# CRITERION 5. CURRICULUM

## A. Program Curriculum

*Complete Table 5-1 that describes the plan of study for students in this program including information on course offerings in the form of a recommended schedule by year and term along with maximum section enrollments for all courses in the program for the last two terms the course was taught. If there is more than one curricular path or option for a program, a separate Table 5-1 should be provided for each path or option. State whether the institution operates on quarters or semesters.*

The curricula for all EP concentrations are designed such that EP majors take approximately equal portions of physics courses, together with their physics peers, and engineering courses, together with the engineering peers of their respective concentrations, to fulfill their major requirements. In other words, there are no courses that are specifically designed and taught to EP students only. Typically, EP major complete the major-design experience (capstone) requirement within an engineering department.

There have been significant changes to the EP curriculum, compared to the 2012 SSR of the EP program. Particularly, there was a complete overhaul of the curricula for the majors in *Chemical Engineering* and *Electrical Engineering*, which greatly affected the EP curricula with those concentrations. For those engineering subjects, some courses were eliminated, others were combined and new ones were introduced. Although not as wide-ranging, there were also some changes in the requirements for *Mechanical Engineering* and *Aerospace Engineering*, some of which were adopted for EP majors with those concentrations. Compared the 2012 SSR, the physics content remained largely unchanged, with just a few changes in course contents, delivery methods and/or streamlining of assessment processes.

Table 5.1 provides a list of required and elective courses and their classification as *Math & Basic Sciences*, *Engineering*, *General Education* or *Viewing the Wider World*. The classification of each course is consistent with its classification for any of the engineering majors at NMSU.

In collaboration with the associated engineering departments, the *EP Program Committee* engaged in a continuous effort on the evaluation and needed modifications of mostly upper-level physics courses, such that they could be counted toward the contingent of 'engineering' courses, without adversely affecting the basic-physics knowledge that physics majors are expected to have after taking such courses. This has been an important process since the 2012 SSR, where the distinction between basic sciences and engineering for physics courses was raised as a concern by *ABET*. A discussion of the classification of physics courses is provided below.

***Physics courses counting toward science contingent in Table 4.1***

All EP students are required to take *PHYS 213/213L* or *PHYS215G/215GL*, *PHYS 214/214L* or *PHYS 216/216GL*, and *PHYS 217/217L*. The former two sets of courses and their associated labs are required courses for most engineering majors; they can be counted toward the *State's General Education – Area III (Laboratory Science experience).* For all engineering majors, these courses count toward their Math & Basic Sciences contingent.

*PHYS 395 (Math Methods in Physics)*, *PHYS 454* and *PHYS 455 (Intermediate Modern Physics I and II)* are required for all EP majors, *PHYS* 451 (Mechanics) is required for EP students with

the *Aerospace and Mechanical Concentrations*, and *PHYS 480 (Thermodynamics and Statistical Physics)* is required for EP students with the *Electrical Concentration*. These courses are currently taught such that the focus is mostly on the fundamental physics phenomena and theoretical/mathematical approach treatment of those. Therefore, these courses count toward the general *Math & Science* contingent in Table 5.1.

To make scheduling more flexible for EP students with the *Mechanical Concentration*, they can choose between *M E 333* (counts toward engineering) or *PHYS 451* (counts toward Math & Sciences).

***Physics courses with significant engineering components***

*PHYS 315/315L* and *PHYS 461* are required courses for all EP majors. *PHYS 462* is required for all EP majors, except those with the *Electrical Concentration*, who can choose between this course and *EE 351*. An *Advanced Physics Laboratory*, i.e. *PHYS 471*, *PHYS 475* or *PHYS493*, is required for EP students with the *Chemical* or *Electrical Concentrations.*

*PHYS 315* is the *Modern Physics* course and *PHYS 315L* is its associated laboratory. One third of the course teaches modern-physics applications, such as *Solid-State Physics* (including structure characterization, magnetic materials, superconductors and semiconductors) and *Nuclear Physics* (including particle detectors, nuclear fission and fusion). The lab consists of experiments related to modern-physics phenomena and students are required to design, complete and present on a more challenging study as their final assignment. The *Department of Chemical and Materials Engineering* have accepted *PHYS 315* and *PHYS 315L* in a list of *Technical Electives* for their *Minor in Materials Engineering*.

*PHYS 461* is a course on electrostatic and magnetostatics. The engineering content of that course was expanded in recent years, and it now includes homework assignments and/or projects focused on engineering applications. The *Department of Electrical and Computer Engineering* accepts *PHYS 461* as a *Technical Elective* for their *Minor in Electrical Engineering*.

*PHYS 462* is the continuation of *PHYS 461* with a focus on electrodynamics. Like *PHYS 461*, the engineering content of *PHYS 462* was recently expanded, and it would also count as a *Technical Elective* toward a *Minor in Electrical Engineering*.

The *Department of Physics* currently offers three upper-level *Advanced Physics Laboratories*, all of which are cross-listed with the equivalent 500-level graduate labs: *PHYS 471/571* is an Optics Laboratory, *PHYS 475/575* a Solid-State Physics Laboratory and *PHYS 493.593* a Nuclear Physics Laboratory. In each of the labs, the undergraduate and graduate students work together on the same set of experiments and/or projects; however, the graduate students get more difficult assignments and expectations are slightly higher. The main reason for cross-listing is to meet the minimum enrollment requirements for courses to run, i.e. enrollment minimum equals to 10 and each graduate students count double. Each of the *Advanced Physics Laboratories* consists of experiments related to its emphasis, capped by project report and presentation. Since each of the *Advanced Physics Laboratories* has stringent project reporting requirement and some project-management component, the EP program accepts passing the *Advanced Physics Laboratory* as an alternative to passing all pre-requisite requirements for the *Senior-Design (Capstone) Course*. This is particularly important for EP majors with the *Chemical Concentration*, who typically don't fulfill the pre-requisite requirements imposed to *Chemical Engineering* majors. The

*Advanced Physics Laboratories* are accepted as *Technical Electives* for both, the *Minor in Materials Engineering* and the *Minor in Electrical Engineering.*

