The completed and signed proposal should be submitted by the Dean’s Office to: curriculumplanning@asu.edu. Before academic units can advertise undergraduate minors or include them in their offerings as described in the university catalogs, they must be recommended for approval by the Senate Curriculum and Academic Programs Committee and approved by the University Provost.

**Definition and minimum requirements:**
These are the minimum requirements for approval. Individual undergraduate minors may have additional requirements.

A minor is an approved, coherent focus of academic study in a single discipline, other than the student's major, involving substantially fewer hours of credit than a corresponding major. Certain major and minor combinations may be deemed inappropriate either by the college or department of the major or minor. Inappropriate combinations include (but would not be limited to) ones in which an excessive number of courses in the minor are simultaneously being used to fulfill requirements of the student’s major.

A minor:
- Requires a minimum of 15 semester hours of which at least 9 semester hours must be upper division
- Is not intended for students pursuing a major in the department which offers the minor

**College/School/Institute:** New College of Interdisciplinary Arts and Sciences

**Department/Division/School:** School of Mathematical and Natural Sciences

**Proposing Faculty Group (if applicable):**

**Proposed Minor Name:** Applied Computing

**Requested effective date:** 2018-19

**Delivery method:** On-campus only (ground courses and/or iCourses)

*Note: Once students elect a campus or On-line option, students will not be able to move back and forth between the on-campus and the ASU Online options. Approval from the Office of the University Provost and Philip Regier (Executive Vice Provost and Dean) is required to offer programs through ASU Online.*

**Campus/Locations:** indicate all locations where this program will be offered.

- [ ] Downtown Phoenix
- [ ] Polytechnic
- [ ] Tempe
- [x] West
- [ ] Other:

**Proposal Contact**

**Name:** Suzanne W. Dietrich
**Title:** Professor, Applied Computing Program Lead
**Phone number:** 602 543 5628
**Email:** dietrich@asu.edu

**DEAN APPROVAL(S)**

This proposal has been approved by all necessary unit and College/School levels of review. I recommend implementation of the proposed organizational change.

**College/School/Division Dean name:** Todd Sandrin

Signature ____________________________ Date: 6/9/2017

**College/School/Division Dean name:**
(if more than one college involved)

Signature ____________________________ Date: / /20

*Note: An electronic signature, an email from the dean or dean’s designee, or a PDF of the signed signature page is acceptable.*
PROPOSAL TO ESTABLISH A NEW MINOR

1. Overview

A. Description
Provide a brief description of the proposed minor. "Computer Science for all" is a national initiative referred to in President Obama’s State of the Union Address in 2016. Computational skills are important for all majors, and in particular, the ability to use computers for problem solving within a particular discipline is in demand. The applied computing minor will provide those computational skills in combination with a depth of knowledge in databases, networks, and systems.

B. Why should this be a minor rather than a concentration?
A minor can serve many students from other disciplines to add a computational component to their major field of study. The proposed courses represent a subset of the applied computing major, and thus provide the necessary foundation for a minor.

C. Affiliation
If the minor is affiliated with a degree program, include a brief statement of how it will complement the program. If it is not affiliated with a degree program, incorporate a statement as to how it will provide an opportunity for a student to gain knowledge or skills not already available at ASU.

The minor in applied computing is affiliated with the applied computing major in the School of Mathematical and Natural Sciences, this minor will serve students in almost any discipline. In particular, the students in the Applied Mathematics BS or Statistics BS within the School of Mathematical and Natural Sciences are likely to take advantage of this opportunity. Any ASU student who has completed the first two programming courses (ACO 101 Introduction to Computer Science, ACO 102 Object-Oriented Programming) will be on track to complete the minor, adding a computational perspective to their degree.

D. Demand
Explain the need for the new minor (e.g., market, student demand, interdisciplinary considerations).
There is a market demand for students who are computationally advanced and can solve problems that involve leveraging programming and data skills.

