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| **PROGRAM NAME:** Software Development | **AUTHORING TEAM CONTACT:** Justin Lewis |
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Executive Summary (complete this section last)

**Briefly summarize the topics that are addressed in this program review, including areas of strengths and areas of concern.**

**What does our program do?**  
The Software Development program at Collin College equips students with the skills and knowledge necessary for entry-level employment in various technology fields, such as software development, web development, and database management. Through a mix of hands-on training, theoretical knowledge, and exposure to current industry practices, students are prepared to meet the demands of a rapidly evolving technological landscape. Over the past five years, the program has undergone two name changes—from Web & Mobile Development to Web Development in Fall 2022, and then to Software Development in Fall 2024—to better reflect its evolving focus and alignment with industry standards.

**Why do we do the things we do? Program relationship to the College Mission & Strategic Plan.**  
The Software Development program supports the Collin College Mission and Strategic Plan by ensuring graduates are well-prepared to contribute to a technology-driven workforce. By incorporating advisory board feedback and focusing on high-demand skills such as programming, secure software development, and database management, the program stays aligned with industry needs. In addition, the curriculum fosters critical thinking, teamwork, and problem-solving, empowering students to succeed in their chosen careers and to further their education through transfer pathways, such as the partnership with Texas A&M-Central Texas.

**Why do we do the things we do? Program relationship to student demand and market demand.**  
The demand for skilled software developers continues to grow locally in the DFW area and nationally. The Software Development program aims to meet this demand by maintaining a curriculum that reflects industry needs and by preparing students for the future launch of the Bachelor of Applied Technology (BAT) in Software Development. The BAT program, planned to begin in Fall 2025, is expected to further increase student demand for the AAS degree and associated courses.

**How effective is our curriculum, and how do we know?**  
The curriculum has been refined over the years through feedback from advisory boards, industry partners, and continuous improvement plans. Success rates for key courses have steadily improved, with targeted interventions such as milestone check-ins planned for project-based courses like IMED 1341 - Interface Design. The addition of advanced Computer Science courses (COSC-1436, COSC-1437, and COSC-2436) has strengthened the foundation for programming skills. These efforts ensure that graduates are well-equipped for employment and transfer opportunities.

**How effectively do we communicate, and how do we know?**  
The program has recently improved its communication channels by updating its website and adding the program website URL to the college catalog. These updates provide prospective and current students with easy access to course details, program outcomes, and transfer opportunities.

**How well are we leveraging partnership resources and building relationships, and how do we know?**  
The program leverages partnerships with institutions like Texas A&M-Central Texas to provide seamless transfer pathways and with industry partners to guide curriculum development. Active engagement with the advisory committee ensures the curriculum remains relevant to industry trends, aligning student learning outcomes with market demands.

**How have past Continuous Improvement Plans contributed to success?**  
Previous Continuous Improvement Plans (CIPs) have focused on enhancing programming skills and improving course retention. Notable successes include the introduction of COSC-1436 as a curriculum requirement to strengthen foundational programming knowledge. While data collection for past CIPs was limited and did not yield substantial insights, the program has identified this as an area for improvement and aims to implement more robust data collection processes in future CIPs to better measure and inform progress.

**How will we evaluate our success?**  
The program will continue to evaluate its effectiveness through success rates, student feedback, and industry advisory input. Specific efforts include the implementation of milestone check-ins for project-based courses and the monitoring of enrollment growth in response to the launch of the BAT program. Ongoing data collection and analysis will ensure that the program remains aligned with both student and industry needs, fostering continuous improvement in student success and program outcomes.

1. **Program and Its Context**
2. **Describe the program, its relationship to the college, and the community it serves.**

The **Associate of Applied Science (AAS) in Software Development** at Collin College has evolved significantly over the years to meet changing industry demands. Originally launched as **e-Business**, the program transitioned to **Web and Mobile Development** to reflect the growing importance of online business platforms and mobile technologies. In **2022**, the program was renamed **Web Development** to focus on modern web technologies and practices, and finally, in **2024**, it became **Software Development** to align with current industry trends and anticipated future needs.

The program reflects Collin College’s **mission to foster workforce development** by providing career-focused education that equips students with the knowledge and practical skills needed to thrive in the **dynamic technology industry**. The degree curriculum emphasizes **programming, web development, data management, and project management**, preparing students to enter the workforce or continue their education in computer science and related fields.

This evolution was driven by feedback from **industry partners and advisory committees**, which meet twice a year to ensure the program remains aligned with **employer needs and regional market trends**. The curriculum now incorporates in-demand skills such as **Python programming, secure software development, and artificial intelligence** to ensure students are prepared for the **growing tech sector** in the DFW area.

The AAS program will also hopefully serve as a pathway to a future **Bachelor of Applied Technology (BAT) in Software Development**, a new degree currently under development and expected to launch in **Fall 2025**. While the BAT program is a separate degree still in the approval process, the AAS curriculum is structured to allow for a **seamless transition** into the upper-division coursework needed for this bachelor's degree. At the time of this documents writing, the BAT proposal has been approved by the Texas Higher Education Coordinating Board (THECB), and is awaiting final approval by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC).

Through **partnerships with local employers, student-focused learning experiences, and faculty expertise**, the Software Development program plays an essential role in meeting the needs of both **students and the regional economy**. Collin College remains committed to equipping graduates with marketable skills and contributing to **the growth of the North Texas technology sector**.

1. **Describe the following points as applicable:**
2. **Program’s purpose**

The **Associate of Applied Science (AAS) in Software Development** at Collin College is designed to provide students with the technical knowledge and practical skills needed for successful careers in software development. The program emphasizes hands-on learning, enabling students to master programming languages, database management, and web development tools essential for the modern technology workforce.

The program’s purpose is to:

1. **Prepare students for immediate entry into the workforce** by equipping them with in-demand technical skills.
2. **Encourage continuous learning and academic growth**, serving as a foundation for students who may pursue advanced studies, including the proposed Bachelor of Applied Technology (BAT) in Software Development.
3. **Align with the needs of local industries and employers** through continuous collaboration with advisory committees, ensuring the curriculum reflects current trends and workforce demands.
4. **Contribute to regional economic development** by producing graduates with the skills needed to fill roles in North Texas’s expanding technology sector.

Through its focus on real-world application and collaborative learning, the Software Development program ensures that students are not only technically proficient but also prepared to succeed in professional environments requiring teamwork, problem-solving, and effective communication.

**If the program has a purpose/mission statement, upload it in section I.B.1. of the Appendix.**

1. **Program’s learning outcomes and marketable skills**

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| Program-Level Learning Outcomes | |
| Program Learning Outcome 1: | Apply the fundamental concepts of structured programming, such as data types, control structures, functions/methods, arrays, and object-oriented programming techniques. |
| Program Learning Outcome 2: | Apply data management techniques, demonstrating the ability to design and manipulate databases. |
| Program Learning Outcome 3: | Implement user interface design principles, encompassing aesthetics and usability, to develop intuitive and engaging digital interfaces utilizing advanced HTML and CSS techniques. |
| Program Learning Outcome 4: | Utilize project management and software design techniques to plan and execute team-based software projects. |

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| **Marketable Skills** |
| **Technical Skills**   1. Software Lifecycle - Create, manage and implement software applications from concept to deployment. 2. UI/UX Design - Create responsive or device specific front-end user interfaces for web sites, and software applications, with intuitive user experience designs. 3. Version Control - Manage source code using GIT version control and remote repositories. 4. Debugging & Testing - Troubleshoot, debug and test code, throughout the development process. 5. Database Management - Create, manage and use databases in projects. 6. Foundational Programming - Master foundational programming concepts, algorithms, and data structures to develop efficient and effective software solutions across various platforms and environments. 7. Programming Proficiency - Apply understanding and proficiency in programming concepts and skills in software projects. 8. Strategic Software Design - Analyze business requirements, assess feasibility, and design software solutions using Agile, Prototyping, and Object-Oriented methodologies.   **Soft Skills**   1. Team Dynamics - Navigate and contribute to diverse team environments, fostering collaboration and promoting shared goals. 2. Technical Communication - Communicate complex technical concepts clearly to stakeholders, ensuring understanding and alignment on project requirements. 3. Adaptability - Adapt to evolving project demands and technological shifts, demonstrating resilience and a commitment to continuous learning. 4. Task Management - Prioritize tasks effectively in high-pressure situations, ensuring timely delivery without compromising quality. 5. Problem-Solving Innovation - Critically evaluate challenges and devise innovative solutions, leveraging a deep understanding of software development principles. |

**Upload the program’s Program Outcomes and Course Alignment (POCA) document in section I.B.2. of the Appendix.**

1. **Industry or industries program serves**

The **AAS in Software Development** program at Collin College is designed to meet the workforce needs of multiple industries that rely on software and technology solutions. Graduates from this program are prepared to enter a variety of roles across sectors that depend on skilled software developers and IT professionals. Key industries served by the program include:

1. **Technology and Software Development**:
   * Core companies focused on software products, services, and solutions.
   * Demand for roles like software developers, web developers, and application engineers is strong in the DFW metroplex and beyond.
2. **Financial Services and FinTech**:
   * Banks, financial institutions, and startups need software developers to create, maintain, and secure digital financial tools and platforms.
   * Emphasis on programming and data management skills aligns with needs in this sector.
3. **Healthcare Technology (HealthTech)**:
   * Hospitals and healthcare providers require software solutions for patient management, telemedicine, and electronic health records (EHR).
   * Graduates are well-equipped to contribute to the development of such platforms.
4. **E-commerce and Retail**:
   * Companies increasingly depend on online platforms and web-based tools to reach customers and streamline operations.
   * The program’s focus on **web development and database management** prepares students to meet the needs of these industries.
5. **Defense and Aerospace**:
   * The **DFW region** is home to numerous **defense contractors and aerospace companies** that develop software solutions for military and government use.
   * Graduates with skills in **software development, data management, and secure programming** are well-suited for roles within this industry.
6. **Government and Public Sector**:
   * Federal, state, and local government agencies require developers to maintain websites, software solutions, and databases for public services.
   * Public sector jobs offer stable employment opportunities for software development graduates.
7. **Education and Training**:
   * The rise of educational technologies and e-learning platforms offers opportunities for developers skilled in web development and software design.
   * Software professionals are required to build and maintain systems that support remote and hybrid learning.
8. **Business Services and Consulting**:
   * Many consulting firms provide software development and IT support to other businesses, offering roles that require versatile developers with strong problem-solving skills.

