

**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: | | | **Mechanical Engineering** |
|  | |  |  | |  | | |
| 3. Academic      Plan Name: | | **Mechanical Engineering (MEEGRBSEX)** | | 4. Emphasis: | |  | |

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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.     1. An ability to apply knowledge of mathematics, science, and engineering 2. An ability to design and conduct experiments, as well as to analyze and interpret data 3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability 4. An ability to function on multi-disciplinary teams 5. An ability to identify, formulate, and solve engineering problems 6. An understanding of professional and ethical responsibility 7. An ability to communicate effectively 8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context 9. A recognition of the need for, and an ability to engage in life-long learning 10. A knowledge of contemporary issues 11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice 12. A broad technical education 13. Disciplinary expertise, or depth, within Mechanical Engineering | 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/>) ***Mechanical Engineering; B.S.E.***  In addition to University Requirements:   * At least 58 units of engineering requirements * At least 46 units of mechanical engineering requirements * Be aware that you may not use courses with an ME prefix to satisfy liberal studies requirements * Elective courses (including 22 units of liberal studies requirements) to reach an overall total of at least 126 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 | 126 | | --- | --- | | Mathematics Required | [MAT 362](http://catalog.nau.edu/Courses/course?courseId=005239&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#MEEGRBSEX) |   *Major Requirements*  Take the following 104 units:  Engineering Requirements (58 units)  Mathematics and science courses (27 units):   * CHM 151\*, CHM 151L (5 units) * MAT 136\*, MAT 137\*, MAT 238\*, MAT 239\* (15 units) * PHY 161\*, PHY 262\* (7 units)   Computer science and engineering courses (27 units):   * CENE 225\*, CENE 251\* (6 units) * CS 122\*, CS 122L (3 units) * EE 188\*, EE 188L (4 units) * EGR 186\*, EGR 286\* (6 units) * ME 180\*, ME 252\*, ME 291\* (8 units) * ME 476C\* and ME 486C, which together meet Northern Arizona University's senior capstone requirement (4 units)   Mechanical Engineering Requirements (46 units)  Take the following 28 units, which provide an overview of the two branches of mechanical engineering - solid mechanics and thermal and fluid sciences - and give you background for further specialization:   * MAT 362 (3 units) * CENE 253\*, CENE 253L (4 units) * EGR 386W (3 units) * ME 340\*, ME 365\*, ME 392, ME 395\*, ME 450\*, ME 495 (18 units)   For mechanical engineering depth, you select coursework from either the courses listed here or from other 300, 400, or 500-level mechanical engineering courses with approval from your advisor and department. Generally these courses have the ME prefix; the only exceptions allowed are the listed EE and CENE courses due to their significant ME content. You can also use ME 500-level courses as depth electives, as a qualified senior with departmental approval. We encourage you to gain expertise in one of the two primary branches of mechanical engineering, by means of the following groupings (9 units):  \*Prerequisities to Engineering coursework that must be completed with grades of "C" or better. In addition, ENG 105 must be completed with a grade of "C" or better.  Mechanical design:   * CENE 376, CENE 477 * EE 325, EE 458 * ME 454, ME 455, ME 467, ME 482, ME 484   Fluid and thermal sciences:   * CENE 430, CENE 480 * EE 325, EE 458 * ME 441, ME 442, ME 451, ME 454   To gain breadth in fields related to mechanical engineering, you also select upper-division (300-400 level) courses in engineering, natural sciences, business, or mathematics. No more than one lower division course (100-200 level) can be used as a breadth elective. You must get approval from your advisor and department for these courses. (9 units)  *General Electives*  Additional coursework is required, if, after you have met the previously described requirements, you have not yet completed a total of 126 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 that you can't have more than two grades of "D" in your engineering and computer science courses. Furthermore, all prerequisite courses for your engineering courses must be completed with grades of "C" or better.  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.  ***Mechanical Engineering; B.S.E.