learning to have the students work on semester projects together fostering creativity and innovation.

The faculty in our area stay up to date with rapidly changing technology by attending conferences, seminars, workshops, reading and taking online courses (see Appendix I). The computer science program works in conjunction with our E-Business and Computer Systems disciplines to bring students the knowledge that they need to be successful in the workplace. The Computer Science discipline lead attends both the E-Business and Computer Systems Advisory Board meetings. All three disciplines collaborate with one another to ensure that our courses are providing content that will benefit the students with whatever path they choose to take. Our E-business program demonstrates innovation by being one of the first programs in Texas to provide mobile programming tracks for Apple and Android mobile devices. The students must take 2 of our Java programming transfer courses in order to work on the mobile programming workforce track.

Our program also seeks to develop our students' professionalism which includes integrity, responsibility and professional ethics. Students are expected to respect others both in the classroom and online, be responsible by meeting deadlines, and to complete their own work. They are also expected to respect others work, copyrights, licenses, and to properly give credit to their sources.

The full-time faculty members that teach these courses are engaged in professional development and college service. The faculty have attended and presented at various technical conferences and workshops/seminars (i.e. Working Connections), taken online courses, obtained higher level degrees, are involved in various technical committees/communities, have volunteered to mentor

and advise students, have been involved in various grants, have worked with students to give their real-world experience through internships and collaborative software projects. Our program faculty is involved in service across the campus. We have one faculty member who is currently serving on Online Advisory Board (OAB) and another has served on Curriculum Advisory Board (CAB). One faculty member has been involved in an NSF grant to work with integrating software into our programming courses and another grant to work on restructuring coursework for our Web Development certificate in E-Business into a Competency-Based Education (CBE) format and has written her own textbook. Our faculty members teach classes in the Computer Science degree, but most of them also cross over to teach courses in the E-Business and Computer Systems disciplines. Most faculty will read various textbooks and online tutorials to keep abreast of technology. Some others are participating in other committees (such as Technology Committee), working with student orientation events, and participating in campus based events.

- **Provide program-specific evidence that documents how the program supports the College's strategic plan**: https://www.collin.edu/aboutus/index.html.

*Requested points to address, but not limited to:*

- *What evidence is there to support assertions made regarding how the program relates to the mission, core values and strategic plan?*
- *Think broadly-increasing completion, pathways to 4-yr and from high schools, etc.*
- *Analyze the evidence you provide. What does it show about the program?*

All of the established strategic goals are not directly supported by the Computer Science program. However, as part of the organization and as integral to the primary mission of education, the program indirectly supports and affects district-wide strategic goals. Of the strategic goals, the following may be more directly supported and affected by the program:

**"Increase Outreach and Create Streamlined Pathways from High School."** – The Computer Science department working with the Associate Dean is actively engaged in seeking which of our courses could be offered as dual credit option.

**"Emphasize Student Achievement and Streamline Pathways to Four Year College and Universities."** – The very fact of our program being a Field of Study and the fact of our ongoing efforts to enter into articulation agreements with four-year public institutions directly supports this strategic goal.

**"Create an Increasingly Welcoming Environment for Students, Community Members, Faculty and Staff."** – The Computer Science program is continuously involved in encouraging the faculty to be engaged in the educational goals of our students and

in this endeavor, our faculty is engaged in focused student advising and encouraging students to demonstrate soft skills through service learning.

**"Expand the Physical Footprint of Collin College to Meet Emerging Programmatic Needs; Improve Facilities as Necessary, and Implement the Maintenance Plan to Elevate Services to Our Students."** – Many of our faculty have been deeply engaged in the design and planning stages of the two new campuses. Suggestions made by our faculty have been incorporated into the design to the extent possible.

All of the foregoing along with the recent trend of enrollment increases place the Computer Science program as a significant player in the future of this institution.

## 3. WHY WE DO THE THINGS WE DO: THE PROGRAM HAS A CLEAR TRANSFER PATHWAY TO A BACCALAUREATE IN A RELATED FIELD.

**A. Make a case with evidence to show the program offers a clear transfer pathway to a baccalaureate in a related field.**

*Suggested Points to consider, but not limited to:*

- *Attach scanned copies of any signed and current articulation agreements with Collin's university partners and top transfer schools.*
- *Address the percentage of students who are completing your academic certificate or degree prior to transfer out.*
- *At what point(s) are a substantive percentage of students transferring out of the program?*
- *How do Collin students perform at the university level?*
- *Analyze the evidence you provide. What does it show about the program?*

***Articulation agreements are located in the Appendix VI through VII.***

The fact of our program being a Field of Study (FOS) lends itself to the transferability of the program. The discipline lead met with the Associate Dean for Undergraduate Education at the University of Texas at Dallas, Simeon Ntafos, and he said that they aren't currently tracking the students transferring from Collin, but he believes that there is "an initial drop in GPA but transfers are at about the same GPA as FTIC at graduation." The department needs to do a better job of actively engaging in dialogues with all potential 4-year partner schools. At the time of compiling this document, our program has only two articulation agreements in place, UTD and UNT (See appendix VI and VII). Efforts to articulate with Texas A& M Commerce, UT Arlington, and Tarleton State among others must be pursued.

It is hard to keep track of where the students are going since only some of them are Computer Science majors. Some of the students in our programming courses are working towards a degree in CIS or E-Business Media for which they only need 1 or 2 programming courses. A large percentage of the students taking our programming courses are Engineering transfer students that require only Fundamentals of Programming I and II to transfer to the university. We are currently trying to add a programming course for Engineering students (COSC1420), C Programming. This would help us to better keep track of which students are planning to major in Engineering and which are majoring in Computer Science.

## B. 4. WHY WE DO THE THINGS WE DO: PROGRAM RELATIONSHIP TO STUDENT DEMAND

**MAKE A CASE WITH EVIDENCE TO SHOW THAT STUDENTS WANT THE DEGREE OR CERTIFICATE, AND ARE ABLE TO COMPLETE THE PROGRAM.**

*Requested points to address, but not limited to:*

- *THE NUMBER OF STUDENTS WHO COMPLETED THE AWARD IN EACH OF THE LAST 4 YEARS.*
- *ANALYZE THE ENROLLMENT PATTERN. IS IT DECLINING, FLAT, GROWING, OR NOT EXHIBITING A STABLE PATTERN?*
- *WHAT ARE THE IMPLICATIONS FOR THE NEXT 5 YEARS IF THE ENROLLMENT PATTERN FOR THE PAST 4 YEARS CONTINUES?*
- *DESCRIBE ANY ACTIONS TAKEN TO IDENTIFY AND SUPPORT STUDENTS ENROLLED IN PROGRAM-REQUIRED COURSES EARLY IN THE DEGREE PLAN. IF NO ACTIONS ARE TAKEN AT THE PRESENT, PLEASE DEVELOP AND DESCRIBE A PLAN TO DO SO.*
- *Analyze the evidence you provide. What does it show about the program?*

A number of data sets have been analyzed to show the program relationship to student demand. As demonstrated by the data below enrollment has increased significantly along with an increase in completion. The increase in completion compared to the growth in enrollment is minimal to moderate. At this time there is not a well thought out early intervention plan to address the steep drop in enrollment in higher level courses. If the enrollment trend continues, number of sections will have to be increased as well as expanding the program to the new campuses.

The following chart shows that the number of identified Computer Science majors has increased 153% from the fall 2013 to the fall 2017 and 103% from the spring 2013 to spring 2017.

| | Year 2013 | Year 2014 | Year 2015 | Year 2016 | Year 2017 | Overall |
|---|---|---|---|---|---|---|
| **Fall** | 252 | 435 | 580 | 499 | 637 | |
| *Percentage Change* | | *73%* | *33%* | *-14%* | *28%* | *153%* |
| **Spring** | 306 | 439 | 535 | 430 | 622 | |
| *Percentage Change* | | *43%* | *22%* | *-20%* | *45%* | *103%* |

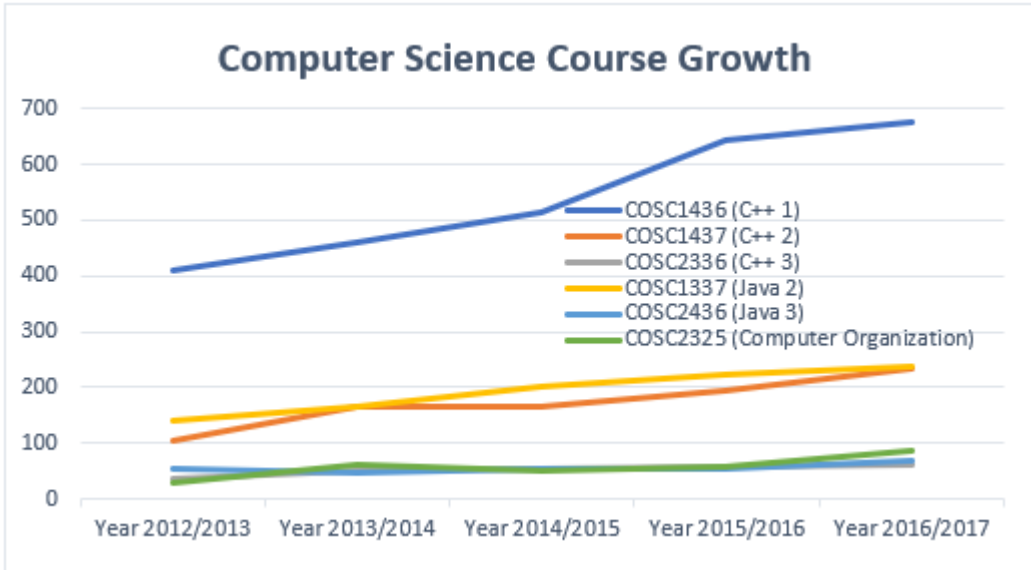
The following chart shows the enrollment of the fall/spring semesters from 2013-2017. The overall trend shows significant enrollment gains during this period.

***Computer Science Field of Study***

| Term | Count of Unique Enrolled Students |
|---|---|
| **FY2013** | |
| Fall 2012 | 252 |
| Spring 2013 | 306 |
| Maymester 2013 | 20 |
| Summer I 2013 | 162 |
| Summer II 2013 | 77 |
| **FY2014** | |
| Fall 2013 | 435 |
| Spring 2014 | 439 |
| Maymester 2014 | 21 |
| Summer I 2014 | 209 |
| Summer II 2014 | 129 |
| **FY2015** | |
| Fall 2014 | 580 |
| Spring 2015 | 535 |
| Summer 2015 | 263 |
| **FY2016** | |
| Fall 2015 | 499 |
| Winter 2015 | 14 |
| Spring 2016 | 430 |
| Summer 2016 | 298 |
| **FY2017** | |
| Fall 2016 | 637 |
| Winter 2016 | 29 |
| Spring 2017 | 622 |
| Summer 2017 | 440 |

*Note: Students counted for this measure were enrolled at Collin during the specified term and are identified based on their declared major in Banner.*

The following chart shows the enrollment in our computer science courses from 2013-2017. Most courses show steady growth.




| Course | Fall 2012 | Spring 2013 | Summer 2013 | **Year 2012/2013** | Fall 2013 | Spring 2014 | Summer 2014 | **Year 2013/2014** | Fall 2014 | Spring 2015 | Summer 2015 | **Year 2014/2015** | Fall 2015 | Spring 2016 | Summer 2016 | **Year 2015/2016** | Fall 2016 | Spring 2017 | Summer 2017 | **Year 2016/2017** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COSC1436 (C++ 1) | 173 | 190 | 47 | **410** | 203 | 199 | 57 | **459** | 230 | 224 | 60 | **514** | 282 | 285 | 75 | **642** | 298 | 299 | 78 | **675** |
| COSC1437 (C++ 2) | 27 | 58 | 20 | **105** | 57 | 81 | 29 | **167** | 65 | 69 | 30 | **164** | 67 | 96 | 30 | **193** | 103 | 100 | 29 | **232** |
| COSC2336 (C++ 3) | 19 | 16 | | **35** | 27 | 23 | | **50** | 29 | 26 | | **55** | 29 | 27 | | **56** | 24 | 38 | | **62** |
| COSC1337 (Java 2) | 66 | 73 | | **139** | 75 | 76 | 14 | **165** | 75 | 99 | 28 | **202** | 90 | 106 | 27 | **223** | 84 | 105 | 49 | **238** |
| COSC2436 (Java 3) | 25 | 30 | | **55** | 27 | 21 | | **48** | 25 | 29 | | **54** | 25 | 30 | | **55** | 35 | 32 | | **67** |
| COSC2325 (Computer Organization) | 30 | | | **30** | 31 | 30 | | **61** | 27 | 25 | | **52** | 27 | 29 | | **56** | 28 | 58 | | **86** |

The following chart shows the number of students completing a degree/certification in Computer Science from 2013-2017. The numbers have been gradually increasing, but the numbers are low for how many students are enrolled in our Computer Science courses. Unfortunately, not all students that start the Computer Science program at Collin will finish their degree at our school before transferring. Not all the students registering for COSC1436 (first programming course) are Computer Science majors. Some of the students in our programming courses are working towards a degree in CIS or E-Business Media in which they only need 1 or 2 programming courses. A large percentage of the students taking our programming courses are Engineering transfer students that only Fundamentals of Programming I and II (COSC1436 and COSC1437 or COSC1337) to transfer to the university. We are currently trying to add a programming course for Engineering students (COSC1420), C Programming. This would help us to better keep track of which students are planning to major in Engineering and which are majoring in Computer Science.

| Computer Science FOS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Degree | CPFC | | | | 4 | 8 | 12 |
| | CPLU | | | | | 1 | 1 |
| | CSFJ | | | | 2 | 5 | 7 |
| | CSFS | 6 | 8 | 11 | 7 | 1 | 33 |

| | | Counts of Award by Academic Year | | | | | |
|---|---|---|---|---|---|---|---|
| **Award Type** | **Major Code** | **2013** | **2014** | **2015** | **2016** | **2017** | **Grand Total** |
| **Computer Science FOS (continued)** | | | | | | | |
| Degree | JAVA | | | | | 2 | 2 |
| Degree Total | | 6 | 8 | 11 | 13 | 17 | 55 |
| Certificate | CSFS | 18 | 20 | 20 | 22 | 22 | 102 |
| | JAVA | | | 2 | 15 | 13 | 30 |
| Certificate Total | | 18 | 20 | 22 | 37 | 35 | 132 |
| Computer Science FOS Total | | 24 | 28 | 33 | 50 | 52 | 187 |

## 5. WHY WE DO THE THINGS WE DO: WHAT MARKETABLE SKILLS SHOULD STUDENTS HAVE AFTER COMPLETING YOUR PROGRAM?

**Make a case with evidence to show that the program teaches skills that are useful in the workplace.**

*Requested points to address, but not limited to:*

- *What foundational skills and knowledge do employers say they want?*
- *Provide evidence of the foundational skills and knowledge the program teaches.*
- *Provide evidence from national, state, and/or local employer surveys, studies, editorials and other sources that identify current employer expectations for baccalaureate graduates in program-related fields.*
- *Identify and discuss the strengths and weaknesses of the program related to teaching marketable skills.*

**Soft Skills (Marketable Skills):**
Students attain the following skills from the general education courses: communication, interpersonal, and basic reasoning skills.

**Occupational Skills (foundational):**
The computer science program is not a workforce program and as a FOS program it does not have a business and industry advisory committee. Therefore, feedback from employers on foundational skills from the region surrounding the college is not available.

We teach the foundational skills to prepare students to be successful when they transfer to a college/university specializing in such disciplines as computer science and computer software engineering. Computer Science Field of Study (FOS) curriculum (See Appendix I) is a set of courses that will satisfy the lower division requirements for a bachelor's degree in a specific academic area at a baccalaureate institution. If a student successfully completes the Field of Study curriculum, that block of courses may be transferred to a baccalaureate institution (http://www.sacs.org/). The FOS must be substituted for that institution's lower division requirements within the degree program for the Field of Study into which the student transfers. Within the Computer Science FOS there are courses listed which will satisfy requirements for both the AS General Education Core and the FOS. There are two tracks offered in the FOS (C++ Track and Java Track). Both tracks cover the same fundamental theory and content, but uses different languages. An outline of our degrees is provided in Appendix I.

