Microcertificate in Foundations of Computing

Under Review | Spring 2026

Proposal Information

Workflow Status

In Progress

Graduate Council Agenda Preparation, Graduate College Curriculum expand

Waiting for Approval | Graduate Council Agenda Preparation

Amanda Morales-Calderon
Lisa Anderson
Amy Glasscock
Sophia Mcgovern
Kayla Durazo

Proposal to Establish a New Program

Requested Term & Year (The first term for which applications will be accepted and students admitted.)

Spring 2026

This proposal can also be viewed at:
https://asu.kuali.co/cm/#/programs/view/68c4498127f300caaf89fe1d

General Information

Select Program Level and Type
Graduate certificate

General Program Information

College/School/Institute
Ira A. Fulton Schools of Engineering (CES)

Department/Division/School
Dean, Ira A. Fulton Schools of Engineering (CESDN)

Name of Program
Microcertificate in - Foundations of Computing

Program

Foundations of Computing

Degree Type

Proposing Faculty Group
N/A

Responsible Faculty Member or Director
Yinong Chen

Campus or Location options

Add a Different Campus or Location
No

Are you requesting an online offering?
Yes

Complete the Request for Digital Immersion Implementation.

Program Description/Justification

The Foundations of Computing microcertificate offers a rigorous curriculum designed to build a strong theoretical and practical understanding of the core principles that drive modern computing. The microcertificate prepares non-computer science students for professional roles that require a solid understanding of computing, including foundations of engineering mathematics, multivariable calculus, differential equations and optimization, probability and statistics as well as programming paradigms. The microcertificate also prepares students interested in applying to FSE's computing-focused graduate degree programs.

Students will develop proficiency in key areas such as logic, proof strategies, combinatorics, algorithm analysis, discrete structures (including sets, relations, and trees), and the fundamentals of finite automata. In addition to theoretical foundations,

the microcertificate emphasizes hands-on experience in computer programming. Learners will engage with multiple programming paradigms and gain the skills necessary to design and implement robust, object-oriented software systems, and understand programming language design.

The Foundations of Computing microcertificate expands access by welcoming students from non-STEM backgrounds into rigorous computing pathways, removing traditional barriers to advanced study. It also promotes inclusivity by equipping diverse learners with essential mathematical, logical, and programming skills needed to thrive in a digital economy. In alignment with ASU and the Fulton Schools' mission, the program fosters upward mobility, workforce readiness, and preparation for graduate education in high-demand computing fields. Lastly, the program enhances FSE's Global Engagement leadership as the top developer of engineering and technical talent.

The microcertificate will be delivered via ASU's existing digital immersion platform in collaboration with the EdPlus/AZX teams to address the language and timezone needs of the target audience for this program.

Program Need

According to the US Bureau of Labor Statistics, overall employment in computer and information technology occupations is projected to grow much faster than the average for all occupations from 2024 to 2034. About 317,700 openings are projected each year, on average, in these occupations due to employment growth and the need to replace workers who leave the occupations permanently.

In collaboration with AZX / CinLearn, we were able to identify the following international context for program need. China produces approximately 10 million Zhuanke graduates annually (3-year applied college programs) alongside a significant number of Benke graduates without diploma. Both are highly career-focused and strong candidates for applied skills-based programs. This number has increased YOY as documented by China's Ministry of Education. Looking within the current AZX student pool- 39% of CinLearn graduate degree leads come from students with Zhuanke (3-year applied college degree) and Benke graduates without diploma, even though current marketing does not target them. These students show high motivation to pursue advanced study. The global market demand in specific geographic areas adds to the evidence for this credential.

Many global professionals with STEM, business, or liberal arts degrees are seeking entry into computing fields but lack formal CS training. A microcertificate offering foundational CS knowledge appeals strongly to this group, providing a pathway into advanced computing studies found in a graduate degree.

ASU currently does not offer this type of pathway in a non-English form. ASU should offer this program to continue to diversify its Mandarin-language portfolio to meet the needs of an expanding market. CinLearn census data shows 684 AZX students in 2024 vs. 359 YTD in 2025, projecting a ~28% decline in enrollment. This highlights the urgency of diversifying into new audiences, including Benke graduates, through flexible microcertificates.

