

**UCC/UGC/ECCC**

Proposal for **Plan Change** or Plan Deletion

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| --- |
| **[ ]  FAST TRACK (Select if this will be a fast track item**. **Refer to** [**UCC**](http://www4.nau.edu/avpaa/UCCPolicy/FastTrack.docx) **or** [**UGC**](http://www.nau.edu/gradcol/UGC/UGC_FastTrack_Policy%26Process.pdf) **Fast Track Policy for eligibility)** |

***If this proposal represents changes to the intent of the plan or its integral components, review by the college dean, graduate dean (for graduate items) and/or the provost may be required prior to college curricular submission.***

***All Plans with NCATE designation, or plans seeking NCATE designation, must include an NCATE Accreditation Memo of Approval from the NAU NCATE administrator prior to college curricular submission.***

***UCC proposals must include an updated 8-term plan.***

***UGC proposals must include an updated program of study.***

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| --- | --- | --- | --- |
| 1. College: | **CEFNS** | 2. Academic Unit: | **Electrical Engineering & Computer Science**  |
|  |  |  |  |
| 3. Academic      Plan Name: | **Computer Science; B.S.C.S. (CSBSCSX)** | 4. Emphasis: |  |

|  |  |  |
| --- | --- | --- |
| 5. Plan proposal: | [x]  Plan Change | **[ ]** Plan Deletion |
|  | **[ ]** New      Emphasis | **[ ]** Emphasis       Change | **[ ]** Emphasis             Deletion |

|  |  |
| --- | --- |
| 6. Current student learning outcomes of the plan. If structured as plan/emphasis, include for **both c**ore and emphasis. Objective 1: Graduates are technically competent and prepared for leadership and professional practice with strength in design, problem solving, communications and teaming.Outcome 1.1 Possess professional skills and knowledge of the software design process.Outcome 1.2 Ability to function effectively in both co-located and distributed software development teams.Outcome 1.3 Possess abilities to effectively communicate orally. Outcome 1.4 Possess abilities to effectively communicate in writing.Outcome 1.5 Abilities in creativity, critical thinking and problem identification, formulation and solving.Objective 2:  Graduates are grounded in computer science and related mathematical fundamentals and prepared for advanced education and lifelong learning.Outcome 2.1 Competence in and ability to apply foundational theoretical concepts and skills related to software development, including underlying knowledge of mathematics (including discrete math, linear algebra, and statistics).Outcome 2.2 Familiarity with a broad range of programming languages and paradigms, with practical competence in at least two languages and paradigms.Outcome 2.3 Ability to apply knowledge of formal software development concepts to select and apply software development processes, programming paradigms, and architectural models appropriate to different application contexts.Outcome 2.4 Motivation and skills needed for lifelong learning.Outcome 2.5 Ability to use industry standard Integrated Development Environments (IDEs), debugging support tools, and other modern software development tools. Objective 3: Graduates are have an understanding of the scope and implications of the rapid and increasing integration of software-driven technologies into personal and professional spheres of modern society. Outcome 3.1 Ability to relate a broad education and contemporary issues to software solutions and their impact in a societal and global context.Outcome 3.2 An appreciation and understanding of professional and ethical responsibility.Objective 4: Graduates integrate quickly into the workplace or advanced education due to an emphasis on high quality teaching, advising and mentoring.Outcome 4.1\* Be a leader in educational innovation and the use of technology in providing a quality educational experience.Outcome 4.2\* Attract and retain well-qualified students.Outcome 4.3\* Foster advising and mentoring relationships between faculty and students.Outcome 4.4\* Graduates have accurate well-     formed expectations about workplace or graduate school.   | Show the proposed changes in this column (if applicable). **Bold** the changes, to differentiate from what is not changing, and change font to **~~Bold Red with strikethrough~~**for what is being deleted. *(*[*Resources, Examples & Tools for Developing Effective Program Student Learning Outcomes*](http://www4.nau.edu/avpaa/Assessment/ProgramLearningOutcomesPDF_090712.pdf)*).***UNCHANGED** |
| 7. Current catalog plan overview and requirements in this column. Cut and paste the *Overview* and *Details* tabs, in their entirety, from the current on-line academic catalog: (<http://catalog.nau.edu/Catalog/>)Computer Science, Bachelor of Science in Computer ScienceIn addition to University Requirements:* At least 36 units of preprofessional requirements
* At least 61 units of major courses
* Be aware that you may not use courses with a CS prefix to satisfy liberal studies requirements
* Elective courses, if needed, to reach an overall total of at least 120 units