With the increasing demand for software solutions across these industries, the Software Development program equips students with the technical and professional skills needed to thrive. Advisory committee meetings with local employers ensure the curriculum aligns with the evolving needs of these industries, making graduates well-prepared to contribute immediately to the workforce.

1. **Career paths and/or degree paths program prepares graduates to enter**

The **AAS in Software Development** at Collin College prepares students for **entry-level technology careers**, providing a practical education with hands-on training in programming, software development, and web technologies. Graduates gain the skills necessary to enter various industries, including technology, finance, defense, healthcare, and public services.

#### **Career Paths**:

Graduates are equipped to pursue roles such as:

* **Software Developer**: Designing and maintaining software applications for businesses.
* **Web Developer**: Developing websites and web-based applications.
* **Database Administrator**: Managing relational databases to support business needs.
* **IT Support Specialist**: Providing troubleshooting and technical support for IT systems.
* **Application Developer**: Building mobile or desktop applications for specific business functions.

With industry experience, graduates can move into advanced roles such as **Software Engineer**, **Full-Stack Developer**, or **Project Manager**.

#### **Degree Paths**:

The AAS in Software Development at Collin College is designed to support students who wish to enter the workforce directly while also providing opportunities for further academic advancement. The program includes 15 general education credits, such as English and Math, that are transferable to four-year institutions. Additionally, it incorporates 12 credits in Programming Fundamentals, which align with Computer Science requirements, making them transferable to many bachelor's degree programs.

Collin College has recently signed an articulation agreement with Texas A&M University – Central Texas (TAMUCT), enabling students who complete the AAS in Software Development to seamlessly transfer into TAMUCT's Bachelor of Applied Arts and Sciences (BAAS) program in Information Technology. This pathway includes focus areas such as Software Development, offering graduates an excellent opportunity to continue their education and enhance their career prospects.

Furthermore, the college has proposed a Bachelor of Applied Technology (BAT) in Software Development, which is currently under review and expected to launch in Fall 2025. The AAS curriculum is intentionally structured to align with this potential bachelor's program, providing graduates with additional options to advance their education and career. As previously mentioned, the BAT proposal has been approved by the THECB, and is awaiting final approval by SACSCOC.

Through these transfer opportunities and workforce-ready training, the program ensures students are well-prepared for both immediate employment and further educational pursuits.

1. **Regulatory standards program must meet, if applicable (e.g., THECB, Workforce, external accreditation)**

The **AAS in Software Development** program at Collin College operates under the following regulatory and accreditation frameworks:

1. **Accreditation**:
   * Collin College is accredited by the **Southern Association of Colleges and Schools Commission on Colleges (SACSCOC)**, which ensures the quality and integrity of academic programs and degrees awarded by the institution.
2. **Course Listings and Standards**:
   * **Workforce Education Course Manual (WECM)**:  
     Most of the workforce courses in the Software Development program are listed under the **WECM** system, which is maintained by the **Texas Higher Education Coordinating Board (THECB)**. WECM courses ensure alignment with industry standards and workforce needs.
   * **Local Needs Courses**:  
     Some workforce courses were developed to meet local industry needs and are designated as **Local Needs (LN)** courses. These courses were designed with input from advisory committees to address skills unaccounted for the WECM course lists.
     1. ITSE 2371 - Frontend Web Frameworks
     2. ITSE 2374 - Capstone Project
     3. ITSE 2375 - Intro to Data Science & AI
     4. ITSE 2376 - Secure Software Development
3. **General Education and COSC Courses**:
   * General education courses, such as **English, Math, and other core curriculum subjects**, as well as **COSC courses (Computer Science)**, are listed under the **Academic Course Guide Manual (ACGM)**. The ACGM ensures that these courses meet state-level academic standards and are transferable to other Texas public colleges and universities.   
     The following technical courses are listed under ACGM and are required in our program:
     1. COSC 1436 - Programming Fundamentals I
     2. COSC 1437 - Programming Fundamentals II
     3. COSC 2436 - Programming Fundamentals III
4. **Program Relationship to College Mission and Strategic Plan**
5. **Explain with evidence how the program supports the College’s mission statement: “Collin County Community College District is a student and community-centered institution committed to developing skills, strengthening character, and challenging the intellect.”**

#### **Developing Skills**

* **Database Management and SQL**: In **ITSE2309 – Database Programming SQL**, students undertake a project to design and manipulate a database, developing key data management skills. This assignment is assessed with a faculty-developed rubric that evaluates their proficiency in database structures, SQL queries, and optimization techniques.
* **Interface Design and Front-End Development**: **IMED1341 - Interface Design** requires students to create a fully responsive website, focusing on design, code quality, and usability. This project reinforces front-end skills critical for web development roles, with a rubric measuring their success against industry standards.
* **Capstone Software Project**: In the **Capstone course (ITSE2374)**, students complete a comprehensive software project from inception to deployment, allowing them to apply project management, coding, and problem-solving skills. The project serves as a capstone piece in their portfolios, demonstrating readiness for real-world software development.
* **Programming Languages and Tools**: The curriculum includes top programming languages identified in the Stack Overflow survey, such as **Python, Java, C++, and SQL**. Students also gain proficiency in **VS Code** across multiple courses, preparing them for diverse development environments.

#### **Strengthening Character**

* **Professionalism and Responsibility**: Students are introduced to industry standards of professionalism, including the importance of clear documentation and maintaining clean, reliable code. Through project-based learning, they experience the responsibilities of delivering high-quality work and managing tasks effectively.
* **Collaborative Skills**: Although team-based projects are only just being introduced, students in the capstone course have the option to collaborate with peers, fostering communication skills and a sense of accountability that will serve them in professional environments.

#### **Challenging Intellect**

* **Complex Problem Solving and Critical Thinking**: Courses like **Programming Fundamentals** (COSC 1436 and 1437) challenge students to develop applications using Python and Java, building skills in problem-solving, debugging, and optimization.
* **Real-World Application Development**: The capstone project in ITSE 2374 simulates real-world software development, requiring students to apply their learning in a practical setting. This project reinforces their ability to tackle complex problems and prepares them for industry challenges.
* **Extracurricular Development**: The **Software Engineering Club** offers additional opportunities for skill-building, such as a recent series of Git/GitHub lessons, fostering essential version control skills. Club activities promote a community of learners and encourage the application of classroom knowledge.

1. **Explain with evidence how the program supports the College’s strategic plan (2020–2025 Strategic Plan).**

#### **Goal 1: Improve student outcomes to meet or exceed local, state, and regional accreditation thresholds and goals**

The Software Development program strives for high student outcomes by providing structured, skills-based learning experiences aligned with industry requirements. Key projects, like the **database project in ITSE2309** and the **capstone software project in ITSE2374**, are assessed through faculty-developed rubrics to ensure students meet rigorous academic standards. These assessments help track and improve student proficiency, keeping outcomes aligned with accreditation requirements and enhancing students’ readiness for the workforce.

#### **Goal 2: Develop and implement strategies to become a national exemplar in program and student outcomes**

Our program continuously enhances curriculum quality based on **advisory committee feedback** and industry trends. Over the past five years, updates have been made to emphasize **compiled languages, project management, and the software development lifecycle (SDLC)**. By integrating feedback from industry professionals, the program keeps pace with emerging practices, positioning itself as a model of adaptability and alignment with workforce demands.

#### **Goal 3: Create and implement comprehensive integrated pathways to support student transitions**

While the AAS in Software Development is primarily designed for workforce entry, it includes **15 general education credits** and **12 programming credits** that support transferability to four-year institutions. Additionally, Collin College’s proposed **Bachelor of Applied Technology (BAT) in Software Development**, expected to launch in **Fall 2025** (pending final SACSCOC approval), will create a pathway for AAS graduates to pursue advanced studies within the college, supporting continued professional growth.

#### **Goal 5: Develop a coordinated and systematic approach to engage external stakeholders**

The program actively engages with external stakeholders through **biannual advisory committee meetings**. These stakeholders, consisting of industry professionals, provide critical input on curriculum relevance and labor market trends, ensuring the program remains responsive to the needs of local employers. The advisory committee’s insights have informed updates such as the introduction of **team-based projects** and the focus on **fundamental coding skills**, which support students’ transition from the classroom to the workplace.