The purpose of this program is to set the pathway with the foundational skills needed to transfer to a college or university and specialize in computer science and computer software engineering. All of our computer science courses are listed in the Lower

Division Academic Course Guide Manual (http://www.thecb.state.tx.us/AAR/UndergraduateEd/WorkforceEd/acgm.htm). Our computer science program is a field of study program which transfers to colleges and/or universities in the state of Texas. The students will learn how to design, code, and document programming projects in C++ and/or Java. They will learn how to break their programs in methods/functions, pass data between their methods/functions, use precedence and associativity operators, code logical control structures (sequence, selection, and iteration), use input and output, manipulate one dimensional and multidimensional arrays, code data structures (linked list, stack, queue, binary tree, and sorting algorithms), use error-handling mechanisms, use object-oriented methodology (inheritance, polymorphism, and encapsulation), and read and write to sequential data files.

Along with these technical skills, professional communication in oral and written media are commonly sought. Various assignments and project-based assignments allows the instructors to assess student attainment of these skills.

**Strengths and Weaknesses related to Marketable Skills:**

**Career demand:**
InterLink targeted high skill/high demand occupations from 2016-2021 (http://www.interlink-ntx.org/pdfs/targetedlist.pdf). They listed “Computer Programmers”, “Software Developers, Applications”, and “Software Developers, Systems Software” as high demand. “Computer Programmers” wage ranges from $24-57 per hour. This helps to support the area of Computer Science as a viable option for a Bachelor’s Degree for students.

The Bureau of Labor Statistics projects “Software developers, applications” to have 135,300 new projected jobs from 2014-2024 at a salary of about $100K (https://www.bls.gov/ooh/most-new-jobs.htm). The entry level education needed is a bachelor’s degree. According to the Occupational Outlook Handbook, in May 2012, the job outlook for 2014-2024 was 17% (much faster than average) (https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm).

The Washington Post listed Computer Science as the highest paying college major with a bachelor’s degree with a base median salary of $70K in October 2016 (https://www.washingtonpost.com/news/grade-point/wp/2016/10/17/want-college-to-pay-off-these-are-the-50-majors-with-the-highest-earnings/?hpid=hp_hp-more-top-stories-2_college-majors-7a:homepage/story&utm_term=.7a5e62bbd162).

The Indeed Job search engine lists 4,481 jobs within 25 miles of Dallas with 130 of those jobs being full-time with salaries estimating 65K and up. We offer Java and C++ programming tracks in our certificate. When searching for "Java" jobs specifically there were 1,940 jobs with 1,632 being full-time positions. When searching for "C++" jobs specifically there were 516 jobs with 438 being full-time positions. See the appendix for job search result screen shots. Our transfer schools that we are partnered with are currently teaching students Java and C++ and so our students will be prepared to transfer into their programs with ease since they have already had exposure to those languages (we teach Java and C++ in our program). The Indeed Job search results are listed in Appendix VIII. We are teaching students the foundational math and computer skills that are needed to pursue a computer science degree.

# *Section II. Are We Doing Things Right?*

## 6. How effective is our curriculum, and how do we know?

**A. Make a case with evidence that there are no curricular barriers to completion. Review data related to course enrollments, course retention rates, course success rates, and the frequency with which courses are scheduled to identify barriers to program completion.**

*Requested points to address, but not limited to:*

- *Enrollment flows, retention, and progression to sequent courses in the program degree plan.*
- *FOS only: Given that FOS courses are defined by the state, what actionable barriers are seen?*
- *For Core only: Do all course options have sufficient enrollment to continue their inclusion in core?*
- *For Core and FOS certificates: What steps can be taken to improve course completion/success rates, course enrollment, and scheduling frequencies for specific courses?*
- *Program course retention and success rates: Attach the relevant information from the Program Review Data Set on the Institutional Research Office's intranet page.*
- *Identify and discuss all courses that have a retention rate below 78% (Carl Perkins' standard) or a success rate below 90%.*
- *Using assessment evidence and instructor observations, identify the student learning outcomes that are the greatest challenges for students. Identify any additional barriers to student success.*
- *What instructional or other interventions hold promise for improving enrollment and retention/success rates for each identified course?*
- *Is there sufficient course enrollment to support a stable cycle of required course offerings at least once every two years?*
- *Analyze the evidence you provide. What does it show about the program?*

Being a FOS puts certain limitations as to the number of discipline specific courses that can be offered after meeting the general education core requirements. Many of the technical skills identified by the industry can only be offered at the junior and senior level of a four-year institution. Identifying courses (as seen in a previous enrollment chart) where the most drop off of students is seen and intervening with at risk students in the course preceding may alleviate the issue of low completion to some extent. The program also needs to move deeper from course level to the learning objective level to see which of them offers the most challenge to the students. The faculty then must develop an intervention strategy. The following success rate charts show that the computer science course success rate increased for the C++ courses from the Fall 2015 to the Fall 2016 and Spring 2016 to the Spring 2017. For example, COSC1436 increase from 57 to 72 and COSC1437 increased from 49 to 72 from Fall 2015 to Spring 2016. COSC1436 increased from 67 to 70 and COSC1437 increased from 54 to 71 from the Spring 2016 to the Spring 2017. We switched textbooks for the COSC1436 and COSC1437 courses in the Fall 2016 and this may have helped to increase the success rates in those courses. We need to look into the curriculum and prerequisites listed in the COSC1337 class to help increase success rates. We will also look into whether more tutoring attention could be given to students in COSC1337 to increase success rates.

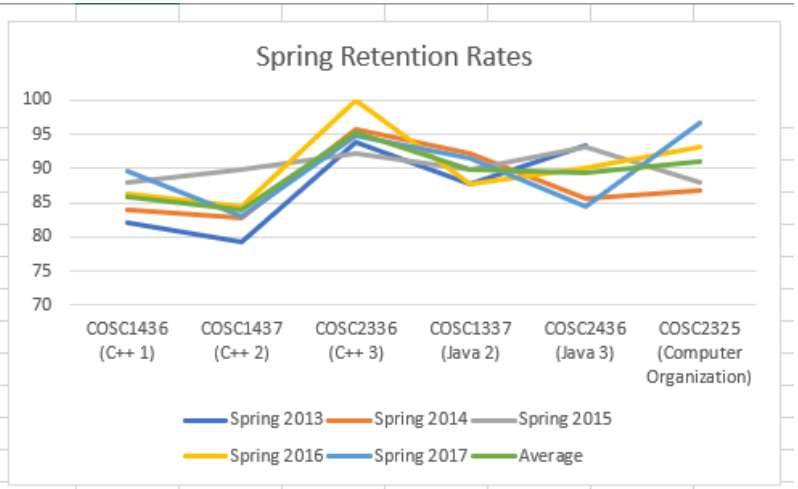
Traditionally, the COSC Computer Science courses have been taught in a lecture classroom, but some students and faculty members have expressed interest in teaching these courses in a computer lab to increase the success rates. In the past, the instructor would need to schedule time in an open computer lab to take students into the lab during class time to work on hands-on activities, projects, tests, etc. Some instructors have been reserving the open lab for the whole semester for their class and taking their class to the lab during the second half of the class. This has caused issues with other instructors wanting to schedule lab time. There is only one open lab at the Spring Creek Campus and this is where a majority of our computer science courses are taught. To fix this issue, some classes are being taught in a computer lab for the Spring 2018 semester. Not all classes are able to be taught in the lab since the Spring Creek Campus is out of computer lab space. We are going to try to schedule classes at different times and campuses to make better use of available computer labs.

Seventy-four students from various computer science courses volunteered to supply information about their thoughts on teaching coding courses in a computer lab. Majority of the student (86%) felt that having coding classes in a computer lab would be beneficial. Eighty-eight percent of the students felt that having hands-on coding class activities would be helpful (see Appendix V). Eight faculty members that teach various computer science courses volunteered to supply information about their thoughts teaching coding courses in a computer lab. Seven out of 8 faculty members believe that computers in the coding classrooms would be advantageous to students learning and the other faculty member was neutral (see Appendix VI). As you can see from the feedback from the students and faculty members taking and teaching computer science courses, most feel that

having classes in a computer lab would be very beneficial to their learning. We are going to try to work on getting as many computer science classes into a computer lab as possible by reworking our offerings of these classes to match computer lab availability as much as possible.

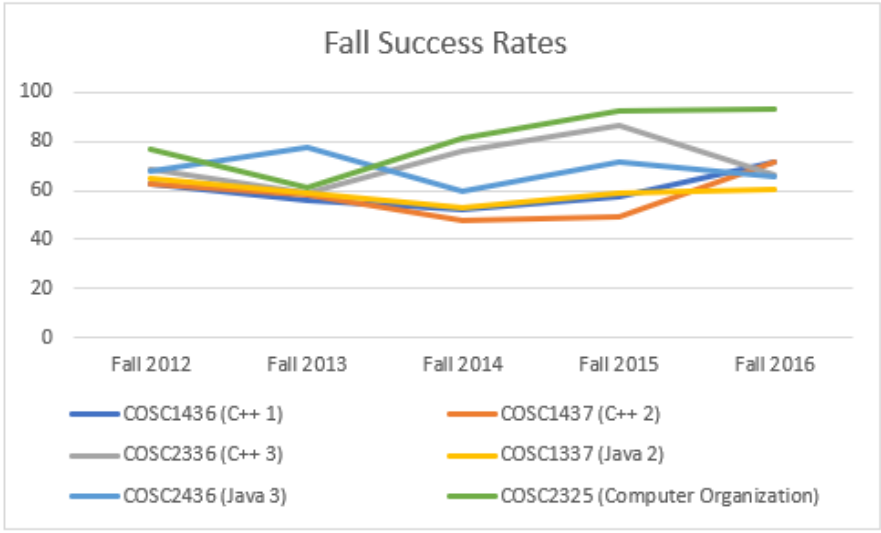
The following charts show the retention rates for the Fall and Spring semesters from 2013-2017. In the Fall 2016 and Spring 2017, the COSC courses were in the 80 and 90 percentile.

| Course | Spring 2013 | Spring 2014 | Spring 2015 | Spring 2016 | Spring 2017 | Average |
|---|---|---|---|---|---|---|
| COSC1436 (C++ 1) | 82 | 84 | 88 | 86 | 90 | 86 |
| COSC1437 (C++ 2) | 79 | 83 | 90 | 84 | 83 | 84 |
| COSC2336 (C++ 3) | 94 | 96 | 92 | 100 | 95 | 95 |
| COSC1337 (Java 2) | 88 | 92 | 90 | 88 | 91 | 90 |
| COSC2436 (Java 3) | 93 | 86 | 93 | 90 | 84 | 89 |
| COSC2325 (Computer Organization) | | 87 | 88 | 93 | 97 | 91 |

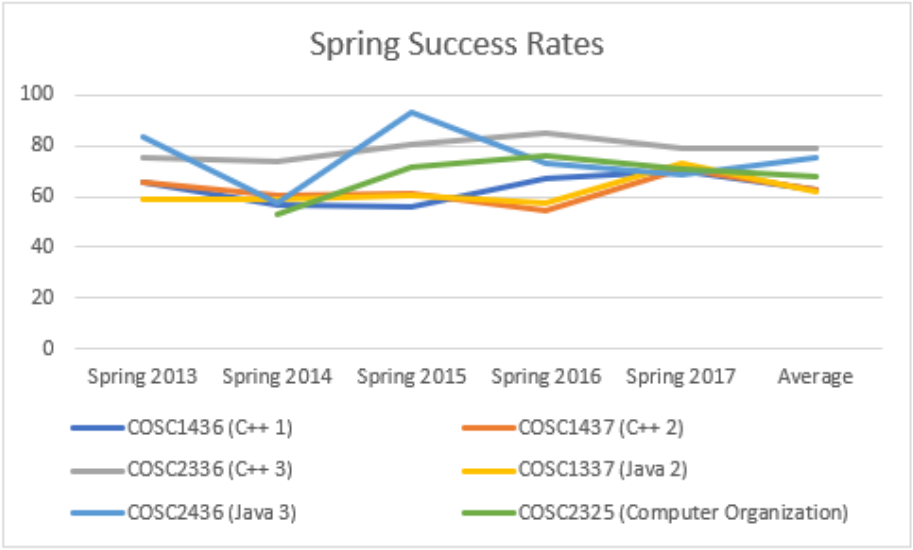


The following charts show the success rates for the Fall and Spring semesters from 2013-2017.

| Course | Fall 2012 | Fall 2013 | Fall 2014 | Fall 2015 | Fall 2016 | Average |
|---|---|---|---|---|---|---|
| COSC1436 (C++ 1) | 63 | 56 | 53 | 57 | 72 | 60 |
| COSC1437 (C++ 2) | 63 | 58 | 48 | 49 | 72 | 58 |
| COSC2336 (C++ 3) | 68 | 59 | 76 | 86 | 67 | 71 |
| COSC1337 (Java 2) | 65 | 59 | 53 | 59 | 61 | 59 |
| COSC2436 (Java 3) | 68 | 78 | 60 | 72 | 66 | 69 |
| COSC2325 (Computer Organization) | 77 | 61 | 82 | 93 | 93 | 81 |




| Course | Spring 2013 | Spring 2014 | Spring 2015 | Spring 2016 | Spring 2017 | Average |
|---|---|---|---|---|---|---|
| COSC1436 (C++ 1) | 66 | 57 | 56 | 67 | 70 | 63 |
| COSC1437 (C++ 2) | 66 | 61 | 61 | 54 | 71 | 62 |
| COSC2336 (C++ 3) | 75 | 74 | 81 | 85 | 79 | 79 |
| COSC1337 (Java 2) | 59 | 59 | 61 | 58 | 73 | 62 |
| COSC2436 (Java 3) | 83 | 57 | 93 | 73 | 69 | 75 |
| COSC2325 (Computer Organization) | | 53 | 72 | 76 | 71 | 68 |



**B. For any required program courses where there is a pattern of low enrollment (fewer than 15 students), explain your plan to grow enrollment and/or revise the curriculum.**

The Computer Science FOS typically does not run classes with enrollment below 15. See the chart below to see the average class size.

