



Sam Houston State University

College of Science
and Engineering Technology

Department *of* Computer Science Undergraduate Handbook

Bachelor of Science in Computing Science
Bachelor of Science in Software Engineering
Bachelor of Science in Cybersecurity
Minor in Computer Science

<https://cs.shsu.edu>
2021-2022 academic year

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Chapter 1 Introduction

Welcome and congratulations to all new students in our three undergraduate degree programs and minor in computer science. The Department of Computing Science offers degree programs for students wishing to pursue careers as a programmer/analyst/software engineer, network and database administrators, digital forensics and information security professionals, or to prepare for advanced studies at the graduate level. Minor study plans are offered which can be tailored to the needs of students majoring in almost any field. The information contained in this handbook is for informational purposes only. The official catalog for undergraduate program requirements may be found online: <http://catalog.shsu.edu/undergraduate/colleges-academic-departments/science-and-engineering-technology/computer-science/>

1.1 Current Department Faculty



Dr. Min Kyung An
Associate Professor and Graduate Advisor
Office: 212G
Phone: 936-294-4333
Email: an@shsu.edu
Website: <https://www.shsu.edu/mka012/>
Research area: Wireless Ad Hoc and Sensor Networks, Sensor Network Security, Design and Analysis of Approximation Algorithms, Graph Theory, Program Analysis, Social Networks, Social Network Security, IoT (Internet of Things).



Kirk Burns
Instructor
Online
Email: lib_kab@shsu.edu



Dr. David Burris
Professor and University Articulation Coordinator
Office: 212C
Phone: 936-294-1568
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Research area: Software Engineering, Translator Design, Data Structures, Design of Programming Languages, Operating Systems, Database, Steganography, User Level Cryptography.



Dr. Hyuk Cho
Professor
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Research area: Data mining, Statistical Pattern Recognition, Machine Learning, and related topics.



Dr. ABM Rezbaul Islam
Assistant Professor
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Website: <https://www.shsu.edu/ari014/>
Research area: Computer Vision, Machine Learning, Image processing.

Coming Soon

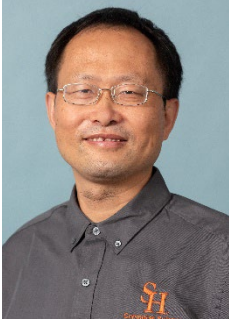
Dr. Pat Ko
Lecturer
Office: 216J
Phone: 936-294-1075
Email: ko@shsu.edu
Website: <https://patkoinfo.com/>
Research area: Computer Science Education, Computational Thinking, Educational Robotics, Engineering Education.



Dr. Li-Jen Lester
Associate Professor
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Research areas: Computer and Technology Curriculum Alignment from Secondary to Graduate Levels, Educational Multimedia Research, International Technology Development in Education.



Dr. Fan Liang
Assistant Professor
Office: 212D
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Research area: Effective and secure Deep Learning-Driven data analytics in IoT Systems, distributed computing in IoT, and data analysis.



Dr. Frank (Qingzhong) Liu
Associate Professor
Office: 216D
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Website: <https://www.shsu.edu/~qx1005/New/Index/index.html>
Research areas: Information Assurance, Digital Forensics, Image/Video/Audio Analysis, Multimedia Forensics, Bioinformatics, Machine Intelligence, Computational Applications.



Dr. Van Vung Pham
Assistant Professor
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Research area: data visualizations, data analytics, machine learning, and deep learning.



Dr. Amar Rasheed
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Dr. Ramin Sahba
Visiting Assistant Professor
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Dr. Karpoor Shashidhar
Associate Professor and Director of the Digital and Cyber Forensic Science
doctoral program
Office: 216B
Phone: 936-294-1591
Email: nks001@shsu.edu
Research area: Cryptography, Steganography, Combinatorial Optimization,
Distributed Computing, P2P/Sensor Networks.



Dr. Gary Smith
Associate Professor
Office: 216G
Phone: 936-294-1493
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Research area: Operating Systems, Programming Languages, Data Structures,
Real-Time Programming and Introductory Programming, Networks, Database,
GIS, Computer Security.



Dr. Cihan Varol
Associate Professor
Office: 216F
Phone: 936-294-3930
Email: cvarol@shsu.edu
Website: <https://www.shsu.edu/~cxv007/index.html>
Research area: Information (data) quality and its applications on Digital Forensics and Information Security, Personal Identity Recognition, Record Linkage, Entity Resolution, Pattern Matching Techniques, Natural Language Processing, Multi-Platform VoIP Applications, Data Cleansing of VoIP Artifacts and Web Storage Data.



Dr. Bing Zhou
Department Chair and Associate Professor
Office: 212B
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Website: <https://www.shsu.edu/bxz003/>
Research area: Cyber Security, Cyber Forensics, Soft Computing, Data Mining.

1.2 Current Department Staff



Ashley Miksch
Administrative Associate III and Assistant to the Chair
Email: arj014@shsu.edu
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Ricky Malcom
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Office: 208C
Phone: 936-294-1939



Dustin Thornton
Lab Manager
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Office: 208A
Phone: 936-294-4785

Coming Soon

Jacquelyn Vasquez
Administrative Associate II
Email: jkv005@shsu.edu
Office: 208B
Phone: 936 -294-4768

1.3 Degrees Offered

The Department of Computer Science offers three bachelor's degrees, as well as a minor.