Please note that you may be able to use some courses to meet more than one requirement. Contact your advisor for details.

| Minimum Units for Completion | 120 |
| --- | --- |
| Mathematics Required | [MAT 316](http://catalog.nau.edu/Courses/course?courseId=005229&catalogYear=1314) |
| Additional Fees/Program Fees | Required |
| University Honors Program | Optional |
| Progression Plan | [View Progression Plan](http://catalog.nau.edu/ProgressionPlans/index.jsp?inst=NAU00&cat=1314#CSBSCSX) |

*Major Requirements*Take the following 97 units with a Grade of "C" or better in all required CS Core courses and CS 486C:Preprofessional Requirements (at least 36 units)* Basic Science courses, select one of the following blocks (7-8 units):
	+ PHY 161, PHY 262 (7 units)
	+ CHM 151, CHM 151L, CHM 152 (8 units)
	+ BIO 181, BIO 181L, BIO 182, BIO 182L (8 units)
* MAT 136, MAT 137, MAT 226, (MAT 316 or MAT 362) (14 units)
* CENE 225, STA 270, or STA 275 (3 units)
* Technical electives at the 200-level or above, select from (9 units):
	+ Engineering disciplines (EE, EGR,ME, CENE)
	+ Natural Sciences (MAT, PHY, CHM, BIO)
	+ CS (excluding CS 248)
	+ At least 3 units of technical electives need to come from the Natural Sciences block. (Please note that you may use courses with other prefixes with your advisor's approval.)
* ENG 302W (3 units)

Major Courses (61 units)* Core Courses: CS 126, CS 126L, CS 136, CS 136L, CS 200, CS 212, CS 249, CS 301, CS 315, CS 386, CS 396, CS 421, CS 476, CS 480 (36 units)
* CS 486C (4 units)
* Select CS courses at the 300-level or above, chosen with your academic advisor (21 units)

You are allowed to take up to six units of letter-graded individualized study classes (e.g., CS 485 or CS 497). You may petition the department chair for approval of other computing-intensive courses.*General Electives*  Additional coursework is required, if, after you have met the previously described requirements, you have not yet completed a total of 120 units of credit. You may take these remaining courses from any academic areas, using these courses to pursue your specific interests and goals. We encourage you to consult with your advisor to select the courses that will be most advantageous to you. (Please note that you may also use prerequisites or transfer credits as electives if they weren't used to meet major, minor, or liberal studies requirements.)*Additional Information*No more than one "D" is allowed in CS electives and technical electives.Be aware that some courses may have prerequisites that you must also take. For prerequisite information click on the course or see your advisor. | Show the proposed changes in this column.  **Bold** the changes, to differentiate from what is not changing, and change font to **~~Bold Red with strikethrough~~** for what is being deleted.Computer Science, Bachelor of Science in Computer ScienceIn addition to University Requirements:* At least **~~36~~** **39** units of preprofessional requirements
* At least **~~61~~** **58** units of major courses
* Be aware that you may not use courses with a CS prefix to satisfy liberal studies requirements
* Elective courses, if needed, to reach an overall total of at least 120 units

Please note that you may be able to use some courses to meet more than one requirement. Contact your advisor for details.

| Minimum Units for Completion | 120 |
| --- | --- |
| Mathematics Required | [MAT 316](http://catalog.nau.edu/Courses/course?courseId=005229&catalogYear=1314) |
| Additional Fees/Program Fees | Required |
| University Honors Program | Optional |
| Progression Plan | [View Progression Plan](http://catalog.nau.edu/ProgressionPlans/index.jsp?inst=NAU00&cat=1314#CSBSCSX) |