*Average Class Size by Term*
*Collin College Program Review 2017-18*
*FY2013 through FY2017*

***Computer Science Field of Study***

| | FY2013 | | | | | FY2014 | | | | | FY2015 | | | FY2016 | | | | FY2017 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fall 2012 | Spring 2013 | Maymester 2013 | Summer I 2013 | Summer II 2013 | Fall 2013 | Spring 2014 | Maymester 2014 | Summer I 2014 | Summer II 2014 | Fall 2014 | Spring 2015 | Summer 2015 | Fall 2015 | Winter 2016 | Spring 2016 | Summer 2016 | Fall 2016 | Winter 2016 | Spring 2017 | Summer 2017 |
| **Courses** | | | | | | | | | | | | | | | | | | | | | |
| COSC1337 | 22 | 24.3 | - | - | - | 25 | 25.3 | - | 14 | - | 25 | 33 | 28 | 22.5 | - | 26.5 | 27 | 21 | - | 26.3 | 49 |
| COSC1436 | 28.8 | 27.1 | - | 23.5 | - | 29 | 28.4 | - | 28.5 | - | 28.8 | 28 | 30 | 28.2 | - | 23.7 | 25 | 27.1 | - | 27.2 | 26 |
| COSC1437 | 27 | 29 | - | 20 | - | 28.5 | 27 | - | 29 | - | 21.7 | 23 | 30 | 22.3 | - | 24 | 30 | 20.6 | - | 20 | 29 |
| COSC2325 | 30 | - | - | - | - | 31 | 30 | - | - | - | 27 | 25 | - | 27 | - | 29 | - | 28 | - | 29 | - |
| COSC2336 | 19 | 16 | - | - | - | 27 | 23 | - | - | - | 29 | 26 | - | 29 | - | 27 | - | 24 | - | 19 | - |
| COSC2436 | 25 | 30 | - | - | - | 27 | 21 | - | - | - | 25 | 30 | - | 25 | - | 30 | - | 17.5 | - | 16 | - |
| MATH2413 | 25.3 | 25.3 | - | 23.8 | 24.5 | 23.5 | 24.4 | - | 23 | 21.7 | 21.3 | 22.6 | 21.8 | 20.4 | - | 25.4 | 23.8 | 23.2 | - | 23.9 | 23.1 |
| MATH2414 | 24 | 23.4 | - | 23.3 | 23.8 | 23.6 | 21.6 | - | 20.8 | 23 | 22.3 | 18.7 | 25 | 23.7 | - | 20.9 | 24.3 | 23.8 | - | 23.3 | 23.4 |

*Note: If present, values in blue text indicate terms in which the course was not included in this program's curriculum. The program course list is a composite from 2013-2017 academic catalogs.*
*Core courses, co-op courses and private study courses may be excluded from section enrollment averages.*

**C. Make the case with evidence that the required courses in the program are offered in sequencing or at intervals appropriate to enable students to complete "on time" if a student was enrolled full-time and followed the degree plan.**

All of the field of study courses are offered every fall and spring semester. We offer the beginning courses in the summer semesters as well. The math courses are offered each semester. Our Computer Science courses have a prerequisite of Math1314 (College Algebra).

Our faculty are dedicated to meeting the needs of our students by volunteering to teach a variety of teaching formats and offering classes at a variety of days/times. We are working to get our Computer Science courses entirely online. If a program course has multiple sections, we focus on providing that course at different times, campuses, and delivery methods. If a program course has one section, that course is usually scheduled either at night or online to make the course accessible to both traditional and non-traditional students.

*Duplicated Enrollment in Courses by Term*
*Collin College*
*FY2013 through FY2017*

*Computer Science Field of Study*

| | FY2013 | | | | | FY2014 | | | | | FY2015 | | | FY2016 | | | | FY2017 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Courses | Fall 2012 | Spring 2013 | Maymester 2013 | Summer I 2013 | Summer II 2013 | Fall 2013 | Spring 2014 | Maymester 2014 | Summer I 2014 | Summer II 2014 | Fall 2014 | Spring 2015 | Summer 2015 | Fall 2015 | Winter 2015 | Spring 2016 | Summer 2016 | Fall 2016 | Winter 2016 | Spring 2017 | Summer 2017 |
| COSC1337 | 66 | 73 | - | - | - | 75 | 76 | - | 14 | - | 75 | 99 | 28 | 90 | - | 106 | 27 | 84 | - | 105 | 49 |
| COSC1436 | 173 | 190 | - | 47 | - | 203 | 199 | - | 57 | - | 230 | 224 | 60 | 282 | - | 284 | 75 | 298 | - | 299 | 78 |
| COSC1437 | 27 | 58 | - | 20 | - | 57 | 81 | - | 29 | - | 65 | 69 | 30 | 67 | - | 96 | 30 | 103 | - | 100 | 29 |
| COSC2325 | 30 | - | - | - | - | 31 | 30 | - | - | - | 27 | 25 | - | 27 | - | 29 | - | 28 | - | 58 | - |
| COSC2336 | 19 | 16 | - | - | - | 27 | 23 | - | - | - | 29 | 26 | - | 29 | - | 27 | - | 24 | - | 38 | - |
| COSC2436 | 25 | 30 | - | - | - | 27 | 21 | - | - | - | 25 | 30 | - | 25 | - | 30 | - | 35 | - | 32 | - |
| MATH2413 | 303 | 303 | - | 119 | 49 | 376 | 317 | - | 138 | 65 | 340 | 294 | 262 | 326 | - | 406 | 285 | 418 | - | 430 | 277 |
| MATH2414 | 192 | 211 | - | 70 | 95 | 212 | 281 | - | 83 | 115 | 245 | 243 | 225 | 261 | - | 272 | 267 | 310 | - | 326 | 257 |
| PHYS2425 | 114 | 74 | - | 68 | - | 132 | 117 | - | 76 | - | 154 | 135 | 97 | 190 | - | 152 | 121 | 218 | - | 183 | 122 |
| PHYS2426 | 46 | 90 | - | - | 104 | 49 | 71 | - | 23 | 104 | 73 | 111 | 128 | 89 | - | 132 | 148 | 98 | - | 143 | 141 |

*Note: The program course list is a composite from 2013-2017 academic catalogs. If values appear in blue, that course was not included in this program's curriculum during that term. Core courses may be excluded from the list for this program.*

## 7. How effectively do we communicate, and how do we know?

**A. Provide website URLs (for both the program website and the catalog information posted by the Curriculum Office): If no program website is available, describe plans for creation of a program website.**

https://www.collin.edu/academics/programs/pdf/csfos.pdf

This is an area that could use improvement. Right now, the Computer Science discipline only has the program degree courses listed as a PDF on the website. We do not have a departmental website.

**B. Make a case with evidence that the program literature and electronic sites are current, provide an accurate representation of the program, and support the program's recruitment plan, retention plan and completion plan.**

*Requested points to address, but not limited to:*

- *Demonstrate how the program solicits student feedback regarding its website and literature and how it incorporates that feedback to make improvements.*
- *Designate who is responsible for monitoring and maintaining the program's website, and describe processes in place to ensure that information is current, accurate, relevant, and available.*

Seventy-four students from various computer science courses volunteered to supply information about their thoughts on what we currently have posted for the Computer Science discipline (see Appendix VII).

If you compare our website to what Dallas Community College and UTD has for their Computer Science and Engineering department (see Appendix II and III), ours look primitive and unappealing. Computer Science should join forces with Computer Systems, E-Business Media, and Engineering to create a departmental website. We included a few screen shots of what Dallas Community College and UTD has for their departmental Computer Science/Engineering department in Appendix II and III. They list contact information, internship possibilities, job outlooks, helpful resources, course descriptions, their degree listings are interactive (if you click on the course, it will take you to the current schedule so that you can see when the course is being offered and you can register for the course). Faculty bio as seen in the Dallas Community College has the potential for attracting students. In addition, the use of student success stories as seen in the DCCCD website might be a good recruitment tool.

We only have the catalog PDF at this moment. It is our feeling that it is really important for us to get a departmental website. Many students ask questions about contact information for our dean, discipline leads, faculty members, and tutors. They are lost particularly after searching for it on our current site. Having a departmental website could also help with retention. Students may get lost and not ask for help, but a departmental website would help guide them to the right place and provide them with valuable information. As a department we could create a website, but we would need to have a link to our website that is easy for students to locate. The other schools have their departmental webpages listed under the academics page so that it is easy to find and then their degree plans are listed on the departmental webpages. This seems like a good temporary solution, but ultimately having consistent professional departmental websites across our school with interactive elements and dedicated personnel to look after these websites keeping them up to date would be ideal.

Creating consistent professional interactive departmental websites across all departments would be a huge task, but could greatly benefit our students. In order to create a website similar to the websites at Dallas Community College or the University of North Texas at Dallas, we would need to hire personnel to work on creating departmental websites. When a student goes to a departmental website for a particular degree/certificate, the class list should be interactive (display a list of current classes with times, availability, professor contact information, syllabi, and textbook information). When the student clicks on the textbook information they should be able to add that book to their bookstore cart without having to go to a separate page. Same thing with the class schedule. Right now they are given a PDF listing of the classes and then they have to go to the catalog to look for a class description, the class schedule to find out what times the classes are available (this is tough to use with find class rubric numbers), and then go look up the professor's contact information and syllabi). This process could be vastly improved.

These webpages would need to be updated every semester to better serve our students. It is certainly hoped that the current initiative by PR to update the district web presence will be of help. At this time it would be wise to wait until the district-wide web site plan be implemented first.

**C. Describe the process used to keep all program literature (course descriptions, degree plans, catalog entries, etc.) and electronic sites updated and aligned with district-wide college literature and sites.**

There is a set process for degree updates, course description updates (ACGM descriptions), and changes in course outcomes. All curriculum changes go through the Curriculum Advisory Board. After approval of any changes, catalog and website updates are completed through the Curriculum office. Departmental processes to keep materials updated needs to be evaluated. The program is informing the Associate Dean and the Dean's office to look into developing processes to address this issue.

**D. In the Program Literature Review Table, below, document that the elements of information listed on the website and in brochures (current academic calendars, grading policies, course syllabi, program handouts, program tuition costs and additional fees, description of articulation agreements, availability of courses and awards, and local job demand in related fields) were verified for currency, accuracy, relevance, and are readily available to students and the public.**

### Program Literature Review Table

| Title | Type (i.e. URLs, brochures, handouts, etc.) | Date of Last Review/Update | | Responsible Party |
|---|---|---|---|---|
| Catalog Verification | | Occurs after any curriculum update for the next catalog | ☐ Current<br>X Accurate<br>☐ Relevant<br>☐ Available | Karen Murph, Discipline leads |
| Program Brochures and promotional materials | Brochures and Promotional materials | Unable to determine | Unavailable | Associate Dean's Office |
| Program Information | Curriculum and cost | Curriculum PDF<br>Program costs | Current<br>Unavailable | Associate Dean's Office |

## 8. How well are we leveraging partnership resources and building relationships, and how do we know?

**A. Make a case that the program enlists business, industry, government, college, university, and/or consultant partnerships to advance program outcomes.**

*Requested points to address, but not limited to:*

- *Partnership types include: Co-op or internship sites; visiting class presenters; tours of facilities; facility use; equipment donors; dedicated program scholarship donors; mentors, other.*

We have aligned our coursework to match the coursework of the surrounding universities (University of Texas at Dallas, University of Texas at Arlington, and Texas A & M). We used ACGM courses so that our courses will transfer to most colleges/universities in Texas. We keep in close contact with the University of Texas at Dallas; we met with their Associate Dean for Undergraduate Education in the Spring 2017 and Fall 2017 to discuss changes to their curriculum and our course content. We also met with the University of North Texas in the Fall 2017.

**B. Complete the Partnership Resources Table below.**

## Partnership Resources

| Partner/Organization | Description (See Points to Consider) | Brief Description of the Partnership's Value to the Program |
|---|---|---|
| We have transfer agreements with the following colleges/universities:<br>• University of Texas at Dallas<br>• University of Texas at Arlington<br>• Texas A & M | | Having transfer agreements with nearby colleges and universities provides a clear path for students and makes their chances of obtaining a bachelor degree in Computer Science much more obtainable. |
| University of Texas at Dallas | Hi-TECCC scholarships available to students transferring to UTD in Math, Science, Engineering or Computer Science | Endowed by Texas Instruments, this initiative provides scholarships to Collin College for college students pursuing science, mathematics, engineering or technology careers.<br><br>As part of this initiative, the High-Technology Transfer Scholarship to UTD is awarded to five students from Collin who will continue their studies at UTD and major in a STEM (Sciences, Technology, Engineering, Mathematics) area.<br><br>The High-Technology Transfer Scholarship to |

| | | |
|---|---|---|
| | | UTD is for $1,250 per semester, renewable for a maximum of four semesters.<br>http://www.collin.edu/foundation/hiteccc/ |

## 9. ARE WE HIRING QUALIFIED FACULTY AND ADJUNCTS, AND SUPPORTING THEM WELL WITH PROFESSIONAL DEVELOPMENT, AND HOW DO WE KNOW?

**Make a case with evidence that faculty are qualified, keep current, and fulfill instructional, scholarship, service and leadership roles that advance the program and the college.** List program employees (full-time and part-time), their roles, credentials, and known professional development activity in the last four years.

*Requested points to address, but not limited to:*

- *Document that all faculty meet SACSCOC standards in the table (or add an appendix)*
- *Professional development related to discipline and/or teaching*
- *Related scholarly efforts by program faculty*
- *Outreach and engagement efforts*
- *Analyze the evidence you provide. What does it show about the program?*

All faculty are vetted through the SACSCOC standards using the district-wide procedure verified initially by the Associate Dean, then the Dean followed by the VP/Provost.

### Employee Resources Table

| Employee Name | Role in Program | Credentials | Professional Development since Last Program Review** |
|---|---|---|---|
| Charles Braun | Teaches COSC1436, COSC1437, COSC2436, COSC1337 | BS in Mechanical Engineering, MS in Engineering, 30 graduate hours in Systems Engineering, 18 graduate hours in Computer Science, 18 graduate hours in Accounting/Finance, 18 graduate hours in Software Engineering | Please see appendix IV |
| Glen Grimes | Teaches COSC1337, COSC1436, COSC1437, COSC2436 | BS in Math, MS in Computer Science, MBA | Please see appendix IV |
| Tebring Daly | Teaches COSC1436 & COSC1315 | BS in Education, Master's Degree in Information Science, Ph.D. in Educational Computing | Please see appendix IV |
| Bill Slater | Teaches COSC1436, COSC1437, COSC2325, COSC2336, COSC1337 | BS in Physics, MS in Computer Science | Please see appendix IV |
| Scott Dollinger (Associate) | Teaches COSC1436 & COSC2325 | BS in Computer Science, MS in Computer Science | Please see appendix IV |
| Jason Moore (Associate) | Teaches COSC1436 | BS in Computer Science, MS in Computer Science, PhD in Computer Engineering | Please see appendix IV |

## 10. DO WE SUPPORT THE PROGRAM WELL WITH FACILITIES, EQUIPMENT, AND THEIR MAINTENANCE AND REPLACEMENT, AND HOW DO WE KNOW?

**Make a case with evidence that current deficiencies or potential deficiencies related to program facilities, equipment, maintenance, replacement, plans, or budgets pose important barriers to program or student success.** As part of your response, complete the resource tables below to *support* your narrative.

*Requested points to address, but not limited to:*

- *The useful life of structure, technologies and equipment,*
- *Special structural requirements, and*
- *Anticipated technology changes impacting equipment sooner than usual.*
  - *If you plan to include new or renovated facilities or replacement of equipment in your continuous improvement plan in Sections 11 & 12, be sure to provide qualitative and/or quantitative data evidence of the need in this section.*
  - *Analyze the evidence you provide. What does it show about the program?*

### Classroom Utilization Table

| Classroom/Lab Location | Description (i.e. Special Characteristics) | Meets Needs (Y or N): Current | For Next 5 Years | Analysis of Classroom Utilization |
|---|---|---|---|---|
| SCC – J129 | Windows Computer Lab | Y | Y | 30 computers & podium computer |
| SCC – J133 | Classroom | Y | Y | 30 seats & podium computer |
| SCC – I213 | Classroom | Y | Y | 30 seats & podium computer |
| PRC – H123 | Windows Computer Lab | Y | Y | 30 computer & podium computer |

### Equipment/Technology Table

| Current Equipment Item or Budget Amount | Description (i.e. Special Characteristics) | Meets Needs (Y or N): Current | For Next 5 Years | Analysis of Equipment Utilization |
|---|---|---|---|---|
| Lab Utilization | All lab computers are updated and maintained by the college. All computer labs are scheduled to be updated on a 3-4 year cycle. The computers meet our needs, but we are out of lab space at the Spring Creek campus and that is | N | N | We are not able to offer all of our COSC classes in a computer lab for instructors that wish to do so at the Spring Creek Campus since we are out of lab space. We are working with other departments to try and use their labs when they are not in use. We will be putting more |

| | | | | |
|---|---|---|---|---|
| | where a majority of the computer science students want to be. | | | classes in the lab in the spring 2018. With the addition of the Wylie Campus, we will be able to offer more classes in the computer lab. Hopefully this will meet our demand. |

### Office Space

| Office Location | Description | Meets Needs (Y or N): Current | For Next 5 Years | Analysis of Office Utilization |
|---|---|---|---|---|
| Faculty Offices | SCC and PRC | Y | Y | |

### Financial Resources

| Source of Funds (i.e. college budget, grant, etc.) | Meets Needs (Y or N): Current | For Next 5 Years | For any no in columns 2 or 3, explain why | For any no in columns 2 or 3, identify expected source of additional funds |
|---|---|---|---|---|
| College budget | Y | Y | | |

# *Section III. Continuous Improvement Plan*

## 11. GIVEN OUR PRESENT STATUS, HOW DO WE INTEND TO CHANGE IN WAYS THAT HELP US ADVANCE?

**Based on the information, analysis, and discussion that have been presented up to this point, summarize the strengths and weaknesses of this program. There should be no surprise issues here! This response should be based on information from prior sections of this document. Describe specific actions the faculty intends to take to capitalize on the strengths, mitigate the weaknesses, and improve student success.**

Strengths:

- Faculty do stay current in their discipline and are active in college service (see Appendix IV).
- Steady enrollment growth in the program (see Section 3B4).

