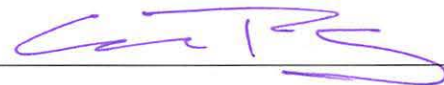




## Executive Memorandum 24-012

February 22, 2024

**From:** Stephen Perez, President 

**Subject:** Approval of the Online MS in Computer Science

Upon the recommendation of the Academic Senate, with the concurrence of the Provost, and with the approval of the Chancellor's Office, I approve the online, self-support version of the MS in Computer Science within the Department of Computer Science; College of Engineering, Computer Science, and Construction Management. The program will use CSU code 07011 with a related CIP code of 11.0701, and will be effective fall 2024.

|   |   |
|---|---|
| <b>Policy Title:</b>                            | EM 24-012 MS in Computer Science Online   |
| <b>Contact:</b>                                 | Department of Computer Science; College of Engineering, Computer Science, and Construction Management |
| <b>Supersedes:</b>                              |   |
| <b>Revision:</b>                                |   |
| <b>Enabling Legislation or Executive Order:</b> |   |

# New Online Program

**Program Name:** Online MS in Computer Science

Program named above will be (complete only if applicable):

Option within Computer Science  
(degree program name)

Will this be a subject matter preparation or credential program? Yes  No

- If yes, then program will be submitted to AURTEC for review.

**Department Contact(s):**

David Zeichick

## Required Signatures

**The Department of Computer Science  
has reviewed and approved this program**

*David Zeichick*

Chair, Department Curriculum Committee

Oct 17, 2023

Date

*Tyson R. Henry*

Department Chair

Oct 17, 2023

Date

**The College of ECC  
has reviewed and approved this program**

*Tyson R. Henry*

Chair, College Curriculum Committee

Oct 17, 2023

Date

*Bob Ward*

College Dean

Oct 18, 2023

Date

**Graduate Studies has reviewed and approved this program**

\_\_\_\_\_  
Dean, Graduate Studies

\_\_\_\_\_  
Date

**Send signature page with proposal attached to Curriculum Services: SSC 464B, zip 128, or [ypaacurriculum@csuchico.edu](mailto:ypaacurriculum@csuchico.edu)**

Note: The department will be notified of the dates for EPPC, Academic Senate, and Chancellor's Office (if applicable) review.

## Proposal for a New Online Program

- I. Proposed title of new program  
Online Master of Science in Computer Science
- II. Program level: Graduate
- III. Academic year of intended implementation.  
2024-2025
- IV. Program will be: Self-support
  - A. see the [add-self-support-proposal document \(attached\)](#)
- V. Name of the department and college submitting the proposal.  
Computer Science Department (CSCI) in the College of ECC
- VI. Statements on questions of need and demand.
  - A. Relation of the program to the [University Strategic Plan \(if applicable\)](#).  
The online accelerated MS in Computer Science program will enable students to pursue their advanced educational goals, regardless of their geographical location, professional commitments, or family responsibilities. The online MS in Computer Science program will particularly serve the northstate region and appeal to our alumni throughout California. This online delivery format aligns perfectly with CSU's mission of expanding educational access, facilitating a larger demographic to conveniently acquire an MS in Computer Science degree and Chico State's Enduring Commitments to Academic Distinction, and Transformative Student Experiences.
  - B. Relation of the program to the proposing college's Strategic Plan (if applicable).  
The Department's Mission is to advance knowledge in the computing sciences by providing our students with the highest quality educational experience. The Department strives to:  
  
Provide excellence in teaching;  
Develop a community of scholars that includes faculty, staff, students, and alumni;  
Provide service to others;  
Respond to the changing demands for trained computing professionals.  
  
The Computer Science department's current in-person MS in Computer Science is driven by the department's mission. The online version is designed to include the same courses, instructors, and rigor of the in-person MS program. The online program will extend our service area, thereby providing service to more individuals in California and neighboring states.
  - C. Need for the proposed program.
    1. What are the program's objectives and/or learning outcomes?  
ABET Student Outcomes:

SO-1 Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

PI-1.1 Demonstrate correct use of the Master Method given a recurrence.

PI-1.2 Identify key issues and problems of a selected area through review of academic literature.

PI-1.3 Develop an appropriate solution to a non-linear classification problem.

PI-1.4 Demonstrate the ability to map a concrete business or other domain problem to possible abstract solution models and algorithms.

PI-1.5 Analyze a machine learning problem through rigorous application of EDA, visualization, and transformation techniques.

SO-2 Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

PI-2.1 Design a large-scale project from a set of requirements.

PI-2.2 Implement, test, and debug a large-scale project from a set of requirements.

PI-2.3 Evaluate a large-scale project from a set of requirements.

PI-2.4 Evaluate and compare performance of multiple models.

SO-3 Communicate effectively in a variety of professional contexts.

PI-3.1 Demonstrates organized oral communication.

PI-3.2 Demonstrates organized written communication.

PI-3.3 Cites relevant sources and literature when explaining design decisions.

PI-3.4 Summarizes information appropriately by using tables and/or figures.

PI-3.5 Demonstrates the ability to effectively synthesize complex presentations for time and/or length.

SO-4 Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

PI-4.1 Identify ethical issues that arise in software development.

PI-4.2 Justify professional duties and obligations that pertain to a particular software development case study.

PI-4.3 Reflect on the viewpoints of the stakeholders for a particular software development case study.

PI-4.4 Describe how to address ethical issues in software development technically and conscientiously.

SO-5 Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

PI-5.1 Demonstrates accountability of assigned tasks for the benefit of the team.

PI-5.2 Demonstrates engagement with the team and its collective effort.

PI-5.3 Gives and receives feedback regularly, and acts on that feedback as a mechanism to improve team effectiveness.

PI-5.4 Evaluates themselves and other members for their concrete and intangible contributions to a team.

PI-5.5 Delivers tangible valued contributions to team project

This information is provided in our MSCS Assessment Plan in Box here:

<https://csuchico.box.com/s/iwqt31kdlvqiyje3t5dbmfiwy7zkyqie>

2. Identify other CSU campuses with the proposed program by consulting the [Search Degrees page](#).

There are no other CSU campuses that currently offer an online MS in Computer Science.

3. Identify and explain the differences, if any, between these programs and the proposed program.

There are no other CSU campuses that currently offer an online MS in Computer Science.

D. Identify other closely related curricula currently offered by the campus.

The campus currently offers an in-person state-funded MS in Computer Science program. The exact requirements, selected courses from in-person program, and instructors will be involved in the online version of the program.

1. Explain the impact (if any) the proposed program will have on these existing programs (e.g., enrollment, opportunities for collaboration, use of existing courses).

The in-person MS in Computer Science program at Chico is tailored to benefit international students seeking an on-campus study experience, recent graduates of Chico who recognize the potential of an MS in Computer Science for their career enhancement, and working professionals based in or willing to move to Chico. Meanwhile, the proposed online self-support MS in Computer Science program is designed to accommodate mid-career professionals juggling full-time jobs and family commitments, who find relocating to Chico unfeasible, and who would otherwise be unable to undertake an MS in Computer Science from Chico State.

This online program will complement, rather than compete with or supersede, the existing on-campus program, to which the Computer Science Department (CSCI) remains fully dedicated. This commitment involves preserving the quality and volume of

face-to-face classes offered by the on-campus program. The department continues to allocate state financial resources and staff, including the Computer Science Chair, to the traditional MS in Computer Science program.

Furthermore, the on-campus MS in Computer Science program maintains its collaboration with the Office of International Education and Global Engagement to promote and augment the population of international graduate students. It remains a crucial part of CSCI's portfolio, and it is actively growing year to year (it is worth noting that the incoming Fall 2023 in-person program has over 70 new students).