- Bachelor of Science in Computing Science (BS in CS); offers three concentrations: Computing Science (CS), Information Assurance (IA), and Information Systems (IS).
- Bachelor of Science in Software Engineering (BS in SE).
- Bachelor of Science in Cybersecurity (BS in CbS).
- Minor in Computer Science.

Details of the degrees are provided later in this document, but in this section, we provide major course requirements comparison of the three BS CS concentrations (Figure 1.1) and comparison of the three degrees (Figure 1.2).

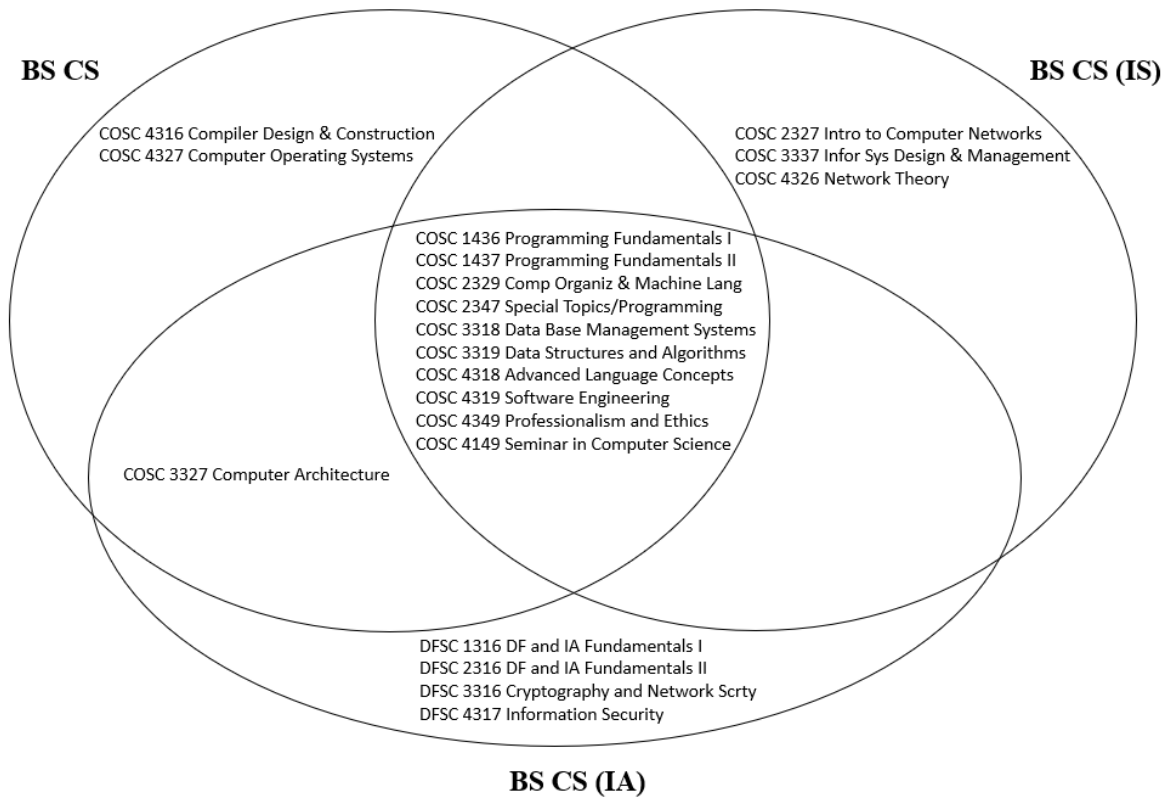


Figure 1.1: Course Requirements Comparison of Three BS CS Concentrations

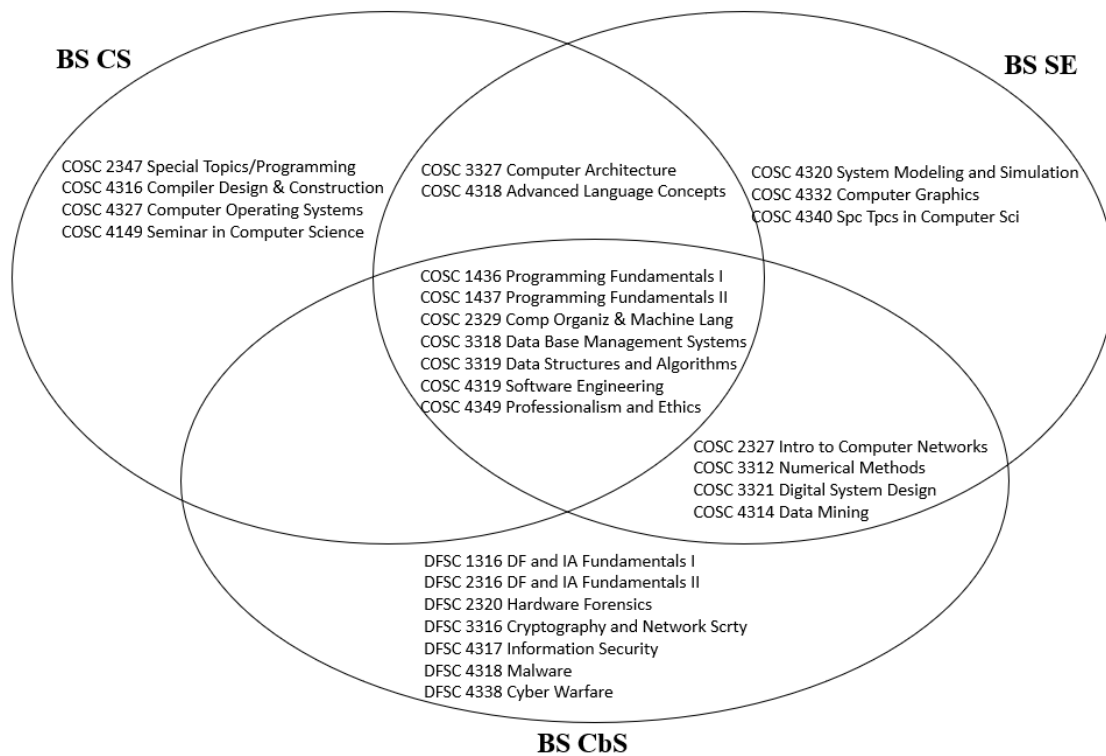


Figure 1.2: Course Requirements Comparison of Three BS Degrees

1.4 ABET Accreditation

The Bachelor of Science in Computing Science (BS in CS) at Sam Houston State University is accredited by the Computing Accreditation Commission of ABET. More information can be found online: <https://cs.shsu.edu/abet/>

1.5 CAE Designation

The Bachelor of Science in Computing Science (BS in CS)/Information Assurance program at Sam Houston State University is designated as a Center of Academic Excellence by the National Security Agency. More information can be found online: <https://www.nsa.gov/resources/students-educators/centers-academic-excellence/>



Chapter 2 Bachelor of Science in Computing Science

2.1 Introduction

Students in Bachelor of Science in Computing Science program are expected to select an emphasis from the options of Computing Science (CS), Information Systems (IS), or Information Assurance (IA). Each concentration requires slightly varied coursework, the curriculum overview can be found at:

<u>Bachelor of Science, Major in Computing Science (Computing Science, CS)</u>
<u>Bachelor of Science, Major in Computing Science (Information Systems, IS)</u>
<u>Bachelor of Science, Major in Computing Science (Information Assurance, IA)</u>

2.2 Suggested Plan of Study

<u>Bachelor of Science, Major in Computing Science (Computing Science, CS)</u>
<u>Bachelor of Science, Major in Computing Science (Information Systems, IS)</u>
<u>Bachelor of Science, Major in Computing Science (Information Assurance, IA)</u>