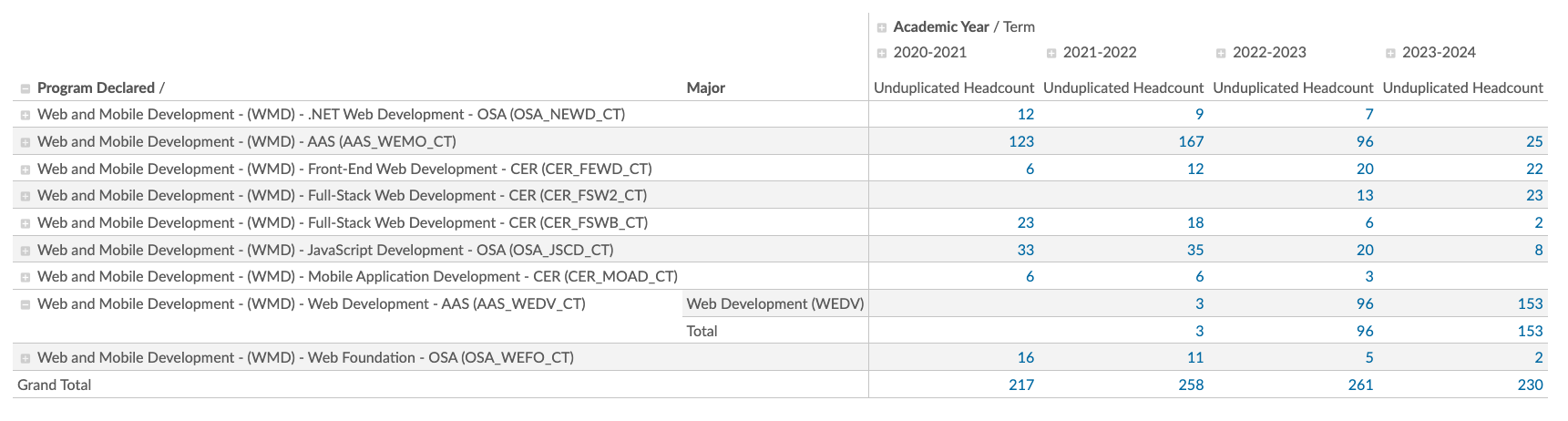
#### **Goal 6: Expand career and technical programs and training offerings in alignment with current and future regional labor market demand**

The Software Development program closely aligns with the current and anticipated demands of the regional labor market. The inclusion of widely-used programming languages like **Python, Java, C++, and SQL**—as well as tools like **VS Code**—ensures graduates possess the technical skills that are highly valued by local employers. Advisory committee input further enhances the program’s relevance, as committee members highlight the critical skills needed in the DFW area and support curriculum updates that reflect these needs.

1. **Program Relationship to Student Demand**
2. **Describe with evidence student demand for program awards (degrees and certificates).**

The Software Development program at Collin College has seen generally positive enrollment trends, with some fluctuations due to recent curriculum changes and the introduction of new requirements. The historical enrollment data demonstrates a steady increase in total program enrollment over the years, reflecting student interest and demand for the skills and qualifications the program provides. However, in the most recent academic year (2023–2024), the total enrollment count dropped from 261 to 230, following the curriculum shift implemented in Fall 2022, when the **AAS in Web and Mobile Development (WEMO)** was replaced by the **AAS in Web Development (WEDV)**.

This decline aligns with expectations, as the new curriculum now includes **COSC programming fundamentals** courses, which require a **TSI math exam**. These more rigorous programming and math requirements have made the degree more challenging, potentially affecting enrollment and completion rates. Although this has reduced enrollment in the short term, the program’s goal is to produce more proficient coders who are better prepared for the workforce.



1. **What does the program’s enrollment pattern, if unaltered, suggest for the program’s future? Explain.**

If the current enrollment pattern continues without intervention, we might see ongoing fluctuations as students adjust to the heightened academic requirements of the AAS program. The introduction of more challenging COSC courses and math prerequisites will likely continue to filter out students who may struggle with STEM-focused courses, resulting in a slightly smaller but more capable student body.

However, the future trajectory of enrollment is expected to shift significantly if the **Bachelor of Applied Technology (BAT) in Software Development** is approved by SACSCOC, anticipated for launch in **Fall 2025**. A bachelor’s degree offering through a community college, with lower math requirements than a typical computer science degree, is projected to appeal to a broader demographic and increase overall enrollment. Additionally, the affordability of a community college bachelor’s program is likely to be a strong driver for growth.

In the interim, as we await the BAT degree’s approval and begin advertising it, the program’s enrollment may remain stable or experience gradual growth. Once the BAT is formally promoted, we anticipate a significant increase in enrollment, particularly among students who see the pathway from an associate’s to a bachelor’s as a cost-effective way to achieve their career goals.

1. **For technical program courses (not general education courses) that have a pattern of low enrollment (fewer than 15 students), explain your plan to grow enrollment and/or revise the curriculum.**

In Fall 2024, we introduced a new curriculum for the AAS in Software Development, offering two pathways: the Web Development path and the General path. The General path includes two new courses, **Introduction to Data Science and AI** and **Secure Software Development**, which are planned as second-year courses. Our initial strategy was to begin offering these courses in Fall 2025, anticipating they would meet demand from students progressing through the new curriculum.

However, due to current enrollment patterns in second-year courses, where enrollment counts are relatively low, we have decided to delay the introduction of these new General path courses until the **2026-2027 academic year**. This approach ensures we maintain viable enrollment in second-year courses by focusing on a single pathway (Web Development) until demand increases sufficiently to support both pathways.

While we have not yet advertised the **upcoming Bachelor of Applied Technology (BAT) in Software Development**, which is expected to drive greater enrollment, we anticipate that promotion of the BAT degree will encourage more students to pursue the AAS degree. This should enable us to offer both option paths by Fall 2026, when increased enrollment can support the development and delivery of both the Web Development and General pathways.

1. **What plans, if any, does the program have for changing its enrollment pattern?**

Now that the **BAT in Software Development** has received the approval of the **Texas Higher Education Coordinating Board (THECB)**, we plan to initiate limited marketing efforts for the BAT degree with a “pending SACSCOC approval” disclaimer, as SACSCOC approval is also expected in the Spring, before the program’s launch in **Fall 2025**.

This early promotion strategy will allow us to inform prospective students of the pathway from the AAS to the BAT, emphasizing three main benefits:

1. **Lower Math Requirements**: Unlike a traditional computer science or software engineering degree, which often includes extensive math coursework, the BAT degree is structured to have lighter math requirements, making it accessible to students who might be deterred by higher-level math.
2. **Cost-Effectiveness**: The affordability of a community college bachelor’s degree presents a unique opportunity for students to achieve their educational and career goals without the financial burden associated with traditional university programs.
3. **Career-Relevant Curriculum**: The BAT program’s courses focus on practical, technical skills that are directly applicable to software development careers, unlike some university computer science or software engineering programs that may lean toward theoretical concepts. This focus on real-world applications will prepare students for the demands of the job market more effectively.

By highlighting these advantages, we expect to attract a broader student base and increase demand for the AAS degree as students see a clear, affordable, and career-aligned pathway to a bachelor’s degree within Collin College. This proactive approach is designed to shift enrollment patterns significantly, building momentum for the BAT program’s official launch.

1. **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 present, please develop and describe a plan to do so.**

Identifying and supporting students early in the Software Development program is crucial for increasing enrollment, retention, and completion rates. The following methods are used to provide guidance and resources for students throughout their academic journey:

* **Workforce Program Coach Introduction**: Since most Software Development courses are offered online, the Program Coach reaches out to all students via email to introduce themselves and provide information on how they can assist within the program. This initial communication includes guidance on degree mapping, details about special events on campus, and contact information for further support.
* **Referrals for Struggling Students**: Instructors are proactive in identifying students who may be struggling academically or who have inconsistent attendance. These students are referred to the Program Coach, who follows up to discuss available resources, such as tutoring options or deadlines for withdrawal, to help them stay on track.
* **Course Substitution and Degree Plan Assistance**: The Program Coach collaborates with faculty to provide course substitution options for students who are finishing their degrees under older catalog requirements, approaching the five-year degree plan deadline, or have transfer coursework that needs review. This personalized support helps students complete their degrees more efficiently and ensures they meet graduation requirements.
* **Scholarship and Job Opportunities**: The Program Coach regularly sends out information about scholarship opportunities, job openings, career fairs, and events aimed at enhancing students' career readiness. These communications include resources for interview preparation, resume review, and networking opportunities to help students transition smoothly from the program into the workforce.
* **Faculty Engagement and Support**: Faculty members maintain an open-door policy (virtually, when necessary) and are approachable, encouraging students to communicate any issues early on. Instructors also facilitate peer collaboration through group assignments and discussions, helping students build a support network within their cohort.

Through these targeted actions, the Software Development program strives to create a supportive learning environment that enhances student engagement, improves retention, and helps students successfully complete their academic and career goals.

1. **Discuss program enrollment by gender, race, and ethnicity compared to Collin College’s overall student demographics. How does the program attract (or plan to attract) a diverse student population? What does the demographic and enrollment evidence suggest about the program?**

The software development industry has historically exhibited significant gender and racial disparities.

**Gender Representation:** Men constitute the majority of software developers. Data from 2023 indicates that approximately 91.88% of software developers are male, while only 5.17% are female, and the rest of the developers (2.95%) identifying as queer, non-binary, gender non-conformist, and more).