2. Explain how current programs do not meet the proposed program's objectives.

The current MS in Computer Science program campus-based has over 120 enrolled. The program being proposed is an online program offered in an accelerated format designed for working adults.

E. Student demand for the program.

1. Give evidence of serious student interest in the proposed program.

Computer Science (CS) is among the fastest-growing disciplines at the graduate level both nationally and in California. According to the National Center for Education Statistics, the number of students enrolling in CS graduate programs has consistently increased every year, demonstrating a robust demand. In California, the trend has been similar with a high growth rate in CS enrollments.

There is a strong demand for more affordable, yet high-quality CS graduate programs. The average cost of an MS in CS at a private university in California like Stanford or USC is currently significantly higher than anticipated costs for the Chico State program. By offering an affordable option, Chico State can attract students who may otherwise be unable to pursue a graduate degree due to financial constraints.

The online program will be delivered in an accelerated format, allowing busy adult learners to take one class at a time and complete six units each semester to complete the degree in five semesters. This format and the affordability of a Chico State degree makes the program highly competitive.

Market research from Everspring, a leading education marketing and recruitment firm, identified the MS in Computer Science as a high potential, low risk program recommendation as part of their

2022 Portfolio Review conducted for Chico State. Data from the Education Advisory Board, a research firm specializing in helping universities make data-informed program development decisions, also notes Computer Science as one of the growing fields in strong demand.

2. If this is an online self-support version of an existing state-support program, discuss whether the creation of the self-support program will affect enrollment in the state-support program. If the new program may negatively affect enrollment in the state-support program, explain how the college and department will address this.

In Section D, item 1, it is noted that the present on-campus state-supported program is designed to cater to international students who desire an on-campus learning experience, Chico's recent graduates who see the value of an MS in Computer Science for career growth, and working professionals who are in Chico or prepared to relocate there. Specifically, over 90% of the current enrollees in the in-person program are international students, and they will qualify for a three-year work Visa upon graduation. Conversely, those who choose to enroll in the Online program will not be eligible for the three-year work Visa after graduating.

3. Estimate number of students seeking the program:
  - a. in the year of initiation 60
  - b. after three years 120
  - c. after five years 180
  - d. Describe methodology for developing these estimates.

These estimates are based on an average of 60 new students each academic year, with admissions in both fall and spring. This projected enrollment numbers are supported by market research conducted by Everspring.
4. Estimate the number of degrees awarded:
  - a. in the year of initiation 60
  - b. after three years 120
  - c. after five years 180
  - d. Describe methodology for developing these estimates.

The estimates are based on a target of at least 30 applicants in each application cycle, fall and spring. With a consistent average of 60 new students minimum in each academic year, the program will reach a steady state of ~180 students. Students are expected to graduate within two years.

#### 4. Resources

A. List the faculty members for the required and elective courses in the program

Name Abbas Attarwala  
Rank Associate Professor  
Highest degree earned PhD  
Name Kevin Buffardi  
Rank Associate Professor  
Highest degree earned PhD  
Name Bryan Dixon  
Rank Associate Professor  
Highest degree earned PhD  
Name Todd Gibson  
Rank Associate Professor  
Highest degree earned PhD  
Name Elena Harris  
Rank Associate Professor  
Highest degree earned PhD  
Name Ben Juliano  
Rank Professor  
Highest degree earned PhD  
Name Jaime Raigoza  
Rank Associate Professor  
Highest degree earned PhD  
Name Sam Siewert  
Rank Associate Professor  
Highest degree earned PhD  
Name Kun Tian  
Rank Associate Professor  
Highest degree earned PhD  
Name Richard Tillquist  
Rank Assistant Professor  
Highest degree earned PhD  
Name David Ziechick  
Rank Assistant Professor  
Highest degree earned PhD

B. Discuss the resources needed to sustain the program per year for the first five years, including cost and funding source:

The Online MSCS will be self-supporting, using student fee revenue to cover direct and indirect expenses incurred to deliver the program and PCE program development reserves to fund the initial development and pre-launch marketing costs.

The program budget model is based on a per unit fee of \$825, a total program cost of \$24,750.



If the program achieves the enrollment levels projected, the program will generate cost recovery to the college starting in year one; by year four the program will have repaid the initial launch investment, and by year five will be generating more than \$400K in alternative revenue to ECC and CSCI.

PCE Admin generated by the program will contribute the PCE's program development reserves to support new program development across all colleges.

1. **Faculty:** list any additional faculty needed to teach this program, beyond the ones listed in question VII.A above

Current CSCI faculty will teach the program in the first few years of the program; as enrollments grow, fee revenue will allow CSCI to hire additional qualified instructors as needed to meet program growth goals.

2. **Staff**

Yes, Faculty Program Coordinator (CSCI) and Admin/staff support/Advising (CSCI). Fee revenue will reimburse the campus for .5 of a faculty appointment to coordinate the program and .25 of a staff advisor to support the program needs. As the program grows, the staff reimbursement may need to be increased; any increases will be covered by fee revenue and will not impact the CSCI general fund budget.

3. **Facilities**

The online MS program doesn't require physical spaces like classrooms or labs.

Support from the Division of IT will be required to support the digital infrastructure and support service needs to ensure effective delivery and a good student experience:

IT Infrastructure & Support: The expense related to "IT 24/hr Technical Support" emphasizes the importance of ensuring students and faculty have round-the-clock technical support. This might involve server maintenance, troubleshooting issues with the LMS, or assisting with software problems. Cost recovery to DoIT includes the use of the Canvas LMS and is included in the program budget and is based on the most recent per Student Credit Unit reimbursement of \$14/SCU. Basing cost recovery on SCU provides more reimbursement to DoIt as enrollment grows.

Instructional Design: Instructional Design Support indicates a focus on creating engaging and effective online courses. Instructional designers help faculty transition their in-person courses to online formats that are pedagogically sound and engaging for students. The

OMSCS budget provides funding for .5 ITC in TLP to provide those services to the program.

Graduate Studies: Cost recovery is also provided to the Office of Graduate Studies for their efforts in the admissions and grad program services by reimbursing .25 time basis for a grad admissions advisor.

Digital Library Services: Access to online academic resources, journals, e-books, and databases would be essential for graduate students, even more so in an online context. The program budget includes cost recovery to MLIB based on the current rate of \$3.25/SCU.

Student Support Services: This can involve online academic advising, virtual counseling, webinars for skill-building, or resources for career placement.

Accessibility Resources: Ensuring the online platform and course materials are accessible to all students, including those with disabilities, is crucial. This might involve captioning services, screen reader compatibility, or alternative formats for course materials. The program budget includes 5% of revenue for overall campus cost recovery, which includes the services of Student Affairs.

International Education and Global Engagement will be reimbursed for reviewing transcripts from international applicants. Other charges from the campus include Student Financial Services for the collection of fee payments and other campus entities who are involved in the delivery of this self-support, including Business & Finance/HR.

The most meaningful cost recovery to the campus in terms of generating alternative revenue through self-support programs is the cost recovery to the ECC College and the Department of Computer Science. The budget model includes 10% of revenue returned to ECC split between the Dean's Office and the CSCI Department. PCE retains a standard percent of revenue to fund their operations.

4. [Library resources; provide evidence of consultation with the Library Dean indicating that the program can be supported by the library.](#)

Letter attached

5. [Equipment](#)

Recording Studio: For higher production quality, a studio setup with proper lighting, green screens, and video recording equipment can be beneficial for creating course content.

Audio-Video Editing Software: Tools like Adobe Premiere Pro or Audacity to edit and enhance recorded lectures or instructional videos.

Screen Recording Software: Tools like Camtasia or ScreenFlow for recording on-screen tutorials or presentations.

Interactive Tools: Equipment or software for creating interactive content like quizzes, simulations, or animated explanations.

Examples include Articulate Storyline or Adobe Captivate.