E. Projected Enrollment
What are enrollment projections for the first three years?

<table>
<thead>
<tr>
<th></th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Yr. 1 continuing + new entering)</td>
<td>(Yr. 1 &amp; 2 continuing + new entering)</td>
<td></td>
</tr>
<tr>
<td>Number of Students (Headcount)</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

2. Support and Impact

A. Faculty governance
Provide a supporting letter from the chair of the academic unit verifying that the proposed minor has received faculty approval through appropriate governance procedures in the unit and that the unit has the resources to support the minor as presented in the proposal, without impacting core program resources.
Attached

B. Other related programs
Identify other related ASU programs and outline how the new minor will complement these existing ASU programs. (If applicable, statements of support from potentially-affected academic unit administrators need to be included with this proposal submission.)
Letter of support from the Ira A. Fulton Schools of Engineering and the School of Computing, Informatics and Decision Systems Engineering attached.

C. Letter(s) of support
Provide a supporting letter from each college/school dean from which individual courses are taken.
N/A
3. Student Learning Outcomes and Assessment Methods

A. Knowledge, competencies, and skills

List the knowledge, competencies, and skills students should have when they graduate from the proposed degree program. You can find examples of program Learning Outcomes at (https://uoeep.asu.edu/plan-outcomes).

Graduates with a minor in applied computing will demonstrate knowledge of the principles of programming languages, databases, networks, systems, and security along with computational problem-solving skills.

4. Academic Curriculum and Requirements

A. Provide a description of the curricular requirements for the minor. Be specific in listing required courses as well as electives and specify the total minimum number of hours required for the minor. Please attach one or more model programs of study to illustrate the choices students might make, if appropriate.

Required Minor Courses

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Number</th>
<th>Title</th>
<th>Is this a new course?</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACO</td>
<td>201</td>
<td>Data Structures and Algorithms</td>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td>ACO</td>
<td>240</td>
<td>Introduction to Programming Languages</td>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td>ACO</td>
<td>320</td>
<td>Database Systems</td>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td>ACO</td>
<td>330</td>
<td>Computer Networks</td>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td>ACO</td>
<td>350</td>
<td>Systems Programming</td>
<td>No</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Minor Courses

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Number</th>
<th>Title</th>
<th>Is this a new course?</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
<td>(Select one)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
<td>(Select one)</td>
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<tr>
<td>N/A</td>
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<td>(Select one)</td>
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<tr>
<td>N/A</td>
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<td>(Select one)</td>
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<tr>
<td>N/A</td>
<td></td>
<td>(Select one)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other Minor Requirements

E.g. – Capstone experience, internship, clinical requirements, field studies, foreign language skills as applicable

N/A

Total minimum credit hours required for the Minor

15
B. Minimum residency requirement
   How many hours of the minor must be ASU credit? 15

C. New Courses
   Provide prefix, number and a brief course description for each new course.
   All courses in the minor are courses that are currently offered as part of the Applied Computing major.

   Note: All new required courses should be submitted in Curriculum Changemaker and ready for Provost’s Office approval
   before this minor is put on Curriculum and Academic Programs Committee (CAPC) agenda

5. Administration and Resources
   A. Describe the procedures and any qualifications for enrollment in the minor.
      Must have a 2.50 GPA in ASU coursework.

   B. Describe the advising procedures as well as measures for verification of completion of the minor.
      The current advisors for the Applied Computing major are aware of the requirements for the courses in the minor.

   C. What are the resource implications for the proposed minor, including any projected budget needs? Will new books, library
      holdings, equipment, laboratory space and/or personnel be required now or in the future? If multiple units/programs will
      collaborate in offering this minor, please discuss the resource contribution of each participating program. Letters of support
      must be included from all academic units that will commit resources to this minor.
      No additional resources are needed for the minor.