Source: https://dataprot.net/statistics/software-development-statistics/

**Racial and Ethnic Representation:** In the United States, the racial composition of software developers is as follows:

* **White:** 52.5%
* **Asian:** 29.9%
* **Hispanic or Latino:** 8.2%
* **Black or African American:** 4.5%
* **American Indian and Alaska Native: 0.1%**
* **Unknown:** 4.8%

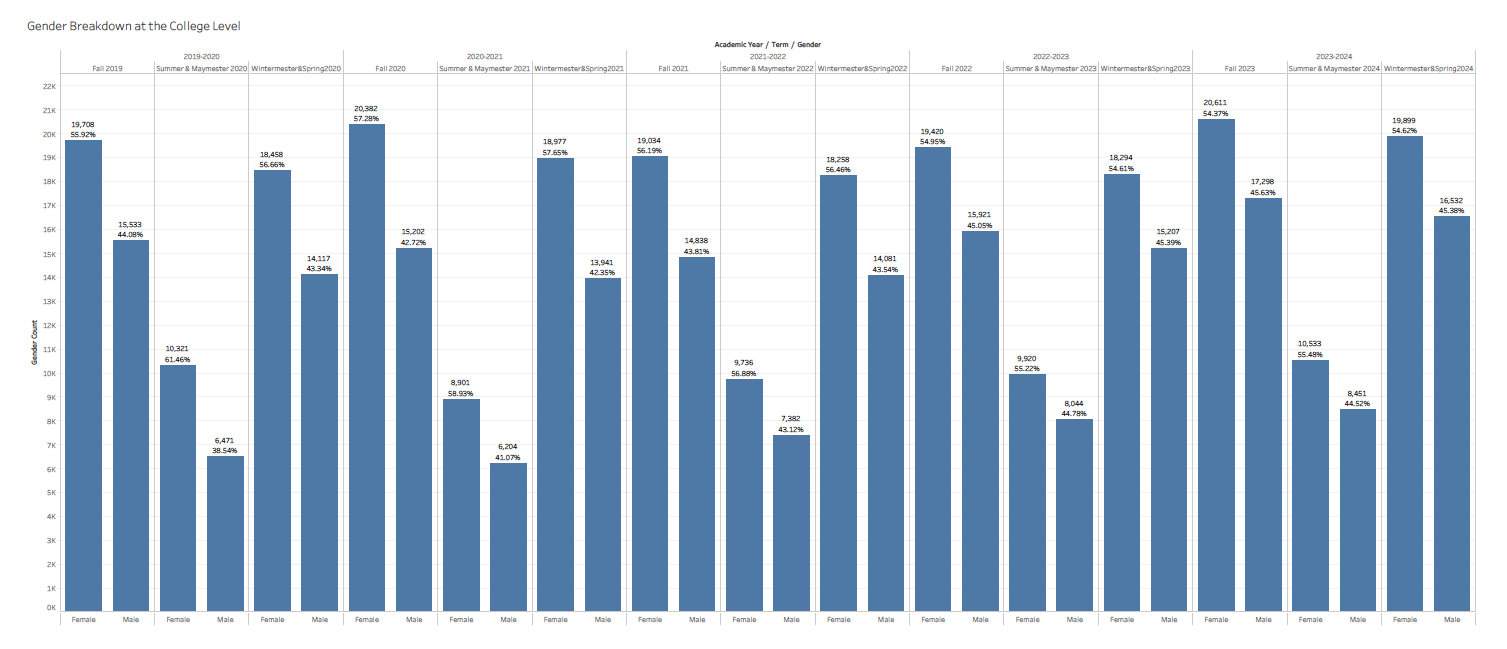
Source: https://www.zippia.com/software-developer-jobs/demographics/

These statistics highlight the underrepresentation of women and certain racial and ethnic groups in the software development field. Efforts are ongoing within the industry to promote diversity and inclusion, aiming to create a more balanced and representative workforce.

The following charts show data for Gender, Race, and Ethnicity for both the Software Development program and Collin College as a whole:

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The following graph is the Race Breakdown at the Discipline Level:A graph of a number of people

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A graph with blue and white bars

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The following graph is the Ethnicity Breakdown at the Discipline Level:

A graph of blue columns

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The data above shows the racial distribution of enrolled Software Development students compared with Collin College’s overall student racial distribution and it looks as if we are in line with the college’s overall distribution. Although, we have a higher population of Asian students enrolled compared with the college’s overall number.

When comparing gender distribution, the Software Development program has about 35% female while the college has an overall of around 56% female.

Two of our female computer science faculty members have been working to encourage females to explore engineering opportunities by offering summer coding camps for middle school girls and by promoting students to get involved with Collin’s chapter of the Society of Women Engineers (SWE), a national organization that supports females interested in engineering. One of the faculty members has been an advisor for the Collin chapter of SWE for the past few years. This student organization offers resume building workshops, mock interviews, company tours, and hosts various speakers every year. The student officers of SWE have promoted this organization at our various campuses during various events, have attended the SWE national conference (the world’s largest conference for women in engineering and technology), and have volunteered to help with engineering events such as Design your World, aimed at promoting and engaging middle school/high school girls in STEM areas.

Collin College is also collaborating with Texas A&M University at Commerce on an NSF S-STEM grant that provides financial support and mentoring to eligible non-traditional computer science students. This grant could help to attract more females into the software development field.

While we have a low enrollment of female students and Collin College has been encouraging more females to consider majoring in computer science/engineering disciplines by promoting engineering to females at the middle school, high school, and college level with the Society of Women Engineers and by offering summer coding camps to local middle school girls.

1. **Program Relationship to Market Demand**

**Discuss the evidence indicating that employers need and hire the program’s graduates. Identify and discuss the program’s strengths and weaknesses related to market demand.**

The Software Development program aligns with strong market demand both nationally and within the Dallas-Fort Worth (DFW) Metroplex. This demand is driven by the increasing need for software solutions across industries like healthcare, finance, and e-commerce, as well as the tech sector’s growth in the DFW area. The program aims to supply the local job market with skilled graduates ready to enter a high-demand field with competitive salaries.

Sources:

Bureau of Labor Statistics:

<https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm>

<https://www.bls.gov/oes/current/oes151252.htm>

<https://dallas.culturemap.com/news/innovation/best-tech-cities-plano-frisco/>

<https://texascareercheck.com/OccupationInfo/OccupationSummary/15-1252.00/>

<https://www.zippia.com/software-developer-jobs/trends/>

1. **How many program-related jobs are available in the DFW Metroplex for program graduates? If the majority of related jobs in the DFW Metroplex require a baccalaureate degree, provide evidence that the program has a current signed articulation agreement with one or more transfer institutions or that the program plans to develop one.**

According to the Bureau of Labor Statistics (BLS), the software development occupation is projected to grow by 25% from 2021 to 2031, which is significantly faster than the average growth rate for all occupations. This translates to approximately 162,900 job openings each year due to growth and replacement needs​

In the DFW area, demand for software developers is especially high. A recent search on Indeed.com showed over 2,000 job listings for software development roles within the region, underscoring the strong demand in this local market​. Additionally, a **Dallas CultureMap** article highlights Plano and Frisco as emerging tech hubs, further fueling demand for skilled software professionals​

While many employers prefer candidates with a bachelor’s degree, there is industry recognition of the value of relevant skills and experience, sometimes making an associate degree sufficient for entry-level roles. This is particularly true for students with practical coding experience and certifications, which are emphasized in our program. Furthermore, Collin College’s proposed Bachelor of Applied Technology (BAT) degree in Software Development, expected to launch in Fall 2025, will provide AAS graduates a seamless path to a bachelor’s degree, enhancing their marketability and meeting the demand for higher educational qualifications in some companies.

1. **What proportion of the program’s graduates (seeking employment) found employment within 6 months of graduation?**

Tracking employment outcomes for program graduates has been challenging, as it relies on self-reported information. Currently, students are not systematically surveyed after graduation, making it difficult to gather accurate data on employment rates within six months of graduation. However, the program is considering new measures, such as exit interviews and tracking systems, to improve our understanding of graduate outcomes. These efforts will allow us to collect data on employment or further education plans, including job offers secured prior to or shortly after graduation.

1. **What changes are anticipated in market demand in the next 5 years? Do program completers meet, exceed, or fall short of local employment demand? How will the program address under- or over-supply?**

Market demand for software developers in the DFW area is expected to remain high over the next five years, fueled by tech sector growth and the ongoing digital transformation across industries. According to the **Texas Career Check** data, software development is classified as a high-growth occupation in Texas. Competitive wages in the DFW area reflect the regional demand for skilled software developers, making it an attractive career path with stable job prospects​

The program continuously adapts its curriculum based on input from our advisory committee, which meets twice a year to ensure that the skills taught align with current industry demands. Recent curriculum updates have increased the focus on relevant programming languages, cloud technologies, and software development methodologies, ensuring graduates meet employer expectations.

As the program anticipates launching the BAT degree in Software Development, we expect this to attract additional students seeking a cost-effective path to a bachelor’s degree in a high-demand field. Given that the BAT requires fewer advanced math courses than a traditional computer science degree, it appeals to a broader range of students who may seek a more practical, career-oriented education. By addressing both immediate and long-term workforce needs, the AAS and proposed BAT programs position graduates for success in a competitive job market.

A graph of software developers

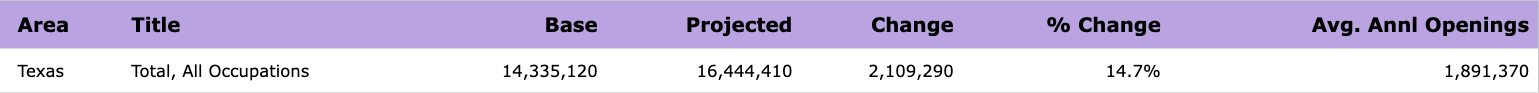
Description automatically generated with medium confidence

A screenshot of a graph

Description automatically generated

Texas Projections, according to Projections Central, a site sponsored by the US Department of Labor:

Source: <https://projectionscentral.org/longterm>



1. **Effectiveness of Curriculum**
2. **Describe with evidence any curricular barriers to program completion.**

One potential curricular barrier to program completion is the sequencing of the COSC courses (COSC 1436, 1437, and 2436), which are foundational for the program. Students must pass the TSI Math exam to enroll in COSC 1436, and the courses build on one another, meaning that difficulties in one course may delay progress through the sequence. This can be especially challenging for students who need additional time to meet the TSI Math requirement.