Several upper-level cross-listed physics courses offered by the *Department of Physics* contain significant engineering components as well, and they are accepted *Technical Electives* of various engineering minors. The following courses are offered as electives: *PHYS 467/567 (Nanoscience and Nanotechnology), PHYS 468/568 (Elements of X-ray Diffraction), PHYS 473/473 (Optics), PHYS 476/576 (Computational Physics), PHYS 477/577 (Fiber Optic Communication Systems), PHYS 478/578 (Fundamentals of Photonics), PHYS 479/579 (Lasers and Applications), PHYS 488/588 (Condensed Matter Physics), PHYS 489/589 (Introduction to Modern Materials), PHYS 491/591 (High-Energy Physics)* and *PHYS 497/*597 (Introduction to Plasma Physics). Several of those courses are cross-listed with courses in different engineering departments (see Appendix A: Syllabi)

***Physics courses counting toward Viewing-the-Wider-World (VWW) courses***

NMSU requires all the majors to take the equivalent of two *VWW* courses. These courses should not be counted toward either the Math & Sciences or Engineering contingents for ABET purposes. However, these courses can provide data for *Program Outcomes Assessment*, if such assessments have been implemented by the instructors of such courses.

The *Department of Physics* has offered some *VWW* courses in recent years, such as *PHYS 303V (Energy and Society), PHYS 304 (Forensic Physics)* and *PHYS 305V (Search for Water in the Solar System)*.

***Substitutions, Exceptions and Waivers***

Each of the departments involved in the EP program (*Physics, Aerospace & Mechanical Engineering, Chemical & Materials Engineering, Electrical & Computer Engineering*) perform their own separate scheduling of courses for their respective majors. This leads to often unavoidable time conflicts for courses that EP students are required to take. In many cases, however, the students and their advisors may be able to identify alternative scheduling or other courses that may be considered as equivalent. The *College of Engineering* implemented a system *Exception-Ease*, where EP advisors may submit substitution or exception requests for approval to the *Academic Dean of the College of Engineering* for consideration and approval. Aside from substitutions/exceptions of majors courses, the most common substitutions are the 9-credit rule to substitute for one of the *VWW* course or transfer credits from another institution. *Exception-Ease* also allows requests for waivers; however, waivers are granted only under very unusual circumstances.

Tables 5.1.a-d provide the plan of study for each of the four EP concentrations (in alphabetical order), namely *Aerospace*, *Chemical*, *Electrical* and *Mechanical*. NMSU operates on a semester system with spring and fall semesters of approximately 14 weeks of instruction each. For some of the lower-level courses, students also can take classes during summer.

***Table 5.1.a.*** *Curriculum for Bachelor of Science in Engineering Physics – Aerospace Concentration (130 credits)*

| **Course (Department, Number, Title)**<br>**List all courses in the program by term starting with first term**<br>**of first year and ending with the last term of the final year.** | **Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[1]** | ***Subject Area (Credit Hours)*** | | | | **Last Two Terms the Course was Offered: Year and, Semester, or Quarter** | **Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]** |
|---|---|---|---|---|---|---|---|
| | | **Math & Basic Sciences** | **Engineering Topics Check if Contains Significant Design (√)** | **General Education** | **Other (VWW)** | | |
| **Year 1, Semester 1 (15 credits)** | | | | | | | |
| MATH 191G, Calculus and Analytic Geometry I | R | 4 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 213 (or 215), Mechanics | R | 3 | | | | F 2016<br>F 2017 | 22<br>18 |
| PHYS 213L (or 215L), Experimental Mechanics | R | 1 | | | | F 2016<br>F 2017 | 22<br>18 |
| ENGR 100, Introduction to Engineering | R | | 3 | | | F 2017<br>S 2018 | 32<br>16 |
| ENGL 111G, Rhetoric and Composition | R | | | 4 | | F 2017<br>S 2018 | 27<br>27 |
| **Year 1, Semester 2 (18 credits)** | | | | | | | |
| MATH 192G, Calculus and Analytic Geometry II | R | 4 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 214 (or 216), Electricity and Magnetism | R | 3 | | | | S 2017<br>S 2018 | 21<br>12 |
| PHYS 214 (or 216L)L, Electricity and Magnetism Laboratory | R | 1 | | | | S 2017<br>S 2018 | 21<br>12 |
| M E 240, Thermodynamics | R | | 3 | | | F 2017<br>S 2018 | 46<br>50 |
| CHEM 111G (or 115G), General Chemistry | R | 4 | | | | F 2017<br>S 2018 | 142<br>166 |
| Written Communications Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 2, Semester 3 (16 credits)** | | | | | | | |
| MATH 291G, Calculus and Analytic Geometry III | R | 3 | | | | F 2017 | 40 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | S 2018 | 40 |
| PHYS 217, Heat, Light, and Sound | R | 3 | | | | F 2016<br>F 2017 | 28<br>29 |
| PHYS 217L, Experimental Heat, Light, and Sound | R | 1 | | | | F 2016<br>F 2017 | 15<br>16 |
| M E 236, Engineering Mechanics I | R | | 3 | | | F 2017<br>S 2018 | 48<br>45 |
| M E 261, Mechanical Engineering Problem Solving | R | | 3 | | | F 2017<br>S 2018 | 95<br>95 |
| Oral Communication Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 2, Semester 4 (18 credits)** | | | | | | | |
| MATH 392, Introduction to Ordinary Differential Equations | R | 3 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 315, Modern Physics | R | | 3 | | | S 2017<br>S 2018 | 32<br>33 |
| PHYS 315L, Experimental Modern Physics | R | | 3 | | | S 2017<br>S 2018 | 15<br>16 |
| M E 237, Engineering Mechanics II | R | | 3 | | | F 2017<br>S 2018 | 53<br>43 |
| C E 301, Mechanics of Materials | R | | 3 | | | F 2017<br>S 2018 | 44<br>59 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 3, Semester 5 (18 credits)** | | | | | | | |
| PHYS 395, Intermediate Math. Methods of Physics | R | 3 | | | | F 2016<br>F 2017 | 12<br>11 |
| PHYS 461, Intermediate Electricity and Magnetism I | R | | 3 | | | F 2016<br>F 2017 | 17<br>15 |
| A E 339, Aerodynamics I | R | | 3 | | | F 2016<br>F 2017 | 40<br>37 |
| A E 362, Orbital Mechanics | R | | 3 | | | F 2016<br>F 2017 | 47<br>46 |
| A E 364, Flight Dynamics and Controls | R | | 3 | | | F 2016<br>F 2017 | 41<br>45 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |

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|---|---|---|---|---|---|---|---|
| **Year 3, Semester 6 (15 credits)** | | | | | | | |
| PHYS 462, Intermediate Electricity and Magnetism II | R | | 3 | | | S 2017<br>S 2018 | 13<br>13 |
| M E 345, Experimental Methods I | R | | 3 | | | F 2017<br>S 2018 | 55<br>62 |
| A E 363, Aerospace Structures | R | | 3 | | | S 2017<br>S 2018 | 45<br>48 |
| A E 439, Aerodynamics II | R | | 3 | | | S 2017<br>S 2018 | 49<br>45 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 4, Semester 7 (15 credits)** | | | | | | | |
| PHYS 454, Intermediate Modern Physics I | R | 3 | | | | F 2016<br>F 2017 | 13<br>12 |
| A E 419, Propulsion | R | | 3 | | | F 2016<br>F 2017 | 35<br>37 |
| A E 424, Aerospace Systems Engineering | R | | 3 | | | S 2017<br>S 2018 | 40<br>38 |
| A E 447, Aerofluidics Laboratory | R | | 3 | | | F 2017<br>S 2018 | 29<br>24 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 4, Semester 8 (15 credits)** | | | | | | | |
| PHYS 455, Intermediate Modern Physics II | R | 3 | | | | S 2017<br>S 2018 | 13<br>12 |
| Capstone Design | R | | 3 (√) | | | F 2017<br>S 2018 | 28<br>41 |
| Viewing a Wider World Elective | SE | | | | 3 | F 2017<br>S 2018 | n/a<br>n/a |
| Viewing a Wider World Elective | SE | | | | 3 | F 2017<br>S 2018 | n/a<br>n/a |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **TOTALS - ABET BASIC-LEVEL REQUIREMENTS** | | **39** | **60** | **25** | **6** | | |
| **TOTAL CREDIT HOURS FOR COMPLETION OF THE PROGRAM** | **130** | | | | | | |
| **PERCENT OF TOTAL** | | **30.0%** | **46.2%** | **19.2%** | **4.6%** | | |

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|---|---|---|---|---|---|---|
| **Total must satisfy either credit hours or percentage** | **Minimum Semester Credit Hours** | **32** | **48** | | | |
| | **Minimum Percentage of Total Credits Required for Graduation** | **25%** | **37.5%** | | | |

***Table 5.1.b.*** *Curriculum for Bachelor of Science in Engineering Physics – Chemical Concentration (132-133 credits)*

| **Course (Department, Number, Title)**<br>**List all courses in the program by term starting with first term**<br>**of first year and ending with the last term of the final year.** | **Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[1]** | ***Subject Area (Credit Hours)*** | | | | **Last Two Terms the Course was Offered: Year and, Semester, or Quarter** | **Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]** |
|---|---|---|---|---|---|---|---|
| | | **Math & Basic Sciences** | **Engineering Topics Check if Contains Significant Design (√)** | **General Education** | **Other (VWW)** | | |
| **Year 1, Semester 1 (17 credits)** | | | | | | | |
| MATH 191G, Calculus and Analytic Geometry I | R | 4 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 213 (or 215), Mechanics | R | 3 | | | | F 2016<br>F 2017 | 22<br>18 |
| PHYS 213L (or 215L), Experimental Mechanics | R | 1 | | | | F 2016<br>F 2017 | 22<br>18 |
| ENGR 100, Introduction to Engineering | R | | 3 | | | F 2017<br>S 2018 | 32<br>16 |
| CHME 101, Introduction to Chemical Engineering Calculations | R | | 2 | | | --<br>F 2017 | --<br>67 |
| CHEM 115, Principles of Chemistry I | R | 4 | | | | F 2016<br>F 2017 | 62<br>70 |
| **Year 1, Semester 2 (18 credits)** | | | | | | | |
| MATH 192G, Calculus and Analytic Geometry II | R | 4 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 214 (or 216), Electricity and Magnetism | R | 3 | | | | S 2017<br>S 2018 | 21<br>12 |
| PHYS 214L (or 216), Electricity and Magnetism Laboratory | R | 1 | | | | S 2017<br>S 2018 | 21<br>12 |

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|---|---|---|---|---|---|---|---|
| CHME 102, Materials Balances | R | | 2 | | | S 2017<br>S 2018 | 38<br>40 |
| CHEM 116, Principles of Chemistry II | R | 4 | | | | S 2017<br>S 2018 | 41<br>53 |
| ENGL 111G, Rhetoric and Composition | R | | | 4 | | F 2017<br>S 2018 | 27<br>27 |
| **Year 2, Semester 3 (16 credits)** | | | | | | | |
| MATH 291G, Calculus and Analytic Geometry III | R | 3 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 217, Heat, Light, and Sound | R | 3 | | | | F 2016<br>F 2017 | 28<br>29 |
| PHYS 217L, Experimental Heat, Light, and Sound | R | 1 | | | | F 2016<br>F 2017 | 15<br>16 |
| CHME 201, Energy Balances & Basic Thermodynamics | R | | 3 | | | F 2016<br>F 2017 | 36<br>41 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| Written Communication Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 2, Semester 4 (16 credits)** | | | | | | | |
| MATH 392, Introduction to Ordinary Differential Equations | R | 3 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 315, Modern Physics | R | | 3 | | | S 2017<br>S 2018 | 32<br>33 |
| PHYS 315L, Experimental Modern Physics | R | | 3 | | | S 2017<br>S 2018 | 15<br>16 |
| CHME 301, Chemical Engineering Thermodynamics | R | | 4 | | | S 2017<br>S 2018 | 30<br>34 |
| CHME 305, Transport Operations I: Fluid Flow | R | | 3 | | | S 2017<br>S 2018 | 28<br>34 |
| **Year 3, Semester 5 (16 credits)** | | | | | | | |
| PHYS 395, Intermediate Math. Methods of Physics | R | 3 | | | | F 2016<br>F 2017 | 12<br>11 |
| PHYS 461, Intermediate Electricity and Magnetism I | R | | 3 | | | F 2016<br>F 2017 | 17<br>15 |
| CHME 306, Transport Operations II: Heat & Mass Transfer | R | | 4 | | | F 2016<br>F 2017 | 28<br>34 |