- In the Fall 2016 and Spring 2017, the computer science courses were in the 80 and 90 percentile (see Section 6A).

Weaknesses:

- The average success rates in most of our courses is 60% (see Section 6A).
- Lack of a well-designed and comprehensive program web site that includes E-Business, Computer Systems, and Engineering to provide accurate information to prospective and current students (see Appendix II and III).
- Completion rates are low albeit increasing recently (see Section 3B4).
- Lack of a sustained method and/or practice to track student progress in order for timely intervention (see Section 6A).

As a result of the findings, the following goals are developed to address the gaps:

**Goal 1—Improve academic success rates in Computer Science courses**

The following is being considered to achieve Goal 1:

- Isolate courses where most students stop out. Faculty working together in order to see if any intervention is necessary pedagogically or otherwise to slow down and eventually stop student exodus.
- Teach as many of the COSC courses as possible in a computer lab encouraging live hands-on training as concepts are being taught. For this, instructors will be strongly encouraged to teach in a lab and involve students in multiple project-based and active learning exercises.

**Goal 2 - Create a departmental website for Computer Science**

The following are being considered for reaching Goal 2:

- Create a departmental website for Computer Science. Partner with E-Business Media, Computer Information Systems, and Engineering when developing the web site to meet the needs of our students. Students taking Computer Science courses could major in any of these fields. It makes sense to partner with these areas since our courses overlap.
- Model our departmental website off of the surrounding areas schools. This will allow for familiarity for students and easier navigability.
- Complete a comprehensive survey to get feedback on what information to include on the website.

**Goal 3 – Increase successful completion rates in Computer Science degree**

Our program is a transfer program which includes courses that are used in a variety university programs. Some students may take the first level computer science course in order to fulfill a requirement for their degree (i.e. – Engineering, Mathematics, Computer Systems, E-Business), they may intend to complete the Computer Science degree at their transferring college/university, or they may take a course to refresh or gain a skill for their job. We have been increasing enrollment in our courses, but the number of students completing the degree/certificate still remains relatively low.

- In order to address this gap, revise the courses include more effective strategy for teaching, assignment, and assessment practices following best practices. Track students by better sequencing of courses and only keeping appropriate pre-requisites.
- Not all the students registering for COSC1436 (first programming course) are Computer Science majors. Adding a programming course for engineering students (COSC1420), such as C-Programming would help to better keep track of which students are planning to major in Engineering separating them from students pursuing other tracks in Computer Science.
- Encourage major declaration after successful completion of entry-level courses as well as require students to complete a degree plan as they plan their degree progression.

## 12. How Will we evaluate our success?

Program review at Collin College takes place within five-year cycles. During the last (fifth) year of each cycle, the program completes this instrument and submits its completed review to the Program Review Steering Committee. There are two two-year CIP cycles within each five-year program review cycle. As part of the fifth year program review, the program should use the observations and data generated by this process along with data generated by COAT's process and any data from other relevant assessment activities to develop the program's CIP and an action plan for the first two-year CIP cycle. At the conclusion of the first two-year CIP cycle, data collected from the first cycle, plus any other relevant data that was collected in the interim, should be used to build on the accomplishments of the first two-year CIP cycle by developing another two-year action plan for the second CIP cycle to help the program accomplish the expected outcomes established in its CIP.

**Complete the Continuous Improvement Plan (CIP) tables that follow.**

Within the context of the information gleaned in this review process and any other relevant data, identify program priorities for the next two years, including at least one student learning outcome, and focus on these priorities to formulate your CIP. You may also add short-term administrative, technological, assessment, resource or professional development outcomes as needed.

## CIP Outcomes, Measures & Targets Table

| **A. Expected Outcome(s)**<br>Results expected in this program/department | **B.**<br>**Measure(s)** | **C. Target(s)**<br>Level of success expected |
|---|---|---|
| Improve academic success rates in COSC Programming I,II, and III (COSC1436, COSC1437, COSC1337, COSC2336, COSC2436) | 1. Semester success rate for COSC Programming I,II, and III (COSC1436, COSC1437, COSC1337, COSC2336, COSC2436) according the Institutional Research's annually provided Program Review data. | Increase success rates to average at least 70 percent. |
| Create a departmental website for Computer Science | Student survey feedback | Get a departmental website with contact information, tutoring hours, and course descriptions |
| Increase the number of students completing Computer Science degree by reevaluating the Computer Science curriculum and encouraging students to fill out degree plans. | Higher number of students completing the Computer Science degree plan according the Institutional Research's annually provided Program Review data. | Higher number of students completing the Computer Science degree. |
| Track Computer Science students by adding a programming course for Engineering students (COSC1420) to differentiate Computer Science and Engineering majors. | Use the Institutional Research's annually provided Program Review data by course to keep track of students in Engineering vs Computer Science. The Engineering students should start with COSC1420 and the Computer Science students should start with COSC1436. | Better ability to track Computer Science through the program |
| | | |

The current discipline lead became Discipline Lead for the Computer Science department in the Fall 2016. This discipline has not been reviewed yet. Data was not collected or reported previously. Since the discipline lead do not have five years to complete this report, only available data were analyzed using which devised a plan. The CIP is based on current data and not 5 years of data collection process.

Therefore, the ensuing years' data collection would either validate CIP or potentially point to altering CIP. However, the discipline lead believes the process has been good and will only help to enhance our program.

Implementation of the action plan laid out in the CIP Cycle 1 Table will begin during the next academic year.

## CIP Cycle 1 Table

| **Outcomes (From Outcomes, Measures & Targets Table)**<br><br>Results expected in this program/department | **Action Plan (Review Cycle Year 5)**<br>Based on analysis, identify action(s) to be taken to accomplish outcome. | **Implement Action Plan (Review Cycle Year 1)**<br><br>Implement action plan and collect data. | **Results Summary (Review Cycle Year 2)**<br><br>Summarize collected data. | **Findings (Review Cycle Year 2)**<br><br>What does data say about outcome(s)? |
|---|---|---|---|---|
| Increase success rates in COSC computer science programming courses to average at least 70 percent. | • Isolate courses where most students stop out. Faculty working together in order to see if any intervention is necessary pedagogically or otherwise to slow down and eventually stop student exodus.<br>• Teach as many of the COSC courses as possible in a computer lab encouraging live hands-on training as concepts are being taught. For this, instructors will be strongly encouraged to teach in a lab and involve students in multiple project-based and active learning exercises. | | | |
| Get a departmental website with contact information, tutoring hours, and course descriptions | • Create a departmental website for Computer Science. Partner with E-Business Media, Computer Information Systems, and Engineering when developing the web | | | |

| Outcomes (From Outcomes, Measures & Targets Table)<br><br>Results expected in this program/department | Action Plan (Review Cycle Year 5)<br>Based on analysis, identify action(s) to be taken to accomplish outcome. | Implement Action Plan (Review Cycle Year 1)<br><br>Implement action plan and collect data. | Results Summary (Review Cycle Year 2)<br><br>Summarize collected data. | Findings (Review Cycle Year 2)<br><br>What does data say about outcome(s)? |
|---|---|---|---|---|
| | site to meet the needs of our students.<br>• Model our departmental website off of the surrounding areas schools. This will allow for familiarity for students and easier navigability.<br>• Complete a comprehensive survey to get feedback on what information to include on the website. | | | |
| Higher number of students completing the Computer Science degree. | • Revise the curriculum to make it easier to follow and to better track students by better sequencing of courses and only keeping appropriate pre-requisites.<br>• Make mandatory major declaration after successful completion of entry-level courses as well as require students to complete a degree plan as they plan their degree progression. | | | |

COLLIN COLLEGE

# ACADEMIC PROGRAM REVIEW

REV. 10-05-2017

| **Outcomes**<br>**(From Outcomes, Measures & Targets Table)**<br><br>Results expected in this program/department | **Action Plan**<br>**(Review Cycle Year 5)**<br>Based on analysis, identify action(s) to be taken to accomplish outcome. | **Implement Action Plan**<br>**(Review Cycle Year 1)**<br><br>Implement action plan and collect data. | **Results Summary**<br>**(Review Cycle Year 2)**<br><br>Summarize collected data. | **Findings**<br>**(Review Cycle Year 2)**<br><br>What does data say about outcome(s)? |
|---|---|---|---|---|
| Better ability to track Computer Science through the program | Add a programming course for Engineering students (COSC1420) | | | |
| | | | | |

Development of a CIP Cycle 2 action plan in the following table will occur at the end of the CIP 1 Cycle and implantation will begin during the third year of the program review cycle.

## CIP Cycle 2 Table

| **Outcomes**<br>**(May come from CIP Cycle 1 Table or from the Outcomes, Measures & Targets Table if it includes any expected outcomes that were not address during CIP Cycle 1)**<br>Results expected in this program/department | **Adapt Action Plan**<br>**(Review Cycle Year 2)**<br>Based on analysis, identify new action(s) or adapt prior actions to accomplish outcome. | **Implement Action Plan**<br>**(Review Cycle Year 3)**<br>Implement new or adapted action plan and collect data | **Results Summary**<br>**(Review cycle Year 4)**<br>Summarize collected data. | **Findings**<br>**(Review Cycle Year 4)**<br>What does data say about outcome? |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## 13. How do our Improvement Plans impact the program budget?

**A. What additional funding beyond the program's base budget is needed to implement your Continuous Improvement Plan?**

Briefly describe steps your department will take to secure these funds.

Ultimately, we would need more computer lab space in order to meet the demand of the number of sections that we are offering at the Spring Creek Campus to offer all of our instructors the ability to teach in a computer lab to work on hands-on computer programming labs with students during class time. The department will work with the Associate Dean's office to impact potential computer lab space through the yearly budget cycle. The opening of the Wylie campus and Technical campus will hopefully help give us more computer labs at those sites and potentially open up space in existing campuses. We will need to start offering more classes at the Preston Ridge Campus and at non-peak times at the Spring Creek Campus to better utilize the computer labs that we have access to.

Creating a departmental website for our area would be a large task. The district-wide initiative for rolling out web sites by PR needs to be implemented first. Meanwhile, working with available help within the division process must begin to put the elements of department web site together. Computer Science should collaborate with Engineering, E-Business Media, and Computer Systems to come up with a website since our areas overlap. This would probably take a full-time web developer to accomplish this task. It would be nice to have consistent departmental websites across the college. However, a departmental initiative to get this done internally cannot be ruled out. Any budget implications of this will be routed through the annual budgeting process.

**B. With these additional funds, please explain how funds will be used to improve student learning or other program outcomes.**

**See possible examples below:**

- *Increase and retain enrollment*
- *Increase completers*
- *Develop resources*
- *Update facilities*
- *Expand curricular opportunities*
- *Partner to increase post-graduation employment opportunities*
- *Increase transfers to related baccalaureate institutions*
- *Increase effectiveness and/or efficiency*
- *Improve student performance levels*

- *Expand or transform services*
- *Anything else? Briefly describe*

The increase in computer lab space would hopefully help with the increase in success rates, and possible increase in enrollment, completers. The departmental website might help with student satisfaction and retention rates. It may also help with success, enrollment, and completion rates. Implementing a continuous curriculum review to keep it updated and relevant will be initiated. Use of the newly acquired program career coaches in retrieving and arranging data will be of further help in reaching the goals. Overall district-wide initiative to reach the strategic goals will also enhance program-level outcomes.

## What happens next? The Program Review Report Pathway

**A. Following approval by the Steering Committee,**

- Program Review Reports will be evaluated by the Leadership Team;
- Reports will be posted on the intranet prior to fall semester;
- At any point prior to Intranet posting, reports may be sent back for additional development by the department.

**B. Program responses to the Program Review Steering Committee recommendations received by August 1st will be posted with the Program Review Report.**

**C. Leadership Team members will work with program supervisors to incorporate Program Review findings into planning and activity changes during the next five years.**

**Appendix I – Computer Science Field of Study PDF**

# Computer Science Field of Study

The Associate of Science degree with Computer Science coursework prepares students for work in a variety of related areas. In particular, students are prepared for transfer to a college or university where they can specialize in such disciplines as computer science and computer software engineering. The coursework for a Bachelor of Science degree in computer science is similar at most colleges and universities. However, the student is advised to consult an academic advisor when deciding upon which university to attend and which course of study to pursue.

**Computer Science Field of Study** (FOS) curriculum is a set of courses that will satisfy the lower division requirements for a bachelor's degree in a specific academic area at a baccalaureate institution. If a student successfully completes the Field of Study curriculum, that block of courses may be transferred to a baccalaureate institution. The FOS must be substituted for that institution's lower division requirements within the degree program for the Field of Study into which the student transfers. The student shall receive full academic credit toward the degree program for the FOS block of courses transferred.

Within the Computer Science FOS there are courses listed which will satisfy requirements for both the AS General Education Core and the FOS. There are two tracks offered in the FOS (C++ Track and Java Track). Both tracks cover the same fundamental theory and material but use different languages.

Upon completion of the Computer Science Field of Study curriculum, a certificate will be awarded to acknowledge completion and recognize preparedness to transition from an associate level to a baccalaureate (BA/BS) level, at any Texas public institution.

# Certificate – Computer Science Field of Study

30 credit hours

**Required General Education Core Courses**
**12 credit hours**

MATH 2413 Calculus I[1]
PHYS 2425 University Physics I[1]
PHYS 2426 University Physics II[1]

**Other Required Courses**
**18 credit hours**

COSC 1436 Programming Fundamentals I (C++) [2]
COSC 2325 Computer Organization [3]
MATH 2414 Calculus II [1]

*Select from one of the following tracks.*

**C++ Track Content Courses**

COSC 1437 Programming Fundamentals II (C++) [2]
COSC 2336 Programming Fundamentals III (C++) [2]

**Java Track Content Courses**

| | | |
|---|---|---|
| COSC | 1337 | Programming Fundamentals II (Java) [2] |
| COSC | 2436 | Programming Fundamentals III (Java) [2] |

An Associate of Science may also be earned with the Computer Science Field of Study. To earn the AS degree, in addition to the Field of Study Certificate, complete the remaining General Education Core requirements:

1. *It is recommended that students complete the math sequence, physics sequence, and computer science sequence at the same institution to reduce the likelihood of potential gaps in the curriculum.*
2. *COSC 1436 and COSC 1337/1437 are preparatory and sequential in nature; however, not all courses are required for the Computer Science major at all universities but may apply to general degree requirements.*
   a) *COSC 1436 is not part of the Computer Science major requirements at The University of Texas at Austin, the University of Texas at Arlington, The University of Texas at Dallas, and Texas A&M University.*
   b) *COSC 1337 and COSC 1437 are not part of the Computer Science major requirements at The University of Texas at Austin. Preparatory courses such as COSC 1436 and COSC 1337/1437 will assist students who need additional background but do not apply toward the computer science major requirements.*
3. *COSC 2325/2425 is not part of the Computer Science major requirements at The University of Texas at Austin, The University of Texas at Dallas, or Texas A&M University but may be applied to general degree requirements.*

## Appendix II– Dallas Community College Screenshots of their Computer Information Technology Website



# CIT Degrees and Certificates

Computer Information Technology courses are offered at all seven of the colleges of DCCCD: Brookhaven, Cedar Valley, Eastfield, El Centro, Mountain View, North Lake and Richland.