#### 6. [Specialized material](#)

Digital Lab Simulations: For courses such as Robotics and Operating Systems that traditionally rely on lab work online versions of these classes might employ virtual lab simulations or software that can mimic lab experiments.

#### C. [Additional support resources required, including source of support.](#)

The source of support for the following services is fee revenue paid to VPSA and VPIT as cost recovery to their general fund accounts.

Tutoring and Academic Support: Assistance for students who need additional help in understanding course materials or preparing for exams.

Accessibility Services: Resources to make online learning accessible to students with disabilities, such as screen readers, captioned videos, or alternative exam formats.

Mental Health and Counseling Services: Support for students dealing with stress, anxiety, or other mental health challenges.

Career Services: Guidance for students in job searching, resume building, interview preparation, and networking opportunities.

Peer Interaction and Networking Platforms: Events to facilitate interactions among students, such as virtual study groups, online student clubs, or networking events.

Feedback and Evaluation Tools: Tools for students to provide feedback on courses, teaching, and overall program experience, ensuring continuous improvement.

#### D. [Provide evidence of consultation with Professional and Continuing Education indicating their ability to support the program.](#)

We have been working closely with Clare Van Ness from PCE. She has actively been editing this document and provided the OMSCS Self-Support Budget Model.

#### E. [Provide evidence of consultation with the Academic Technology Officer in the Technology and Learning Program \(TLP\).](#)

Note: Online program developers should encourage faculty to attend a QLT workshop before teaching in an online program. Please visit [Quality Learning and Teaching](#) for more information and a schedule of workshops.

Letter attached

## VII. Curriculum

Note: Proposed curriculum should take advantage of courses already offered in other departments when subject matter would otherwise overlap or duplicate existing course content.

- A. Are there any departments or programs that may overlap with this program or duplicate existing course content? If so, please explain how this has been or will be addressed and please provide documentation of consultation with them (if available).

The proposed program is reusing the existing courses from the in-person Computer Science Master's Program. However, the sets of target students for these two programs are radically different (students can choose either the online program or in-person program but not both). Therefore, there shall be no conflicts between the two programs in terms of students' interests.

- B. Total number of units required for the program.  
30 units.

- C. Explain differences in curriculum from any existing, similar degree program at Chico State (if any).

The curriculum is similar to the existing in-person master's program in computer science at Chico State, and the courses of the in-person program are reused for the online program.

- D. Special criteria for admission and/or continuation (if applicable).

The admission criteria of the online program is the same as the in-person program, as it is supposed to be offered to the students with the same level of preparedness who want to study for the degree remotely.

- E. Explanation of any special program characteristics (e.g., terminology, units required, types of coursework, etc.).

NA

- F. List all new courses for the proposed program (copy and paste fields if necessary to add more courses). Indicate whether the course has already been approved or not. If not, indicate when approval is anticipated. Explain why the new course is necessary for the proposed program.

None

- G. List all required courses for the program along with a specific rationale for why each course should be required (copy and paste fields to add more courses).

1. OMSCS Program Structure Waterfall attached

Reusing the prerequisite requirements of the in-person program, all of the courses from the online program use the same set of courses as the prerequisites, as given in the below (program requisite courses).

CINS 370 Introduction to Databases  
CSCI 111 Programming and Algorithms I

CSCI 211 Programming and Algorithms II  
CSCI/MATH 217 Discrete Mathematics  
CSCI 311 Algorithms and Data Structures  
CSCI 430 Software Engineering  
CSCI 440 Operating Systems

CSCI and PCE are exploring self-support special session offerings of the OMSCS prerequisites to best serve the applicants to the program by providing a flexible, online pathway to full admission to the program.

**Course number and title** CSCI 611 Applied Machine Learning

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

It is a core course in the in-person program, and it covers the essential topic of Machine Learning Applications that is suitable for graduate studies in Computer Science.

**Course number and title** CSCI 620 Web Technology

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

This is an important course that will offer students a full stack web applications experience. It will help prepare our students for the corresponding industrial jobs for web development.

**Course number and title** CSCI 630 Software Design and Maintenance

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

It is a core course in the in-person program, and it covers the advanced topics in Software Engineering that are suitable for graduate studies in Computer Science.

**Course number and title** CSCI 640 Scalable Software Systems

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

This course offers a practical exploration of topics in scalable computing, which is an essential (and advanced) in computer science studies, especially at the graduate level.

**Course number and title** CSCI 650 Algorithms and Computability

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

It is a core course in the in-person program, and it covers the advanced topics in Computer Algorithms that are suitable for graduate studies in Computer Science. It has a strong emphasis on theories and will prepare students well for post-graduate studies toward a terminal degree in Computer Science.

**Course number and title** CSCI 693 Research Methods in Computer Science

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

This course interweaves three distinct themes (investigation, experimentation, and technical writing), that culminate in a comprehensive research project, written report, presentation, and oral defense. It also satisfies the graduate writing requirement by CSU.

**Course number and title** CSCI 511 Advanced Object-Oriented Programming

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

This course is dedicated to the analysis, design, and implementation of programming problems using an object-oriented approach. Modern object-oriented languages are utilized. It advances students' knowledge in object orientation, a de facto standard in software development in industry.

**Course number and title** CSCI 546 Computer Forensics

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

This course covers advanced network management concepts and implementations, including a network operating system, workstation management, and domain administration. It prepares students with advanced knowledge in computer networking and related management.

**Course number and title** CSCI 580 Artificial Intelligence

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

This course covers the various topics of Artificial Intelligence. The unique feature of this course is the breadth of coverage. It prepares students well for more advanced studies in each of the sub-fields in Artificial Intelligence if they choose so in the future. It is also usually a

core course in the Artificial Intelligence tracks of many Graduate Computer Science programs nationwide.

**Course number and title** CINS 570 Advanced Database Management Systems

**Units of credit** 3

**Prerequisites** Program requisite courses.

**Rationale**

This course covers the advanced (graduate level) topics in the Database domain. It is an important course to prepare students well for higher end jobs in the category of database administration in the industry.

- H. List all elective courses for the program along with a general rationale for why these courses should be electives. (copy and paste fields to add more courses).

NA

I. Writing Requirements

1. For undergraduate degrees or options, list the number and title of the Graduation Writing Assessment (GWAR) course for the program.

NA.

2. For undergraduate degrees or options, list the number and title of the department-designated third writing requirement, or indicate if any upper-division W course can be used.

NA.

3. For graduate degrees or options, indicate how the graduate literacy requirement is met.

This requirement will be met by students taking the course of CSCI 693 Research Methods in Computer Science.

- J. Attach complete catalog copy, including admission and completion requirements. See the current *University Catalog* for correct format; please follow it exactly. Before the proposal is submitted to Curriculum Services, it may be helpful to review catalog copy with Academic Publications. See attached:

1. Online Computer Science MS Program Requirements
2. Online Computer Science MS Admission/Advancement

CSCI 611 Applied Machine Learning - 3 Units

Prerequisite: CSCI 311 and classified graduate standing.

Typically Offered: Spring only

The course offers a practical exploration into machine learning and cutting-edge topics in neural networks, including modern techniques for deep learning. Students build deep learning models using sophisticated machine learning frameworks and scientific libraries. 3 hours lecture.

(002395)

Grade Basis: Graduate Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Graduate Division

CSCI 620 Web Technology - 3 Units

Prerequisite: CINS 467 with a grade of C or higher, or web programming experience, and classified graduate standing.

Typically Offered: Fall only

This course examines frameworks, libraries, languages, and tools for the development of full stack web applications that are progressive, responsive, and secure. Student propose, design, develop, test, and present a nontrivial full stack web application. 3 hours seminar.

