

**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  [***Fast Track Policy***](http://www4.nau.edu/avpaa/UCCPolicy/Agenda_FastTrack_Consent.docx) 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 and Computer Science** |
|  | |  |  | |  | | |
| 3. Academic      Plan Name: | | **Electrical Engineering (EEBSEX)** | | 4. Emphasis: | | **Computer Engineering Emphasis (COMPEEM)**  **Electrical Engineering Emphasis (ELECEGRM)** | |

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| 5. Plan proposal: | | Plan Change | | Plan Deletion | |
|  | New        Emphasis | | Emphasis       Change | | Emphasis             Deletion |

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| 6. Current student learning outcomes of the plan. If structured as plan/emphasis, include for **both c**ore and emphasis. Program Learning Outcomes  1. Apply knowledge of physics and mathematics, including calculus, linear algebra, complex variables and differential equations 2. Apply knowledge of probability, statistics and transform methods 3. Construct and test hypotheses about system behavior by designing and conducting engineering experiments and analyzing and interpreting data and information 4. Employ professional skills and knowledge of the engineering design process within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability 5. Function effectively in diverse disciplinary and multi-disciplinary teams 6. Identify engineering problems, formulate descriptive models, and create, evaluate and synthesize solution 7. Demonstrate knowledge of ethical theories and codes and their application to professional engineering responsibility 8. Demonstrate effective oral communication skills 9. Demonstrate effective written communication skills 10. Relate a broad education and contemporary issues to engineering solutions and express the interactions of global and societal events and engineering 11. Demonstrate global cultural competency 12. Demonstrate the motivation and skills needed for life-long learning 13. Demonstrate the ability to apply techniques, skills and engineering tools necessary for engineering practice | 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** |