2.3 Course Dependency/Prerequisite Structure

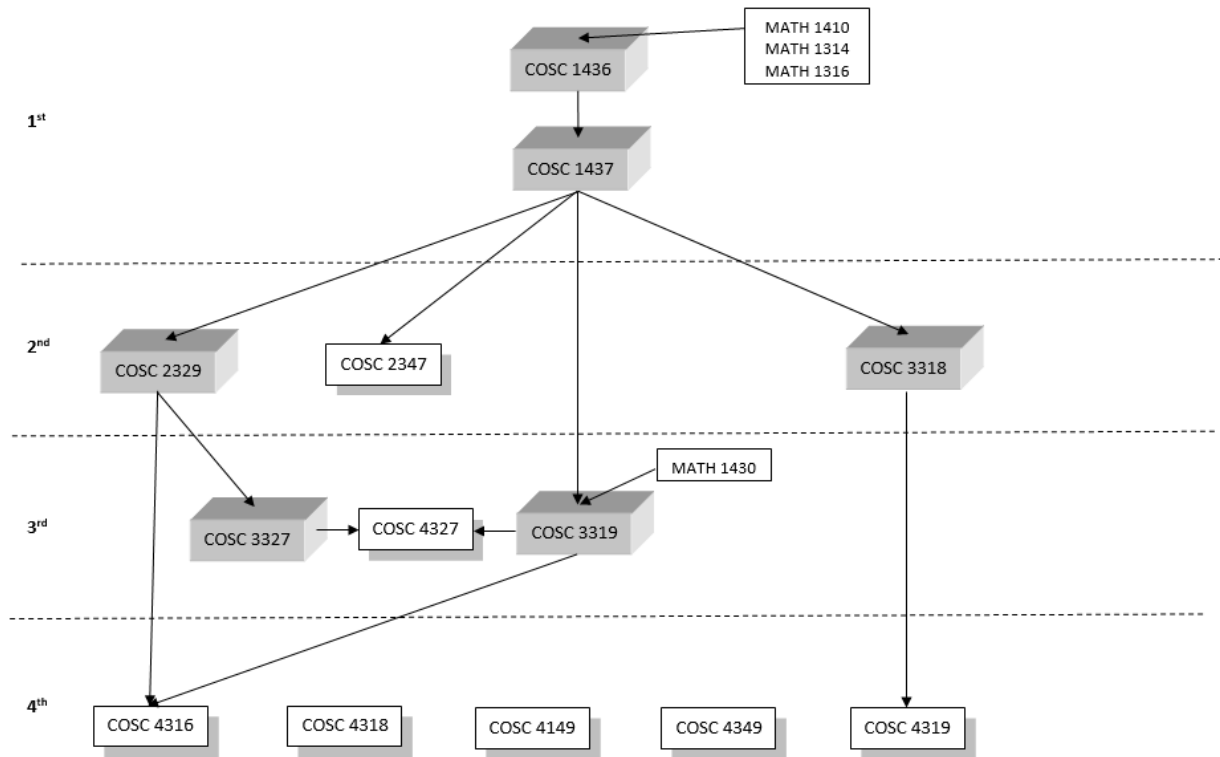


Figure 2.1: Course Dependency/Prerequisite Structure for Concentration in CS

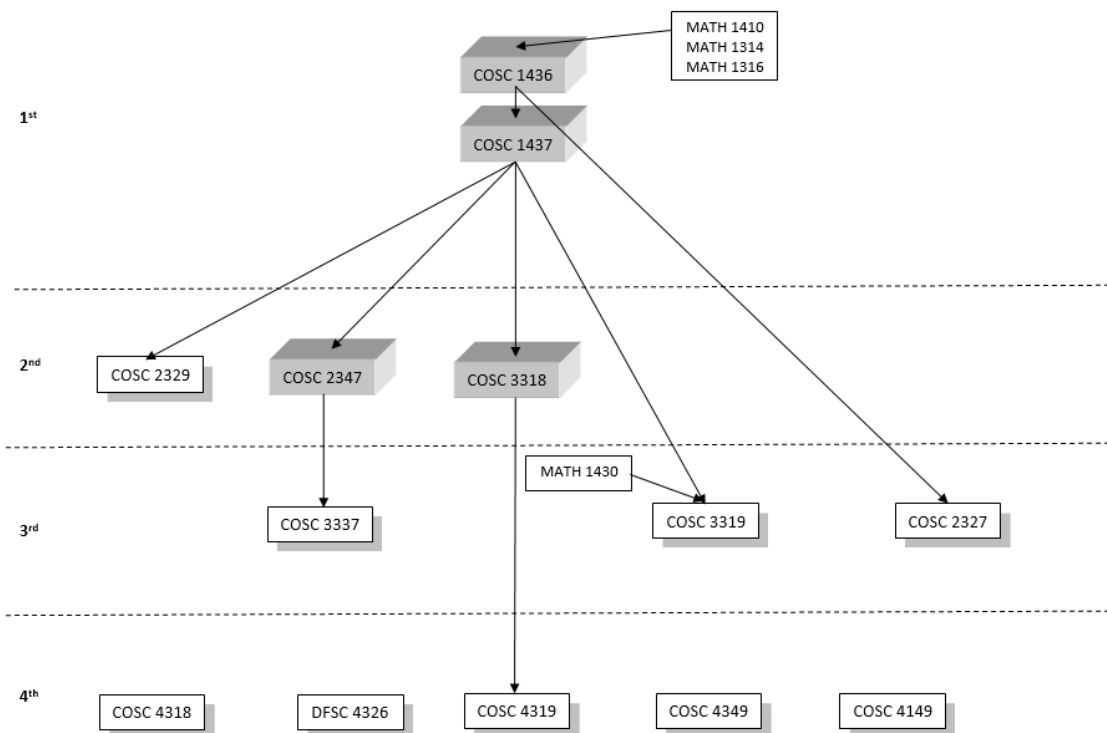


Figure 2.2: Course Dependency/Prerequisite Structure for Concentration in IS

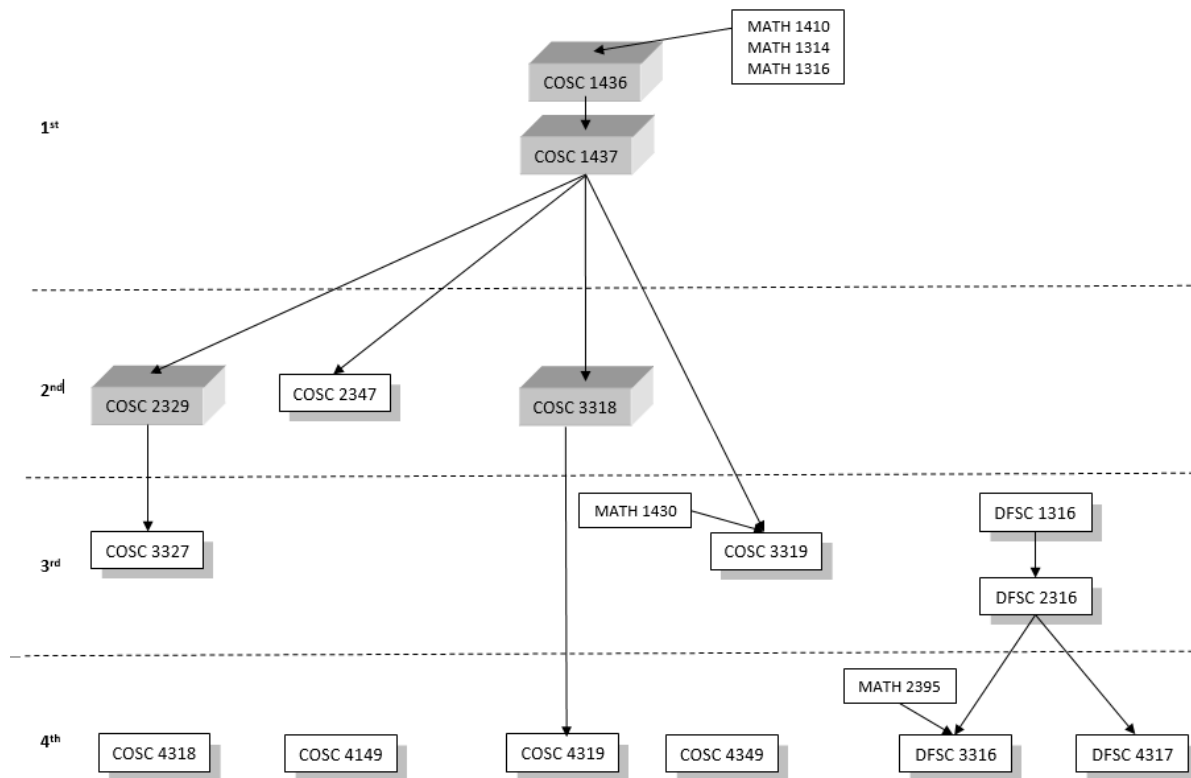


Figure 2.3: Course Dependency/Prerequisite Structure for Concentration in IA

2.4 Careers in Computing Science

- Analyst
- Cyber Security Engineer
- Database Administrator
- Network Administrator
- Pentester
- Blue/Red Teamer
- Security Researcher
- Site Reliability Engineer
- Software Developer
- Software Engineer