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|---|---|---|---|---|---|---|---|
| CHEM 313, Organic Chemistry I | R | 3 | | | | F 2017<br>S 2018 | 117<br>90 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 3, Semester 6 (16 credits)** | | | | | | | |
| PHYS 462, Intermediate Electricity and Magnetism II | R | | 3 | | | S 2017<br>S 2018 | 13<br>13 |
| CHME 307, Transport Operations III: Staged Operations | R | | 3 | | | S 2017<br>S 2018 | 26<br>32 |
| CHME 352L, Simulation of Unit Operations | R | | 1 | | | S 2017<br>S 2018 | 28<br>31 |
| CHME 361, Engineering Materials | R | | 3 | | | F 2017<br>S 2018 | 178<br>95 |
| CHME 441, Chemical Kinetics and Reactor Engineering | R | | 3 | | | S 2017<br>S 2018 | 26<br>32 |
| Oral Communication Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 4, Semester 7 (18 credits)** | | | | | | | |
| PHYS 454, Intermediate Modern Physics I | R | 3 | | | | F 2016<br>F 2017 | 13<br>12 |
| PHYS 451, Intermediate Mechanics | R | 3 | | | | F 2016<br>F 2017 | 15<br>17 |
| PHYS 475 (or 471, 493), Advanced Physics Laboratory | R | | 3 | | | S 2017<br>S 2018 | 8<br>4 |
| PHYS / CHME, Technical Elective | E | | 3 | | | F 2017<br>S 2018 | n/a<br>n/a |
| Viewing a Wider World Elective | SE | | | | 3 | F 2017<br>S 2018 | n/a<br>n/a |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 4, Semester 8 (15-16 credits)** | | | | | | | |
| PHYS 455, Intermediate Modern Physics II | R | 3 | | | | S 2017<br>S 2018 | 13<br>12 |
| Capstone Design | R | | 3-4 (√) | | | S 2017<br>S 2018 | 4<br>4 |
| Viewing a Wider World Elective | SE | | | | 3 | F 2017<br>S 2018 | n/a<br>n/a |

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|---|---|---|---|---|---|---|---|
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **TOTALS - ABET BASIC-LEVEL REQUIREMENTS** | | **49** | **52-53** | **25** | **6** | | |
| **TOTAL CREDIT HOURS FOR COMPLETION OF THE PROGRAM** | **132-133** | | | | | | |
| **PERCENT OF TOTAL** | | **37.1%** | **39.5%** | **18.9%** | **4.5%** | | |
| **Total must satisfy either credit hours or percentage** | **Minimum Semester Credit Hours** | **32** | **48** | | | | |
| | **Minimum Percentage of Total Credits Required for Graduation** | **25%** | **37.5%** | | | | |

***Table 5.1.c.*** *Curriculum Bachelor of Science in Engineering Physics – Electrical Concentration (130-131 credits)*

| **Course (Department, Number, Title)**<br>**List all courses in the program by term starting with first term**<br>**of first year and ending with the last term of the final year.** | **Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[1]** | ***Subject Area (Credit Hours)*** | | | | **Last Two Terms the Course was Offered: Year and, Semester, or Quarter** | **Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]** |
|---|---|---|---|---|---|---|---|
| | | **Math & Basic Sciences** | **EngineeringTopics Check if Contains Significant Design (√)** | **General Education** | **Other (VWW)** | | |
| **Year 1, Semester 1 (15 credits)** | | | | | | | |
| MATH 191G, Calculus and Analytic Geometry I | R | 4 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 213 (or 215), Mechanics | R | 3 | | | | F 2016<br>F 2017 | 22<br>18 |
| PHYS 213L (or 215L), Experimental Mechanics | R | 1 | | | | F 2016<br>F 2017 | 22<br>18 |
| ENGR 100, Introduction to Engineering | R | | 3 | | | F 2017<br>S 2018 | 32<br>16 |
| ENGL 111G, Rhetoric and Composition | R | | | 4 | | F 2017<br>S 2018 | 27<br>27 |
| **Year 1, Semester 2 (16 credits)** | | | | | | | |
| MATH 192G, Calculus and Analytic Geometry II | R | 4 | | | | F 2017 | 40 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | S 2018 | 40 |
| PHYS 214 (or 216), Electricity and Magnetism | R | 3 | | | | S 2017<br>S 2018 | 21<br>12 |
| PHYS 214L (or 216L), Electricity and Magnetism Laboratory | R | 1 | | | | S 2017<br>S 2018 | 21<br>12 |
| E E 100, Introduction to Electrical Engineering | R | | 4 | | | F 2017<br>S 2018 | 54<br>33 |
| CHEM 111G (or 115), General Chemistry | R | 4 | | | | F 2017<br>S 2018 | 142<br>166 |
| **Year 2, Semester 3 (18 credits)** | | | | | | | |
| MATH 291G, Calculus and Analytic Geometry III | R | 3 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 217, Heat, Light, and Sound | R | 3 | | | | F 2016<br>F 2017 | 28<br>29 |
| PHYS 217L, Experimental Heat, Light, and Sound | R | 1 | | | | F 2016<br>F 2017 | 15<br>16 |
| E E 112, Embedded Systems | R | | 4 | | | F 2017<br>S 2018 | 17<br>33 |
| E E 200, Linear Algebra, Probability & Statistics Applications | R | | 4 | | | F 2017<br>S 2018 | 36<br>20 |
| Written Communication Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 2, Semester 4 (16 credits)** | | | | | | | |
| MATH 392, Introduction to Ordinary Diff. Equations | R | 3 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 315, Modern Physics | R | | 3 | | | S 2017<br>S 2018 | 32<br>33 |
| PHYS 315L, Experimental Modern Physics | R | | 3 | | | S 2017<br>S 2018 | 15<br>16 |
| E E 212, Intro to Computer Architecture and Organization | R | | 4 | | | F 2017<br>S 2018 | 33<br>29 |
| Oral Communication Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 3, Semester 5 (16 credits)** | | | | | | | |
| PHYS 395, Intermediate Math. Methods of Physics | R | 3 | | | | F 2016<br>F 2017 | 12<br>11 |
| PHYS 451, Intermediate Mechanics | R | 3 | | | | F 2016 | 15 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | F 2017 | 17 |
| PHYS 461, Intermediate Electricity & Magnetism I | R | | 3 | | | F 2016<br>F 2017 | 17<br>15 |
| E E 230, AC Circuit Analysis & Introduction to Power Systems | R | | 4 | | | F 2017<br>S 2018 | 16<br>36 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 3, Semester 6 (16-17 credits)** | | | | | | | |
| PHYS 480, Thermodynamics | R | | 3 | | | S 2017<br>S 2018 | 13<br>11 |
| PHYS 462 (or E E 351), Intermediate Electricity & Magnetism II | R | | 3-4 | | | S 2017<br>S 2018 | 13<br>13 |
| E E 312, Signals and Systems I | R | | 3 | | | F 2017<br>S 2018 | 28<br>33 |
| E E 380, Semiconductor Devices and Electronics | R | | 4 | | | F 2017<br>S 2018 | 33<br>25 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 4, Semester 7 (18 credits)** | | | | | | | |
| PHYS 454, Intermediate Modern Physics I | R | 3 | | | | F 2016<br>F 2017 | 13<br>12 |
| Capstone Design I | R | | 3 (√) | | | F 2017<br>S 2018 | 4<br>4 |
| PHYS / E E, Technical Elective | E | | 3 | | | F 2017<br>S 2018 | n/a<br>n/a |
| Viewing a Wider World Elective | SE | | | | 3 | F 2017<br>S 2018 | n/a<br>n/a |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 4, Semester 8 (15 credits)** | | | | | | | |
| PHYS 455, Intermediate Modern Physics II | R | 3 | | | | S 2017<br>S 2018 | 13<br>12 |
| PHYS 475 (or 471, 493), Advanced Physics Laboratory | R | | 3 | | | F 2017<br>S 2018 | 8<br>4 |
| Capstone Design II | R | | 3 (√) | | | F 2017 | 4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | S 2018 | 4 |
| Viewing a Wider World Elective | SE | | | | 3 | F 2017<br>S 2018 | n/a<br>n/a |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **TOTALS - ABET BASIC-LEVEL REQUIREMENTS** | | **42** | **57-58** | **25** | **6** | | |
| **TOTAL CREDIT HOURS FOR COMPLETION OF THE PROGRAM** | **130-131** | | | | | | |
| **PERCENT OF TOTAL** | | **32.3%** | **43.9%** | **19.2%** | **4.6%** | | |
| **Total must satisfy either credit hours or percentage** | **Minimum Semester Credit Hours** | **32** | **48** | | | | |
| | **Minimum Percentage of Total Credits Required for Graduation** | **25%** | **37.5%** | | | | |