BLS: https://www.bls.gov/ooh/computer-and-information-technology/

Specialized Accreditation

None

State Authorization and Professional Licensure:

State Authorization and Professional Licensure:

Does this degree program include learning placement opportunities (clinical, externship, internship, research, student teaching, etc.)?
N

Will this degree program be offered via distance education (whole or in-part)?
Y

Will in-person instruction be occurring in any jurisdiction, other than the State of Arizona?
N

Does this degree program potentially lead to professional licensure or certification (attorney, nurse, physician, teacher, etc.) for the student?
N

Collaborating Units

Are two or more academic units collaborating on this program?
No

Is this an officially recognized joint program?
No

Collaboration and Impact

List other academic units or programs that might be impacted by the proposed program and describe the potential impact (e.g., how the implementation of this program might affect student headcount/enrollment, student recruitment, faculty participation, course content, etc. in other programs) and how the programs might complement each other. If there are no comparable programs, describe why the program is unique at ASU.
Statements of support were requested from the following academic units on 9/12/2025:

Global Futures, College of
New College of Interdisciplinary Arts and Sciences
School of Technology for Public Health
The College of Liberal Arts and Sciences
Watts College of Public Service and Community Solutions

Attach a PDF copy of the letter of collaboration and impact from each Dean, or Dean's designee at the Assistant or Associate Dean level, from impacted programs and units consulted.

- TO_NCIAS_Microcertificate in Foundations of Computing – Statement of Support Request.pdf
- FROM_CLAS_ Microcertificate in Foundations of Computing Statement of Support Request.pdf
- FROM_College of Global Futures_ Microcertificate in Foundations of Computing Statement of Support Request.pdf
- FROM_Watts College _ Microcertificate in Foundations of Computing – Statement of Support Request.pdf
- FROM_School of Technology for Public Health_ Microcertificate in Foundations of Computing – Statement of Support Request.pdf

Course Development

Will a new course subject be required for this program?
No

Will new courses be established?
No

Graduate Degree Curriculum

Is the proposed certificate a microcertificate of 9 credit hours?
Yes

Allow 400-level courses?
No

Minimum Credits Required for the Program
9

Curriculum Requirement Option 1
9 credit hours

Add another option?
No

Curriculum Requirement Option 1

9 credit hours

Min credits required for this option
9

Primary Requirement (Culminating experience)
Not Required

Additional Requirement(s)

Curriculum option course requirements

Required Core

9
Total Credits

- Complete all of the following
  - Complete 9 credits from the following courses:
    - FSE598 - Special Topics (1 - 4)
  - The approved topics for FSE 598 are Emerging Computing Technologies, Foundations of Engineering Mathematics, and Programming Languages and Paradigms. Each topic should be completed for three credit hours.

Grand Total Credits: 9

Additional Curriculum Information

We are in the process of requesting permanent number courses for the curriculum, which will share the same titles as the special topics. Once the permanent number courses are approved, they will replace the omnibus course in the curriculum.

Sharing of Credit Hours with a Degree

Will this proposed certificate program allow sharing of credit hours from another ASU degree program to be used as part of this certificate program?

Yes, this will be a stackable credential as part of the Master of Engineering program.

Projected Enrollment

Enrollment Headcounts

	Number of Students Majoring
1st Year	15
2nd Year (Yr 1 continuing + new entering)	30
3rd Year (Yr 1 & 2 continuing + new entering)	45
4th Year (Yrs 1, 2, 3 continuing + new entering)	60
5th Year (Yrs 1, 2, 3, 4 continuing + new entering)	75

Additional Enrollment Information

Estimated Timeframe to Complete Program

What is the minimum timeframe that this program can be completed?
1 year or less

If necessary, please provide additional information.

Resources (Faculty, Staff and Others)

Current Faculty

Name	Title	Highest Degree Obtained	Area of Specialization or Expertise	Estimated Level of Involvement
Yinong Chen	Teaching Professor	PHD	Computer Science/AI	High
Yuli Deng	Assistant Teaching Professor	PHD	Computer Networking	High
Huen Liu	Professor	PHD	Computer Science/AI	Low

New Faculty
No

Is your college in the process of reviewing the new faculty? Or has new faculty already been approved?
No

Administration of the Program
Dr. Yinong Chen will be faculty program lead with Professors Deng and Liu as members of the faculty committee to oversee the program in collaboration with EDO/GOEE leadership. The microcertificate serves as a pathway into a graduate program (master of engineering) where other faculty are involved. Given the language requirement of these offerings, we only include the faculty that have the language proficiency to directly engage with students but from a longevity and sustainability of the program, the program benefits from FSE's SCAI faculty and leadership support.