Another potential barrier is the limited availability of certain courses. For example, ITSE 2302 (Intermediate Web Programming) and ITSE 1350 (Systems Analysis & Design) are typically offered only once per semester. Similarly, INEW 2334 (Advanced Web Programming) is currently offered only once a year (every Spring), though plans are in place to offer it once per semester in response to growing enrollment. IMED 1341 (Interface Design) is usually offered once per semester, but its growing demand has prompted plans to expand to two sections per semester in the near future. These limitations can impact students' ability to complete their required coursework in a timely manner, particularly if they need to repeat a course or if their schedules conflict with course offerings.

1. **How many students completed program awards in each of the last 4 years? If the number of graduates does not average 5 or more per year, describe a plan to increase completions, and address this issue in the Continuous Improvement Plan (CIP) in Section XII of this program review.**

Total Awards Completed per year (Including AAS, Certificates and Occupational Skill Awards):

2020-2021: 85

2021-2022: 110

2022-2023: 69

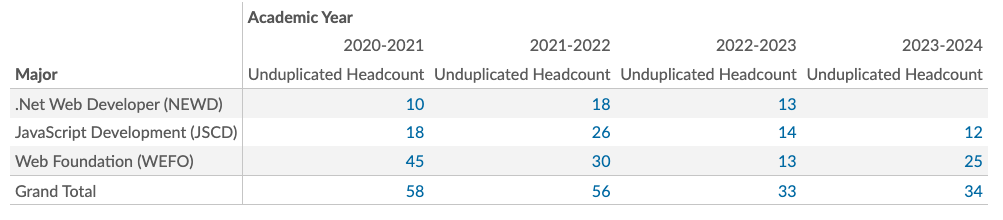
2023-2024: 57

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1. **Analyze the course success rates and the course completion rates of each course in your program. Address problems in the CIP in Section XII of this program review.**

Analysis of Course Success Rates and Course Completion Rates is done in sections

5.E.6 and 5.B.3, respectively.

Program CIP’s used to address things like completion, retention rates etc. However, more recently, the College administration has decided that the CIP must focus on improving a program’s Student Learning Outcomes.

This directive came after the Program Review Steering Committee had already finalized the existing report template's language.

Therefore this field is outdated.

Our CIP will focus on SLO’s.

1. **Show evidence that the institutional standards listed below have been met. For any standard not met, describe the plan for bringing the program into compliance.**
2. **Completers Standard (Texas Higher Education Coordinating Board [THECB] standard): Average 25 completers over the last 5 years or an average of at least 5 completers per year.**
3. **Number of completers** : 321 **in last 5 years.**
4. **If the average number of completers is below the stated standard (5 per year), describe a plan for raising the number of completers by addressing barriers to completion and/or by increasing the number of students enrolled in the program.**

N/A

1. **Licensure Standard (targeted level of success Collin College has chosen for meeting the SACSCOC standard): 93% of test-takers pass licensure exams.**
   * 1. **If applicable, state the program’s licensure pass rate for the most recent academic year.**

N/A

* + 1. **For any pass rate below 93% (Collin College standard), describe a plan for raising the pass rate.**

N/A

1. **Course Completion Standard (Collin College standard): 78% of students enrolled in program courses on the census date should still be enrolled on the last class day (grades of A through F).**
2. **State the course completion rate of each program course in the last 4 years.**

The following are the average Course Completion Rates for each required course in the AAS Web Development degree, over the past 4 years.

COSC 1436: 91%

COSC 1437: 90%

COSC 2436: 94%

IMED 1341: 90%

INEW 2334: 95%

ITSE 1301: 90%

ITSE 1306: 86%

ITSE 1311: 87%

ITSE 1346: 79%

ITSE 1359: 91%

ITSE 2302: 88%

ITSE 2309: 82%

ITSE 2313: 96%

ITSE 2371: 100% (New course had only run once with 12 students)

ITSE 2374: 95%

1. **For each course completion rate below 78%, describe a plan for raising the course completion rate.**

None of the above Course Completion Rates are below 78%.

**C. Indicate with evidence that the program curriculum is current.**

To demonstrate that the program curriculum is current, Collin College’s Software Development program undergoes regular updates based on input from industry advisory committees, employer feedback, and labor market data. The curriculum includes programming languages and technologies that are highly in demand, such as Python, Java, React, and Node.js, alongside foundational courses in databases, project management, and software development methodologies. Additionally, the program aligns with industry needs by incorporating SDLC principles, team-based capstone projects, and pathways for advanced learning, such as the proposed BAT degree. Evidence of the curriculum's relevance is further supported by biannual advisory committee meetings and regular curriculum revisions to match evolving job market requirements.

1. **How does the program curriculum compare to curricula at other schools? Review programs at two or more comparable colleges. Discuss differences in curriculum and ideas for improvement, if any.**

#### **Curriculum Comparison**

1. **Programming Foundations and Languages**:
   * **Collin College**:
     + Collin’s program emphasizes a strong foundation in programming languages, starting with **ITSE 1359 (Intro to Scripting - Python)** in the first semester. This ensures students ease into programming before tackling more advanced languages.
     + **COSC 1436 (Programming Fundamentals I)** introduces **C++**, followed by **COSC 1437 (Programming Fundamentals II)** and **COSC 2436 (Programming Fundamentals III)**, which focus on **Java** for object-oriented programming and data structures, respectively.
     + In addition, students learn **JavaScript** in **ITSE 2302 (Intermediate Web Programming)** and **SQL/Oracle** in **ITSE 1346 (Database Theory and Design)** and **ITSE 2309 (Database Programming - SQL)**.
   * **Dallas College**: Offers a broad range of programming languages, including Visual Basic, C++, and Java. However, it does not provide the step-by-step progression of foundational programming and advanced concepts like Collin’s COSC sequence.
   * **Tarrant County College**: Focuses heavily on **native mobile app development**, offering **iOS Programming** and **Android Programming**. It provides web programming courses, but with less emphasis on progressive programming fundamentals.

**Observation**: Collin College provides a well-rounded programming curriculum, with progressive courses focusing on multiple programming languages and paradigms (scripting, OOP, data structures). Unlike Tarrant County, Collin shifted away from native mobile development, recognizing that a single iOS or Android course in a two-year program is insufficient for employment in that field. Instead, Collin emphasizes adaptive and responsive web development, reflecting market trends.

1. **Database and Backend Programming**:
   * **Collin College**: Provides comprehensive database training through **ITSE 1346 (Database Theory - Oracle)** and **ITSE 2309 (SQL Programming)**. Additionally, backend web development is taught in **INEW 2334 (Advanced Web Programming)**, which covers **Node.js** and **Express**.
   * **Dallas College**: Includes database programming courses but does not integrate backend development technologies like Node.js.
   * **Tarrant County College**: Offers database courses, but the emphasis is more on web programming and mobile development integration.

**Observation**: Collin College stands out by balancing database education with backend web programming. This combination prepares students for versatile roles in the tech industry.

1. **Web Development and Emerging Technologies**:
   * **Collin College**: Focuses on **responsive web frameworks** through **ITSE 2371 (Frontend Web Frameworks)**, teaching **React** and some **Vue.js**. The program also includes **IMED 1341 (Interface Design)** and **ITSE 2302 (Intermediate Web Programming)** for foundational web design and development skills.
   * **Dallas College**: Offers web development but lacks a modern emphasis on frameworks like React or Vue.js.
   * **Tarrant County College**: Includes **capstone web programming projects** but focuses heavily on web design tools without frontend frameworks.

**Observation**: Collin’s focus on modern web frameworks like React ensures graduates are prepared for current industry demands.

1. **Capstone Projects**:
   * **Collin College**: In the capstone **ITSE 2374 (Software Development Project)**, students work in teams on real-world projects. They can choose the type of project (e.g., mobile app, database project, or web app), utilizing skills from their prerequisite courses like project management, database programming, and OOP.
   * **Dallas College**: Provides final projects but does not emphasize team-based capstone projects as much.
   * **Tarrant County College**: Focuses its capstone on advanced web programming but lacks flexibility in project type.

**Observation**: Collin’s capstone project stands out by allowing students to select projects based on their interests, fostering creativity and collaboration.

1. **Curriculum Flexibility and Future Growth**:
   * **Collin College**: The new 2024 curriculum introduces two option paths:
     + **Web Development Path**: Focused on web technologies and frameworks.
     + **General Path**: Includes elective slots and plans for emerging fields like **Data Science** and **Secure Software Development** (set to launch in 2026/2027).
     + This modular structure allows for future growth, with potential for additional paths in **Game Development**, **AI Development**, or **Database Development**, depending on enrollment growth.
   * **Dallas College**: Offers electives but lacks future-focused pathways like Collin’s planned options.
   * **Tarrant County College**: Specializes in mobile app development, but this narrow focus may limit broader opportunities.

**Observation**: Collin’s flexible design allows for customization and scalability, positioning the program for long-term growth as student interest and market demands evolve.

**Ideas for Improvement**

1. **Cloud Integration**: While Collin plans to introduce a **Cloud-Enabled Software Development** course in its BAT program, including introductory cloud computing concepts in the AAS could enhance immediate job readiness.
2. **Mobile Development**: Reintroducing **introductory mobile development** as an elective might appeal to students interested in this niche.
3. **Broader Electives**: Offering electives like **Cybersecurity Basics** or **AI Fundamentals** could provide students with additional pathways aligned with market trends.

By focusing on modern frameworks, backend programming, team-based projects, and modular curriculum growth, Collin College’s Software Development AAS program is uniquely positioned to meet industry demands and offer students robust career opportunities.

1. **How does the program curriculum align with any applicable professional association standards or guidelines?**

The Software Development program curriculum aligns with industry expectations and best practices as guided by feedback from the advisory committee, which includes local industry professionals. While there are no specific professional association standards in software development, the program emphasizes in-demand skills and technologies, such as Python, JavaScript, SQL, Agile processes, and modern web frameworks, which reflect current industry needs. Additionally, courses are designed to align with the Texas Workforce Education Course Manual (WECM) standards, ensuring that the program meets state guidelines for technical education. This approach ensures students are well-prepared to enter the workforce with relevant skills.