*Major Requirements*Take the following 97 units with a Grade of "C" or better in all required CS Core courses and CS 486C:Preprofessional Requirements (at least **~~36~~** **39** units)* Basic Science courses, select one of the following blocks (7-8 units):
	+ PHY 161, PHY 262 (7 units)
	+ CHM 151, CHM 151L, CHM 152 (8 units)
	+ BIO 181, BIO 181L, BIO 182, BIO 182L (8 units)
* MAT 136, MAT 137, MAT 226, (MAT 316 or MAT 362) (14 units)
* CENE 225, STA 270, or STA 275 (3 units)
* **Mathematics or Natural Science electives (MAT, STA, PHY, AST, CHM, BIO or GLG prefixes) at the 200-level or above (6 units)**
* Technical electives at the 200-level or above, select from (**~~9~~** **6** units):
	+ Engineering disciplines (EE, EGR,ME, CENE)
	+ **Mathematics or** Natural Sciences (MAT, **STA,** **AST,** BIO, CHM, **GLG,** PHY)
	+ CS (excluding CS 248)

**You may petition the department chair for approval of courses with other prefixes.*** + **~~At least 3 units of technical electives need to come from the Natural Sciences block. (Please note that you may use courses with other prefixes with your advisor's approval.)~~**
* ENG 302W (3 units)

Major Courses (**~~61~~** **58** units)* Core Courses: CS 126, CS 126L, CS 136, CS 136L, CS 200, CS 212, CS 249, CS 301, CS 315, CS 386, CS 396, CS 421, CS 476, CS 480 (36 units)
* CS 486C (4 units)
* **~~Select~~** CS **Electives** **~~courses~~** at the 300-level or above, chosen with your academic **or faculty** advisor (**~~21~~** **18** units)

You are allowed to take up to six units of letter-graded individualized study classes (e.g., CS 485 or CS 497). You may petition the department chair for approval of other computing-intensive courses.*General Electives*  Additional coursework is required, if, after you have met the previously described requirements, you have not yet completed a total of 120 units of credit. You may take these remaining courses from any academic areas, using these courses to pursue your specific interests and goals. We encourage you to consult with your advisor to select the courses that will be most advantageous to you. (Please note that you may also use prerequisites or transfer credits as electives if they weren't used to meet major, minor, or liberal studies requirements.)*Additional Information*No more than one "D" is allowed in CS electives and technical electives.Be aware that some courses may have prerequisites that you must also take. For prerequisite information click on the course or see your advisor. |

8. Justification for proposal:

**A total of at least 30 units of math and basic science units are required by ABET, our accreditation organization. Our current plan falls three credits short of meeting this target.**

**This plan change addresses the problem by adding three units of mathematics, statistics or natural sciences to the preprofessional requirements and at the same time lowering the number of computer science electives by the same amount.**

9. NCATE designation, if applicable**:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| [ ]  Initial Plan |  | [ ]  Advanced Plan |  | [ ]  Remove Designation |
| 10. Effective beginning **FALL**: | **2014** |  |
|  [**See effective dates calendar**](http://www4.nau.edu/avpaa/timelines/1213Effective.xls). |  |

11. Will this proposal impact other plans, sub plans, or course offerings, etc.? Yes [x]      No [ ]

      If yes, describe the impact and include a letter of response from each impacted academic unit.

**The implementation of this plan change will have a shared workload impact of one additional course in the Departments of Mathematics and Statistics, Biology, Chemistry, Physics and Astronomy and the School of Earth Sciences and Environmental Sustainability.**

**An email has been sent out to all of these departments on 9/12/13, no negative response has been returned to date.**

**See attached responses from BIO, CHM, ENV, MAT/STA, and PHY**

**Answer 12-13 for UCC/ECCC only:**

12. A major is differentiated from another major by required course commonality: 24 units of the        required credit hours of a major must be unique, (i.e. not common or not dual use as a required        element in another major), to that major. Does this plan have 24 units of unique required        credit? Yes [x]       No [ ]

13. Minor: A planned group of courses from one or more subject matter areas consisting of at least        18 hours and no more than 24 hours. At least 12 hours of the minor must be unique to that minor        to differentiate it from other minors.

       Does this minor have 12 units of unique required credit? Yes [ ]       No [ ]

**Answer 14-15 for UGC only:**

14. If this is a non-thesis plan, does it require a minimum of 24 units of formal graded coursework?                                                                                                                                       Yes [ ]       No [ ]

       If no, explain why this proposal should be approved.

15. If this is a thesis plan, does it require a minimum of 18 units of formal graded coursework?                                                                                                                                       Yes [ ]       No [ ]

       If no, explain why this proposal should be approved.