However, please note that all CIT degrees and certificates are not available at all colleges. Check with an academic advisor at the college you plan to attend to ensure that it offers the courses and academic plan you wish to follow.

There are four separate career paths:

- Networking/Security
- PC Support
- Programming
- Web/Internet Services

About the CIT Program
CIT Careers
CIT Degrees and Certificates

## Networking Security

(View career information.)

- Network Administrator and Support Associate in Applied Sciences degree. This degree can be completed in two years if you are a full-time student.
- Cisco Networking Assistant Skills Achievement Award. This award can be completed in one semester.
- Cisco Networking Intern Skills Achievement Award. This award can be completed in one semester.
- Convergence Technology Intern Certificate (Gainful Employment Information) can be completed in two semesters.
- Convergence Technology Technician Certificate (Gainful Employment Information) can be completed in three semesters.

CIT Degrees and Certificates
CIT Faculty
CIT Program Contact Information
CIT Student Success Stories
Computer Information Technology (CIT)

# CIT Faculty

## Brookhaven College

Patti Burks

Brookhaven College

Charles Cadenhead

Brookhaven College

Bill Hammerschlag, Ph.D.

Brookhaven College

Mary Milligan

Brookhaven College

# Patti Burks

**Brookhaven College**
**office: Bldg. K, Room K104**
**phone: 972-860-4329**
**email: pBurks@dcccd.edu**

Patti Burks joined the Business Studies Division at Brookhaven College in 2001. She teaches Computer Information Technology (CIT) courses in e-commerce and Web development, as well as Web Design I and II in Brookhaven's Visual Communications Department.

Ms. Burks has a Bachelor of Business Administration degree from the University of North Texas in business computer systems and a Master of Science in management information systems from the University of Texas at Dallas.

She previously taught Web development at the Art Institute of Dallas. She has extensive experience as a programmer, systems analyst, supervisor and information systems consultant at ARCO Oil and Gas Company, and has also worked as an independent Web development consultant. Her primary fields are Web design, Web development and programming.

# CIT Careers

The number of computer-related job openings continues to grow rapidly. Depending on the skills sets that you acquire from our various programs, you might work as:

**Networking/Security Path**

Jobs include:

- Network administrator
- Network support technician
- Convergence technology specialist or technician
- Home technology integrator
- Network security specialist
- Database administrator
- Cloud-support technician

CareerOneStop, sponsored by the U.S. Department of Labor, projects for Texas:

| Job | Median Hourly Rate | Median Annual Salary | Projected Growth in Texas Through 2024 |
|---|---|---|---|
| Computer network support specialist | $32.71 | $68,030 | +20% |
| Computer systems analyst | $42.10 | $87,580 | +32% |
| Database administrator | $39.94 | $83,070 | +24% |
| Information security analyst | $44.19 | $91,920 | +31% |
| Multimedia artists and animators | $32.40 | $67,390 | +17% |
| Network and computer systems administrator | $39.71 | $82,590 | +21% |
| Web developer | $32.65 | $67,910 | +37% |

# CIT Student Success Stories

No matter where these current or former students are in the process of reaching their goals, we salute them. They have dared to turn dreams into reality through education.

Could you be next?

## Cedar Valley College

**Nisreen Almasri**

Freelance Web Page Designer and Lab Assistant, Cedar Valley Student Resource Center

## Eastfield College

**Tommy Alsbrooks**

Assistant Vice President, Desktop Services Division, The Federal Reserve Bank of Dallas

**Neethu Karukacheril Kuriakose**

Data Entry Clerk, Immunization Division, Dallas County Health and Human Services; Adjunct Faculty, Computer Science, Eastfield College

**Appendix III– University of Texas at Dallas Screenshots of their Computer Science/Engineering Department Website**

UT DALLAS

Erik Jonsson School of Engineering and Computer Science

## Bachelor of Science in Computer Science

Catalog Page | Download PDF

A computer science degree not only prepares students to design and build software but also provides them with the skills to address broad issues such as developing innovative ways to send data over networks. Training in computer science also enables students to work as part of a team in a vast number of areas, including robotics, computer vision and digital forensics.

### Careers in Computer Science

You'll find computer science careers in virtually every industry, from finance to Web design to software development. Computer scientists work on: data security, data mining, computer graphics, artificial intelligence, modeling, game design, animation and biotechnology.

What all these computer science careers have in common is the foundation in mathematics. Our curriculum provides this foundation at the start, then we build upon it with an ample selection of courses in the core areas of the discipline.

### High School Preparation

Computer science requires strong high school preparation. A minimum of elementary algebra and geometry should be completed, while trigonometry, calculus, physics and chemistry are highly recommended. Any Advanced Placement courses in computer science or advanced technology are highly beneficial. Solid communication skills are very important since most computer science professionals work as part of a team.

### Computer Science at UT Dallas

One of the largest departments of its kind in the country, the Computer Science


### Internships and Fast-Track

The Jonsson School operates one of the largest internship and cooperative education programs of its kind, averaging more than 1,200 undergraduate and graduate student placements a year at Dallas-area high-tech companies, including Texas Instruments, Intel, Raytheon, Alcatel-Lucent and IBM.

The Fast-Track Program enables exceptionally gifted undergraduate students

research building.

With nearly 160 tenured/tenure-track faculty members, 5,800 students, and almost $51 million in research funding, the Jonsson School has six academic departments:

- Bioengineering
- Computer Science
- Electrical and Computer Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Systems Engineering

The school also offers a minor in nanoscience and technology

## Degrees Offered

***Bachelor of Science:*** Biomedical engineering, computer engineering, computer science, electrical engineering, mechanical engineering, software engineering

***Master of Science:*** Biomedical engineering, computer engineering, computer science, electrical engineering, materials science and engineering, mechanical engineering, software engineering, systems engineering and management*, telecommunications engineering

***Doctor of Philosophy:*** Biomedical engineering, computer engineering, computer science, electrical engineering, materials science and engineering, mechanical engineering, software engineering, telecommunications engineering

*Joint program between Jindal School of Management and Erik Jonsson School of Engineering and Computer Science

## Research

Research efforts under way at the school involve such cutting-edge technology as:

- Carbon nanotubes
- Micro-electromechanical systems
- Semiconductor design and manufacturing
- Wireless networking
- Cochlear implant technology

graduate programs and ranking third in Texas.

- The Jonsson School has significantly increased the size of its faculty in recent years, hiring top recent graduates of Stanford University, Cornell University, Purdue University, Georgia Tech and UCLA as well as seasoned professionals from Rutgers University, USC, UC Davis, and from companies such as Freescale Semiconductor and Texas Instruments.
- The Jonsson School features a variety of student organizations that are actively involved in both academic and social activities. Completely student-run, these include the Association for Computing Machinery, the Game Development Group, the National Society of Black Engineers, a chapter of the scientific research society Sigma Xi, the Society of Hispanic Professional Engineers and the Society of Women Engineers.
- Jonsson School students took first place in their division of the 2007, 2009, 2011 and 2015 BattleBots National Championship, and they won first place in the 2015 American Society of Mechanical Engineers Manufacturing Science and Engineering Conference.

## Contact Information

*Software Engineering Program*
Erik Jonsson School of Engineering and Computer Science, EC-31
The University of Texas at Dallas
800 West Campbell Road
Richardson, TX 75080-3021

*Software Engineering Undergraduate Program*
Dr. Ovidiu Daescu
Phone: 972-883-4196
Website: ecs.utdallas.edu
Email: daescu@utdallas.edu

*Office of Admission and Enrollment*
800 West Campbell Road
Richardson, TX 75080-3021
Phone: 972-883-2270 or 1-800-889-2443
Email: interest@utdallas.edu
Website: utdallas.edu/enroll

# Bachelor of Science in Computer Science

***Degree Requirements*** *(124 semester credit hours)*[1]

***View an Example of Degree Requirements by Semester***

## Faculty

**Professors:** Farokh B. Bastani, R. Chandrasekaran, Ovidiu Daescu, Yvo G. Desmedt, Ding-Zhu Du, András Faragó, Gopal Gupta, Zygmunt Haas, Sanda M. Harabagiu, Dung T. Huynh, Jason Jue, Latifur Khan, Andrian Marcus, Dan I. Moldovan, Yu-Chung (Vincent) Ng, Simeon C. Ntafos, Ivor P. Page, Balakrishnan Prabhakaran, Ravi Prakash, Balaji Raghavachari, Ivan Hal Sudborough, Bhavani Thuraisingham, Subbarayan Venkatesan, W. Eric Wong, Weili Wu, I-Ling Yen, Si Qing Zheng

**Professors Emeritus:** William J. Pervin, Klaus Truemper

**Associate Professors:** Sergey Bereg, Lawrence Chung, Jorge A. Cobb, Vibhav Gogate, Xiaohu Guo, Kevin Hamlen, Zhiqiang Lin, Yang Liu, Neeraj Mittal, Kamil Sarac, Haim Schweitzer, Rym Zalila-Wenkstern

**Assistant Professors:** Alvaro Cárdenas, Cong Liu, Ryan McMahan, Benjamin Raichel, Nicholas Ruozzi, Lingming Zhang

**Research Professor:** Ranavir Bose

**Senior Lecturers:** Ebru Cankaya, Anjum Chida, Michael Christiansen, John Cole, Chris I. Davis, Karen Doore, Timothy (Tim) Farage, Ranran Feng, Richard Goodrum, Neeraj Gupta, Shyam Karrah, Pushpa Kumar, Khiem Le, Richard K. Min, Linda Morales, Anarag Nagar, Nhut Nguyen, Mehra Nouroz Borazjany, Greg Ozbirn, Mark Paulk, Miguel Razo-Razo, William (Bill) Semper, Charles Shields Jr., Jason W. Smith, Janell Straach, Laurie Thompson, Jeyakesavan (Jey) Veerasamy, Don G. Vogel, Nurcan Yuruk

## II. Major Requirements: 71 semester credit hours

**Major Preparatory Courses: 20 semester credit hours beyond Core Curriculum**

**ECS 1100** Introduction to Engineering and Computer Science[7]

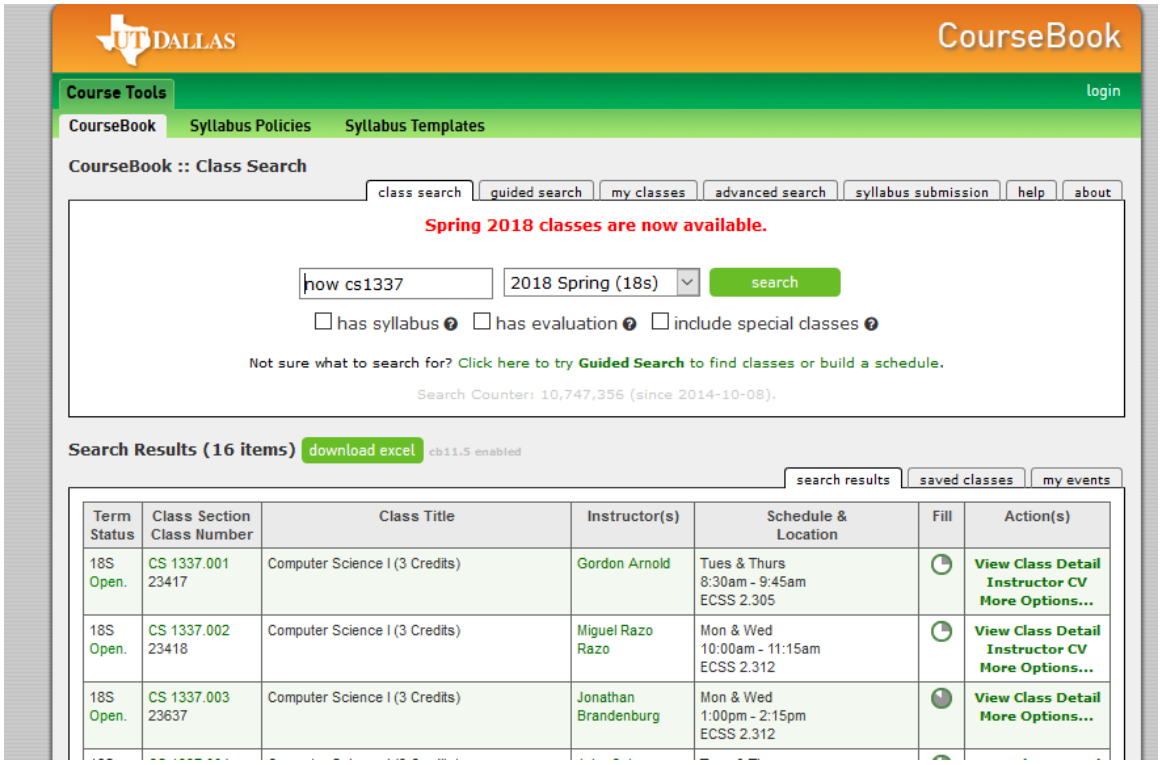
**CS 1200** Introduction to Computer Science and Software Engineering

**CS 1337** Computer Science I

**CS 2305** Discrete Mathematics for Computing I

**CS 2336** Computer Science II

**MATH 2413** Differential Calculus[4]



## Appendix IV– Professional Development Activities

| Employee Name | Professional Development since Last Program Review** |
|---|---|
| Charles Braun | • Taking short (4-6 wks) online courses to update and extend knowledge and skills in the areas of Data Science and Business Analytics. Recently completed a 6-wk course on "Time Series Forecasting for Business Analytics".<br>• Participate in the Teradata University Network of educators and practitioners of Data Analytics for sharing and collaborating information.<br>• Member Association for Computing Machinery(ACM), and frequently use their Computer Science Education resources for programming classes.<br>• Subscribe to and read (1)"Communications of the ACM" journals for new programming class topics, (2)the twice-weeky ACM online newsletter for computing technology updates, and (3) the twice-monthly Career newsletter.<br>• Implemented a Lecture-Lab approach for my face-to-face Programming Fundamentals I - C++ (COSC 1436) classes.<br>• Completed development of the subject matter material(Reading assignments, Lecture notes, Exercises, quizzes, & Programming assignments) for theProgrammimg Fundamentals II - C++ (COSC 1437) Online class.<br>• Completed development of the AAS for CIS Database Development.<br>• Completed development of a 30-hr Certificate for Database Development.<br>• Prepared a preliminary proposal for a Course of Studies for a Data Analytics Advanced Technical Certificate Program(45-hrs).<br>• Identified the audience (market) for Analytics programs as currently practicing Data Analysts, Business Analysts, Computer Systems Analysts, Report Developers, IT and Accounting/Financial Professionals as well as career changers who desire to enhance their skills in Data Analytics.<br>• Explored the feasibility of implementing a 4-yr BS degree program in Data Analytics or a 75-hrs(5-semester) AAS degree program, (similar to the Texas State Technical College programs).<br>• Currently developing ITSE 2370, a Descriptive Analytics course.<br>• Currently developing a COSC 2336 Programming Fundamentals III C++ (Data Structures) online course.<br>• Currently exploring the viability of the various degree options for a Data Analytics course of studies. (e.g., 4-yr vs 2-yr,2-yr vs 45-hr Advanced Technical Certificate).<br>• Currently researching platforms that deliver MOOCs for best practices and pedagogies.<br>• Currently researching/investigating use of Graph Databases to organize and process high volume, unstructured, streaming data; with complex and dynamic relationships in highly connected data for analysis.<br>• Prepared a brochure describing the Database Programming and Data Analytics programs of study at Collin College.<br>• Participated in the Workforce Program initiatives such as Job Fairs and PRC "Super Saturday" college recruitment event. |