1. **Is the curriculum subject to external accreditation? If so, identify the accrediting body and the most recent accreditation date for the program, and summarize the outcome of the last accreditation review, if available.**

Our Software Development Program is not subject to external accreditation.  However, our college is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC), which accredits all degree programs offered by our institution.

1. **If the program curriculum differs significantly from these benchmarks, explain how the Collin College curriculum benefits students and other college constituents.**

The Collin College Software Development curriculum offers distinct benefits compared to other local programs by incorporating a broader range of programming languages and technologies, including Python, Java, React, and Node.js, as well as an emphasis on project management and capstone projects. The curriculum is designed to prepare students for versatile roles in the industry, allowing them to work in web development, database management, or software engineering. Additionally, the inclusion of pathways for future growth, such as a proposed Bachelor of Applied Technology (BAT) degree, ensures long-term opportunities for students and supports regional workforce needs.

**D. Present evidence from advisory committee minutes and composition that the program has an engaged committee that includes employers who are actively engaged on the committee, and who are representative of area employers.**

The Software Development program's advisory committee is actively engaged, consisting of eight voting members who represent a range of employers, including global corporations, local businesses, and educational institutions in the DFW area. Members include senior engineers, engineering managers, and directors, offering diverse industry perspectives. Over the past five years, committee members have consistently attended meetings, with the exception of Spring 2024, which experienced scheduling conflicts due to a new meeting format.

1. **How many employers does your advisory committee have?**

The advisory committee currently consists of **8 voting members**, all of whom are professionals actively working in the software development and related industries.

1. **How many employers attended the last 2 meetings?**

In **Fall 2024**, **7 out of 8 voting members** attended the meeting, demonstrating strong engagement from the advisory committee. However, in **Spring 2024**, only **1 member was present**, which was an unusual occurrence over the past five years. This drop in attendance resulted from a new format where all workforce programs held their advisory meetings on the same day, limiting scheduling flexibility. Two committee members were present at different advisory board meetings due to their involvement in multiple programs. Historically, the committee has consistently met quorum, and Spring 2024 was the only instance where attendance fell short. Moving forward, the program will return to more flexible scheduling to ensure continued robust participation.

1. **How has the advisory committee impacted the program over the last five years (including latest trends, directions, and insights into latest technologies)?**

The advisory committee has significantly influenced the direction of the program, ensuring alignment with industry trends and workforce needs. Their insights have led to a stronger emphasis on foundational coding skills, with the integration of COSC Programming Fundamentals courses that teach C++ and Java. These changes ensure that students gain proficiency in both scripting and compiled languages, addressing the industry's preference for versatile developers.

The committee also emphasized workplace readiness, prompting the inclusion of project management, business communication, and systems analysis and design courses. These additions introduce students to Agile methodologies, SDLC, and other industry-standard practices. Furthermore, the advisory committee recommended the removal of native mobile app development courses, shifting focus to responsive web development to better align with local job market demands.

1. **Briefly summarize the curriculum recommendations made by the advisory committee over the last 4 years.**

Over the last four years, the advisory committee has made key recommendations, resulting in the following updates:

* **Addition of Advanced Courses:** Introduced COSC 1436, 1437, and 2436 to build a progression in programming skills, focusing on C++, Java, and data structures.
* **Focus on Workplace Skills:** Added ITSC 1315 (IT Project Management) and ITSE 1350 (Systems Analysis & Design), emphasizing teamwork, Agile, and real-world scenarios.
* **Removal of Native Mobile Development:** Phased out iOS and Android programming courses based on limited employability at the associate degree level.
* **Incorporation of Team-Based Learning:** Plans are in development to require team collaboration for the Capstone course, ensuring students experience group dynamics and project management.
* **Language Versatility:** Ensured a mix of scripting and compiled languages, aligning with industry feedback on essential coding skills.

These updates reflect a collaborative effort to ensure the program remains relevant, rigorous, and responsive to market demands.

1. **Make a case with evidence that the program is well managed.**

The Software Development program is well managed, as demonstrated by the continuous refinement of curriculum, data-driven decision-making, and active collaboration with industry experts. Over the years, the program has evolved based on advisory committee feedback, resulting in an updated curriculum that balances fundamental programming skills with relevant technical and workplace-focused competencies. Course schedules are thoughtfully developed to ensure strong enrollment numbers and to meet student demand while maintaining academic rigor. Grade distributions and section size data reflect a proactive approach to maintaining and improving student success, as seen in the increasing success rates of courses like ITSE 1311. Additionally, courses with fluctuating enrollment, such as ITSE 2374, are carefully monitored to optimize offerings without overburdening resources. Faculty and administrators consistently implement industry-relevant teaching practices and incorporate feedback from instructor evaluations and indirect student feedback mechanisms. The program's management is also forward-thinking, as evidenced by its flexibility to accommodate future growth. With the introduction of multiple option paths in the updated curriculum and preparation for the upcoming Bachelor's of Applied Technology degree, the program is positioned to adapt to market demands while maintaining a focus on quality education for its diverse student body.

1. **Upload the current Institutional Research Office (IRO) table of average section size of program courses in section V.E.1. of the Appendix.**
2. **Examine the IRO table of average section size of program courses and draw conclusions from the data.**

### **General Trends from 2020–2024:**

1. **ITSE-1311 - Beginning Web Programming:**
   * Average section sizes typically range between **23 and 27 students** during most semesters, with slightly lower averages in summer terms. This indicates strong and steady demand for this foundational course, often approaching the cap of 25 students for online classes.
2. **ITSE-1359 - Intro to Scripting Languages - Python:**
   * Section sizes range from **19 to 25 students**, with 25 being a common figure. This suggests that the course frequently fills to its capacity, reflecting high demand for Python programming as an introductory scripting language.
3. **IMED-1341 - Interface Design:**
   * Starting in 2020, section sizes for IMED-1341 generally average around **24 students**, nearing the 25-student cap. Due to its popularity, the program plans to offer a second section starting next spring to accommodate the demand.
4. **INEW-2334 - Advanced Web Programming:**
   * Typically, **one section per year** has been offered to maintain enrollment numbers over 10 students. The section sizes average between **10 and 18 students**, reflecting moderate demand for advanced backend web development topics.
5. **ITSE-2302 - Intermediate Web Programming:**
   * Recent semesters show section sizes ranging from **21 to 25 students**, indicating that this course remains consistently popular and often reaches its cap.
6. **ITSE-2371 - Frontend Web Frameworks:**
   * As a relatively new course, it has only been offered three times in the data, with section sizes consistently between **10 and 15 students**. This course has been offered in a single section per semester to maintain these numbers.
7. **ITSE-2374 - Software Development Project (Capstone):**
   * Section sizes vary significantly, reflecting the nature of a capstone course. Enrollment has ranged from **2 to 18 students**, with one section offered per semester. The course is run on a “per-head” basis when necessary, particularly when enrollment falls below 10 students. To improve numbers, the program plans to stop offering this course in summer, which may help consolidate enrollments in fall and spring semesters.

### **Conclusions:**

1. **Broad Demand for Foundational Courses Across Majors:**
   * Courses like ITSE-1311 and ITSE-1359 consistently approach or reach their enrollment caps, with section sizes often ranging from 23 to 27 and 19 to 25 students, respectively. These courses are not only critical to the Software Development program but are also required by other majors, contributing to their consistently high demand and the need for multiple sections each semester.
2. **Steady Interest in Core and Specialized Courses:**
   * Core courses such as IMED-1341 and ITSE-2302 show strong and stable enrollment, often nearing the maximum capacity of 25 students. Specialized courses like INEW-2334 and ITSE-2371 maintain viable enrollment levels, with section sizes ranging between 10 and 18 students. Strategic scheduling ensures these courses remain accessible without oversaturating offerings.
3. **Capstone Enrollment Variability:**
   * Enrollment in ITSE-2374, the capstone course, varies significantly due to its nature as a culminating experience for students nearing graduation. Enrollment has ranged from 2 to 18 students per semester, often requiring the course to run on a "per-head" basis when numbers fall below 10. Moving the capstone course to fall and spring semesters exclusively is expected to help stabilize enrollment.

Note: Several courses in the curriculum are managed by other programs, and therefore not discussed above:

|  |  |
| --- | --- |
| **Department** | **Course** |
| Database Development | ITSE 1346  ITSE 2309 |
| Computer Science | COSC 1436  COSC 1437  COSC 2436 |
| Computer Systems | ITSE 1350 |
| Cloud Computing | ITSC 1315 |
|  |  |
|  |  |
|  |  |

1. **Upload the current Institutional Research Office (IRO) table of grade distributions of program courses in section V.E.3. of the Appendix.**
2. **Examine the IRO table of grade distributions of program courses and draw conclusions from the data. For any courses that have a success rate below 75%, explain the instructional and other intervention(s) that might improve success rates for each identified course.**

COSC 1436: 77%

COSC 1437: 79%

COSC 2436: 88%

IMED 1341: 75%

INEW 2334: 89%

ITNW 1358: 76% (Course is no longer required after recent curriculum changes)

ITSE 1301: 76%

ITSE 1306: 82% (Course is no longer required after recent curriculum changes)

ITSE 1311: 69%

ITSE 1330: 72% (Course is no longer required after recent curriculum changes)

ITSE 1333: 78% (Course is no longer required after recent curriculum changes)

ITSE 1346: 68% (New course ran two semesters)

ITSE 1359: 78%

ITSE 2302: 78%

ITSE 2309: 68%

ITSE 2313: 89% (Course is no longer required after recent curriculum changes)

ITSE 2371: 92% (New course had only run once with 12 students)

ITSE 2374: 89%

The following courses are listed in the report. However, they were only possible elective courses students could opt to take, and are managed by other programs:

ITSE 1316: 88%

ITSE 2347: 83%

The only course owned by the Software Development department with an average success rate below 75% over the past five years is **ITSE1311 - Beginning Web Programming**, which has averaged a **69% success rate** during this period. However, the data indicates a positive upward trend, with the success rate increasing year-over-year, reaching **76% last year**, surpassing the 75% threshold.