- Systems Analyst
- Technical Support Engineer
- UX Designer

Chapter 3 Bachelor of Science in Software Engineering

3.1 Introduction

The Bachelor of Science in Software Engineering is designed to provide the skills and competencies required by students wishing to pursue a career in software development. Software developers typically focus on either systems or applications. Systems software developers create and maintain the operating systems that make computers and devices run. Application software developers design software programs that run on computers and devices, such as databases and games. Successful software developers are often strong in mathematics, effective communicators who work well with others, and detail oriented. The curriculum overview can be found at:

[Bachelor of Science, Major in Software Engineering](#)

3.2 Suggested Plan of Study

[Bachelor of Science, Major in Software Engineering](#)

3.3 Course Dependency/Prerequisite Structure

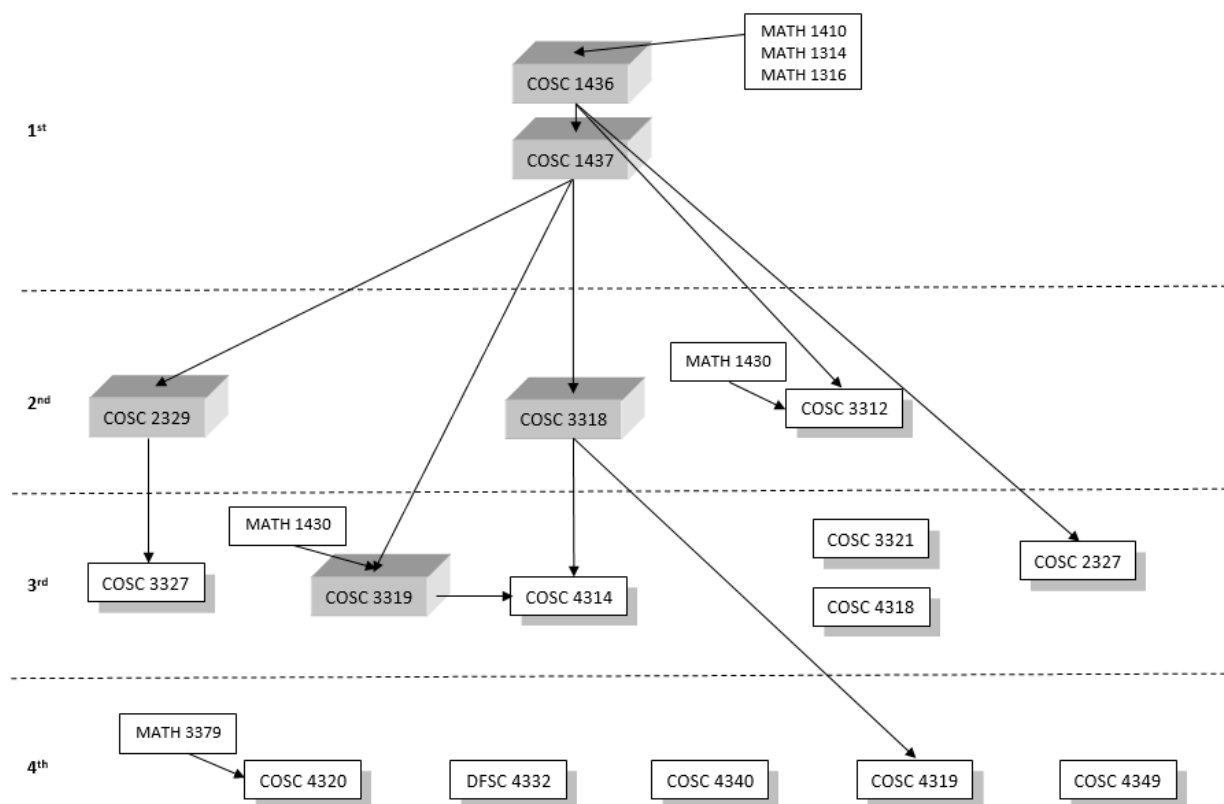


Figure 3.1: Course Dependency/Prerequisite Structure for BS in SE

3.4 Careers in Software Engineering

- Computer Programmer
- Computing Systems Design
- Financial Institutions

- Government Agencies
- Information Systems Manager
- Software Engineer
- Software Publishers
- Web Developer