   D. Primary Faculty
      List the primary faculty participants regarding this proposed minors. For interdisciplinary minors, please include the relevant
      names of faculty members from across the University.

      | Name                | Title             | Area(s) of Specialization as they relate to proposed minor |
      |---------------------|-------------------|----------------------------------------------------------|
      | Suzanne W. Dietrich | Professor         | Databases                                               |
      | Feng Wang           | Associate Professor | Networks                                           |
      | Kuai Xu             | Associate Professor | Networks                                               |
      | Yasin Silva         | Associate Professor | Databases                                               |
      | new hire F 17 - TBD | Assistant Professor | Cyber Security                                         |

6. Additional Materials
   A. Appendix
      Complete and attach the Appendix document.

   B. Program of study
      Provide one or more model programs of study (if appropriate).

   C. Attach other information that will be useful to the review committees and the Office of the University Provost.
1. **Proposed Minor Name:** Applied Computing

2. **Marketing Text:**
   
   *Optional. 50 words maximum. The marketing description should not repeat content found in the program description.*
   
   Computational skills and problem solving form the basis of the applied computing curriculum, with its emphasis on databases, networks, systems, and security. Graduates with the computational skills and depth of knowledge achieved through the minor in applied computing are in high demand in fields that make use of computer technology, including business, government, education, science, and medicine.

3. **Description (150 words maximum)**
   
   The minor in applied computing, offered by the School of Mathematical and Natural Sciences, combines technical computing skills with an understanding of the impact of computer science in real-world contexts. Coursework in the applied computing minor provides a depth of knowledge in databases, networks and systems, and gives students from other disciplines a computational component to their major field of study. Computational and problem-solving skills are in high demand in a multitude of career fields, including cybersecurity, Web administration, education and telecommunications.

4. **Contact and Support Information**
   
<table>
<thead>
<tr>
<th>Building Name, code and room number: ([Search ASU map]) FAB N100</th>
<th>Program office telephone number: (i.e. 480/965-2100) 602/543-3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Email Address: <a href="mailto:MNSadvising@asu.edu">MNSadvising@asu.edu</a></td>
<td>Program Website Address: <a href="http://newcollege.asu.edu/applied-computing-minor">http://newcollege.asu.edu/applied-computing-minor</a></td>
</tr>
</tbody>
</table>

5. **Program Requirements:** Provide applicable information regarding the program such as curricular restrictions or requirements, specific course lists, or academic retention requirements.

   **Required Courses: 15 credit hours**
   
   - ACO 201 Data Structures and Algorithms, CS (3)
   - ACO 240 Introduction to Programming Languages (3)
   - ACO 320 Database Systems (3)
   - ACO 330 Computer Networks (3)
   - ACO 350 Systems Programming, CS (3)

   All courses must be passed with a “C” (2.00) or better.

6. **Additional Enrollment Requirements**
   
   If applicable list any additional enrollment requirements students must complete
   
   **GPA Requirement:** A student must have 2.50 GPA in ASU coursework to add this minor.
   
   **Majors Ineligible to Add This Minor:** Applied Computing, BS
   
   **Other Enrollment Requirements:**
   
   A “C” or better is required in ACO 102 Object-Oriented Programming (3) and MAT 210 Brief Calculus (3) in order to enroll in the required minor course, ACO 201.

   Current ASU undergraduate students may pursue a minor and have it recognized on their ASU transcript at graduation. A student should consult an academic advisor in the unit that offers the minor to ensure they take an appropriate set of courses. They also should consult an academic advisor in the major to make sure that college or department allows recognition of the minor; certain combinations of major and minor may be deemed inappropriate by either offering unit. Courses taken for the minor may not count toward both the major and minor. Students should contact the department offering the minor for more information.

7. **Delivery/Campus Information Delivery:** On-campus only (ground courses and/or iCourses)

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8. **Campus/Locations:** indicate all locations where this program will be offered.

   □ Downtown Phoenix □ Polytechnic □ Tempe □ West □ Other:
June 9, 2017

To:  Todd Sandrin, Dean
     New College of Interdisciplinary Arts and Sciences

From: Lara Ferry, Director and Professor
      School of Mathematical and Natural Sciences

Re:  Applied Computing Minor

Attached please find the Proposal to Establish a New Minor in Applied Computing. This proposal was prepared by a faculty committee chaired by Suzanne W. Dietrich. It was approved by the School Curriculum Committee and the entire faculty.

Please approve this proposal and forward it for further approvals.
The completed and signed proposal should be submitted by the Dean's Office to curriculumplanning@asu.edu. Before academic units can advertise undergraduate minors or include them in their offerings as described in the university catalogs, they must be recommended for approval by the Senate Curriculum and Academic Programs Committee and approved by the University Provost.