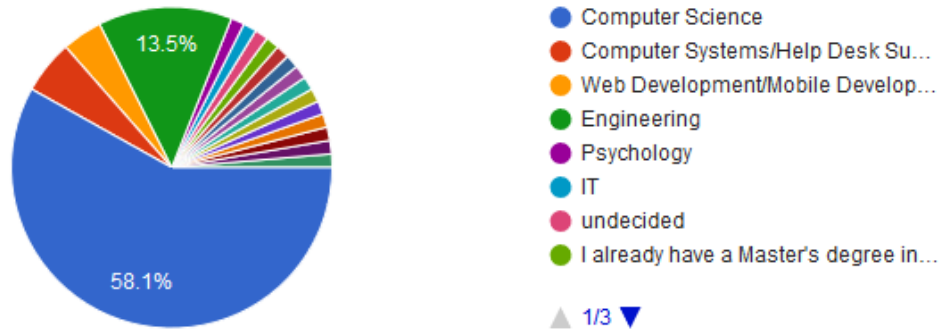
| | |
|---|---|
| Tebring Daly | • Co-authored a textbook for COSC1315; it is now on the 3rd edition (Learning Java through Alice 3)<br>• Been involved in several grants: NSF grant entitled “Transition: Alice 2 to Alice 3 in Community Colleges” and the Perkins Competency-Based Education grant<br>• Served as Department Chair of Computer Systems and E-Business Media, Discipline Lead of Computer Systems, and Discipline Lead of Computer Science.<br>• Created and maintain our department Facebook page<br>• Promoted our programs at Super Saturday events and Technology Education Fairs<br>• Volunteered at several New Student Orientations and “Need Help Ask Me” sessions and mentored students<br>• Worked with several co-op students<br>• Created project-based courses for students to complete our degrees<br><br>Has been a member of the following committees:<br>• Chair and Co-chair of the Technology Committee for Faculty Council<br>• Program Review Steering Committee<br>• Online Advisory Board Committee<br>• OAB Rubric Subcommittee for the Online Advisory Board<br>• Distance Learning/Information Technology (DLIT) Committee<br>• TX CC Tech Forum Planning Committee<br><br>Presented at several conferences and conducted several workshops:<br>• Presented at Faculty Development Conference (January 9, 2015) with Ann Cervantez on “Google Tools for Education”<br>• Conducted one day Alice lesson for middle school student at Mindbender Summer Camp 2013<br>• Presented a hands-on Android Boot Camp for students at PRC on 4/10/13 using AppInventor – DOL grant – the goal was to increase enrollment in mobile computing<br>• Presented dissertation findings at Alice Symposium in Raleigh, NC (June 2013).<br>• Conducted a week long workshop for college and high school teachers at the Alice Symposium in Raleigh, NC (June 2013).<br>• Presented an overview of Alice3 at HI-TEC (High Impact Technology Exchange) conference in Austin, TX (July 2013).<br>• Conducted a day workshop for college and high school teachers at the HI-TEC (High Impact Technology Exchange) conference in Austin, TX (June 2013).<br>• Conducted a week long workshop for community college teachers in Orlando, Florida - funded by NSF Alice grant (July 2013).<br>• Conducted week long Alice workshops at Collin College for teacher from surrounding colleges/universities in the summer 2011 and 2012<br>• Conducted a workshop on Camtasia Studio at the Information Systems for Educators Conference, Pittsburgh, Pennsylvania, 2007<br>• Co-Presented "Hybrid Courses," Texas Distance Learning Association Conference, Galveston, Texas, 2007<br>• Co-Presented “Online Optional: Merging Online and Traditional Students," Collin College Faculty Development Week, 2007 |

| | |
|---|---|
| Glen Grimes | • Attends the Lone Star Software Symposium every year in Dallas, a Java technologies-related program.<br>• Attended several of the summer programs at Collin, Summer Connections. These have ranged from Java technologies, Android sessions, and this past summer the iPhone and Swift environment.<br>• Volunteer for welcome events for new students, offering suggestions on how to best succeed.<br>• Worked with several co-op students<br>• Was Chair of the Dallas Java Mug Educational group<br>• Was a member of Curriculum Advisory Board (CAB)<br>• Prior member of the Board of Directors for the Java Mug. |
| Bill Slater | • Worked with several co-op students<br>• Worked with Dr. Potter in the math dept. and one of his students to get a math program he had received up and running and modify it to use in some research they were doing<br>• Member of the Microsoft Developer Network and keep up to date on new developments by doing the web presentations they do on new products and changes in the development environments they support.<br>• Advisor to the National Technical Honor Society |
| Scott Dollinger (Associate) | • Took 60 Hours of Profession Development Unit (PDU) Hours of courses to maintain Project Management certification. Some of the PDUs were on topics in the Education Community of Practice (CoP).These courses enhanced the understanding of the modern changing college environment.<br>• Researched and implemented collaborative teaching methods into his courses.<br>• Attended several Canvas training sessions and obtained eLC certification to teach online courses. |
| Jason Moore (Associate) | Currently pursuing an MS in Security Engineering |

**Appendix V – Survey of Students on Conducting Computer Science Courses in a Computer Lab**

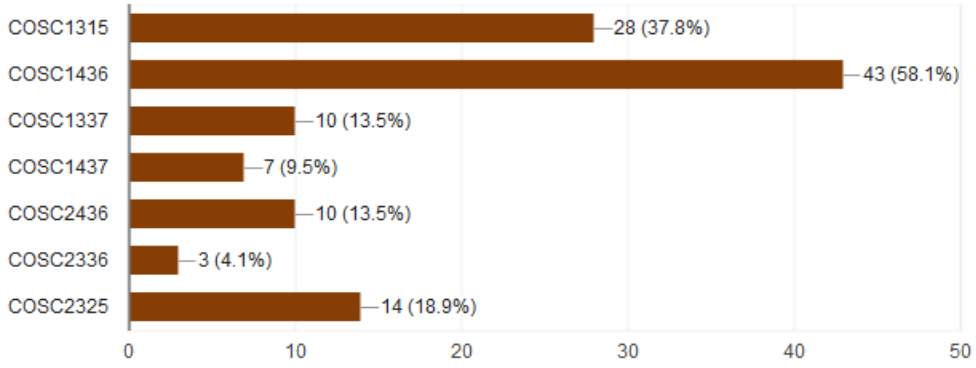
## What is your major?

74 responses



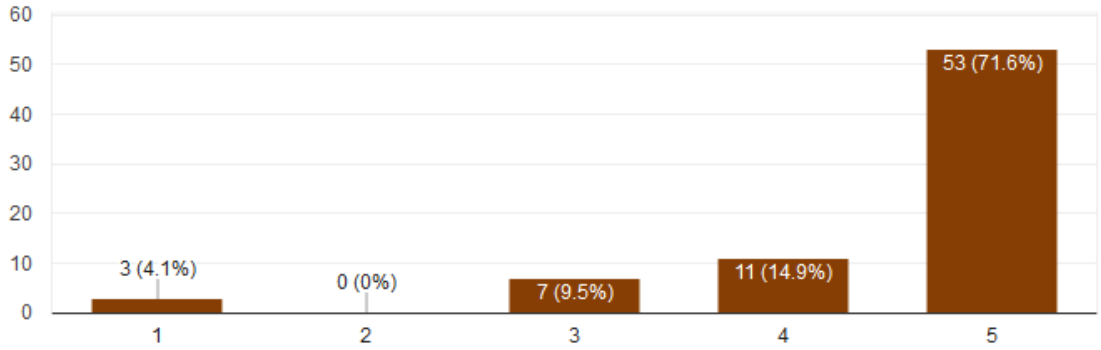

## What courses have you taken or are you currently taking:

74 responses



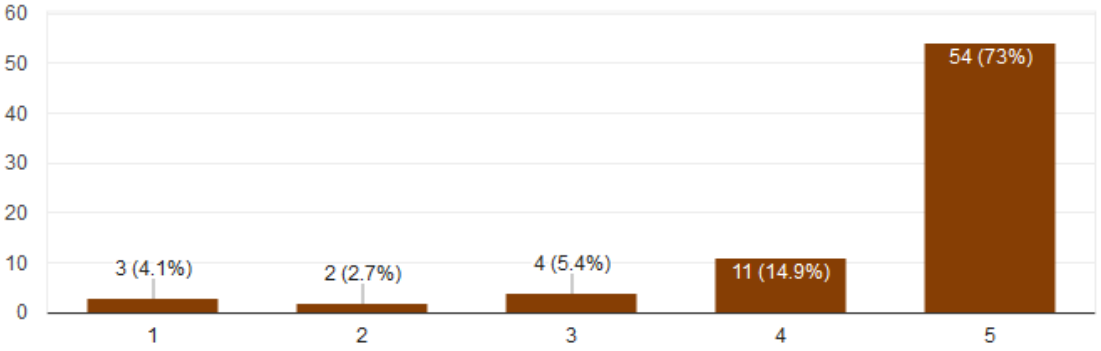
It would be beneficial to have computers in the coding classrooms?

74 responses




I feel that having hands-on coding activities on the computer during class would be beneficial.

74 responses




What are your thoughts on having coding classes in a computer classroom?

**Positive Student Reactions:**

- I think it is a good idea to have coding classes in a computer classroom, and concentrating on different algorithms would make our new gained knowlegde practical and strenghten in our minds.
- Helps a lot with learning and using new skills that were just learned.
- It would allow students to maybe intertwine the lecture with time alloted between, makes each part blended rather than remember take what you know by word.
- it makes it a lot easier for people to learn by playing around with their program
- Having computer access would help by allowing students to go through PowerPoints at their own pace during a lecture. Students would also be able to follow along during coding examples without having to bring a laptop to class.
- I think it would be beneficial if hands-on coding activities are done the second half of the class time. This will help to gauge the understanding of the topic learnt. I am for learning then practice.
- You need computers to code properly, and it helps with hands on work.
- It's mandatory to have a hands on experience of coding in a classroom because students learn better with hands-on rather then lectures.
- I think that coding classes would be extremely beneficial for people who are more hands-on learners
- Having coding classes in a computer classroom is helpful for those who cannot afford computers. If all students have one, coding classes in a computer lab is not necessary. And I expect computer classrooms will provide the best learning environment.
- Student will learned more about the code and practice more. It will also help in upper division classroom.
- What are your thoughts about having graphic calculators available in the math classroom? Computers are as vital to coding classes as graphing calculators are to math classes. Same train of thought.
- Ability to type out programs ourselves and run them
- If it is utilized good, it will be beneficial.
- Computers are necessary for a coding class. Students need to practice coding under supervision in case they need assistance.
- We have an opportunity to get hands on coding.
- It is extremely helpful in keeping me engaged, and also give me hands on experience in the classroom.
- Would be beneficial to a student especially if the computer is required to be able to code.
- a tangible way to understand the material explained in the class
- It would help students understand about the coding much more.
- Necessary for interaction with a computer. Also, remember syntax for a certain language and understand the language logic I suppose are important.

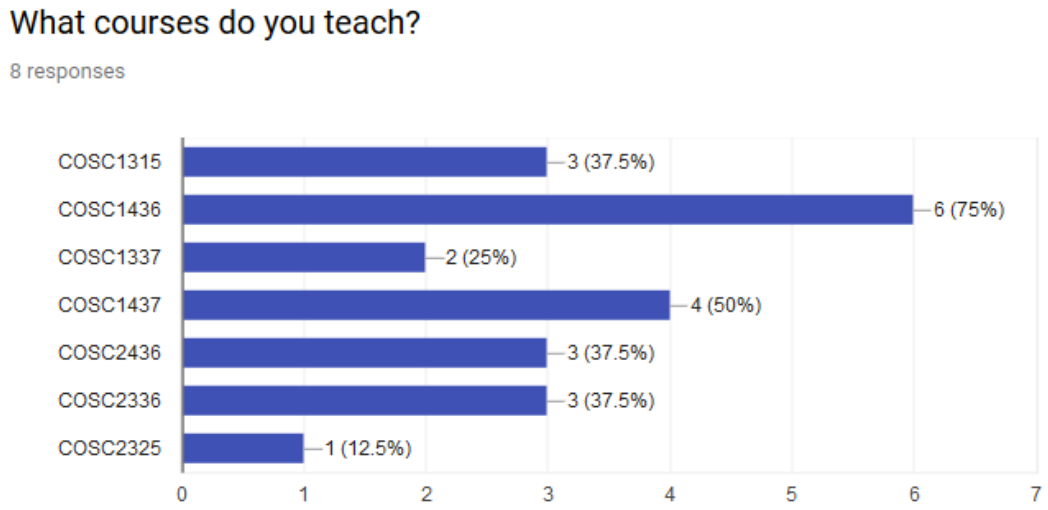
- Use the computer in class, I could follow what the professor did, that would be really helpful.
- Would love to have coding computers available. Hands-on coding activities would have cemented the material so much more for me...
- It would increase the efficiency of learning, and we can apply examples quickly.
- They would be very helpful and save time so we don't have to change classrooms.
- Being able to work examples during lecture would re-enforce concepts.
- Having computers in the classroom would be greatly beneficial in learning how to program by trying it yourself as opposed to simply getting a lecture.
- it is actually a great idea. It would be easy to do lectures and lab both in computer lab
- I believe that having the hands on experience as the professor is teaching the class would play a major role in students learning how to code. That way we could experiment ourselves and have our questions answered on the spot about any specific code.
- This would be extremely beneficial. I learn the best with hands on experience and typing after the professor to have the source code readily available.
- We need them.
- Takes notes better with lectures; Try to run codes that is demonstrating by the instructor at the same time.
- Its would help students but understand the examples, its easier when students can see the code with a computer in the classroom than without computers.
- Beneficial because it is hands on instead of listening to someone lecture
- Those that will be willing to utilize the computers to their fullest extent will benefit on having computers with compilers/IDEs on them will be great! Especially with different compilers so students can LEARN the TOOLS (I've met quite a few students that are completely lost without a full IDE that already hooks into an IDE). Computers are valuable resources that will benefit students with certain learning styles. I use a computer in all of the programming classes that I take.
- It would make the classes both more engaging and more productive
- Having computers in the classroom are valuable, because they allow for hands-on learning.
- Please make it so.
- I feel this would help in many ways understand the coding concepts quicker if able to practice the coding during the lessons side by side with the professor
- It is good opportunity to learn how to program the code.
- It would make it easier to keep up with the professor and move along with him

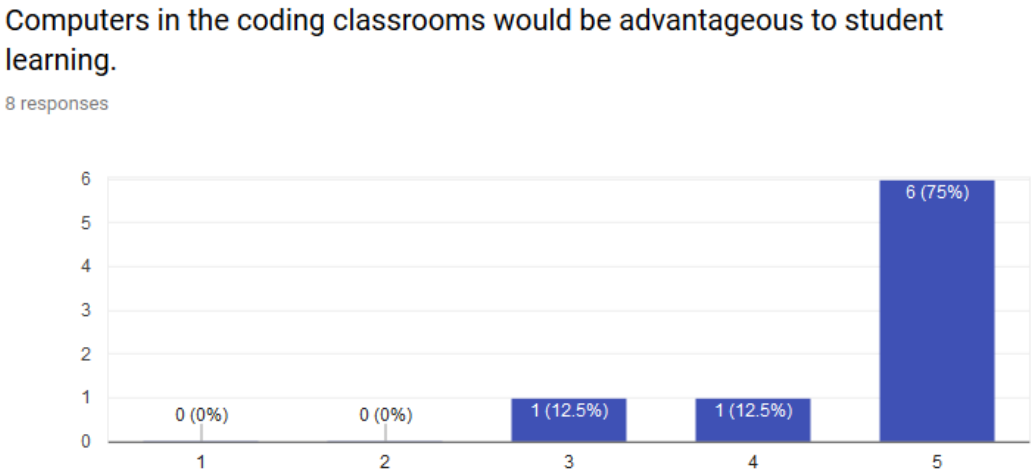
- Application is important to learn on a computer, notes aren't that useful personally.
- It would be very beneficial as students would be able to follow the professor hands on through the class
- it would really help with taking notes, and to better understand the given material
- very helpful for those that don't have a laptop
- YOU GET HANDS ON EXPERIENCE! No brainer really... people learn by doing, and not just copying code - make people find the solution to making a program (and if they can't, just help them/give them the tools to do so)

**Negative Student Reactions:**

- The thing that comes to my mind is that it is beneficial for some students to be able to work on the computer and listen to the lecture at the same time. However, another part of me says that some students cannot multitask as well as others, and it is best that this group of students listen and take notes, instead of trying to multitask all at once.
- If people are fooling around not doing their work because they are distracted on the computer then they are already in the path of failing
- It can be a good thing depending on how the goal of the class. For more high level algorithms I would say a lecture class would be better since jobs often require during interviews that you write functions/programs by hand on a white board.
- I like the more intimate feel of a traditional classroom with my personal laptop. Computer labs are too big and distracting. I wouldnt want class there, and shouldn't be penalized (being made to have class in one) because a few people can't afford, or won't spend the money for a personal computer.
- Browsing website, not focus on course.