Chapter 4 Bachelor of Science in Cybersecurity

4.1 Introduction

The Bachelor of Science in Cybersecurity prepares students for professional work in business and industry, as well as government and law enforcement. You will learn the techniques to collect, preserve, analyze, and report digital evidence, the curriculum overview can be found at:

[Bachelor of Science, Major in Cybersecurity](#)

4.2 Suggested Plan of Study

[Bachelor of Science, Major in Cybersecurity](#)

4.3 Course Dependency/Prerequisite Structure

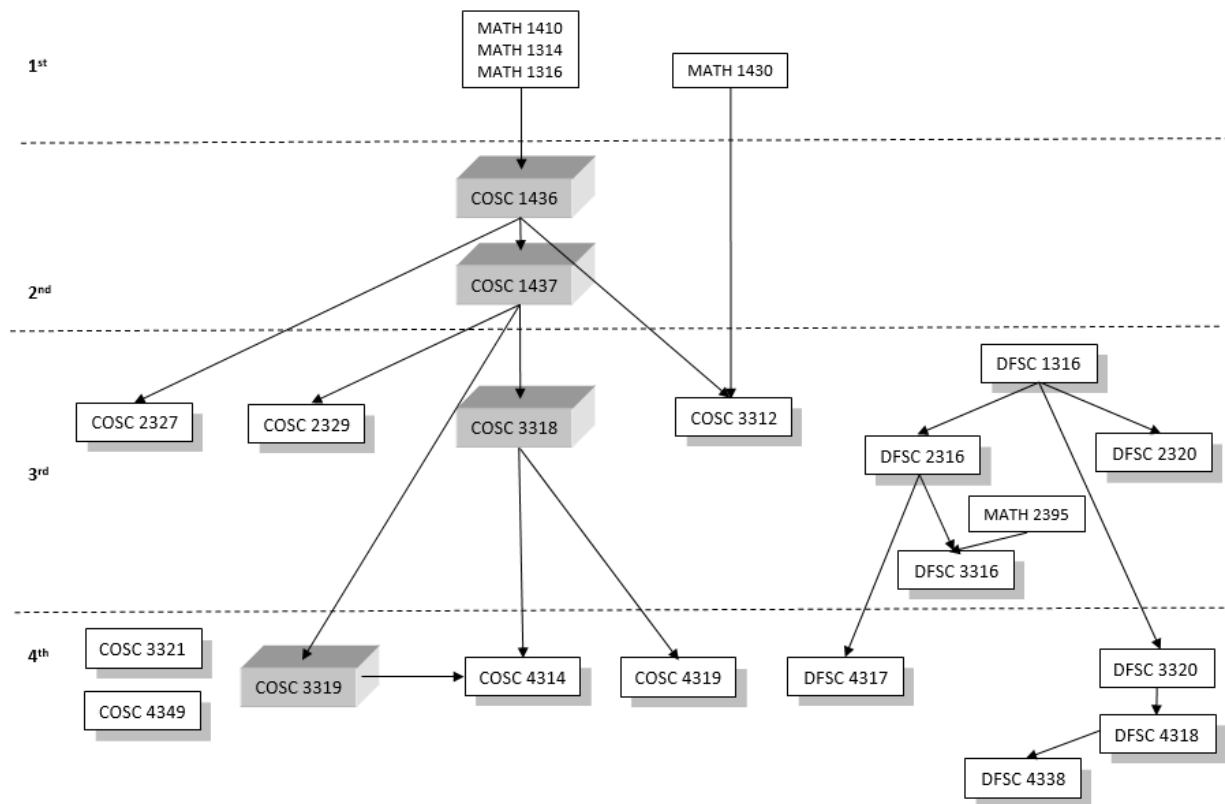


Figure 4.1: Course Dependency/Prerequisite Structure for BS in Cybersecurity

4.4 Careers in Cybersecurity

- Forensic Investigator
- Incident Responder
- Information Security Analyst
- Information Security Specialist
- Law Enforcement
- Penetration Tester
- Security Architect
- Security Engineer
- Security Software Developer

Chapter 5 Minor in Computer Science

5.1 Introduction

A Computer Science Minor consists of 22 or more hours of Computer Science coursework of which at least 9 hours must be advanced. Students are recommended to take COSC 4349 as an advanced course. Three recommended minor plans are shown in section 5.2. Modifications may be made to meet individual student needs as approved by the Computer Science Department Chair. Individualized minor plans are available for students seeking a Computer Science minor for Certification.