(002436)

Grade Basis: Graduate Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Graduate Division; Laptop required

CSCI 630 Software Design and Maintenance - 3 Units

Prerequisite: CSCI 430 and classified graduate standing.

Typically Offered: Spring only

Students conduct a study of designing and maintaining complex software. The course builds upon fundamental software engineering skills with an emphasis on: Object-Oriented software design patterns, anti-patterns, code review and refactoring, and tools for evaluating code quality.

Students practice maintaining software by collaborating on a large-scale open source project using automated development operation (DevOps) tools. 3 hours discussion. (002394)

Grade Basis: Graduate Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Graduate Division

CSCI 640 Scalable Software Systems - 3 Units

Prerequisite: CSCI-311, or CSCI 605 and CSCI211; and classified graduate standing.

Typically Offered: Fall only

The course offers a practical exploration of topics in scalable computing. Students gain hands-on experience building things to solve a multitude of topics in scalable computing. Students should learn how to solve computationally complex problems involving big data. Topics include but are not limited to single-node and multi-node parallelism, threading, and coprocessor programming. (002430)



Grade Basis: Graduate Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Graduate Division

CSCI 650 Algorithms and Computability - 3 Units

Prerequisite: CSCI 311 and classified graduate standing.

Typically Offered: Spring only

This course presents algorithm design techniques (such as divide-and-conquer, greedy algorithms, dynamic programming, and others), mathematical and empirical analysis of algorithms, computability, Rice's theorem, P and NP classes, NP-completeness, and recent advances in algorithms. 3 hours seminar. (002417)

Grade Basis: Graduate Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Graduate Division

CSCI 693 Research Methods in Computer Science - 3 Units

Prerequisite: Candidate status.

Typically Offered: Fall and spring

This course interweaves three distinct themes (investigation, experimentation, and technical writing), that culminate in a comprehensive research project, written report, presentation, and oral defense. First, the students are immersed into the research process within Computer Science. This includes an understanding of the role, ethics, and responsibility of researchers in Computer Science. The second focus is on rigorous design of experiments for the purpose of testing research hypotheses, simulations, and models, and interpreting the results of those experiments. Finally, proficiency in communication of scientific ideas and findings will be addressed, from intensive reading, critiques, technical writing and oral presentations. 9 hours supervision. (020616)

Grade Basis: Report in Progress: Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Graduate Division; Laptop required

CSCI 511 Advanced Object-Oriented Programming - 3 Units

Prerequisite: CSCI 311 with a grade of C or higher.

Typically Offered: Fall only

This course is dedicated to the analysis, design, and implementation of programming problems using an object-oriented approach. Modern object-oriented languages are utilized. Topics include inheritance, the underlying implementation of polymorphism, exception handling, extending existing system libraries, and approaching algorithm development from an object-oriented perspective. 3 hours lecture. (002356)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Upper Division

CSCI 546 Network Forensics - 3 Units

Prerequisite: CSCI 446 with a grade of C or higher.

Typically Offered: Spring only

This course covers the most critical skills needed for the increased focus on network communications and artifacts in today's investigative work. We will cover the tools, technology, and processes required to integrate network evidence sources into investigations, with a focus on efficiency and effectiveness. 3 hours laboratory, 2 hours lecture. (002382)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Upper Division

CSCI 580 Artificial Intelligence - 3 Units

Prerequisite: CSCI 311 with a grade of C or higher.

Typically Offered: Fall and spring

This course introduces the basic principles, techniques, and applications of artificial intelligence. This course is organized in three sections: search, logic, and learning. Topics include but are not limited to problem-solving, heuristic search, genetic algorithm, game-playing, constraint-satisfaction problems, propositional and predicate logic, knowledge representation, feed-forward neural networks, and decision trees. Students implement and analyze artificial intelligence algorithms. 3 hours discussion. (002360)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Upper Division

CINS 570 Advanced Database Management Systems - 3 Units

Prerequisite: CINS 370 with a grade of C or higher or MINS 335.

Typically Offered: Fall only

Course topics include database application programming using a high performance, high concurrency multi-user database management system. This course covers the SQL programming language including Data Definition Language, Data Manipulation Language, and Data Control Language. The course then focuses on a procedural database programming language including control structures, composite datatypes, explicit cursors, exception handling, and writing embedded SQL applications. 2 hours activity, 2 hours discussion. (002381)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Upper Division

# Online Computer Science MS

Total Units Required: 30

## Program Requirements

### Requirements for the Online MS in Computer Science

Completion of all requirements as established by the department graduate committee, the graduate advisory committee, and Graduate Studies, to include:

1. Completion of the approved program consisting of 30 units of work. The courses, which are listed in the following section, meet the following requirements:
  - a. At least 18 of the units are required for the degree in 600-level courses.
  - b. Completion of the three graduate core courses (nine units) [CSCI 611](#), [CSCI 630](#), and [CSCI 650](#).
  - c. Completion of the culminating activity course described below.
  - d. At the discretion of the academic program, a maximum of 30 percent of the units counted toward the degree requirements may be special session credit earned in non-matriculated status combined with all transfer coursework. This applies to special session credit earned through Open University, or in courses offered for academic credit through Professional & Continuing Education. Transfer courses must be approved by the Graduate Coordinator.
2. Culminating Activity:
  - a. **Capstone Course**  
[CSCI 693](#) will be taken as the last class of the graduate program. The course may be attempted a maximum of three times. Failure on the third attempt will result in dismissal from the graduate program in Computer Science.
3. Approval by the Graduate Coordinator and the Graduate Council on behalf of the faculty of the University.

### Online MS in Computer Science Coursework

| <b>Course</b>  | <b>Title</b>                         | <b>Units</b> |
|--|--------------------------------------|--------------|
| CSCI 511   | Advanced Object-Oriented Programming | 3            |
| CSCI 546   | Network Forensics                    | 3            |
| CINS 570   | Advanced Database Management Systems | 3            |
| CSCI 580   | Artificial Intelligence              | 3            |
| CSCI 611   | Applied Machine Learning             | 3            |
| CSCI 620   | Web Technology                       | 3            |
| CSCI 630   | Software Design and Maintenance      | 3            |
| CSCI 640   | Scalable Computing                   | 3            |
| CSCI 650   | Algorithms and Computability         | 3            |
| CSCI 693   | Research Methods in Computer Science | 3            |
| Total  |                                      | 30           |
| The Computer Science department, at its discretion, may substitute any listed course with an online version of a course from the in-person Computer Science Master's program while maintaining compliance with the program requirements specified in the previous section. |                                      |              |

## Graduate Grading Requirements

All courses in the major must be taken for a letter grade, except those courses specified by the department as ABC/No Credit (400/500-level courses), AB/No Credit (600-level courses), or Credit/No Credit grading only. A maximum of 10 units combined of ABC/No Credit, AB/No Credit, and Credit/No Credit grades may be used on the approved program. While grading standards are determined by individual programs and instructors, it is also the policy of the University that unsatisfactory grades may be given when work fails to reflect achievement of the high standards, including high writing standards, expected of students pursuing graduate study.

Students must maintain a minimum 3.0 grade point average in each of the following three categories: all coursework taken at any accredited institution subsequent to admission to the master's program; all coursework taken at California State University, Chico subsequent to admission to the program; and all courses on the approved master's degree program.

In addition, students may not count more than two courses in which they receive a grade of C toward the approved program.

# Online Computer Science MS

Total Units Required: 30

## **Admission/Advancement**

### Prerequisites for Admission to Conditionally Classified Status

1. Meet all Graduate Studies requirements as specified in [Graduate and Postbaccalaureate Admission Requirements](#).
2. Approval by the CS department and Graduate Studies.
3. A baccalaureate from an accredited institution, or an equivalent approved by Graduate Studies.
4. Completion of the Graduate Record Examination (GRE) with a combined score of 300 on the verbal and quantitative portions. Graduates of an ABET accredited program in computer science are exempt from completing the GRE.
5. Submission of a statement of purpose.
6. Submission of two letters of reference.