This microcertificate will be added to FSE's portfolio of online degree and certificate offerings. GOEE has a director and academic advising team for online programs who are dedicated to making these programs successful. Impact to their day-to-day job functions will be minimal since enrollment will be small with only three course offerings. The program is augment by the collaboration with the EdPlus/AZX local team and utilizes the same processes and foundation that have supported the graduate degree program.

Required Resources
None required.

Resource Acquisition
None.

Graduate Program Admission Requirements

The below sections are for initial admission criteria setup for new programs. Once the program is approved, this section will display the admission text as it appears in the academic catalog/degree search.

Applicants must fulfill the requirements of both the Graduate College and the **[name of college]**. Applicants are eligible to apply to the program if they have earned a bachelor's or master's degree in **[subject area]** or related field; from a regionally accredited institution. Applicants must have a minimum cumulative GPA of 3.00 (scale is 4.00 = "A") in the last 60 hours of a student's first bachelor's degree program, or applicants must have a minimum cumulative GPA of 3.00 (scale is 4.00 = "A") in an applicable master's degree program.

Name of College

Ira A. Fulton Schools of Engineering (CES)

Subject Area(s)

any subject

Is the minimum required cumulative GPA in the last 60 hours of bachelor's degree higher than the standard minimum of 3.00?

No

Is the minimum required cumulative GPA in an applicable master's degree program higher than the standard minimum of 3.00?

No

Applicants are required to submit:

- graduate admissions application and application fee
- official transcripts
- proof of English proficiency

Select additional requirements:

professional resume

Additional Application Requirements/Materials

An applicant whose native language is not English must provide proof of English proficiency regardless of current residency. If applicable, list any English proficiency requirements that are supplementary to the Graduate College requirement.

No English is required as the microcertificate is offered in Mandarin to Cintana/AZX students.

If any required components require further explanation, explain here.

Additional Admission Information:

Professional resume should include all degrees earned and professional work experience.

Graduate Application Information

Indicate the first term and year in which applications will be opened for admission. Applications will be accepted on a rolling basis after that time. The regular session is only available for summer.
Note: It is the academic unit's responsibility to display program deadline dates on their website.

Campus or Location	Term	Session
ASU Online	Spring	Regular
ASU Online	Spring	Session B (ASU Online only)
ASU Online	Summer	Regular
ASU Online	Fall	Regular
ASU Online	Fall	Session B (ASU Online only)

Application Deadlines

Modality	Term	Session	Deadline	Type
Online	Spring	Session A/C	2025/12/29	Rolling
Online	Spring	Session B (Online Only)	2026/03/02	Rolling
Online	Summer	Session A/C	2026/05/04	Rolling
Online	Fall	Session A/C	2026/08/07	Rolling
Online	Fall	Session B (Online Only)	2026/10/02	Rolling

Program Admission Deadline Website Address

Fees

Is a program fee required?
No

Degree Search and Operational Information

Marketing Description

Build your computing expertise with the foundations of computing microcertificate. Gain skills in programming, algorithms, math and problem-solving to prepare for tech-driven careers or graduate study—no STEM background required.

Degree Search Program Description

The foundations of computing microcertificate offers a rigorous curriculum designed to build a strong theoretical and practical understanding of the core principles that drive modern computing.

The microcertificate prepares students who are not in science, technology, engineering and mathematics (STEM) for professional roles that require a solid understanding of computing, including foundations of engineering mathematics, multivariable calculus, differential equations and optimization, probability and statistics as well as programming paradigms. The microcertificate also prepares students interested in applying to FSE's computing-focused graduate degree programs.

Students will develop proficiency in key areas such as logic, proof strategies, combinatorics, algorithm analysis, discrete structures (including sets, relations and trees), and the fundamentals of finite automata.

In addition to theoretical foundations, the microcertificate emphasizes hands-on experience in computer programming. Learners will engage with multiple programming paradigms, programming language design, and gain the skills necessary to design and implement robust, object-oriented and service-oriented software systems.

Provide a brief description of career opportunities available for this program.