5.2 Plan of Study

[Minor in Computer Science](#)

Chapter 6 Master's Studies in Computer Science

6.1 Degrees Offered

At the master's level there are programs in Computing and Data Science, Digital Forensics, and Information Assurance and Cybersecurity. The Digital Forensics and Information Assurance and Cybersecurity programs are consistently ranked among the top online digital forensics and cybersecurity programs in the nation. The graduate programs service in excess of 100 students. Here's a list of master's degree and certificate programs the department currently offer:

- [Master of Science in Computing and Data Science \(CSD\)](#)
- [Master of Science in Digital Forensics \(DF\)](#)
- [Master of Science in Information Assurance and Cybersecurity \(IAS\)](#)
- [Graduate Certificate in Cyber Security](#)
- [Graduate Certificate in Data Assurance](#)
- [Graduate Certificate in Digital Investigation](#)

6.2 How to Apply

<https://www.shsu.edu/admissions/applications>

6.3 Admission FAQ

<https://www.shsu.edu/mka012/graduate/admission.html>

6.4 Who to contact?

- **Graduate Advisor** (Master's and Graduate Certificate Programs): **Dr. Min Kyung An**, an@shsu.edu, AB1-212G, 936-294-4333
- **Administrative Associate**: **Ms. Jacquelyn Vasquez**, jkvasquez@shsu.edu, AB1-208, 936-294-1579
- **Department Secretary**: **Ms. Ashley Miksch**, arj014@shsu.edu, AB1-214, 936-294-3846

Chapter 7 Doctorate Degree Program

7.1 Degree Offered

The department houses the only doctoral program in the College of Science and Engineering Technology. The Digital and Cyber Forensics Science program is unique in the nation. In support of this program, the department provides a research center, the Cyber Forensics Intelligence Center (CFIC), which is the focal point for research at all levels and a support center for faculty grant proposal development. The CFIC is also the industry outreach unit for the department, providing paths to internship and employment for a number of students.

7.2 How to Apply

[Digital and Cyber Forensic Science](#)

7.3 Who to contact?

- **Program Director**: **Dr. N. Karpoor Shashidhar**, nks001@shsu.edu, AB1-216B, 936-294-1591
- **Administrative Associate**: **Ms. Jacquelyn Vasquez**, jkvasquez@shsu.edu, AB1-208, 936-294-1579
- **Department Secretary**: **Ms. Ashley Miksch**, arj014@shsu.edu, AB1-214, 936-294-3846

Chapter 8 Common Information

8.1 Academic Advisement

Academic advisement is handled within the department by our professors. Each semester, when advisement for the next semester begins, there will be advisement tables posted on the 2nd floor of Academic Building I as well as online on our department page under “Student Resources.” Advisement is split between each professor depending on a student’s last name or classification. The posted table will provide the information a student needs to make an advising appointment

with the appropriate professor. Once a student has been advised, they will be able to register for courses when registration opens.

8.2 Academic Integrity

According to Sam Houston State University's Academic Dishonesty statement, *"The University expects all students to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action."*

8.3 Scholarships and Financial Support

Financial support is available to students through grants, loans, scholarships, and work study opportunities. To gain more information on how to obtain this type of support use the following link. This will bring you to the Financial Aid & Scholarships university page.

<https://www.shsu.edu/dept/financial-aid/>

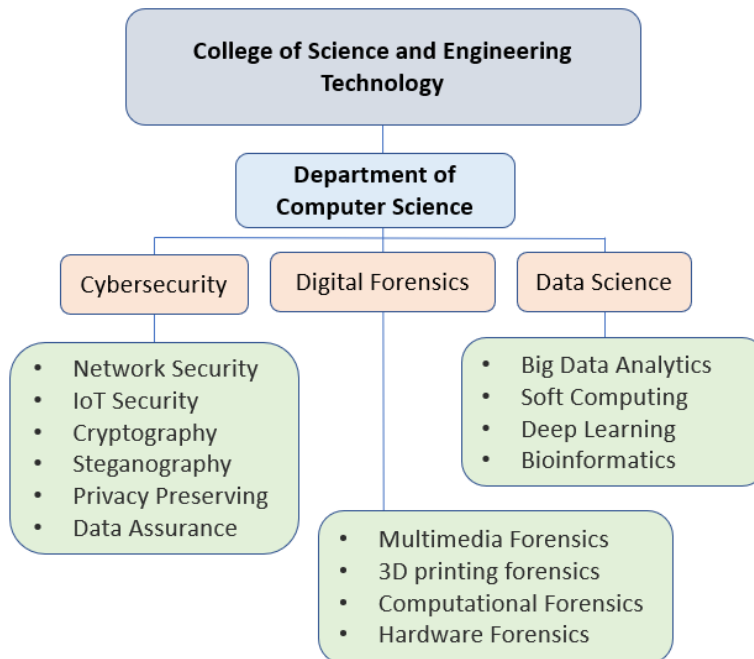
There are many scholarship opportunities for students. A student must apply through Scholarships4Kats. As stated on the university's scholarship page, *"This application dramatically simplifies the process for students by importing key information from their student data record and allowing them to be automatically considered for all relevant scholarships."*

The following link will bring a student to the university's scholarship page with more information: <https://www.shsu.edu/dept/financial-aid/aid/scholarships>

8.4 Research Opportunity

The Department of Computer Science has established three interdisciplinary research groups, providing a rich environment for cross-pollinating work among these groups. Faculty members have proactively promoted students' participation in these research groups and co-authored peer-reviewed articles with students in national and international conferences.