### Prerequisites for Admission to Classified Status

In addition to any requirements listed above:

1. Completion of program prerequisites equivalent to the courses below from an accredited program, approved by the graduate coordinator.
2. Students are expected to complete these courses at a consistent and active pace.
3. Courses taken for the purpose of advancement to classified status will not be used towards the MS degree.

| <b>Course</b>                        | <b>Title</b>                     | <b>Units</b> |
|--------------------------------------|----------------------------------|--------------|
| <a href="#"><u>CINS 370</u></a>      | Introduction to Databases        | 3            |
| <a href="#"><u>CSCI 111</u></a>      | Programming and Algorithms I     | 4            |
| <a href="#"><u>CSCI 211</u></a>      | Programming and Algorithms II *  | 4            |
| <a href="#"><u>CSCI/MATH 217</u></a> | Discrete Mathematics             | 3            |
| <a href="#"><u>CSCI 311</u></a>      | Algorithms and Data Structures * | 4            |
| <a href="#"><u>CSCI 430</u></a>      | Software Engineering             | 3            |
| <a href="#"><u>CSCI 440</u></a>      | Operating Systems                | 4            |

For unclassified students, these courses must be completed through Chico State.\*

Note: CSCI/MATH 217, CSCI 430, CSCI 440, CINS 370, and CSCI 111 can be taken at an accredited program approved by graduate coordinator

## Advancement to Candidacy

In addition to any requirements listed above:

1. Completion of the Graduate Requirement in Writing Proficiency ([CSCI 693](#)).
2. Classified graduate standing and completion of, or enrollment in, the graduate core courses.
3. Development of an approved program in consultation with the Graduate Coordinator.
4. Meet Graduate Studies requirements.



## Online MS Computer Science Budget Model

30 units; 5 semesters

10% Attrition Rate

|  | YR 1 - FY 24/25 | YR 2 - FY 25/26 | YR 3 - FY 26/27 | YR 4 - FY 27/28 | YR 5 - FY 28/29 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>Tuition per unit</b>                | \$ 825          | \$ 825          | \$ 825          | \$ 825          | \$ 825          |
| <b>Fall and Spring admit cycles</b>    | 60              |                 |                 |                 |                 |
| Units Students take in FY              | 960             |                 |                 |                 |                 |
| <b>Fall and Spring admit cycles</b>    |                 | 120             |                 |                 |                 |
| Units Students take in FY              |                 | 1620            |                 |                 |                 |
| <b>Fall and Spring admit cycles</b>    |                 |                 | 120             |                 |                 |
| Units Students take in FY              |                 |                 | 1814            |                 |                 |
| <b>Fall and Spring admit cycles</b>    |                 |                 |                 | 180             |                 |
| Units Students take in FY              |                 |                 |                 | 1993            |                 |
| <b>Fall and Spring admit cycles</b>    |                 |                 |                 |                 | 180             |
| Units Students take in FY              |                 |                 |                 |                 | 2754            |
| <b>Total Units</b>                     | 960             | 1620            | 1814            | 2214            | 2754            |
| <b>Total number of students</b>        | 60              | 120             | 120             | 180             | 180             |
| <b>Revenue</b>                         |                 |                 |                 |                 |                 |
| Tuition                                | \$ 792,000      | \$ 1,336,500    | \$ 1,496,880    | \$ 1,826,550    | \$ 2,272,050    |
| Other                                  |                 |                 |                 |                 |                 |
| <b>Total Revenue</b>                   | \$ 792,000      | \$ 1,336,500    | \$ 1,496,880    | \$ 1,826,550    | \$ 2,272,050    |
| <b>Direct Expenses</b>                 |                 |                 |                 |                 |                 |
| <b>Faculty/Staff</b>                   |                 |                 |                 |                 |                 |
| Faculty Program Coordinator .5 RT      | \$ 49,000       | \$ 51,450       | \$ 54,023       | \$ 56,724       | \$ 59,560       |
| Faculty Program Coordinator Benefits   | \$ 24,500       | \$ 25,725       | \$ 27,011       | \$ 28,362       | \$ 29,780       |
| Faculty Additional Employment          | \$ 110,000      | \$ 242,000      | \$ 242,000      | \$ 352,000      | \$ 264,000      |
| Faculty AE Benefits                    | \$ 1,595        | \$ 3,509        | \$ 3,509        | \$ 5,104        | \$ 3,828        |
| Staff Advisor RT incl benefits .25     | \$ 24,000       | \$ 24,720       | \$ 25,462       | \$ 26,225       | \$ 27,012       |
| TLP .5 Instructional Designer RT       | \$ 65,000       | \$ 66,950       | \$ 68,959       | \$ 71,027       | \$ 73,158       |
| GRAD Admissions Advisor RT .25         | \$ 24,000       | \$ 24,720       | \$ 25,462       | \$ 26,225       | \$ 27,012       |
| <b>Other</b>                           |                 |                 |                 |                 |                 |
| Library Services per SCU \$ 3.5        | \$ 3,360        | \$ 5,670        | \$ 6,350        | \$ 7,749        | \$ 9,639        |
| DoIT Services per SCU \$ 14            | \$ 13,440       | \$ 22,680       | \$ 25,402       | \$ 30,996       | \$ 38,556       |
| IEGE Application Review per app \$ 200 | \$ 1,000        | \$ 1,000        | \$ 1,000        | \$ 1,000        | \$ 1,000        |
| Marketing Services                     | \$ 175,000      | \$ 175,000      | \$ 175,000      | \$ 175,000      | \$ 175,000      |
| Direct Media Spend                     | \$ 200,000      | \$ 200,000      | \$ 300,000      | \$ 300,000      | \$ 400,000      |
| Student Financial Services % of rev 4% | \$ 31,680       | \$ 53,460       | \$ 59,875       | \$ 73,062       | \$ 90,882       |
| <b>Total Direct Expenses</b>           | \$ 722,575      | \$ 896,884      | \$ 1,014,052    | \$ 1,153,475    | \$ 1,199,427    |
| <b>Operating Income/Margin</b>         |                 |                 |                 |                 |                 |
| <b>Indirect Expenses</b>               |                 |                 |                 |                 |                 |
| CSU and State Indirect 3%              | \$ 23,760       | \$ 40,095       | \$ 44,906       | \$ 54,797       | \$ 68,162       |
| Campus Cost Recovery 5%                | \$ 39,600       | \$ 66,825       | \$ 74,844       | \$ 91,328       | \$ 113,603      |
| ECC Cost Recovery 10%                  |                 |                 |                 |                 |                 |
| ECC Dean                               | \$ 39,600       | \$ 66,825       | \$ 74,844       | \$ 91,328       | \$ 204,485      |
| CSCI                                   | \$ 39,600       | \$ 66,825       | \$ 74,844       | \$ 91,328       | \$ 204,485      |
| PCE Admin 8%                           | \$ 63,360       | \$ 106,920      | \$ 119,750.40   | \$ 146,124      | \$ 363,528      |
| Other                                  |                 |                 |                 |                 |                 |
| <b>Total Indirect Expenses</b>         | \$ 205,920      | \$ 347,490      | \$ 389,189      | \$ 474,903      | \$ 954,261      |
| <b>Total All Expenses</b>              | \$ 928,495      | \$ 1,244,374    | \$ 1,403,240    | \$ 1,628,378    | \$ 2,153,688    |
| <b>Net Gain/Loss</b>                   | \$ (136,495)    | \$ 92,126       | \$ 93,640       | \$ 198,172      | \$ 118,362      |
| <b>Pre Launch Investment Repayment</b> |                 |                 | \$ 40,000       | \$ 160,000      | \$ -            |
| <b>Program Balance</b>                 | \$ (136,495)    | \$ (44,369)     | \$ 9,271        | \$ 47,443       | \$ 165,805      |