**Appendix VI- Survey of Facutly on Conducting Computer Science Courses in a Computer Lab**




**Positive Faculty Reactions:**

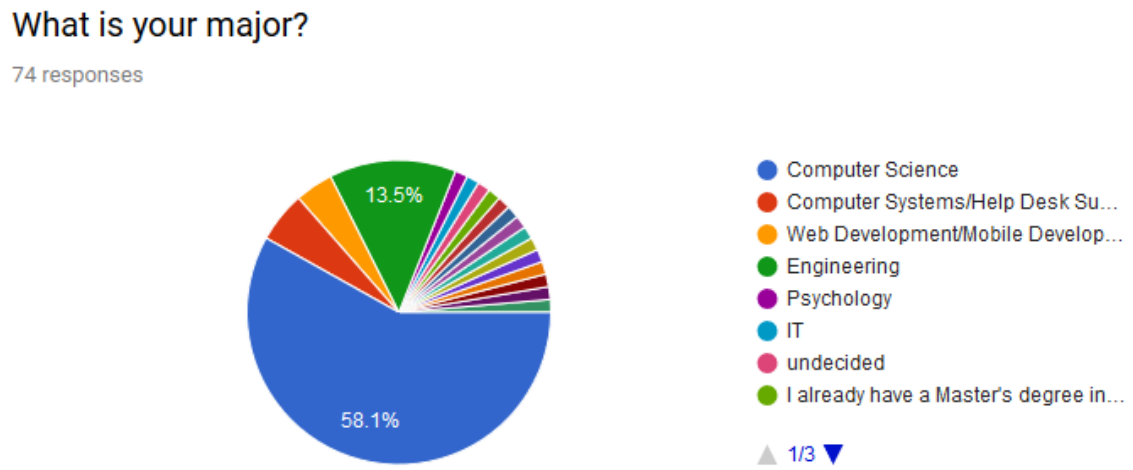
- I have been doing coding in the classes for the past 3 years at PRC. Absolutely Essential for learning how to program.
- Very effective

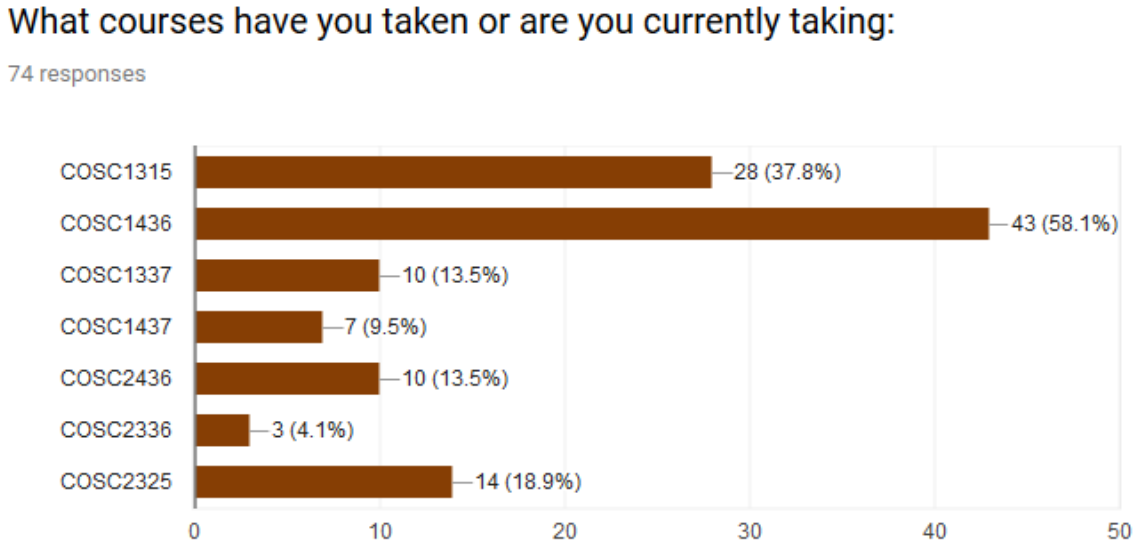
- By having the computers in the class, students could attempt to do implement what I am lecturing about in real time. It would also allow me to give in class assignments to find out sooner what they are struggling with.
- It will be VERY helpful for the student to gain early feedback on some of the code they write.
- Good idea specially at community college level. 100% for beginner classes and alternate class rooms for advanced classes.
- I believe that having classes in the computer classroom is essential to teaching coding. The lower level programming courses need more hands-on practice to learn the programming concepts and to build a strong foundation. If they are just passively watching the instructor show code and talk about the concepts, then they are not getting to experience it. Yes, they can work independently in the computer labs on their own time, but I do not feel that it is the same as hands-on coding during class.

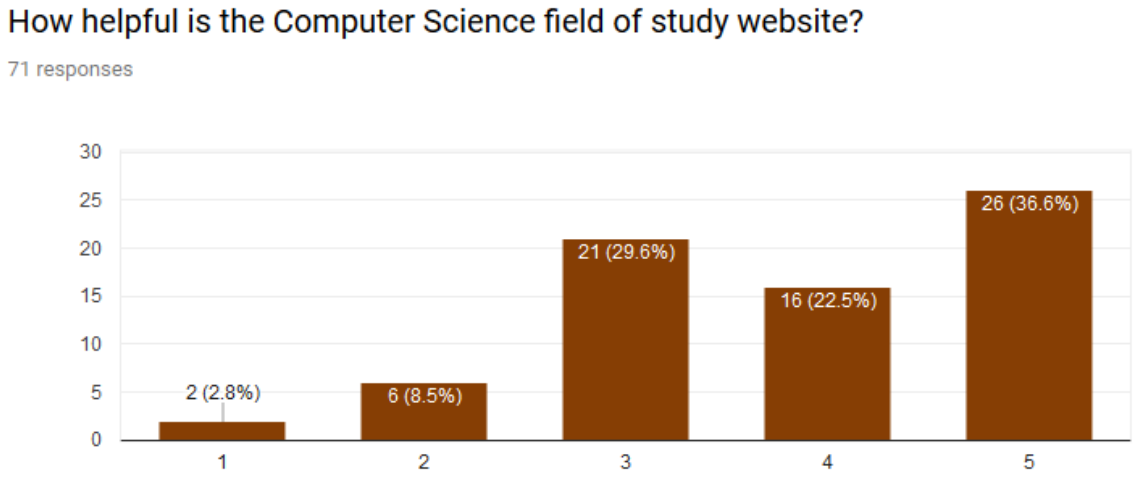
**Neutral Faculty Reactions**

- Today, most students have laptops.
- For some Fundamentals I (COSC 1436) students it may be beneficial to do some work in the classroom for immediate feedback. For advanced students and other COSC 1436 students, I think it is too tempting to start typing and not be involved in discussions of the lecture material. Computers at hand will be too tempting to immediately type and not think of what the lecture is presenting.

**Appendix VII- Survey of Students on Departmental Website**



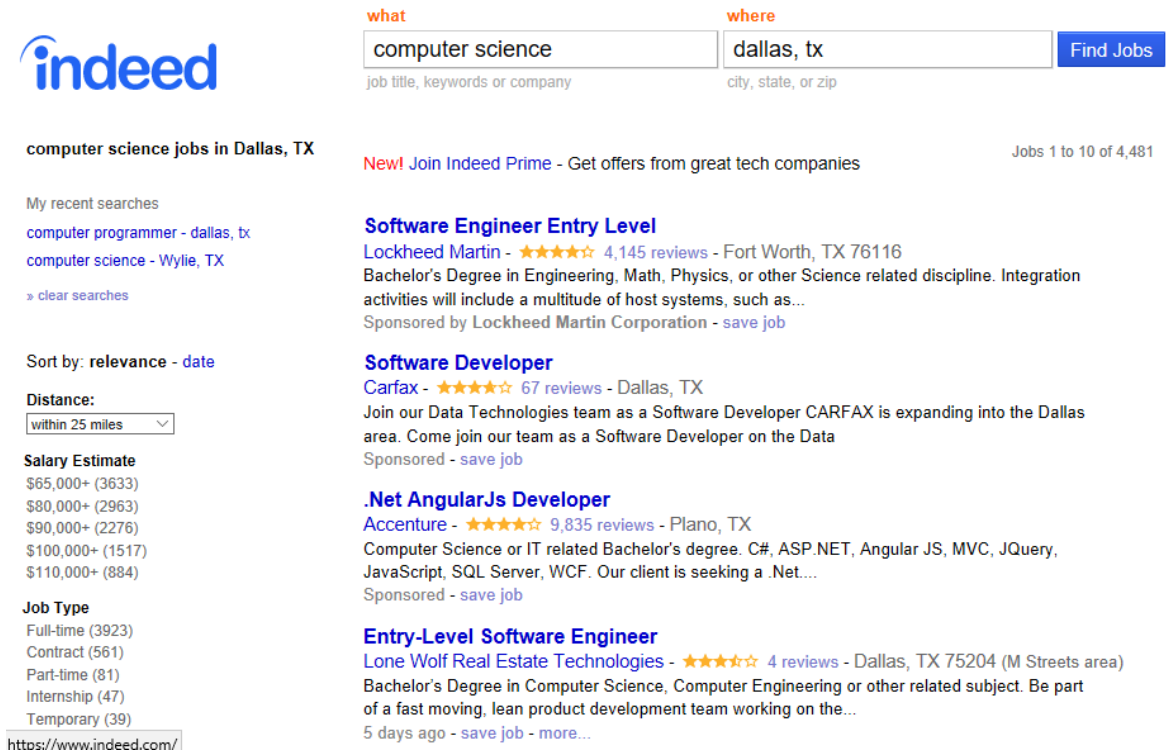






Here are some student suggestions for creating a departmental website:

- Description of courses and course contents.
- Add a meet faculty section. I am struggling to find computer science advisers at Collin College
- Hours of operations for tutoring and who is in charge or who to talk to with any questions.
- Contact information of the person in charge of the class and departments.
- Names, locations and office hours for the tutors/professors.
- What computer lab has the software for the particular class.
- Helpful resources or practice websites, like code academy.
- Bio section for instructions.
- If I google Computer Lab CCCCD there is no result. I can find ESL seminar, math-labs and writing center under Developmental Education - Resources.
- Use a flow chart to display the programming course tracks in the degree.
- Course availability information (semester offerings and format).

## Appendix VIII- Indeed Search Engine Results



what: computer science (job title, keywords or company)
where: dallas, tx (city, state, or zip)
Find Jobs

**computer science jobs in Dallas, TX**

Jobs 1 to 10 of 4,481

New! Join Indeed Prime - Get offers from great tech companies

My recent searches
computer programmer - dallas, tx
computer science - Wylie, TX
» clear searches

Sort by: **relevance** - date

**Distance:**
within 25 miles

**Salary Estimate**
$65,000+ (3633)
$80,000+ (2963)
$90,000+ (2276)
$100,000+ (1517)
$110,000+ (884)

**Job Type**
Full-time (3923)
Contract (561)
Part-time (81)
Internship (47)
Temporary (39)

https://www.indeed.com/

**Software Engineer Entry Level**
Lockheed Martin - ★★★★☆ 4,145 reviews - Fort Worth, TX 76116
Bachelor's Degree in Engineering, Math, Physics, or other Science related discipline. Integration activities will include a multitude of host systems, such as...
Sponsored by **Lockheed Martin Corporation** - save job

**Software Developer**
Carfax - ★★★★☆ 67 reviews - Dallas, TX
Join our Data Technologies team as a Software Developer CARFAX is expanding into the Dallas area. Come join our team as a Software Developer on the Data
Sponsored - save job

**.Net AngularJs Developer**
Accenture - ★★★★☆ 9,835 reviews - Plano, TX
Computer Science or IT related Bachelor's degree. C#, ASP.NET, Angular JS, MVC, JQuery, JavaScript, SQL Server, WCF. Our client is seeking a .Net....
Sponsored - save job

**Entry-Level Software Engineer**
Lone Wolf Real Estate Technologies - ★★★½☆ 4 reviews - Dallas, TX 75204 (M Streets area)
Bachelor's Degree in Computer Science, Computer Engineering or other related subject. Be part of a fast moving, lean product development team working on the...
5 days ago - save job - more...

indeed

what: java (job title, keywords or company)

where: dallas, tx (city, state, or zip)

Find Jobs

**java jobs in Dallas, TX**

My recent searches

computer science - dallas, tx

computer programmer - dallas, tx

computer science - Wylie, TX

» clear searches

Sort by: **relevance** - date

**Distance:**

within 25 miles

**Salary Estimate**

$80,000+ (1554)

$90,000+ (1290)

$95,000+ (1102)

$105,000+ (726)

$115,000+ (401)

**Job Type**

Full-time (1632)

Contract (339)

Part-time (23)

Temporary (18)

Internship (12)

Commission (2)

New! Join Indeed Prime - Get offers from great tech companies

Jobs 1 to 10 of 1,940

### Java Application Mid Level Developer

Allstate - ★★★★☆ 3,723 reviews - Irving, TX 75015

Spring, github, React, JDBC, Junit, J2EE, JDBC, WSDL, XML, JMS, Enterprise Java Beans. 5+ years of solid Java experience....

Sponsored - save job

### Java Development Engineer – Testing – Mid Level

USAA - ★★★★☆ 893 reviews - Plano, TX

AND, 2+ years of developer experience specific to I/T discipline/technology(s) – i.e., Object Oriented Design, Mobile, Web, Java, Unit and Java based Functional...

Sponsored - 3 days ago - save job

### Senior Full-Stack developer / CTO

SiSTeR Technologies - Addison, TX 75001

$90,000 - $120,000 a year

Java and Android Studio. Python, Java Script, AWS, Elastic Search:. We are growing !...

Easily apply

Sponsored - save job

### Sr Java Developer

Agreeya Solutions - ★★★★☆ 19 reviews - Richardson, TX 75081

4 years of hands on coding experience using Java and related technologies. Work with enterprise architects and technical architects and define scalable solution...