**Factors Contributing to Lower Success Rates:**

1. **Variety of Majors Requiring ITSE1311**: ITSE1311 is not exclusive to Software Development students. It is required for multiple majors, such as Computer Systems, whose students often perceive coding as less relevant to their career paths. This lack of interest and engagement from non-Software Development majors likely contributes to lower success rates historically.
2. **Evolving Web Development Practices**: In the past, the course curriculum included techniques like **CSS float** for webpage layouts, which were complex and challenging for beginners. This discouraged many students and contributed to the lower success rate.
3. **Program Curriculum Adjustments**: Previously, the Computer Support major required ITSE1311 as part of its curriculum. Over time, this requirement was removed, leading to a gradual reduction in enrollment by students who historically struggled with the course.

**Successful Interventions:**

1. **Curriculum Updates**: To align with industry standards, the course content has been updated to include modern and beginner-friendly techniques such as **CSS Flexbox and Grid** for webpage layouts. These methods are significantly easier for students to learn and have contributed to the course's improved success rates.
2. **Streamlined Enrollment**: With the removal of ITSE1311 from the Computer Support curriculum, the student cohort is now more aligned with majors that require or value coding skills, leading to higher engagement and better outcomes.

By continuing to monitor trends and make curriculum adjustments, the Software Development department aims to sustain and further improve the success rate of ITSE1311 in future semesters.

Note: Several courses in the curriculum are managed by other programs, and therefore not discussed above:

|  |  |
| --- | --- |
| **Department** | **Course** |
| Database Development | ITSE 1346  ITSE 2309 |
| Computer Science | COSC 1436  COSC 1437  COSC 2436 |
| Computer Systems | ITSE 1350 |
| Cloud Computing | ITSC 1315 |
|  |  |
|  |  |
|  |  |

1. **Insert data pertaining to the program from last Fall’s End-of-Term Full-Time/Part-Time Faculty Contact Hour Report here.**

According to the data in the table below, our percentage split is very close to the institution as a whole.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Full-Time Faculty\* | |  | Part-Time Faculty | |  |
| Department | Number | % |  | Number | % | Total |
| Institutional Total | 3,887,448 | 62% |  | 2,430,432 | 38% | 6,317,880 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Software Development (SFTD) | 13,696 | 63% |  | 8,064 | 37% | 21,760 |

1. **Identify all courses that have a success rate below 75%. Explain the instructional and other intervention(s) that might improve success rates for each identified course.**

The response to Question 6 regarding courses with a success rate below 75% and the interventions to improve them is addressed comprehensively in the answer to Question 4. Please refer to that section for the analysis and proposed strategies for improvement.

1. **How well are general education requirements integrated with the technical coursework?**

The general education requirements in the Software Development AAS degree are well-integrated with the technical coursework, ensuring students develop both technical expertise and critical soft skills necessary for the workplace. Courses such as **PHIL 2303 (Intro to Formal Logic)** support logical thinking and problem-solving skills, which directly align with programming and software design. Similarly, **SPCH 1321 (Business and Professional Communication)** provides students with communication skills essential for collaborative environments and client interactions.

Other courses, such as **ENGL 1301 (English Composition)** and **MATH 1342 (Statistics)**, enhance students' abilities to articulate technical ideas and analyze data effectively, supporting their success in technical courses like **ITSE 2309 (Database Programming - SQL)** and the **capstone project course**. This deliberate alignment ensures that general education courses not only fulfill degree requirements but also provide valuable context and skills applicable in technical fields.

1. **What evidence do you have that students are satisfied with the program? What kinds of complaints do program students make to the associate dean/directors?**

We currently do not have any direct student satisfaction surveys specific to the program. However, we gather feedback indirectly through individual course evaluations and instructor evaluations, which include insights into both the course content and teaching effectiveness.

Some instructors have implemented methods such as quick surveys, anonymous feedback discussion boards, or reflective posts within their courses to gauge student sentiment and gather suggestions for improvement. While these mechanisms provide valuable insights, they are focused on specific courses rather than the overall program.

Regarding complaints, the associate dean or directors occasionally receive feedback about scheduling challenges, particularly for second-year courses with limited sections. There have also been occasional concerns about workload in more advanced courses, though students generally appreciate the rigorous preparation they receive for the industry. Plans are underway to explore better ways to track overall program satisfaction through more structured exit interviews or surveys as students complete the program.

1. **Effectiveness of Program Communications**
2. **Describe with evidence how the program literature and electronic sites are current, including accurately representing the program and supporting the program’s recruitment plan, retention plan, and completion plan.**

The Software Development program at Collin College maintains up-to-date program literature and online resources to accurately represent the program and support recruitment, retention, and completion. The official program catalog, available at [Collin College Catalog](https://www.collin.edu/academics/programs/software-development-overview.html), is reviewed annually by the Curriculum Office and reflects current degree plans, course requirements, and learning outcomes. The department website, located at [Department Website](https://www.collin.edu/department/softwaredev/), was reviewed and updated in 2024, ensuring it provides current, accurate, and relevant information. Promotional materials, including brochures and banners, are in the process of being updated to reflect the latest curriculum changes. Additionally, the program’s LinkedIn page, [Collin College Software Development](https://www.linkedin.com/school/collincollegesoftwaredev), is regularly updated by the Discipline Lead and Program Coach to highlight program achievements, events, and opportunities.

1. **Describe how the program solicits student feedback regarding its website and literature and how the program incorporates that feedback to make improvements.**

Student feedback regarding program websites and materials is solicited through informal discussions, course activities, and faculty interaction. For example, students in the IMED 1341 - Interface Design course evaluate various websites, including the program’s website, as part of their coursework. Feedback collected from students has led to updates and improvements, ensuring the website remains user-friendly and informative.

1. **Describe how the program ensures that students are informed/aware of program literature. Is program literature made accessible to all students (i.e., can they obtain the information they need)?**

Program literature is made accessible to all students through multiple channels, including the college website, in-class announcements, and online communications. Students are introduced to these resources during advising sessions and through outreach by the program coach and faculty. Additionally, the department website URL was recently added to the program description in the college catalog, further enhancing accessibility for current and prospective students.

1. **Identify who is responsible for monitoring and maintaining the program’s website, and describe the processes in place to ensure that information is current, accurate, relevant, and available.**

The Discipline Lead is primarily responsible for monitoring and maintaining the program’s website, in collaboration with the Curriculum Office. Annual reviews ensure the content is accurate, relevant, and reflects any changes to the curriculum. The website is cross-referenced with the college catalog to ensure consistency, and updates are made promptly based on feedback from students, faculty, and advisory committee members.

1. **In the Program Literature Review Table, 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, and relevance and were readily available to students and the public.**

**Upload the completed Program Literature Review Table in section VI.B. of the Appendix.**

1. **Effectiveness of Program Stakeholder Resources and Partnerships**

**In the Program Stakeholder Resources and Partnerships Table, list any business, industry, government, college, university, community, and/or consultant partnerships, including clinical or professional sites and internal Collin departments, to advance program outcomes.**

**Upload the completed Program Stakeholder Resources and Partnerships Table in section VII. of the Appendix.**

1. **Professional Development**

**In the Employee Resources Table, provide a list of professional development activities of program faculty/staff since the last program review.**

**Upload the completed** **Employee Resources Table in section VIII. of the Appendix.**

1. **Facilities, Equipment, and Funding (Optional)**

**NOTE: Respond to section IX only if the program is requesting improved resources.**

1. **Provide evidence regarding current deficiencies or potential deficiencies related to infrastructure (e.g., technology), facilities, equipment, maintenance, replacement, plans, or budgets that pose important barriers to the program or student success.**

N/A

1. **If any current or potential deficiencies exist, complete the resource tables below to supportyour narrative.**
   * + 1. **Facilities Resources Table**

**Upload the completed Facilities Resources Table in section IX.B.1. of the Appendix.**

* + - 1. **Equipment/Technology Table ($5,000 or More)**

**Upload the completed Equipment/Technology Table ($5,000 or More) in section IX.B.2. of the Appendix.**

* + - 1. **Financial Resources Table**

**Upload the completed Financial Resources Table in section IX.B.3. of the Appendix.**

1. **Continuous Improvement Plan (CIP)**
2. **Upload the program’s previous CIP tables in section X.A. of the Appendix.**

**In addition, e-mail the program’s previous CIP tables to the Institutional Research Office (IRO) at effectiveness@collin.edu.**

1. **Describe how the program used its last Continuous Improvement Plan (CIP) to make the following improvements to the program over the past 4 years:**
2. **Program Learning Outcomes/Program Competencies**

The primary focus of the Year 3-4 CIP was on improving programming fundamentals, directly aligning with Program Learning Outcome (PLO) #4: demonstrating an understanding of fundamental programming concepts used for web applications. Actions taken included curriculum changes, such as replacing COSC-1315 with the more rigorous COSC-1436, and analyzing performance data from ITSE-2302. The data revealed consistently high scores on the first two quizzes, meeting or exceeding the 70% benchmark for success. However, limited data and other variables, such as instructor changes, make it difficult to isolate the impact of these curriculum updates fully. The program's ongoing curriculum redesign, effective Fall 2024, further strengthens this PLO by incorporating Python as a precursor to the Computer Science sequence.