|           | 24/25 program year |     |      | 25/26 program year |     |      | 26/27 program year |     |      | 27/28 program year |     |      | 28/29 program year |     |      |     |     |  |
|-----------|--------------------|-----|------|--------------------|-----|------|--------------------|-----|------|--------------------|-----|------|--------------------|-----|------|-----|-----|--|
|           | F24                | S25 | SU25 | F25                | S26 | SU26 | F26                | S27 | SU27 | F27                | S28 | SU28 | F28                | S29 | SU29 |     |     |  |
| Fall 24   | 40                 | 240 | 240  | 240                | 240 | 240  |                    |     |      |                    |     |      |                    |     |      |     |     |  |
| Spring 25 | 20                 |     | 120  | 120                | 120 | 120  |                    |     |      |                    |     |      |                    |     |      |     |     |  |
| Sum 25    |                    | 360 |      |                    |     |      |                    |     |      |                    |     |      |                    |     |      |     |     |  |
| Fall 25   | 40                 |     |      | 240                | 240 | 240  | 240                | 240 |      |                    |     |      |                    |     |      |     |     |  |
| Spring 26 | 20                 |     |      | 120                | 120 | 120  | 120                | 120 |      |                    |     |      |                    |     |      |     |     |  |
| Sum 26    |                    |     |      | 480                |     |      |                    |     |      |                    |     |      |                    |     |      |     |     |  |
| Fall 26   | 50                 |     |      |                    |     |      | 300                | 300 | 300  | 300                | 300 |      |                    |     |      |     |     |  |
| Spring 27 | 23                 |     |      |                    |     |      | 138                |     |      | 138                | 138 | 138  |                    |     |      |     |     |  |
| Sum 27    |                    |     |      |                    |     |      | 558                |     |      |                    |     |      |                    |     |      |     |     |  |
| Fall 27   | 50                 |     |      |                    |     |      |                    |     |      | 300                | 300 | 300  | 300                | 300 |      |     |     |  |
| Spring 28 | 25                 |     |      |                    |     |      |                    |     |      | 150                |     |      | 150                | 150 | 150  |     |     |  |
| Sum 28    |                    |     |      |                    |     |      |                    |     |      | 588                |     |      |                    |     |      |     |     |  |
| Fall 28   | 85                 |     |      |                    |     |      |                    |     |      |                    |     |      | 510                | 510 | 510  | 510 | 510 |  |
| Spring 29 | 40                 |     |      |                    |     |      |                    |     |      |                    |     |      | 240                | 240 | 240  | 240 | 240 |  |
| Sum 29    |                    |     |      |                    |     |      |                    |     |      |                    |     |      | 1200               |     |      |     |     |  |
|           |                    | 2   | 2    | 2                  | 4   | 4    | 3                  | 4   | 4    | 5                  | 5   | 5    | 6                  | 6   | 7    | 6   |     |  |

| Total                                    | 24/25 program year | 25/26 program year | 26/27 program year | 27/28 program year | 28/29 program year |                |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|----------------|
| # students                               | 60                 | 108                | 120                | 133                | 180                |                |
| #SCU                                     | 960                | 1620 10% attrition | 1814               | 1993               | 2754               | 9141 total SCU |
| Comparison with CSCI Waterfall document: |                    |                    |                    |                    |                    | 0.923333       |
| # sections                               | 10                 | 22                 | 22                 | 32                 | 24                 |                |
| SCU/ section @ 30 ea:                    | 900                | 1980               | 1980               | 2880               | 2160               | 9900 total SCU |
| # students per year                      | 60                 | 120                | 120                | 180                | 240                |                |

5 semester program (22) months  
# students per year based on # enrolled in spring of program year  
class max 30



California State  
University **Chico**

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Computer Science, and  
Construction Management  
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[ecc@csuchico.edu](mailto:ecc@csuchico.edu)

To Whom It May Concern,

I am pleased to write this letter of support for the proposed Online Masters of Science in Computer Science. The proposed program supports the campus mission and will not impede the successful operation and growth of existing academic programs in the College of Engineering, Computer Science & Construction Management. The program will be self-support and is modeled after the Online MBA administered by the College of Business. Program faculty are partnering with [Everspring](#) to ensure adequate resources are available for the program's development and launch.

Regards,

Gregory K. Watkins, Ph.D., PE  
Interim Dean  
College of Engineering, Computer Science & Construction Management

October 11, 2023

Dear Colleagues,

This letter is regarding the proposal for the Online MS in Computer Science. In general, the proposal is accepted conditionally due to limited resources available in TLP. With the intention of the university bringing 5 new online programs aboard this year, the resources are and will be strained.

While newly proposed in-person courses and programs are introduced, the infrastructure, operations and resources for campus buildings, classrooms, scheduling, and support already exist at-large. For online programs, infrastructure and operations that support the start of online programs are thin. The campus is in need of organizing a more strategic and systematic approach to launch successful, quality online degree programs and the attention and resources it takes to support that.

TLP's workload is affected. Starting an online degree program takes extra resources. It is not just individual faculty dropping by TLP Lab in Zoom for "quick" questions/issues. Many faculty state that they already taught online but remote "COVID" teaching is not equivalent to the work and focus needed to develop quality online courses and programs. Here is a list of work that TLP provides for online degree programs although the depth of this support is not consistent among online programs.

- Coordinating program expectations with the online program coordinator
  - What courses and what faculty are teaching when? What does the waterfall of courses look like? Self-support programs don't follow our normal on-campus schedule which means preparation of the online course launches happens at different times which changes the workload of TLP resources needed.
  - Developing an online degree program course template. Why?
    - For online student success in navigating their online program's courses
    - To help faculty more quickly get their fully online course up and running that has some consistency for the online students helping them feel that the courses are indeed connected to the online degree program.
  - Participating in the Program Coordinators meetings with faculty for various topics and updates that include technology updates that happen frequently.
- Consultations on course design, not just a "quick question"
  - Teaching Quality Learning and Teaching (QLT) principles
    - Quality Learning and Teaching (QLT) training is highly recommended for faculty teaching a fully online course. TLP works closely with Faculty Development to provide the online QLT course to define quality online teaching and learning but faculty "don't have time" even though they are going to have to spend time developing a fully online course.
    - Realign course designs for online student expectations that are not the same as on-campus students (e.g. one online program talked a lot about changing due dates in their online courses for working adults to meet online students needs).
  - Learning Canvas features and the tools for teaching and learning in fully online courses
    - The assumption is to use exactly the same tools that we do for on-campus courses but faculty aren't aware of better tools for fully online courses.
    - Introduce new tools or ways to implement tools. (e.g. Pronto allows students to easily contact classmates via texting which is VERY helpful to online students)

- Check for broken links and other issues found within the online courses
- Improve course accessibility scores by improving file accessibility and layout
- Regular communication with faculty to check in on needed tech support providing many hours consulting on course design problems and recommendations
- Create and build all content for Canvas Organization specific for students in that online program
  - What does the Canvas Organization contain for online students since they aren't on campus to find resources? (e.g. are there online student clubs?)
  - Collecting resources for the online program that would be helpful for students not on campus
- Co-organize with PCE an Informational Session for potential and incoming fully online students (e.g. Events/activities available to connect to the community of students in the degree program but not in the same courses together?)
- Overall, TLP offers support and resources regarding instructional quality, course design, accessibility, Universal Design for Learning, and Academic Integrity according to [EM 21-029](#) Policy for the Use of Digital Technologies in Teaching and Learning.