***Table 5.1.d.*** *Curriculum for Bachelor of Science in Engineering Physics – Mechanical Concentration (129 credits)*

| **Course (Department, Number, Title)**<br>**List all courses in the program by term starting with first term**<br>**of first year and ending with the last term of the final year.** | **Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[1]** | ***Subject Area (Credit Hours)*** | | | | **Last Two Terms the Course was Offered: Year and, Semester, or Quarter** | **Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]** |
|---|---|---|---|---|---|---|---|
| | | **Math & Basic Sciences** | **Engineering Topics Check if Contains Significant Design (√)** | **General Education** | **Other (VWW)** | | |
| **Year 1, Semester 1 (17 credits)** | | | | | | | |
| MATH 191G, Calculus and Analytic Geometry I | R | 4 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 213 (or 215), Mechanics | R | 3 | | | | F 2016<br>F 2017 | 22<br>18 |
| PHYS 213L (or 215L), Experimental Mechanics | R | 1 | | | | F 2016<br>F 2017 | 22<br>18 |
| ENGR 100, Introduction to Engineering | R | | 3 | | | F 2017<br>S 2018 | 32<br>16 |
| M E 159, Graphical Communication and Design | R | | 2 | | | F 2017<br>S 2018 | 31<br>47 |
| CHEM 111G, General Chemistry | R | 4 | | | | F 2017 | 142 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | S 2018 | 166 |
| **Year 1, Semester 2 (15 credits)** | | | | | | | |
| MATH 192G, Calculus and Analytic Geometry II | R | 4 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 214 (or 216), Electricity and Magnetism | R | 3 | | | | S 2017<br>S 2018 | 21<br>12 |
| PHYS 214L (or 216L), Electricity and Magnetism Laboratory | R | 1 | | | | S 2017<br>S 2018 | 21<br>12 |
| M E 240, Thermodynamics | R | | 3 | | | F 2017<br>S 2018 | 46<br>50 |
| ENGL 111G, Rhetoric and Composition | R | | | 4 | | F 2017<br>S 2018 | 27<br>27 |
| **Year 2, Semester 3 (16 credits)** | | | | | | | |
| MATH 291G, Calculus and Analytic Geometry III | R | 3 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 217, Heat, Light, and Sound | R | 3 | | | | F 2016<br>F 2017 | 28<br>29 |
| PHYS 217L, Experimental Heat, Light, and Sound | R | 1 | | | | F 2016<br>F 2017 | 15<br>16 |
| M E 236, Engineering Mechanics I | R | | 3 | | | F 2017<br>S 2018 | 48<br>45 |
| M E 261, Mechanical Engineering Problem Solving | R | | 3 | | | F 2017<br>S 2018 | 95<br>95 |
| Written Communication Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 2, Semester 4 (18 credits)** | | | | | | | |
| MATH 392, Introduction to Ordinary Diff. Equations | R | 3 | | | | F 2017<br>S 2018 | 40<br>40 |
| PHYS 315, Modern Physics | R | | 3 | | | S 2017<br>S 2018 | 32<br>33 |
| PHYS 315L, Experimental Modern Physics | R | | 3 | | | S 2017<br>S 2018 | 15<br>16 |
| M E 237, Engineering Mechanics II | R | | 3 | | | F 2017<br>S 2018 | 53<br>43 |
| C E 301, Mechanics of Materials | R | | 3 | | | F 2017<br>S 2018 | 44<br>59 |
| Oral Communication Elective | SE | | | 3 | | F 2017 | n/a |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | S 2018 | n/a |
| **Year 3, Semester 5 (15 credits)** | | | | | | | |
| PHYS 395, Intermediate Math. Methods of Physics | R | 3 | | | | F 2016<br>F 2017 | 12<br>11 |
| PHYS 461, Intermediate Electricity and Magnetism I | R | | 3 | | | F 2016<br>F 2017 | 17<br>15 |
| M E 326, Mechanical Design | R | | 3 | | | F 2017<br>S 2018 | 42<br>50 |
| M E 338, Fluid Mechanics | R | | 3 | | | F 2017<br>S 2018 | 58<br>40 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 3, Semester 6 (15 credits)** | | | | | | | |
| PHYS 462, Intermediate Electricity and Magnetism II | R | | 3 | | | S 2017<br>S 2018 | 13<br>13 |
| M E 341, Heat Transfer | R | | 3 | | | F 2017<br>S 2018 | 45<br>65 |
| M E 345, Experimental Methods I | R | | 3 | | | F 2017<br>S 2018 | 55<br>62 |
| M E 425, Design of Machine Elements | R | | 3 | | | F 2017<br>S 2018 | 51<br>38 |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 4, Semester 7 (18 credits)** | | | | | | | |
| PHYS 454, Intermediate Modern Physics I | R | 3 | | | | F 2016<br>F 2017 | 13<br>12 |
| PHYS 451 (or M E 333), Intermediate Mechanics | R | 3 | | | | F 2016<br>F 2017 | 15<br>17 |
| Capstone Design I | R | | 3 (√) | | | F 2017<br>S 2018 | 4<br>4 |
| Viewing a Wider World Elective | SE | | | | 3 | F 2017<br>S 2018 | n/a<br>n/a |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **Year 4, Semester 8 (15 credits)** | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PHYS 455, Intermediate Modern Physics II | R | 3 | | | | S 2017<br>S 2018 | 13<br>12 |
| Capstone Design II | R | | 3 (√) | | | S 2017<br>S 2018 | 4<br>4 |
| PHYS / M E, Technical Elective | R | | 3 | | | F 2017<br>S 2018 | n/a<br>n/a |
| Viewing a Wider World Elective | SE | | | | 3 | F 2017<br>S 2018 | n/a<br>n/a |
| General Education Core Elective | SE | | | 3 | | F 2017<br>S 2018 | n/a<br>n/a |
| **TOTALS - ABET BASIC-LEVEL REQUIREMENTS** | | **42** | **56** | **25** | **6** | | |
| **TOTAL CREDIT HOURS FOR COMPLETION OF THE PROGRAM** | **129** | | | | | | |
| **PERCENT OF TOTAL** | | **32.6%** | **43.4%** | **19.4%** | **4.6%** | | |
| **Total must satisfy either credit hours or percentage** | **Minimum Semester Credit Hours** | **32** | **48** | | | | |
| | **Minimum Percentage of Total Credits Required for Graduation** | **25%** | **37.5%** | | | | |

**Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

Instructional materials and student work verifying compliance with ABET criteria for the categories indicated above will be required during the campus visit.

*Describe how the curriculum aligns with the program educational objectives.*

The *Program Educational Objectives* of the EP program at NMSU are: (1) competitiveness, (2) adaptability, and (3) teamwork and leadership. These objectives are consistent with and supportive of the institutional educational objectives of the College of Engineering, the College of Arts & Sciences, and New Mexico State University.

**Objective 1: Competitiveness.** The curriculum of the EP program has been specifically designed to enable students to acquire strong fundamental knowledge in physics and the chosen engineering field, adopt effective communication and problem-solving skills, develop the ability to tackle new problems, and achieve a level of preparation that allows continuation to advanced studies after graduation. Each of the four program concentrations requires students to complete at least 34-44 credits of mathematics and basic sciences (including physics), 49-57 credit hours of specialized engineering courses, 33 credits of general education courses, and 6 credits of Viewing the Wider World courses. The strong foundation of fundamental science courses and a broad range of specialized engineering courses help ensure that the EP graduates are competitive in internationally-recognized academic, government and industrial environments.

**Objective 2: Adaptability.** The EP program at NMSU offers a broad selection of courses that cover a variety of engineering and scientific disciplines. The EP program entails more than 50 specialized technical and engineering courses that cover the areas of aerospace, chemical, electrical, and mechanical engineering. The wide selection of specialized courses offered by the program curriculum broadens the range of the potential employment opportunities for EP graduates. These opportunities include employment in research and development, energy and utility, manufacturing, automotive, photonics, aerospace, defense and space, sensor technology, and many other fields.

**Objective 3: Teamwork and Leadership.** As a part of the EP curriculum, students are required to take a sequence of physics and engineering laboratory and capstone courses. In the format of these courses students learn to work in teams, collaborate with other students, and lead a team of students toward successful completion of the project. To complete project requirements successfully, the student must demonstrate practical application of relevant knowledge and skills, such as standard analysis techniques, design principles, as well as teamwork, communication, problem solving, and critical thinking. This approach enables EP graduates to have an ability to function as part of and/or lead interdisciplinary teams.

The *Educational Objectives* of the EP program and the methods of their evaluation are described in more detail in *Criterion 2 – Program Educational Objectives* and *Criterion 4 – Continuous Improvement*.