The foundations of computing microcertificate helps learners strengthen technical and analytical skills that are valuable in computing and related fields. This credential can open doors to roles that require computing fluency or prepare learners for graduate study.

Potential career opportunities include:

- Technical Analyst / Data Analyst
- Software Support Specialist / Application Specialist
- Business or Systems Analyst
- Project Coordinator (Tech/Engineering Projects)
- STEM Educator / Trainer (with computing emphasis)
- Graduate Pathways

This credential also boosts employability in non-STEM fields where digital literacy, problem-solving, and programming skills are increasingly expected (e.g., finance, healthcare, consulting, government, and education).

Global Experience: Provide a brief description of global opportunities or experiences (study abroad, international internships) available for this program.

ONET/SOC Codes: Career Options

15-1211.00 Computer Systems Analyst15-1299.08 Computer Systems Architect15-1241.00 Computer Network Analyst
15-1253.00 Computer Software Quality Engineer15-1252.00 Software Developer

Professional Licensure

Additional Professional Licensure Information

Degree Search Contact Information and Support

Building Code
Paul C. Helmick Center (HLMK)

Room Number
372

Program Email Address
student-fseonline@asu.edu

Program Office Telephone Number
480-965-1740

Program Website Address
https://asuonline.asu.edu/online-degree-programs/graduate/master-engineering-area-study-engineering-management/?gclsrc=aw.ds&&utm_source=google&utm_medium=cpc&utm_content=br_grad_engineering_c_engineering-management_prog079_non&utm_campaign=22-nat_acq-hi_br_programs_grad_non_gg&utm_ecd22=22&utm_term=asu+engineering+management+masters&gad_source=1&gad_campaignid=17149135143&gbraid=0AAAACemS5UqhyC35SLlfrkj2CxeCvEq_&gclid=CjwKCAjwiY_GBhBEEiwAFaghvvMEQuFc-EHP8tNuINWIY_S7AFV394VN-QNMCEtob16t-or45ZHYKRoCoK4QAvD_BwE

Keywords
Computer ProgrammingSoftware EngineeringSoftware DevelopmentProgrammingProgrammer

List New Keywords

Select one (1) primary area of interest from the list below that applies to this program
Computing & Mathematics

Select one (1) secondary area of interest from the list below that applies to this program
Engineering & Technology

Program Assessment

Attach a PDF copy of the assessment plan printed from the University Office of Evaluation and Educational Effectiveness assessment portal demonstrating UOEEE's approval of your assessment plan for this program.

- MCERT1757627193_UOEEE_received.pdf

Supporting Documents

Additional Supporting Documentation (Impact statements should be above under Collaboration and Impact)

Please describe the attached files and their relevance to the proposal.

Dependencies

Dependencies

There are no dependencies

From:	Bradley Ryner
To:	Sergio Quiros; Kyle Rader; Brian Bottini
Cc:	Teresa Wu; Amanda Morales-Calderon; Sophia Mcgovern; Jeremy Helm; Patrick Phelan (Professor); Kayla Durazo; Octavio Heredia; Yinong Chen; Kenro Kusumi; Jeffrey Cohen (Dean); Dan Cox; Magda Hinojosa; Kyle Rader; Brian Bottini
Subject:	Re: Microcertificate in Foundations of Computing – Statement of Support Request
Date:	Monday, September 15, 2025 1:59:53 PM

Dear Teresa,

The College of Liberal Arts and Sciences has reviewed your proposal to launch a new microcertificate in Foundations of Computing. We foresee no significant impact on graduate programs in The College and support this program. We at The College look forward to this new degree and future collaborations.

With best,
Brad

Bradley D. Ryner (he/him)
Associate Dean of Graduate Initiatives
The College of Liberal Arts and Sciences
Associate Professor, Department of English
Arizona State University

From: Sergio Quiros <Sergio.Quiros@asu.edu>
Date: Friday, September 12, 2025 at 5:29 PM
To: Bradley Ryner <Bradley.Ryner@asu.edu>, Kyle Rader <kwrader@asu.edu>, Brian Bottini <Brian.Bottini@asu.edu>
Cc: Teresa Wu <Teresa.Wu@asu.edu>, Amanda Morales-Calderon <AMANDA.MORALES-CALDERON@asu.edu>, Sophia Mcgovern <somcgove@asu.edu>, Jeremy Helm <JEREMY.HELM@asu.edu>, Patrick Phelan (Professor) <phelan@asu.edu>, Kayla Durazo <kydurazo@asu.edu>, Octavio Heredia <Octavio.Heredia@asu.edu>, Yinong Chen <YINONG.CHEN@asu.edu>
Subject: Microcertificate in Foundations of Computing – Statement of Support Request

Sent on behalf of Teresa Wu

Hello,

I am writing to request an impact/support letter (email will suffice) for the proposed microcertificate in **Foundations of Computing**.