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| **FLAGSTAFF MOUNTAIN CAMPUS** |  |
| **Scott Galland**  | **09/26/2013** |
| Reviewed by Curriculum Process Associate | Date |
|  |  |
| **Approvals**: |  |
|  |  |
| Department Chair/Unit Head (if appropriate) | Date |
|  |  |
| Chair of college curriculum committee | Date |
|  |  |
| Dean of college | Date |
|  |  |
| **For Committee use only:** |  |
|  |  |
| UCC/UGC Approval | Date |

Approved as submitted: Yes [ ]  No [ ]

Approved as modified: Yes [ ]  No [ ]

|  |  |
| --- | --- |
| **EXTENDED CAMPUSES** |  |
|  |  |
| Reviewed by Curriculum Process Associate | Date |
|  |  |
| **Approvals:**  |  |
|  |
| Academic Unit Head | Date |
|  |
| Division Curriculum Committee (Yuma, Yavapai, or Personalized Learning) | Date |
|  |
| Division Administrator in Extended Campuses (Yuma, Yavapai, or Personalized Learning) | Date |
|  |
| Faculty Chair of Extended Campuses Curriculum Committee (Yuma, Yavapai, or Personalized Learning) | Date |
|  |
| Chief Academic Officer; Extended Campuses (or Designee) | Date |
|  |  |

Approved as submitted: Yes [ ]  No [ ]

Approved as modified: Yes [ ]  No [ ]

Dear chairs,

My name is Dieter Otte, I'm the assistant chair of the EE/CS department and responsible for the CS programs.

We just recently noticed that our accreditation organization requires us to have our BSCS students take three more units of Math or Basic Science than we have on the books right now. We would like to fix this problem quickly (our ABET visit is imminent) by adding three more units of either: MATH, STA, PHY, AST, CHM, BIO, GLG above the 100 level to our preprofessional requirements. The impact on your programs should be minimal as we are talking about roughly 40 CS students per year who would choose one course from the course offerings of all of your departments combined.

I would like to ask you for a short consent email that you are okay with this change.

Thank you very much for your support,

Dieter

MATH

Dieter:

certainly a MAT 320W type course would appear to be the best choices for your majors. Calc III, Diff Eq., STA 275 would all be academically sound choices to satisfy ABET pressure, but ultimately these would appear second best. I am certainly fine with a catalog change to add 3 hours of MAT/STA/science if that is what you need to do right now.

terry

From: **Maribeth Watwood** <Maribeth.Watwood@nau.edu>
Date: Thu, Sep 12, 2013 at 7:44 PM
Subject: RE: Course addition in BSCS
To: Wolf-Dieter Otte <wolfdieterotte@gmail.com>

Dear Dieter,

This change is fine with our department.  Good luck with the change, and I hope your semester is going well.

Best wishes,
Maribeth

Maribeth Watwood, PhD
Professor and Chair
Department of Biological Sciences
Northern Arizona University

On Thu, Sep 19, 2013 at 3:30 PM, Stephen Christopher Tegler <Stephen.Tegler@nau.edu> wrote:

Hi Dieter,

Physics and Astronomy is ok with your request.

Regards,
Steve

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
Stephen C. Tegler
Professor and Chair, Physics and Astronomy
Northern Arizona University
Box 6010
Flagstaff, AZ 86011
Phone: (928) 523-9382
Fax:     (928) 523-1371
On Wed, Sep 25, 2013 at 2:03 PM, Mary Reid <Mary.Reid@nau.edu> wrote:

Hi Dieter,

I'm writing to say that GLG would be OK with the addition of students at the >100 level.

Cheers,

Mary

**From:** Stuart S Galland
**Sent:** Wednesday, October 09, 2013 5:32 PM
**To:** Marin Sands Robinson
**Subject:** FW: Course addition in BSCS

Hi Marin,

I was following up on this request from Computer Science for Dieter.

Sorry if you already replied, but do you support the proposed changes the BSCS?

**From:** Marin Sands Robinson
**Sent:** Thursday, October 10, 2013 11:57 AM
**To:** Stuart S Galland
**Subject:** RE: Course addition in BSCS

Scott,

Yes, these changes are fine.

Marin