***  In addition to University Requirements:   * At least 58**-59** units of engineering requirements * At least 46 units of mechanical engineering requirements * Be aware that you may not use courses with an ME prefix to satisfy liberal studies requirements * Elective courses (including 22 units of liberal studies requirements) to reach an overall total of at least 126 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 | 126 | | --- | --- | | Mathematics Required | [MAT 362](http://catalog.nau.edu/Courses/course?courseId=005239&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#MEEGRBSEX) |   *Major Requirements*  Take the following 104**-105** units:  Engineering Requirements (58**-59** units)  Mathematics and science courses (27 units):   * CHM 151\*, CHM 151L (5 units) * MAT 136\*, MAT 137\*, MAT 238\*, MAT 239\* (15 units) * PHY 161\*, PHY 262\* (7 units)   Computer science and engineering courses (27 units):   * CENE 225\*, CENE 251\* (6 units) * CS 122\*, CS 122L (3 units) * EE 188\*, EE 188L (4 units) * EGR 186\*, EGR 286\* (6 units) * ME 180\*, ME 252\*, ME 291\* (8 units) * **(**ME 476C\* and ME 486C**)** **or (EGR 476C and EGR 486C), where either sequence** **~~which~~** together meet Northern Arizona University's senior capstone requirement (4-**5** units)   Mechanical Engineering Requirements (46 units)  Take the following 28 units, which provide an overview of the two branches of mechanical engineering - solid mechanics and thermal and fluid sciences - and give you background for further specialization:   * MAT 362 (3 units) * CENE 253\*, CENE 253L (4 units) * EGR 386W\* (3 units) * ME 340\*, ME 365\*, ME 392, ME 395\*, ME 450\*, ME 495 (18 units)   For mechanical engineering depth, you select coursework from either the courses listed here or from other 300, 400, or 500-level mechanical engineering courses with approval from your advisor and department. Generally these courses have the ME prefix; the only exceptions allowed are the listed EE and CENE courses due to their significant ME content. You can also use ME 500-level courses as depth electives, as a qualified senior with departmental approval. We encourage you to gain expertise in one of the two primary branches of mechanical engineering, by means of the following groupings (9 units):  \*Prerequisities to Engineering coursework that must be completed with grades of "C" or better. In addition, ENG 105 must be completed with a grade of "C" or better.  Mechanical design:   * CENE 376, CENE 477 * EE 325, EE 458 * ME 454, ME 455, ME 467, ME 482, ME 484   Fluid and thermal sciences:   * CENE 430, CENE 480 * EE 325, EE 458 * ME 441, ME 442, ME 451, ME 454   To gain breadth in fields related to mechanical engineering, you also select upper-division (300-400 level) courses in engineering, natural sciences, business, or mathematics. No more than one lower division course (100-200 level) can be used as a breadth elective. You must get approval from your advisor and department for these courses. (9 units)  *General Electives*  Additional coursework is required, if, after you have met the previously described requirements, you have not yet completed a total of 126 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 that you can't have more than two grades of "D" in your engineering and computer science courses. Furthermore, all prerequisite courses for your engineering courses must be completed with grades of "C" or better.  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. |

8. Justification for proposal:

**EGR 476/486 is being reinstated as a multidisciplinary capstone experience. EGR 476/486 has not been offered in some years as the engineering departments have offered their own capstone classes (ME476C/486C, EE 476C/486C, CENE476/486C, and CS 476/486C). Our accrediting agency as well as the university has moved recently towards a more multi-disciplinary experience for students, and EGR 476C/486C will be offered in the future to reflect that change. The class will be offered to all engineering and computer science majors as a capstone substitute for their departmental capstone. The class will be open to all majors, depending on the projects, and depending on departmental approvals, may be substituted for a senior capstone requirement in other departments. This will enhance cross-disciplinary collaboration at NAU.**

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

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| Initial Plan |  | Advanced Plan | | | |  | Remove Designation | |
| 10. Effective beginning **FALL**: | | | **2014** | |  | | |
| [**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