Students are encouraged to join one of these research groups based on their interested research area. This will allow students to work on various interdisciplinary research projects and to develop an in-depth understanding of real-world cybersecurity challenges. These research projects can also be used as capstone design experience or master project/thesis.



- The **Cybersecurity research group** is interested in the study of digital investigations, multimedia computing and forensics, mobile forensics, network security, biometrics, computer vision, surveillance analytics, bioinformatics, computational forensics, and large data computation analytics, integrated with machine learning, pattern recognition and deep learning techniques, as well as the applications.

Cyber Security Lead Administrator

Dr. Frank (Qingzhong) Liu

Office: 216D

Phone: 936-294-3569

Email: qx1005@shsu.edu

- The **Digital Forensics research group** investigates the sound extraction and analysis of digital evidence from all types of digital media so that it will stand up in a court of law. As societies become increasingly dependent on technology, the importance of digital forensics continues to escalate in today's globally connected world. In this context, digital forensics research includes topics such as software engineering, reverse engineering, application development, software testing, and algorithm development to understand how devices, software, and information system can be compromised, investigated, and mitigated.

DFII Lead Administrators

Dr. N. Karpoor Shashidhar

Office: 216B

Phone: 936-294-1591

Email: nks001@shsu.edu

Dr. Cihan Varol

Office: 216F

Phone: 936-294-3930

Email: cxv007@shsu.edu

- The members of the ***Data Science research group*** focus on developing computational methods, tools and software to better analyze big data by overcoming limitations of human cognitive ability. Real world problems can benefit from techniques, theories, and research findings in computational science and machine intelligence. Close cooperation between forensic scientists and computational scientists is important for modern crime investigations.

Data Science Lead Administrator

Dr. Hyuk Cho

Office: 216H

Phone: 936-294-1535

Email: hxc005@shsu.edu

8.5 Internship Opportunity

The department offers internship opportunities through Cyber Forensics Intelligence Center (CFIC), available depending on external partnerships. More information can be found at:

<https://df.shsu.edu/home/opportunities.html>

8.6 Library

The Newton Gresham Library has a vast collection of print and electronic books and periodicals that support Computer Science, Information Assurance, and Digital Forensics. This includes digital access to peer-reviewed journals, conference proceedings, technical magazines, newsletters, industry standards, and eBooks on the latest information in technology through Association for Computer Machinery (ACM) Digital Library and the IEEE Xplore Digital Library. The Library also maintains subscriptions to databases relevant to our field, including Computer Source, Web of Science, ScienceDirect, Academic Search Complete, Business Source Complete, Information Science and Technology Abstracts, and more. eBooks are available from these as well as through O'Reilly for Higher Education, Info Sci from IGI Global, and Taylor & Francis. ForensicNetBase, Westlaw NEXT, and many other legal and CJ-focused databases are also accessible through the Library. The Library's print collection is also quite expansive, with focus on maintaining a current and balanced collection to meet the department's evolving needs. Interlibrary loan is available for the electronic or print delivery of additional journal articles or monographs that may not be readily available in the local collection. Visit

<https://shsulibraryguides.org/csdb> for more information on the available resources.

8.7 Career Success Center

SHSU has a career success center (<https://www.shsu.edu/dept/career-success-center/>) which offers career assessments, career counseling and advising, career-related workshops and seminars, up-to-date career information and career-related resources. They also provide the means to pursue student employment, internship, and full-time employment opportunities through Handshake, on-campus interviews, job fairs.

Phone: 936-294-1713

Email: careersuccesscenter@shsu.edu

Location: AB 4, Suite 210

Hours: M-F | 8AM-5PM

8.8 Facilities

Offices

Each faculty member in the Computer Science department is allocated an office on the 2nd floor of AB1. The main Computer Science office is in AB1-214 and the faculty offices are in the suites AB1-212 and AB1-216.

Classrooms and Laboratories

The department has (almost) exclusive access to five teaching spaces. Two rooms are equipped as computer laboratories for hands on, practical work. These rooms can accommodate 20 -25 students and are located in AB1-209/211. To log in to the computers in these two rooms, the student will need an account on the CS-Labs network controlled by the CS network/system administrator (Ricky Malcom, ricky.malcom@shsu.edu).

Two rooms are arranged as small traditional lecture rooms with tiered seating. These rooms can accommodate up to 55 students and are located in AB1-204/206.

One room is arranged in a conference room style, accommodating up to 18 students located in AB1-202.

Guidance

All students who enroll in computing science course, regardless of their status as a major or minor with the computing science programs has access to the department's cs-labs network and are provided with credentials separate from university system access credentials. The students can request access to the virtual farm through the CS network/system administrator.

8.9 Student Organizations

The student Association for Computing Machinery (ACM) chapter provides a learning environment through speakers and special projects that unite students, professors, and industry professionals. These relationships help promote the sharing of knowledge and skills related to computer science. The chapter sponsors field trips, campus visits by guest speakers, and occasional student/faculty outings. ACM chapter is located in AB1 203.

Website: <https://shsu.campuslabs.com/engage/organization/acm>

Email: shsu.acm@gmail.com

8.10 Frequently Asked Questions

You can access the SHSU Computer Science Podcast for Q & A.

- Episode 1: <https://open.spotify.com/show/73cjiA6Rg2OyMNDtJpetPQ>