TLP has been providing faculty with technology support for remote instruction both before and during COVID, at which time the unit's workload significantly increased. And now we are supporting faculty migrating from Blackboard to Canvas. While TLP received some additional resources for the online self-support business programs, there is no similar support mechanism in place for state-supported online programs. **TLP has one temporary position due to expire December 2023 based on exhausted funding. That will take six full-time positions down to five.** As the Academic Technology Officer who oversees TLP and the affiliated staff, the university, from a broader view, needs to consider the TLP workload. Here's the work that TLP has had added to their plate:

1. Chico State Fully Online Degree Programs launched since COVID
  - Masters in Business Administration (Fall 2020)
  - BS in Business Administration (Fall 2022)
  - BA in Multicultural and Gender Studies (Fall 2023)
  - BA in Humanities (Fall 2023)
2. TLP worked very hard and at an intense pace since COVID which has been hard on staff.
  - March 19, 2020, One-day conference via Zoom - Teaching Online
  - Summer 2020, Go Virtual
  - Summer 2021, Go Flex (ChicoFlex and HyFlex)
  - And the elephant...January 2022 to December 2023, migrating faculty and students from Blackboard to Canvas

This is not the first letter that has been submitted documenting the limited resources for each online program proposal that comes through Academic Senate. I'm more than happy to discuss and answer questions.

Sincerely,

Kathy Fernandes, Academic Technology Officer



## MEMORANDUM

**To: Dr. David Zeichick**

**From: Jodi Shepherd**

**Date: October 17, 2023**

**Subject: Library support for Online Masters of Computer Science**

This memo outlines the current resources from the Meriam Library for the Online Masters of Computer Science.

While the material resources will support this masters, the Meriam Library does not have an Engineering Librarian who has the background nor expertise in the field of Computer Science nor Engineering. Thus, we continue to be unable to fully meet the needs of the college, this online degree, and engineering students. A librarian hire, directly supporting this masters and the entire College of Engineering is needed to truly provide adequate support to the college. Since this is an online program, it is particularly important to have a librarian who is able to meet with students and support them in their studies when they are not on campus regularly.

Available anywhere, these resources support the Online Masters in Computer Science:

- O'Reilly Ebooks Online (10,000 ebooks on computer science topics.)
- Compendex
- IEEE Xplore
- Science Direct
- SpringerLink
- Wiley Online Library
- Proquest Ebook Central

Students have access to Interlibrary Services that provide services and resources to distance learners as well as obtain materials not owned by the library. Also, please note that the Department of Computer Science receives an annual book budget to purchase new library materials that could be used to fill in any gaps in book coverage as the program takes shape.

# Add Self-Support Counterpart of Degree Program

## Chico State Proposal to Add a Self-Support Online Master of Science in Computer Science Counterpart of the Previously Approved State- Support Master of Science in Computer Science Program

August 2023

### 1. Explain how the existing state-support offering is not being supplanted:

The state-funded MS in Computer Science program at Chico is tailored to benefit international students seeking an on-campus study experience, recent graduates of Chico who recognize the potential of an MS in Computer Science for their career enhancement, and working professionals based in or willing to move to Chico. Meanwhile, the proposed online self-support MS in Computer Science program is designed to accommodate mid-career professionals juggling full-time jobs and family commitments, who find relocating to Chico unfeasible and who would otherwise be unable to undertake an MS in Computer Science from Chico State.

This online program will complement, rather than compete with or supersede, the existing on-campus state-supported program, to which the Computer Science Department (CSCI) remains fully dedicated. This commitment involves preserving the quality and volume of face-to-face classes offered by the on-campus program. The department continues to allocate state financial resources and staff, including the Computer Science Chair, to the traditional MS in Computer Science program.

Furthermore, the on-campus MS in Computer Science program maintains its collaboration with the Office of International Education and Global Engagement to promote and augment the population of international graduate students. It remains a crucial part of CSCI's portfolio, and it is actively growing year to year.

### 2. Specify the program's qualifications to operate as a self-support special session ([per EO 1099](#)):

The online MS in Computer Science program aims to extend educational opportunities to a wider range of adult learners throughout the state and country, operating on a self-sustaining financial basis. Unfortunately, the available CSU operating funds are not allocated to support the initiation and implementation of this online MS program. The entirely online delivery model of the self-funded MS in Computer Science program sets it apart, enabling Chico State to provide a program that surpasses the cost capabilities of current CSU Operating Funds.

This program will adhere to all academic standards that apply to the state-supported MS in Computer Science program, including ABET accreditation and compliance with regional accreditor (WSCUC), campus, and system policies. Faculty compensation will be

## Add Self-Support Counterpart of Degree Program

managed through additional employment as stipulated in the collective bargaining agreement. The program fees will reimburse the campus's educational support services. The Computer Science Department (CSCI) is partnering with Professional and Continuing Education (PCE) to offer the online MS in Computer Science program.

### 3. Provide a detailed rationale for the new support mode:

Chico State has a unique opportunity to extend its existing MS in Computer Science program into an online format, thereby pioneering as the first California State University to offer an online MS in Computer Science. It's important to note that while Cal State Fullerton does provide an online Master's in Software Engineering, this is not equivalent to a Computer Science degree.

The field of Computer Science provides a comprehensive "generalist" understanding, covering all interconnected aspects of modern computing technology. On the other hand, Software Engineering is a distinct discipline focusing on designing and implementing large-scale and complex software systems. Hence, our online MS in Computer Science will fill a niche in the CSU system by offering a broader, more comprehensive curriculum in this increasingly important field.

The primary goal of our online MS in Computer Science program is to serve our local community and our alumni in California. Furthermore, our self-funded online MS in Computer Science program will enable students to pursue their advanced educational goals, regardless of their geographical location, professional commitments, or family responsibilities. This online delivery format aligns perfectly with CSU's mission of expanding educational access, facilitating a larger demographic to conveniently acquire an MS in Computer Science degree.

It's undeniable that competitively priced, highly esteemed providers influence the nationwide market for graduate education in the MS in Computer Science and related fields. Nevertheless, a robust regional provider like Chico has the potential to thrive. Here are a few reasons why:

- Thus far, most online programs continue to attract students living within commutable distances from their campuses. This indicates the importance of regional brand appeal and the value students place on the ability to connect with their campus.
- The rapidly expanding undergraduate and graduate Computer Science markets benefit all involved institutions.
- Chico State has the opportunity to position itself as an early participant in the California market.
- The offering of a professional MS in Computer Science calls for faculty expertise that many institutions aspire to have. If more schools possessed such expertise, we would likely see a greater number of these programs.



## Add Self-Support Counterpart of Degree Program

4. **Attach a detailed cost-recovery budget specifying student fees per unit and total student cost to complete the program.**

**The attached preliminary budget illustrates how the per-unit fees from students will cover both the direct and indirect expenses of delivering the program, including the recovery of costs to the general fund. The fees from Professional and Continuing Education will directly offset the costs of several state employees, including those for program coordination (expense transfers for MS in Computer Science faculty personnel), graduate advising (expense transfers for Student Services Professional personnel), Extended Education Specialists for marketing and program management, and a Professional and Continuing Education funded Academic Support Coordinator for student services and retention.**

**In addition, Professional and Continuing Education fees will compensate the general fund for technological support services, encompassing the Learning Management System (Canvas), help desk services for faculty and staff, and instructional design. Student fees will also be allocated towards direct marketing expenses and the recovery of program development funds initially drawn from the PCE reserves. These reserves will finance a fee-for-service contract for the creation of a branding and marketing campaign and for generating leads for student recruitment.**

**The proposed total program course fees of \$24,750 align with the CSU mission, offering access to an affordable, high-quality MS in Computer Science. The projected program cost is based on an expected fee of \$825 per unit for the 30-unit MS in Computer Science program.**