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| 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/>) ***Electrical Engineering; B.S.E.***  In addition to University Requirements:   * At least 42 units of preprofessional requirements * At least 65-**~~66-~~67** units of professional requirements * Be aware that you may not use courses with an EE prefix to satisfy liberal studies requirements * Elective courses, if needed, to reach an overall total of at least 127 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 | 127 | | --- | --- | | Mathematics Required | [MAT 239](http://catalog.nau.edu/Courses/course?courseId=005224&catalogYear=1314) | | Emphasis, Minor, Certificate | Required | | 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#EEBSEX) |   *Major Requirements*  Take the following 107 **~~108~~-109** units:  Preprofessional Requirements (42 units)  Mathematics and Science courses (27 units)   * CHM 151 (4 units) * MAT 136, MAT 137, MAT 238, MAT 239 (15 units) * PHY 161, PHY 262 (7 units) * CHM 151L or PHY 262L (1 unit)   Engineering and Computer Science courses (12 units)   * CS 122, CS 122L (3 units) * CENE 225 or STA 275 (3 units) * EGR 186, EGR 286 (6 units)   In addition, take the following:   * PHI 105 (3 units)   Professional Requirements (65-**~~66-~~67** units)   * EE 110, EE 188, EE 188L, EE 215, EE 280, EE 310, EE 325, EE 348, EE 364, EE 380 (35 units) * EGR 386W or EE 386W (3 units) * **(**EE 476C **and** EE 486C**)** **or (EGR 476C and EGR 486C)** **where either sequence** **~~which~~** together meet NAU's senior capstone requirement (4-**5** units)   Emphasis Requirements (Select One)  Computer Engineering Emphasis (23 units)   * CS 126, CS 126L, CS 136, CS 136L, CS 249 (11 units) * MAT 226 (3 units) * EE 410 or EE 412 (3 units) * Additional units from any 400- or 500-level EE courses (6 units)   Electrical Engineering Emphasis (24 units)   * EE 222 (3 units) * PHY 263 (3 units) * Additional units from any other course with a prefix of AST, BIO, CENE, CENS, CHM, CM, CS, EGR, ENV, FOR, GLG, MAT, ME, PHY, PHS, or STA - with the following exceptions (3 units): * We will not accept any recitations, BIO 100, BIO 100L, CS 110, EGR 101, EGR 102, ENV 101, ENV 101L, FOR 101, GLG 100, GLG 100L, PHY 103, PHS 101, and MAT classes numbered lower than MAT 136 * Additional units from any 400-level EE courses (9 units) * Additional units from any 400- or 500-level EE courses (6 units)   *General Electives*  Additional coursework is required, if, after you have met the previously described requirements, you have not yet completed a total of 127 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*  Also note:   * You must earn a "C" or better in all required courses. * No more than two grades of "D" in your major elective courses. * Three units of letter-graded individualized study (EE 485 or EE 497) may be used to meet degree requirements.   Be aware that some courses may have prerequisites that you must also take. For prerequisite information click on the course or see your advisor.  PROGRAM FEE INFORMATION  Program fees are established by the Arizona Board of Regents (ABOR). A program fee of $500 per year in students' Junior and Senior years has been approved for this program.  *Integrated Undergraduate/Graduate Plan Option*  This program is available as an Integrated Undergraduate/Graduate Plan. Integrated Programs provide the opportunity for outstanding undergraduates working on their bachelor’s degree to simultaneously begin work on a master’s degree, allowing them to complete both degrees in an accelerated manner. Students must apply to the master’s program by the application deadline, and meet all requirements as listed on the Integrated Program website to be considered for admission. Admission to programs is competitive. Many qualified applicants are denied because of limits on the number of students admitted each year. Be sure to speak with your advisor regarding your interest in Integrated Programs. | 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.  ***Electrical Engineering; B.S.E.***  In addition to University Requirements:   * At least 42 units of preprofessional requirements * At least **~~65-~~66-**67 units of professional requirements * Be aware that you may not use courses with an EE prefix to satisfy liberal studies requirements * Elective courses, if needed, to reach an overall total of at least **~~127~~** **128** 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 | **~~127~~ 128** | | --- | --- | | Mathematics Required | [MAT 239](http://catalog.nau.edu/Courses/course?courseId=005224&catalogYear=1314) | | Emphasis, Minor, Certificate | Required | | 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#EEBSEX) |   *Major Requirements*  Take the following **~~107~~ 108-**109 units:  Preprofessional Requirements (42 units)  Mathematics and Science courses (27 units)   * CHM 151 (4 units) * MAT 136, MAT 137, MAT 238, MAT 239 (15 units) * PHY 161, PHY 262 (7 units) * CHM 151L or PHY 262L (1 unit)   Engineering and Computer Science courses (12 units)   * CS 122, CS 122L (3 units) * CENE 225 or STA 275 (3 units) * EGR 186, **~~EGR~~** **EE** 286 (6 units)   In addition, take the following:   * PHI 105 (3 units)   Professional Requirements (**~~65-~~66-**67 units)   * EE 110, EE 188, EE 188L, EE 215, EE 280, EE 310, EE 325, EE 348, EE 364, EE 380 (35 units) * EGR 386W or EE 386W (3 units) * (EE 476C and EE 486C) or (EGR 476C and EGR 486C) where either sequence together meet NAU's senior capstone requirement (**~~4~~** 5units)   Emphasis Requirements (Select One)  Computer Engineering Emphasis (23 units)   * CS 126, CS 126L, CS 136, CS 136L, CS 249 (11 units) * MAT 226 (3 units) * EE 410 or EE 412 (3 units) * Additional units from any 400- or 500-level EE courses (6 units)   Electrical Engineering Emphasis (24 units)   * EE 222 (3 units) * PHY 263 (3 units) * Additional units from any other course with a prefix of AST, BIO, CENE, CENS, CHM, CM, CS, EGR, ENV, FOR, GLG, MAT, ME, PHY, PHS, or STA - with the following exceptions (3 units): * We will not accept any recitations, BIO 100, BIO 100L, CS 110, EGR 101, EGR 102, ENV 101, ENV 101L, FOR 101, GLG 100, GLG 100L, PHY 103, PHS 101, and MAT classes numbered lower than MAT 136 * Additional units from any 400-level EE courses (9 units) * Additional units from any 400- or 500-level EE courses (6 units)   *General Electives*  Additional coursework is required, if, after you have met the previously described requirements, you have not yet completed a total of **~~127~~** **128** 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*  Also note:   * You must earn a "C" or better in all required courses. * No more than two grades of "D" in your major elective courses. * Three units of letter-graded individualized study (EE 485 or EE 497) may be used to meet degree requirements.   Be aware that some courses may have prerequisites that you must also take. For prerequisite information click on the course or see your advisor.  PROGRAM FEE INFORMATION  Program fees are established by the Arizona Board of Regents (ABOR). 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8. Justification for proposal:

**Two changes are being made. The first change was necessitated by our ABET Accreditation and assessment process to ensure that students learn two of our program learning outcomes, (11) global cultural competency and (12) lifelong learning. In a separate course change proposal, one unit was added to EE 476C in order to add two modules and two major assignments into this class to accomplish this. The second change was necessitated by the shift of responsibility in EGR 286 from the Design4Practice program to the departments and a corresponding shift of EE 386W to Design4Practice, or EGR 386W. This shift has already occurred in Civil and Environmental Engineering where CENE 286 has replaced EGR 286. A new course proposal for EE 286 accompanies this plan change and replaces EGR 286 in this degree plan. This shift allows the sophomore class to serve the particular needs of the department better in terms of electrical engineering accreditation learning outcomes (primarily #4, #8 and #10 listed above).**

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

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| Initial Plan |  | Advanced Plan | | | |  | Remove Designation | |
| 10. Effective beginning **FALL**: | | | **2015** | |  | | |
| [**See effective dates calendar**](http://www4.nau.edu/avpaa/timelines/1314Effective.xls). | | | |  | | | |

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

   If yes, describe the impact. If applicable, include evidence of notification to and/or response from

each impacted academic unit

**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       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** | **2/13/2014** |
| Reviewed by Curriculum Process Associate | Date |
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| **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

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| **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