Please note that the Graduate College has requested a response by September 15, 2025.

Let me know if you have any questions or need additional information.

Teresa Wu
Vice Dean, Academic and Student Affairs
President's Professor, School of Computing and Augmented Intelligence
Director, ASU-Mayo Center for Innovative Imaging
Ira A. Fulton Schools of Engineering
Arizona State University

Sergio Z. Quiros
Assistant Director of Academic Administration
Ira A. Fulton Schools of Engineering
Arizona State University
Tempe, AZ 85287-8109
Phone: 480/727-5770
Email: Sergio.Quiros@asu.edu

From: Kate Eaton
To: Sergio Quiros
Cc: Miki Kittilson; Althea Pergakis
Subject: Re: Microcertificate in Foundations of Computing – Statement of Support Request
Date: Tuesday, September 16, 2025 8:53:15 AM

Hi Sergio,

We support this initiative.

Thanks,
Kate

Kate Eaton, Ph.D.
Arizona State University | **College of Global Futures**
Associate Dean for Students & Academic Innovation
Clinical Professor
kkarnos@asu.edu | Slack: @kkarnos
Office: WCPH 464B | Ph: 480.965.2937 | directory
Pronouns: *she, her, hers* | SafeZONE Ally
I live and work on the ancestral lands of the Akimel O'odham (Pima) and Pee Posh (Maricopa) peoples.
| #HonorNativeLand

On Fri, Sep 12, 2025 at 5:30 PM Sergio Quiros <Sergio.Quiros@asu.edu> wrote:

> *Sent on behalf of Teresa Wu*
>
> Hello,
>
> I am writing to request an impact/support letter (email will suffice) for the proposed microcertificate in **Foundations of Computing**.
>
> Please note that the Graduate College has requested a response by September 15, 2025.
>
> Let me know if you have any questions or need additional information.
>
> Teresa Wu

Vice Dean, Academic and Student Affairs

President's Professor, School of Computing and Augmented Intelligence

Director, ASU-Mayo Center for Innovative Imaging

Ira A. Fulton Schools of Engineering

Arizona State University

Sergio Z. Quiros
Assistant Director of Academic Administration
Ira A. Fulton Schools of Engineering
Arizona State University
Tempe, AZ 85287-8109
Phone: 480/727-5770
Email: Sergio.Quiros@asu.edu

From: Jyoti Pathak
To: Sergio Quiros
Cc: Rachel La Vine; Marc Adams; Michelle Villegas-Gold
Subject: RE: Microcertificate in Foundations of Computing – Statement of Support Request
Date: Monday, September 15, 2025 4:22:09 PM
Attachments: Microcertificate in Foundations of Computing.pdf

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Dear Sergio,

Thank you for the opportunity to review FSE's proposal for the Micro-certificate in Foundations of Computing. The School of Technology for Public Health sees strong value in this micro-certificate for our students, particularly those seeking foundational computing skills to complement their public health training.

We identify only areas of opportunity and no concern with this proposed offering. The micro-certificate provides a pathway for non-computer science students to gain essential computing and programming knowledge, aligning well with the interdisciplinary nature of public health technology. We hope to offer these courses and the certificate as electives for our students.

After reviewing the new concentration courses, we identified no areas of overlap and have no concerns regarding the impact on our existing programs.

Good luck!

Regards,
Jyoti

Jyotishman Pathak, PhD, FACMI
Founding Dean and Foundation Professor
School of Technology for Public Health
Arizona State University, Phoenix, AZ
publichealthtech.asu.edu

From: Rachel La Vine <Rachel.Lavine@asu.edu>
Sent: Monday, September 15, 2025 9:26 AM
To: Marc Adams <Marc.Adams@asu.edu>
Cc: Jyoti Pathak <pathakj@asu.edu>
Subject: FW: Microcertificate in Foundations of Computing – Statement of Support Request

Good morning,

Below and attached is an impact statement request for a new microcert.