5. **Provide evidence of consultation with faculty, administrators, students, and related stakeholders in the collaborative preparation of the plan, assessment, and timeline. Evidence may include but is not limited to dates, times, minutes, and vote counts from meetings, lists of attendees, correspondence, etc.**

**The notion of an online MS in Computer Science program has been a subject of discourse in the Department of Computer Science for more than a year. These conversations have spanned different echelons, from the Dean's office and department chairs to the broader faculty. From April 2022, these discussions have gathered momentum, and now encompass comprehensive consultations with University and Everspring, . A high level of support for an online MS in Computer Science has been evidenced through both formal and casual meetings with faculty members.**

**meeting dates:**

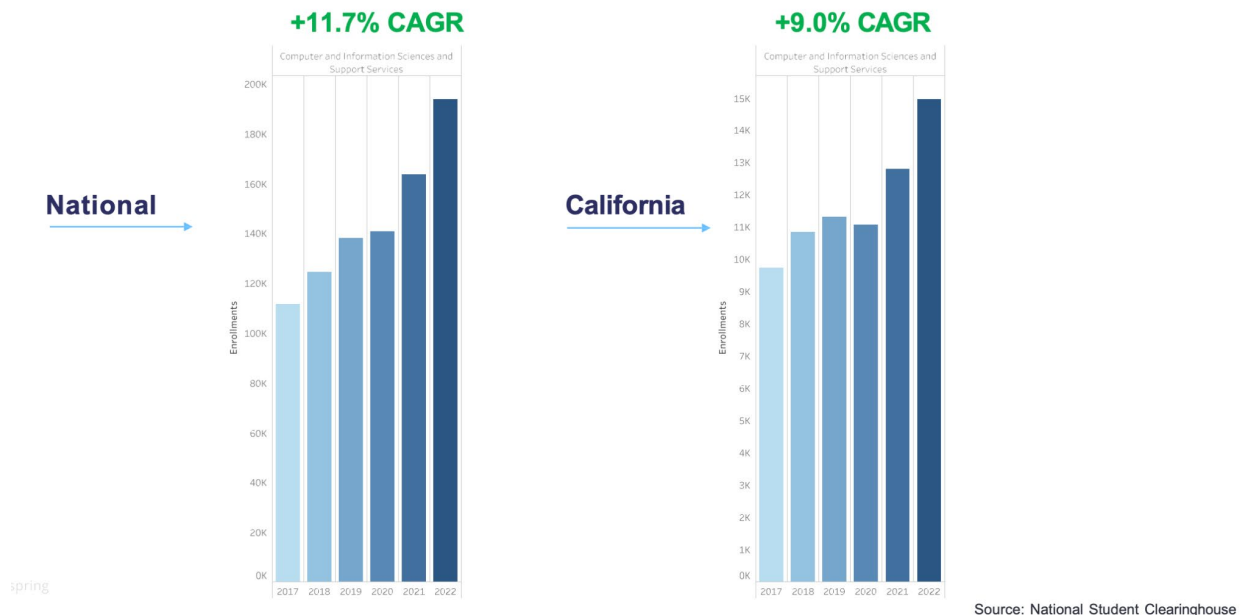
# Add Self-Support Counterpart of Degree Program

- Computer Science Department Meetings on 8/18/23, 8/23/23, 8/30/30, 9/6/23, 9/13/23, 9/20/23
- Computer Science Grad Committee meetings on 9/4/23, 9/11/23, 9/18/23, 9/25/23

6. Provide compelling evidence of student interest and anticipated enrollment in the proposed program. Types of evidence vary and may include (for example), national, statewide, and professional employment forecasts and surveys; petitions; lists of related associate degree programs at feeder community colleges; reports from community college transfer centers; and enrollments from feeder baccalaureate programs.

## National and State Level Trends:

Computer Science (CS) is among the fastest-growing disciplines at the graduate level both nationally and in California. According to the National Center for Education Statistics, the number of students enrolling in CS graduate programs has consistently increased every year, demonstrating a robust demand. In California, the trend has been similar with a high growth rate in CS enrollments.



## High Demand for Affordable Programs:

## Add Self-Support Counterpart of Degree Program

There is a strong demand for more affordable, yet high-quality CS graduate programs. The average cost of an MS in CS at a private university in California like Stanford or USC is currently significantly higher than anticipated costs for the Chico State program. By offering an affordable option, Chico State can attract students who may otherwise be unable to pursue a graduate degree due to financial constraints.

### Program characteristics: California and region

|                       | Institution                                 | State | US News Rank | Degree Name                           | Learning Format | Credits | Cost Per Credit<br>(Out of State / In State) | Total Tuition<br>(Out of State / In State) | Estimated Average<br>Months to<br>Completion |
|-----------------------|---|-------|--------------|---------------------------------------|-----------------|---------|--|--|--|
| California            | Stanford University                         | CA    | National 3   | Master of Science in Computer Science | Online          | 45      | \$1,400                                      | \$63,000                                   | 36 to 60                                     |
|                       | University of Southern California           | CA    | National 25  | Master of Science in Computer Science | Online          | 32      | \$2,309                                      | \$73,888                                   | 30 to 42                                     |
|                       | San Francisco State University              | CA    | National 234 | Master of Science in Computer Science | On Campus       | 33      | (\$396 /\$270)                               | (\$11,880 / \$8,100)                       | 18 to 30                                     |
|                       | San Jose State                              | CA    | West 16      | Master of Science in Computer Science | On Campus       | 33      | \$1,571                                      | \$51,843                                   | 24   |
|                       | California State University, Sacramento     | CA    | West 38      | Master of Science in Computer Science | On Campus       | 30      | (\$396 /\$270)                               | (\$11,880 / \$8,100)                       | 24   |
|                       | National University                         | CA    | West 90-117  | Master of Science in Computer Science | Online          | 59      | \$442  | \$26,078                                   | 13   |
| Outside of California | Arizona State University-Tempe (ASU Online) | AZ    | National 121 | Master of Science in Computer Science | Online          | 30      | \$500  | \$15,000                                   | 18 to 36                                     |
|                       | University of Nevada, Reno                  | NV    | National 263 | Master of Science in Computer Science | On Campus       | 33      | \$322  | \$10,626                                   | 24   |
| Median                |   |       |              |                                       |                 | 33      | \$744  | \$26,078                                   |  |

#### Expanding Online Education Market:

The online education market has seen unprecedented growth in the last few years. The global pandemic accelerated this trend as students sought flexible and remote learning options. As of 2021, around 35% of graduate students in the US were enrolled in fully online programs, a number that continues to rise. By providing an online MS in CS, Chico State will cater to this growing demographic of students who prefer or require the flexibility of online education.

#### Industry Demand for CS Professionals:

There's a strong and growing demand in the industry for professionals with a CS graduate degree. According to the U.S. Bureau of Labor Statistics, jobs in computer and information technology fields are projected to grow 13% from 2020 to 2030, faster than the average for all occupations. This industry growth suggests a continuous stream of students seeking to enhance their career prospects with an MS in CS degree.

#### Chico State's Reputation:

Chico State has a strong reputation as a regional leader in providing quality education. The institution's positive image, combined with the introduction of an affordable, online MS CS program is likely to attract students seeking a competitive yet financially accessible graduate program.

## Add Self-Support Counterpart of Degree Program

7. **Include a statement from the appropriate campus administrative authority (college Dean) that the addition of this program supports the campus mission and will not impede the successful operation and growth of existing academic programs and that adequate resources will be provided for the program.**

- a. **[Dean Letter of Support](#)**

8. **Explain the anticipated impact on the existing state-support program:**

**We anticipate no impact on the state-support program.**

**Within the state-support program, enrollment has been growing and could grow with the increased visibility and recognition that accompanies the marketing and branding of the online MS in CS program.**