Easily apply

3 hours ago - save job - more

indeed

what: c++ (job title, keywords or company)

where: dallas, tx (city, state, or zip)

Find Jobs

**c++ jobs in Dallas, TX**

My recent searches

java - dallas, tx

computer science - dallas, tx

computer programmer - dallas, tx

computer science - Wylie, TX

» clear searches

Sort by: **relevance** - date

**Distance:**

within 25 miles

**Salary Estimate**

$75,000+ (430)

$85,000+ (359)

$90,000+ (295)

$100,000+ (198)

$110,000+ (107)

**Job Type**

Full-time (438)

Contract (80)

Part-time (11)

Temporary (10)

Internship (7)

Commission (3)

Jobs 1 to 10 of 516

New! Join Indeed Prime - Get offers from great tech companies

### Java/C++ Application Developer

Allstate - ★★★★☆ 3,723 reviews - Irving, TX 75015

Where good people build rewarding careers. Think that working in the insurance field can't be exciting, rewarding and challenging? Think again. You'll help us...

Sponsored - 3 days ago - save job

### SW Engineer

Entegee - ★★★★☆ 26 reviews - Dallas, TX

This 6-12 month+ contract job is in the Dallas Texas area Required skills.... • Bachelor's degree in Computer Engineering or Electrical Engineering or Computer

Easily apply

Sponsored - save job

### Operations Research Consultant

American Airlines - ★★★★☆ 1,434 reviews - Fort Worth, TX

Experienced in an object-oriented programming language such as Java, C++, C#, or VB.Net. A significant component of many assignments will be the implementation...

Sponsored - save job

### Sr. Software engineer

Milestone Consulting Group Inc - Dallas, TX

Experience with C, C++:. Very strong programming skills - *extensive experience with C, C++*. Our direct client is looking for *Sr....

Easily apply

4 days ago - save job - more...

| University of Texas at Dallas and Collin College Course Specific Articulation Agreement Matrix | | | | | | |
|---|---|---|---|---|---|---|
| **Collin Course** | **UTD BS Electrical Engineering Course** | **UTD BS Telecommunications Engineering Course** | **UTD BS Computer Engineering Course** | **UTD BS Computer Science Course** | **UTD BS Software Engineering Course** | **UTD BS Mechanical Engineering Course** |
| ENGR 1201 and ENGR 1172 (If Required) | ENGR 1202 and 1 Credit Free Elective | TE 1102 and 2 Credits Free Elective or ENGR 1202 and 1 Credit Free Elective | ENGR 1202 and 1 Credit Free Elective | Not Required | Not Required | MECH 1108 and 1 Credit Free Elective (ENGR 1172 is Not Required) |
| ENGR 2310 and ENGR 2110 | ENGR 2310 and 1 Credit Free Elective | Not Required | CE 2310 and 1 Credit Free Elective | Not Required | Not Required | Not Required |
| ENGR 2300 | ENGR 2300 | Not Required | ENGR 2300 | MATH 2418 (Additional 1 Credit From Calculus MATH Hours*) | MATH 2418 (Additional 1 Credit From Calculus MATH Hours) | ENGR 2300 |
| MATH 2413, MATH 2414, MATH 2415 and MATH 2320 (If Required) | MATH 2417, MATH 2419, MATH 2420 and 3 Credits Free Elective | MATH 2417, MATH 2419, MATH 2420 and 3 Credits Free Elective | MATH 2417, MATH 2419, MATH 2420 and 3 Credits Free Elective | MATH 2417, MATH 2419, and 4 Credits Free Elective (MATH 2320 is Not Required) | MATH 2417, MATH 2419, and 4 Credits Free Elective (MATH 2320 is Not Required) | MATH 2417, MATH 2419, MATH 2420 and 3 Credits Free Elective |
| MATH 2305 | Not Required | ECS 2305 | ECS 2305 | ECS 2305 | ECS 2305 | Not Required |
| ENGR 2332- Lecture Only (Future Offering) | Not Required | Not Required | Not Required | Not Required | Not Required | MECH 2320- Lecture Only |

* Applies to students completing the 3 course Calculus Sequence at Collin College.

**Appendix X– University of North Texas Articulation Agreement**

# Memorandum of Understanding and Articulation Agreement

## Pertaining to the Bachelor of Science and Bachelor of Arts Degrees in Computer Science

**The University of North Texas**
**College of Engineering**

**and**

**Collin County Community College District**
**Division of Business and Computer Science**

The intent of this agreement between the University of North Texas (UNT) College of Engineering and Collin County Community College District (CCCCD) Division of Business & Computer Science is to increase the number and quality of students matriculating from CCCCD into computer science disciplines at UNT. Concomitantly, this agreement is designed to foster enhanced transfer processes for Collin County Community College students pursuing Associate degrees in computer science.

This agreement recognizes the following terms and conditions:

1) Representatives from UNT's and CCCCD's admission's staff, academic advisors, and computer science faculty will collaborate to select students for the program and will provide advising to students in the program.

2) Students who successfully complete Collin County Community College's Associate of Science degrees in Computer Science will be able to transfer credit hours to UNT. The transfer courses should meet UNT College of Engineering core required GPA and the minimum grade per course for transferring to the College of Engineering curriculum.

3) The UNT – CCCCD Equivalences Transfer Guides, attached hereto and incorporated herein by reference as Exhibit A, will be reviewed and updated by CCCCD and UNT

faculty and advisors on at least a yearly basis. The Dean of Business & Computer Science at CCCCD and the Dean of the College of Engineering at UNT will approve changes.

4) CCCCD students participating in the program will have rights and privileges as described in the *UNT–CCCCD Concurrent Agreement* (Dated on August 11, 2000).

5) CCCCD students successfully completing the Associate of Science degree program according to the specified guidelines and who maintain a minimum cumulative GPA of 2.5 in transferable hours will gain automatic admission into UNT's College of Engineering.

6) Participating program students who successfully transfer to UNT are allowed to reverse transfer courses taken at UNT back to CCCCD to complete the Associate degree(s) in Engineering provided that 25 percent of their course work for their CCCCD degree is completed at CCCCD.

7) The progress of this program will be monitored by both institutions and may be revised by mutual agreement at any time. Either party may terminate this agreement at any time when the said party believes that termination is in the best interest of all parties concerned. Those students already participating in the program at the time of termination will have their coursework honored.

8) A copy of the Memorandum of Understanding and Articulation Agreement along with the UNT – CCCCD Equivalences Transfer Guides will be kept in the Office of Academic Affairs and Transfer Programs at CCCCD and the College of Engineering at UNT.

9) Annually, the two institutions will share data related to the enrollment, scholastic progress, and academic performance of former and active cooperative students in order to evaluate the success of this program.

Dr. Cary A. Israel
President
Collin County Community
College District

11/4/04
Date

Dr. Norval Pohl
President
University of North Texas

10-14-04
Date

Dr. Thomas D. Chesney
Interim Vice President of
Academic Affairs
Collin County Community
College District

28 OCT 04
Date

Dr. Howard Johnson
Provost and VP for
Academic Affairs
University of North Texas

Date

Mr. William J. Blitt
Dean
Division of Business and
Computer Science
Collin County Community
College District

10/25/04
Date

Dr. Oscar Garcia
Dean, College of
Engineering
University of North Texas

11/4/04
Date

Mr. William C. Slater
Chair
Department of Computer
Science
Collin County Community
College District

10/25/04
Date

Dr. Krishna Kavi
Chair
Computer Science and
Engineering
University of North Texas

Date

## **BA** Major in **Computer Science** Transfer Guide for the University of North Texas and Collin County Community College 2004-2005 Catalog Year

| University of North Texas Core | Collin County Community College Core |
|---|---|
| English Rhetoric and Composition 6 Hours **(See note 1)**:<br>ENGL 1310 College Writing I - 3 hours<br>ENGL 1320 College Writing II or ENGL 2700 Technical Writing - 3 hours **(See College/Major)** | English Rhetoric and Composition 6 Hours **(See note 1)**:<br>ENGL 1301 - 3 Hours<br>ENGL 1302 - 3 Hours **(See College/Major)** |
| Mathematics 3 Hours:<br>Three hours at the level of College Level Algebra or higher **(See College/Major)** | Mathematics 3 Hours:<br>MATH 1314, 1316, 1324, 1325, 1342, or higher level **(See College/Major)** |
| Natural Sciences 8 Hours:<br>Two courses in the Natural/Life Sciences and/or the Physical Sciences with labs **(See College/Major)** | Natural Sciences 8 Hours (two courses with labs):<br>BIOL 1406, 1407, 1408, 1409, 1411, 2401, 2402, 2404, 2406, 2416, 2421, 2428, CHEM 1405, 1407, 1411, 1412, 1419, 2401, 2423, 2425, ENVR 1401, 1402, GEOL 1401, 1402, 1403, 1404, 1405, 1445, 1447, PHYS 1401, 1402, 1405, 1411, 1415, 2425, 2426 **(See College/Major)** |
| Visual and Performing Arts 3 Hours:<br>ART 1300, 2360, DANC 1200, 2800, THEA 1340, 1375, 2340, MUMH 1600, 2040, 3000, 3010, RTVF 3450, or 3460 | Visual and Performing Arts 3 Hours:<br>ARTS 1301, 1303, 1304, DANC 2303, DRAM 1310, 2361, 2362, MUSI 1306, or 1307 |
| Humanities 3 Hours:<br>AGER 2250, ENGL 2210, 2220, PHIL 1050, 1400, 2050, 2310, 2330, or 2500 | Humanities 3 Hours:<br>ANTH 2346, 2351, ENGL 2322, 2323, 2327, 2328, 2332, 2333, 2342, 2343, FREN 2303, 2304, HUMA 1301, PHIL 1301, 1304, 2303, 2306, 2307, 2321, SPAN 2321, or 2322 |
| U.S. History 6 Hours:<br>HIST 2610 or 3 hours advanced U.S. History - 3 hours<br>HIST 2620 or 3 hours advanced U.S. History - 3 hours | U.S. History 6 Hours:<br>HIST 1301, 1302, or 2301 |
| Political Science 6 Hours:<br>PSCI 1040 (Texas/U.S. Constitutions) - 3 hours<br>PSCI 1050 or 3 hours advanced U.S. Government - 3 hours | Political Science 6 Hours:<br>GOVT 2301 (Texas) - 3 hours<br>GOVT 2302 (U.S.) - 3 hours |
| Social and Behavioral Science 3 Hours:<br>ANTH 1010, 2250, BEHV 2300, CJUS 2100, EDCD 1220, ECON 1110, GEOG 1170, GNET 1030, PSCI 2310, 3310, 3320, PSYC 1630, 1650, RHAB 2500, SOCI 1510, or 1520 | Social and Behavioral Science 3 Hours:<br>ECON 2301, 2302, PSYC 2301, or SOCI 1301 |
| Communications 3 Hours:<br>COMM 1010, COMM 1440, COMM 2020, COMM 2040, COMM 2060, FREN 1010, FREN 1020, FREN 2040, FREN 2050, GERM 1010, GERM 1020, GERM 2040, GERM 2050, GNET 1060, JOUR 2310, LANG 1010 (Italian or Japanese or Russian), LANG 1020 (Italian or Japanese or Russian), MKTG 3010, RHAB 3000, SMHM 3450, SPAN 1010, SPAN 1020, SPAN 2040, SPAN 2050, or SPHS 1020 **(See College/Major)** | Communications 3 Hours:<br>SPCH 1311, 1315, or 1321 **(See College/Major)** |
| Wellness 3 Hours (Institutionally Designated Option I):<br>DANC 1100, PHED 1000, PSYC 2580, or SMHM 1450 | Institutional Options 4 Hours:<br>COSC 1300 or BCIS 1305 (or higher level COSC course) and 1 hour of any PHED Activity Course |
| Cross Cultural, Diversity, and Global Studies 3 Hours (Institutionally Designated Option II):<br>AGER 4560, 4800, ANTH 2045, 2100, 2150, 2350, 4050, ART 2350, ATTD 4490, BUSI 1340, CJUS 2600, COMM 4260, EDCD 2010, EDSP 2500, EDUC 2000, ENGL 3450, 4300, GEOG 1200, 3100, 3750, HIST 1050, 1060, 1075, 1085, HLTH 1100, 2200, JOUR 1210, 4250, KINE 2000, 2050, MKTG 2650, MUET 3020, PADM 2100, PHIL 2070, 2400, PSCI 3500, 3810, 4520, 4620, 4660, 4710, 4720, 4850, RECR 2550, RTVF 2700, SMHM 2750, 4750, SOCI 2010, 4160, SOWK 4540, THEA 2250, 2260, 2300, or WMST 2100 | NOTE: Students transferring to UNT with a completed Collin County Core must complete one course from the approved list for Cross Cultural, Diversity, and Global Studies:<br><br>Approved Courses that may be taken at Collin County for Cross Cultural, Diversity, & Global Studies (UNT Core) 3 Hours:<br>GEOG 1303, COMM 1307, or PHIL 1304 |

| College of Engineering & BA CSCI Requirements | Collin County Equivalents and Approved Substitutions |
|---|---|
| Mathematics 6 hours above Pre-Calculus **(Satisfies University Core Mathematics) (see note 7)**:<br>**MATH 1710, 2770** | Approved Mathematics Courses **(see note 7)**:<br>**MATH 2413, 2305** |
| Laboratory Science 12 hours **(Satisfies University Core Natural Science) (see note 7)**:<br>**BIOL 1710/1730**, 1720/1740<br>**CHEM 1410/1430**<br>**PHYS 1710/1730, 2220/2240** | Approved Laboratory Science Courses **(see note 7)**:<br>**BIOL 1406**<br>**CHEM 1411**<br>**PHYS 2425, 2426** |
| Advanced Oral/Written Communications 6 hours **(Satisfies University Core English Rhet & Comp II and Communications) (see note 7)**:<br>**ENGL 2700**<br>GNET 2060 | Approved Advanced Oral/Written Communications Courses **(see note 7)**:<br>**ENGL 2700** |
| Foreign Language 3 - 14 hours or Proficiency:<br>Must attain Intermediate II (2050) level (Prerequisite for 2050 course is 2040; prerequisite for 2040 course is 1020; prerequisite for 1020 course is 1010.) See catalog for details. See UNT department of Foreign Languages and Literatures for placement information. | Approved Foreign Language Intermediate II Level Courses:<br>Chinese - CHIN 2312, French - FREN 2312, German - GERM 2312, Japanese - JAPN 2312, Sign Language (American) – SGNL 2402, or Spanish - SPAN 2312<br><br>**NOTE:** Students must follow all course prerequisites. |

**College of Engineering Core/BA CSCI Degree Requirements Notes**

1. The minimum hours required for a degree in the College of Engineering is 128 semester hours.
2. Students must complete at least 31 hours in residence at UNT.
3. 24 advanced hours, including 12 advanced in the major, must be earned at UNT.
4. You must complete 24 of your last 30 hours toward your degree at UNT.
5. A minimum grade point average of 2.000 (C) on all work attempted, including all transfer, correspondence, extension and residence work. It should be noted that the GPA that appears on grade reports and is used to determine the student's academic status, does not include correspondence, extension and transfer work. Thus, a 2.000 GPA on the grade report does not necessarily imply eligibility for graduation.
6. A minimum GPA of 2.000 (C) on all work at UNT. Transferred work may not be used to raise the GPA of work done at UNT.
7. A minimum GPA of 2.5 for each category and at least a grade of "C" in each course.

| Bachelor of Arts Major in Computer Science | Collin County Equivalents and Approved Substitutions |
|---|---|
| The major requires 32 hours in Computer Science including the following:<br>**CSCI 1110, 1120, 2010**, 3100, 3400, 3600; plus 12 hours of Computer Science electives including 9 advanced elective hours.<br><br>See the 2003-2004 catalog for approved Computer Science elective courses.<br><br>For additional information contact the Computer Science & Engineering Department at www.cs.unt.edu/ or call (940) 565 - 2767. | Approved Computer Science Courses:<br>**COSC 1436, 1437, 2325**<br>**Or**<br>**COSC 1436, 1337, 2325** |

**Bachelor of Arts Major in Computer Science Notes**

1. 12 hours of Computer Science courses must be taken at UNT.
2. Advanced electives are required to reach the minimum 42 advanced hour requirement for UNT. See your advisor at UNT for more information.
3. No Minor is required for this major.