Thank you,

Rachel La Vine, M.Ed., PMP
Project Manager Senior | ASU Health
Arizona State University
e: rachel.lavine@asu.edu
p: 602-496-0795
w: asuhealth.asu.edu

ASU #1 in the U.S. for innovation
- U.S. News & World Report

From: Sergio Quiros <Sergio.Quiros@asu.edu>
Sent: Friday, September 12, 2025 5:29 PM
To: Rachel La Vine <Rachel.Lavine@asu.edu>
Cc: Teresa Wu <Teresa.Wu@asu.edu>; Amanda Morales-Calderon <AMANDA.MORALES-CALDERON@asu.edu>; Sophia Mcgovern <somcgove@asu.edu>; Jeremy Helm <JEREMY.HELM@asu.edu>; Patrick Phelan (Professor) <phelan@asu.edu>; Kayla Durazo <kydurazo@asu.edu>; Octavio Heredia <Octavio.Heredia@asu.edu>; Yinong Chen <YINONG.CHEN@asu.edu>
Subject: Microcertificate in Foundations of Computing – Statement of Support Request

Sent on behalf of Teresa Wu

Hello,

I am writing to request an impact/support letter (email will suffice) for the proposed microcertificate in **Foundations of Computing**.

Please note that the Graduate College has requested a response by September 15, 2025.

Let me know if you have any questions or need additional information.

Teresa Wu
Vice Dean, Academic and Student Affairs
President's Professor, School of Computing and Augmented Intelligence
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Sergio Z. Quiros
Assistant Director of Academic Administration
Ira A. Fulton Schools of Engineering
Arizona State University
Tempe, AZ 85287-8109
Phone: 480/727-5770
Email: Sergio.Quiros@asu.edu

From: Stephanie Alvey
To: Sergio Quiros
Cc: Chris Hiryak; Cynthia Lietz
Subject: Fw: Microcertificate in Foundations of Computing – Statement of Support Request
Date: Tuesday, September 16, 2025 10:31:43 AM

Hi Sergio,

Watts College is in support of this Microcertificate. If there is anything else you need, please let us know!

Thank you,

Stephanie Alvey, M.Ed.
Associate Director

Watts College of Public Service & Community Solutions
Arizona State University

stephanie.alvey@asu.edu

From: Cynthia Lietz <clietz@asu.edu>
Sent: Tuesday, September 16, 2025 4:22 AM
To: Stephanie Alvey <Stephanie.Alvey@asu.edu>
Cc: Chris Hiryak <chris.hiryak@asu.edu>
Subject: RE: Microcertificate in Foundations of Computing – Statement of Support Request

Yes, this is fine.

From: Stephanie Alvey <Stephanie.Alvey@asu.edu>
Sent: Monday, September 15, 2025 1:54 PM
To: Cynthia Lietz <clietz@asu.edu>
Cc: Chris Hiryak <chris.hiryak@asu.edu>
Subject: Fw: Microcertificate in Foundations of Computing – Statement of Support Request

Hi Cindy,

We got this request for an impact statement for a Microcertificate in Foundations of Computing from Engineering. It doesn't look like there would be any conflicts. If you agree, are you OK with us responding?

Thank you,

Stephanie

From: Sergio Quiros <Sergio.Quiros@asu.edu>
Sent: Friday, September 12, 2025 5:30 PM
To: Chris Hiryak <chris.hiryak@asu.edu>; Stephanie Alvey <Stephanie.Alvey@asu.edu>
Cc: Teresa Wu <Teresa.Wu@asu.edu>; Amanda Morales-Calderon <AMANDA.MORALES-CALDERON@asu.edu>; Sophia Mcgovern <somcgove@asu.edu>; Jeremy Helm <JEREMY.HELM@asu.edu>; Patrick Phelan (Professor) <phelan@asu.edu>; Kayla Durazo <kydurazo@asu.edu>; Octavio Heredia <Octavio.Heredia@asu.edu>; Yinong Chen <YINONG.CHEN@asu.edu>
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Sergio Z. Quiros
Assistant Director of Academic Administration
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Arizona State University
Tempe, AZ 85287-8109
Phone: 480/727-5770
Email: Sergio.Quiros@asu.edu