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**Department/Division/School:** School of Mathematical and Natural Sciences

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**Proposed Minor Name:** Applied Computing

**Requested effective date:** 2018-19

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- Tempe
- West
- Other:

**Proposal Contact**

**Name:** Suzanne W. Dietrich

**Phone number:** 602 543 5628

**Title:** Professor, Applied Computing Program Lead

**Email:** dietrich@asu.edu

**DEAN APPROVAL(S)**

This proposal has been approved by all necessary unit and College/School levels of review. I recommend implementation of the proposed organizational change.

**College/School/Division Dean name:** Todd Sandrin

Signature ______________________ Date: 6/9/2017

**College/School/Division Dean name:**

Signature ______________________ Date: 6/20

Note: An electronic signature, an email from the dean or dean's designee, or a PDF of the signed signature page is acceptable.
CORE REQUIREMENTS (15 Credit Hours – C or better)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Introduction to Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>ACO 320</td>
<td>Database Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACO 330</td>
<td>Computer Networks</td>
<td>3</td>
</tr>
<tr>
<td>ACO 350</td>
<td>Systems Programming (CS)</td>
<td>3</td>
</tr>
</tbody>
</table>

- Minors may not share courses with major requirements.
- All courses used to satisfy the requirements for this minor must be passed with a "C" (2.00) or better.
- Depending on a student’s undergraduate program of study, prerequisite courses may be needed in order to complete the requirements of this minor.
Dear Kyle,

I hope this email finds you enjoying a pleasant end to the spring semester.

Our School of Mathematical and Natural Sciences is proposing a minor in Applied Computing and an undergraduate certificate in Data Science.

I have attached the program proposals for your review.

 Might you provide a statement of impact for each program?
Thanks!

Todd

Todd R. Sandrin, Ph.D.
Professor, School of Mathematical and Natural Sciences
Senior Sustainability Scientist - Julie Ann Wrigley Global Institute of Sustainability
Senior Associate Dean, ASU New College | Director, NCUIRE

Arizona State University
4701 W. Thunderbird Rd. | Glendale, AZ  85306
602.543.6934 | Todd.Sandrin@asu.edu
Stacey: The NC curriculum committee approves the ACO Minor and Data Science Certificate, both unanimously.

Best,
Patricia

I have read through both proposals and the comments of Prof. Kobojek, whose expertise is closest to the focus of the these requests, and I support their moving forward.

as an aside, I meet more and more students in my recruiting role for Barrett who would be interested in these options.

RER

Ramsey Eric Ramsey, Ph.D.
Associate Dean
Barrett, The Honors College
Arizona State University at the West campus
Phoenix, Arizona 85069
602-543-3410
Co-editor, Philosophy/Communication book series
Duquesne University Press
Editor, Review of Communication
Good morning-

I fully support these two initiatives. I think both proposals will be of value to all of our students in New College who are seeking additional credentials and/or specialization to add to their current major curriculum.

Kim

From: Stacey Kimbell
Sent: Friday, April 28, 2017 10:25 AM
To: Patricia Clark <PATRICIA.CLARK@asu.edu>; Ramsey Eric Ramsey <rer@asu.edu>; Kimberly Kobojek <Kimberly.Kobojek@asu.edu>
Cc: Catherine Kerrey <Catherine.Kerrey@asu.edu>; Suzanne Dietrich <dietrich@asu.edu>
Subject: Curriculum Committee Review Needed: ACO Minor and Data Science Certificate

Good morning!

Attached please find the program proposals for the Applied Computing minor and the Data Science certificate.

Please review these proposals and submit your comments to me (for the Dean) no later than Monday, May 15.

If you have any questions about the proposal content, please contact Suzanne Dietrich. If you have any questions about this process, please contact me.

Many thanks,

Stacey Kimbell
Executive Admin Support Specialist
Academic Administration and Curriculum Planning
ASU New College of Interdisciplinary Arts and Sciences
Voice: (602) 543-6150 Fax: (602) 543-4565

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