The Year 1-2 CIP targeted retention between intermediate and advanced courses, particularly from ITSE-2302 to INEW-2334 and other advanced courses. While retention percentages varied due to anomalies in enrollment data, overall enrollment in advanced courses increased, reflecting success in retaining students through effective communication strategies during registration and curriculum improvements.

1. **Overall improvements to the program**

Over the four years, the program has evolved significantly, including:

* Transitioning the curriculum from foundational but standalone programming courses to a progressive, skills-building structure incorporating the COSC sequence and introductory Python.
* Enhanced communication during registration, contributing to increased advanced course enrollment and retention rates.
* Shifting the focus of CIPs from general program metrics to student learning outcomes, allowing for more targeted and measurable improvements.
* Continued adaptation of course content to industry trends, such as better alignment with fundamental programming languages (e.g., JavaScript) and frameworks.

These iterative improvements have ensured that the program remains relevant, student-focused, and responsive to both academic and industry demands.

1. **Evaluation of CIP Success**

**Based on the information, analysis, and discussion that have been presented in sections I–X of this program review, summarize the strengths and weaknesses of the program. Describe specific actions the faculty intends to take to capitalize on the strengths, mitigate the weaknesses, and improve student success and program learning outcomes.** **Provide the rationale for the expected outcomes chosen for the CIP(s).**

#### Strengths

The Software Development program demonstrates significant strengths in its curriculum design, alignment with industry standards, and responsiveness to advisory committee input. The program’s integration of COSC courses has strengthened the programming fundamentals of students, and the inclusion of elective tracks for web development and general software development provides flexibility for diverse career pathways. Additionally, new transfer agreements, such as the partnership with Texas A&M University-Central Texas, enhance opportunities for students to continue their education.

#### Weaknesses

One challenge is ensuring that students complete advanced coursework in a timely manner. Some courses, such as IMED 1341 and INEW 2334, currently only offer limited sections each year due to enrollment patterns. Although the program expects gradual enrollment growth, particularly with the upcoming BAT degree launch, additional sections cannot be added immediately. Another identified issue is in IMED 1341, where some students fail to complete their final projects, impacting both their learning outcomes and grades.

#### Specific Actions

1. **Curriculum Enhancements:**
   * Implement milestone check-ins in IMED 1341 to address issues with project completion. These structured progress checks aim to keep students on track, provide actionable feedback, and improve the likelihood of project submission or partial credit.
2. **Retention and Planning:**
   * Collaborate with advisors and program coordinators to improve communication regarding course sequencing and prerequisites, ensuring students enroll in the correct courses at the right time.
   * Continue monitoring enrollment patterns and strategically plan for additional sections over time as program growth allows, especially with increased visibility from the BAT degree.
3. **Advisory Committee Engagement:**
   * Leverage input from the advisory committee to further align curriculum updates with evolving industry trends, such as emphasizing Agile methodologies, collaborative projects, and practical applications of advanced technologies.

#### Rationale for CIP Focus (2025–2027)

The future CIP will target improvements in IMED 1341 by addressing the identified issue of incomplete final projects. By implementing milestone check-ins, the program aims to ensure students make steady progress, submit their work, and gain valuable hands-on experience. These efforts are expected to enhance average project scores and provide students with the critical skills needed to succeed in real-world interface design scenarios. This focus aligns with the program’s commitment to continuous improvement, student success, and industry readiness, ensuring graduates are prepared to meet the demands of the workforce.

**XII. New CIP Tables**

**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 program learning outcome (or program competency), and focus on these priorities to formulate the program’s new CIP. The program may also add short-term administrative, technological, assessment, resource, or professional development outcomes as needed.**

1. **Complete the CIP Outcomes, Measures & Targets Table. Choose 1 to 2 outcomes from the table to focus on over the next two years.**

**Upload the completed CIP Outcomes, Measures & Targets Table in section XII.A. of the Appendix.**

**In addition, e-mail the completed CIP Outcomes, Measures & Targets Table to the Institutional Research Office (IRO) at effectiveness@collin.edu.**

1. **Complete boxes A, B, C, and D of the CIP Outcomes 1 & 2 Table.**

**Upload the completed CIP Outcomes 1 & 2 Table in section XII.B. of the Appendix.**

**In addition, e-mail the completed CIP Outcomes, Measures & Targets Table to the Institutional Research Office (IRO) at effectiveness@collin.edu.**

**XIII. Program Learning Outcomes (PLOs)**

1. **Upload the program’s most recent Program Assessment Data Report in section XIII.A. of the Appendix.**

**In addition, e-mail the program’s most recent Program Assessment Data Report to the Institutional Research Office (IRO) at effectiveness@collin.edu.**

1. **Describe how the program used the Assessment Plan in the program’s Program Outcomes and Course Alignment (POCA) document to make the following improvements to the program:**
2. **Program Learning Outcomes/Program Competencies**

The Program Learning Outcomes (PLOs) for both tracks—Web Development and General Tracks—are aligned with industry standards and provide students with the essential competencies required for entry-level roles in software development. While the tracks share four common PLOs, each track also has a distinct PLO (PLO 5) that reflects its specialized focus.

**Shared PLOs:**

1. **Programming Fundamentals**: Students demonstrate a fundamental understanding of programming concepts and use object-oriented programming techniques to develop executable programs. This competency is assessed in foundational courses such as COSC-1436 and ITSE-2302, which build programming fluency and problem-solving skills.
2. **Database Management**: Students apply data management techniques, demonstrating the ability to design and manipulate databases. Courses such as ITSE-2309 ensure students have hands-on experience with database programming.
3. **User Interface Design**: Students implement user interface design principles, encompassing aesthetics and usability, to develop intuitive and engaging digital interfaces utilizing advanced HTML and CSS techniques. This outcome is a key focus in IMED-1341, where students create responsive websites as part of their coursework.
4. **Project Management**: Students utilize project management and software design techniques to plan and execute team-based software projects. This outcome is addressed in courses such as ITSE-1350 and the capstone project course (ITSE-2374), preparing students for collaborative and real-world software development projects.

**Specialized PLOs:**

* **Web Development Track (PLO 5)**: Students develop and deploy dynamic web applications using industry-standard languages and data stores, emphasizing secure user authentication, efficient data storage, and effective unit testing. This is achieved through coursework in ITSE-2302, INEW-2334, and other web-focused classes.
* **General Track (PLO 5)**: Students apply fundamental principles of secure software development to design and implement systems that resist various types of security vulnerabilities and threats, ensuring confidentiality, integrity, and availability of data. This outcome is supported through courses such as ITSE-1350 and ITSY-2341.

These PLOs reflect the program's continuous commitment to improving learning outcomes and aligning them with industry needs, as evidenced by the program’s consistent use of the Program Outcomes and Course Alignment (POCA) document for curriculum adjustments. This approach ensures that students not only meet academic goals but also acquire practical skills that prepare them for career success.

1. **Overall improvements to the program**

Over the past review period, the Software Development program has undergone several strategic enhancements aimed at improving curriculum alignment, student outcomes, and program competitiveness. These improvements reflect the program's commitment to leveraging data, feedback, and industry trends to ensure relevance and effectiveness.

**Curricular Enhancements:**

1. **Refinement of Core Curriculum**:
   * The program transitioned from COSC-1315 (Introduction to Programming) to COSC-1436 (Programming Fundamentals I) as a requirement. This change strengthens students’ programming foundations by providing a more rigorous introduction to object-oriented programming, preparing them for advanced coursework in both tracks.
   * An introductory Python programming course has been added to the curriculum to support student success in the Computer Science series. This addition bridges the gap for students new to programming before they tackle more challenging material.
2. **Integration of Secure Development Practices**:
   * The General Track was updated to include **Secure Software Development**, focusing on designing systems that resist security vulnerabilities. This change reflects growing industry demand for secure coding practices and better prepares students for cybersecurity-related roles.
3. **Enhanced Focus on Web Development**:
   * The Web Development Track emphasizes creating responsive, accessible, and dynamic web applications using modern techniques, including secure user authentication and effective unit testing. These updates ensure that graduates are proficient in current industry standards.

**Improved Course Delivery:**

1. **Responsive Offerings**: The program has adjusted course scheduling to better meet student demand. For example, IMED-1341 (Interface Design) is transitioning from one section per semester to multiple sections, reflecting increased enrollment and interest.
2. **Planned Milestone Check-ins for Interface Design**: The **IMED-1341 (Interface Design)** course will implement milestone project check-ins as part of the upcoming CIP. This intervention addresses the issue of some students failing to complete their final projects, aiming to ensure progress and provide valuable feedback. By doing so, the program expects to increase both project completion rates and overall learning outcomes.

**Strengthened Pathways:**

1. **New Transfer Partnerships**:
   * The program recently formalized a partnership with Texas A&M University-Central Texas (TAMUCT), enabling students to transfer seamlessly into the **BAAS in IT with a focus on Software Development**. This pathway provides students with opportunities to continue their education while aligning with their career goals.
2. **Preparation for the BAT**:
   * The curriculum has been aligned with the upcoming Bachelor of Applied Technology (BAT) degree in Software Development, which is expected to launch in Fall 2025. This alignment ensures that AAS graduates have a clear path to advancing their education within Collin College.

**Outcome-Driven Assessment:**

The program uses the **Program Outcomes and Course Alignment (POCA)** document to continuously assess student achievement against Program Learning Outcomes (PLOs). This data-driven approach has led to targeted interventions, such as introducing milestone project checks for Interface Design and adapting course materials to industry needs.

Through these initiatives, the Software Development program has demonstrated a proactive approach to improving the quality of education, addressing student and employer needs, and preparing graduates for successful careers in a rapidly evolving industry.