From:	Sergio Quiros
To:	Stephen Toth; Tosha Ruggles
Cc:	Teresa Wu; Amanda Morales-Calderon; Sophia Mcgovern; Jeremy Helm; Patrick Phelan (Professor); Kayla Durazo; Octavio Heredia; Yinong Chen
Subject:	Microcertificate in Foundations of Computing – Statement of Support Request
Date:	Friday, September 12, 2025 5:28:00 PM
Attachments:	Microcertificate in Foundations of Computing.pdf

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Sent on behalf of Teresa Wu

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Arizona State University
Tempe, AZ 85287-8109
Phone: 480/727-5770
Email: Sergio.Quiros@asu.edu

MCERT in Foundations of Computing

ES-Ira A Fulton Schools of Engineering

Mission

The Foundations of Computing microcertificate equips students from non-STEM backgrounds with essential mathematical and computational knowledge to succeed in technology-driven professional roles and graduate study. The program combines rigorous theory with hands-on programming to advance problem-solving, critical thinking, and applied computing skills in alignment with the ASU charter of inclusion, public value, and academic excellence

Goals

The Foundations of Computing microcertificate goal is to build a strong theoretical foundation in mathematics and computing principles and develop applied programming and software problem-solving skills across paradigms. Graduates from this credential will be prepared for graduate study and professional pathways in computing-intensive fields.

Outcome 1

Students will solve computing problems using mathematical and logical reasoning.

Concepts

Propositional and first-order logic, combinatorics, probability, graph theory, foundations of algorithmic analysis and discrete structures.

Competencies

Students will apply propositional and first-order logic, use combinatorics, apply graph theory, and construct and evaluate logical arguments using formal methods.

Assessment Process

Learning outcome 1 will be assessed using a direct and indirect data. Measure 1.1 includes a computing problem set drawn from FSE 598 Special Topics: Foundations of Engineering Mathematics, a required course in the microcertificate. Measure 1.2 will use survey responses from an end-of-course survey, asking students to rate their confidence in applying mathematical reasoning.

Program assessment data will be reviewed annually by the lead faculty in collaboration with EDO/GOEE leaderships and the results presented to FSE leadership and AZX/Cintana colleagues as part of the program's continuous improvement process. If problems are revealed, a faculty working group led by the faculty direction and GOEE's leadership will be established to determine optimal corrective actions, such as updating program curricula or revising specific courses to better satisfy program learning outcomes.

Measure 1	Performance Criterion 1
FSE 598 Special Topics: Foundations of Engineering Mathematics: Computing Problem Sets will be evaluated with a faculty rubric.	At least 70% of microcertificate students will score "satisfactory" or above on a faculty designed rubric.
Measure 2	**Performance Criterion 2**
End of Course Survey: Student self-reports on confidence applying mathematical reasoning.	At least 70% of microcertificate students will indicate "satisfactory" or above on end of course survey

Outcome 2

Students will evaluate multiple programming paradigms and language features.

Concepts	Competencies
Programming paradigms including imperative, object-oriented, functional, declarative, service-oriented Programming language design syntax, semantics, typing, and runtime models.	Students will compare programming paradigms, select appropriate languages or tools for problem solving.

Assessment Process

Learning outcome 2 will be assessed using a direct and indirect data. Measure 2.1 includes a programming project drawn from FSE 598 Special Topics: Programming Languages and Paradigms, a required course in the microcertificate. Measure 2.2 will use survey responses from an end-of-course survey, asking students to rate their confidence in applying programming languages.

Program assessment data will be reviewed annually by the lead faculty in collaboration with EDO/GOEE leaderships and the results presented to FSE leadership and AZX/Cintana colleagues as part of the program's continuous improvement process. If problems are revealed, a faculty working group led by the faculty direction and GOEE's leadership will be established to determine optimal corrective actions, such as updating program curricula or revising specific courses to better satisfy program learning outcomes.

Measure 1	Performance Criterion 1
FSE 598 Special Topics: Programming Languages and Paradigms: Programming Project will be assessed with a rubric.	At least 70% of microcertificate students will score "satisfactory" or above on a faculty designed rubric.
Measure 2	**Performance Criterion 2**
End of Course Survey: Student self-reports on confidence applying programming languages.	At least 70% of microcertificate students will indicate "satisfactory" or above on end of course survey