*Describe how the curriculum and its associated prerequisite structure support the attainment of the student outcomes.*

A list of the physics and engineering courses with the measured program outcomes is shown in the outcome matrix table attached below. To achieve the desired outcomes, a path of core courses (having pre-requisites) has become essential within an integrated, cumulative educational process (see flow charts above). Each course is expected to measure certain *Program*

*Outcomes (a)-(k)*. The assessment matrix for physics courses is given in Table 5.2. Assessment matrices for the engineering courses are given in *Criterion 3 – Program Outcomes* (Tables 3.2.b-e) and the results of course assessments are presented and discussed in *Criterion 4 – Continuous Improvement.*

***Table 5.2:*** *Assessment Matrix showing the correspondence of Program Outcomes (a) thru (k) to (required and elective) physics courses of the Engineering Physics program. Note, this is the essentially the same table as Table 3.2.a. Unlike this table, Table 3.2.a lists possible physics electives.*

| ***Physics Course*** | **Program Outcomes** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***(a)*** | ***(b)*** | ***(c)*** | ***(d)*** | ***(e)*** | ***(f)*** | ***(g)*** | ***(h)*** | ***(i)*** | ***(j)*** | ***(k)*** |
| PHYS 213 or 215G | **X** | | | | | | | | | | |
| PHYS 213 or 215L | | **X** | | | | | | | | | |
| PHYS 214 or 216G | **X** | | | | | | | | | | |
| PHYS 214 or 216GL | | **X** | | | | | | | | | |
| PHYS 217 | **X** | | | | | | | | | | |
| PHYS 217L | | **X** | **X** | **X** | | | | | | | |
| PHYS 315 | **X** | | | | | **X** | | **X** | **X** | **X** | |
| PHYS 315L | | **X** | **a** | **X** | | | **X** | | | | **X** |
| PhHYS 395 | | | | | | **X** | | | | | |
| PHYS 451 | | | | | **X** | | | | | | |
| PHYS 454 & 455 | | | | | **X** | | | | | | |
| PHYS 461 & 462 | | | | | **X** | | | | | | |
| PHYS 471, 475 or 493 | | **X** | **a** | **X** | | | **X** | | | | **X** |
| PHYS 480 | | | | | **X** | | | | | | |
| Physics Electives | | | **a** | **a** | | **a** | | **a** | **a** | **a** | **a** |

**X:** indicates a measured Program Outcome,
**a:** whether this Program Outcome is measured depends on the individual instructor and/or the course

*Attach a flowchart or worksheet that illustrates the prerequisite structure of the program's required courses.*

Suggested flowcharts for each of the four concentrations (*Aerospace*, *Chemical*, *Electrical* and *Mechanical*) of the EP program are shown in Diagrams 5.1.a-d.

***Diagram 5.1.a.*** *Proposed Schedule for Engineering Physics with the Aerospace Concentration. Arrows coming in from the top indicate pre-requisite requirements. Arrows from the side indicate co-requisites.*

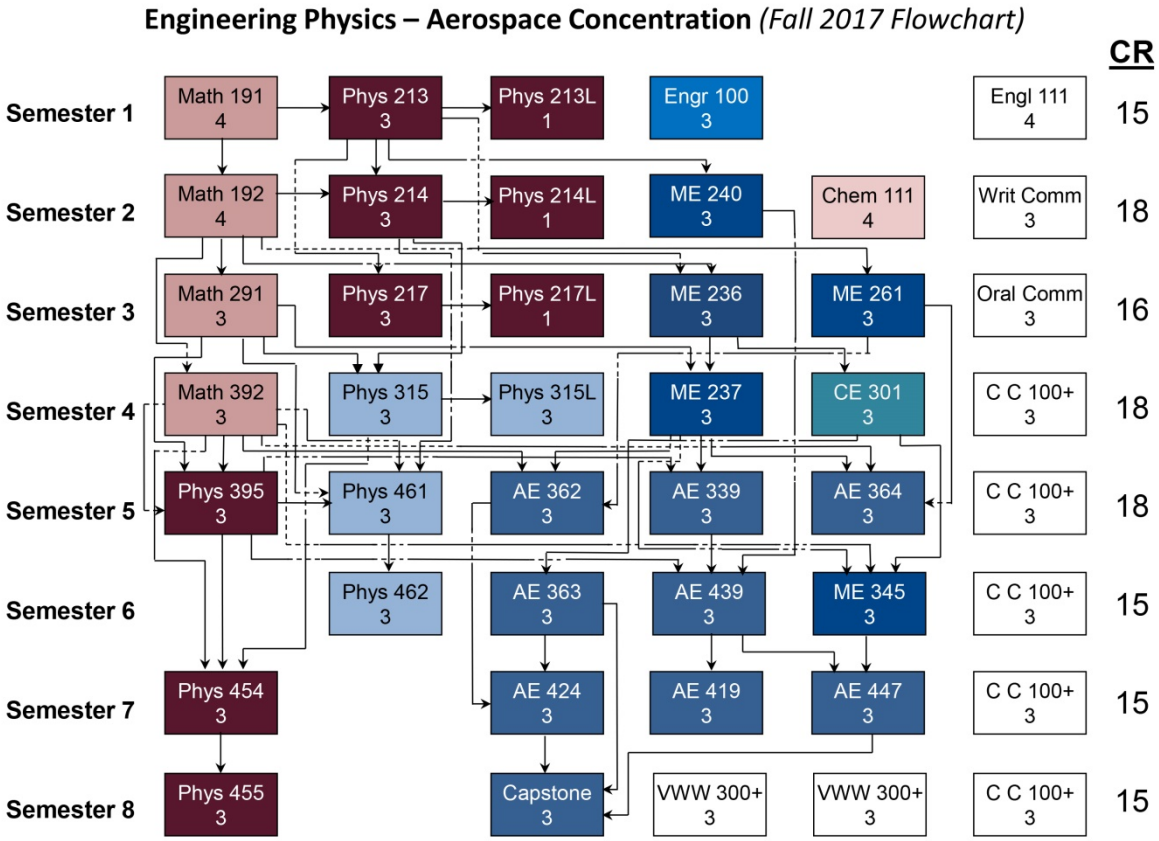
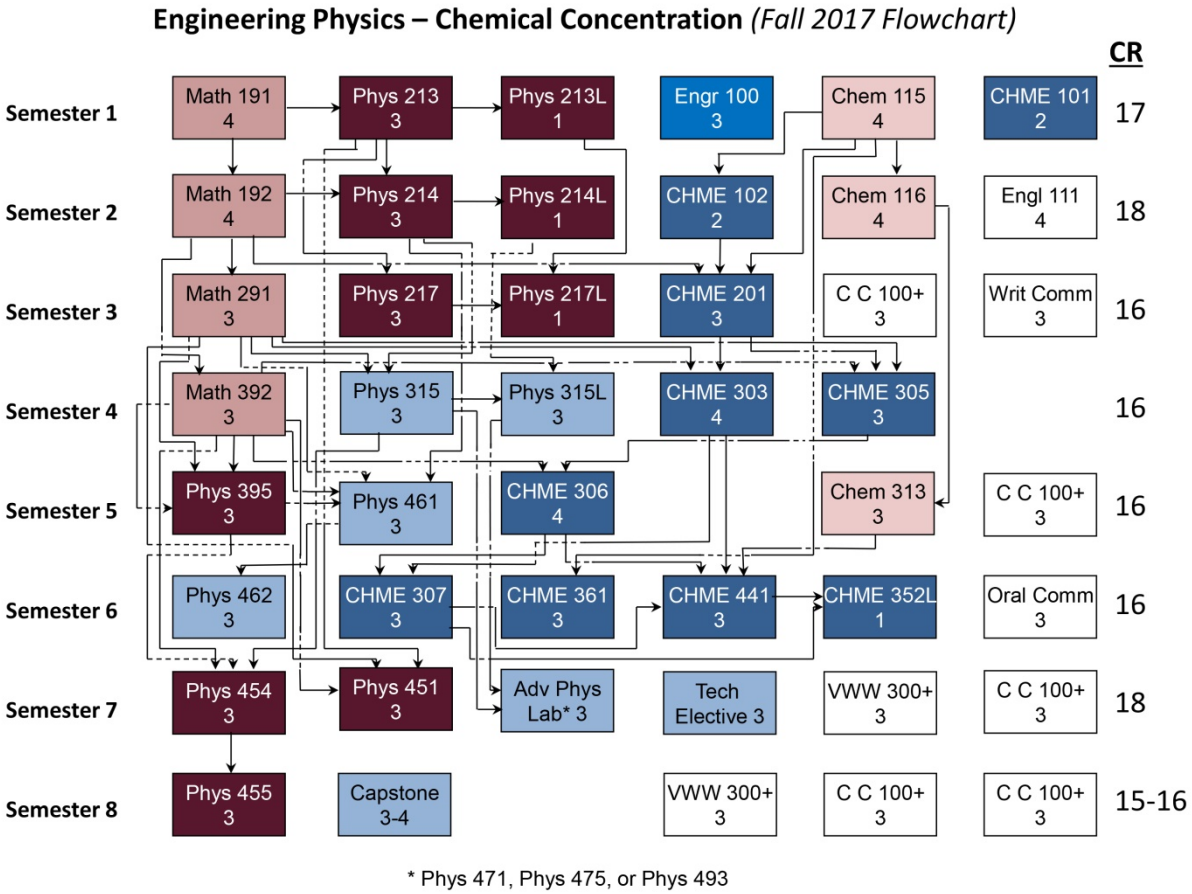
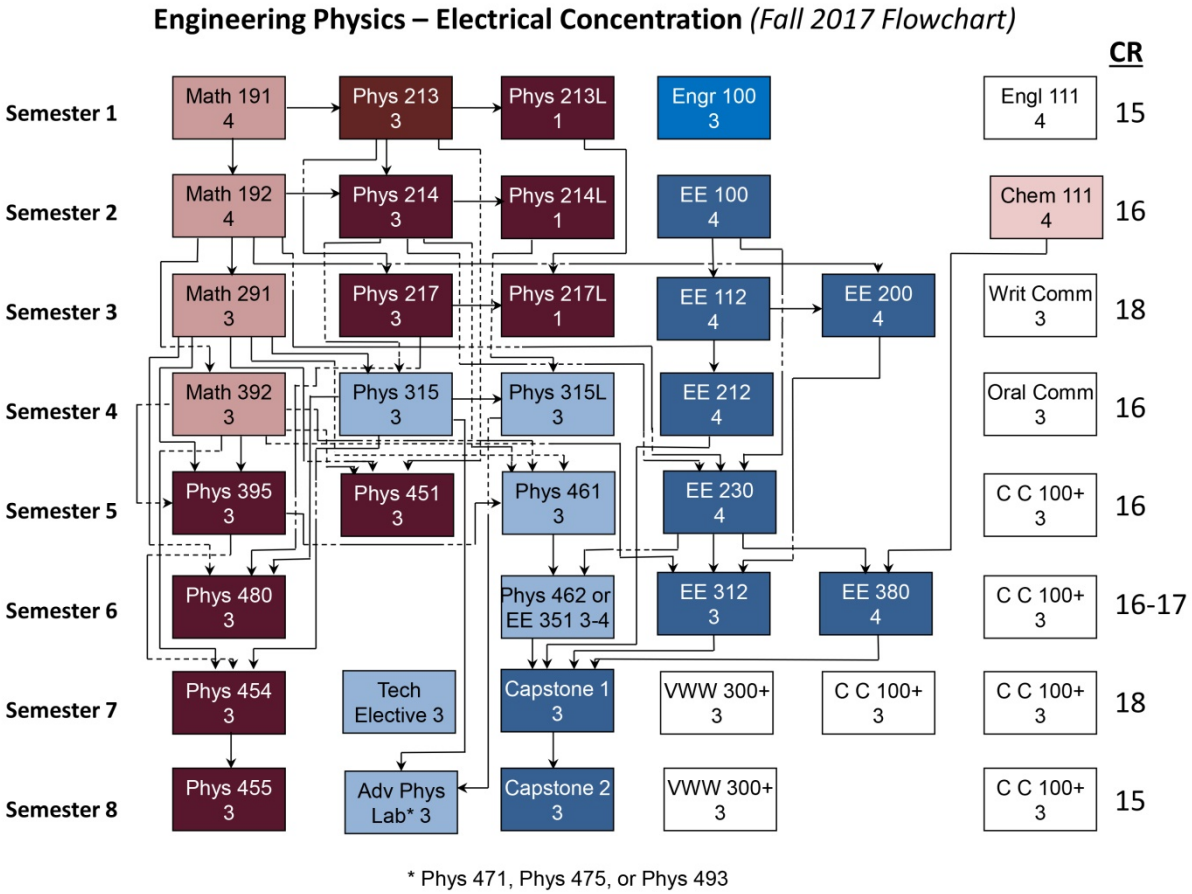


***Diagram 5.1.b.*** *Proposed Schedule for Engineering Physics with the Chemical Concentration. Arrows coming in from the top indicate pre-requisite requirements. Arrows from the side indicate co-requisites.*



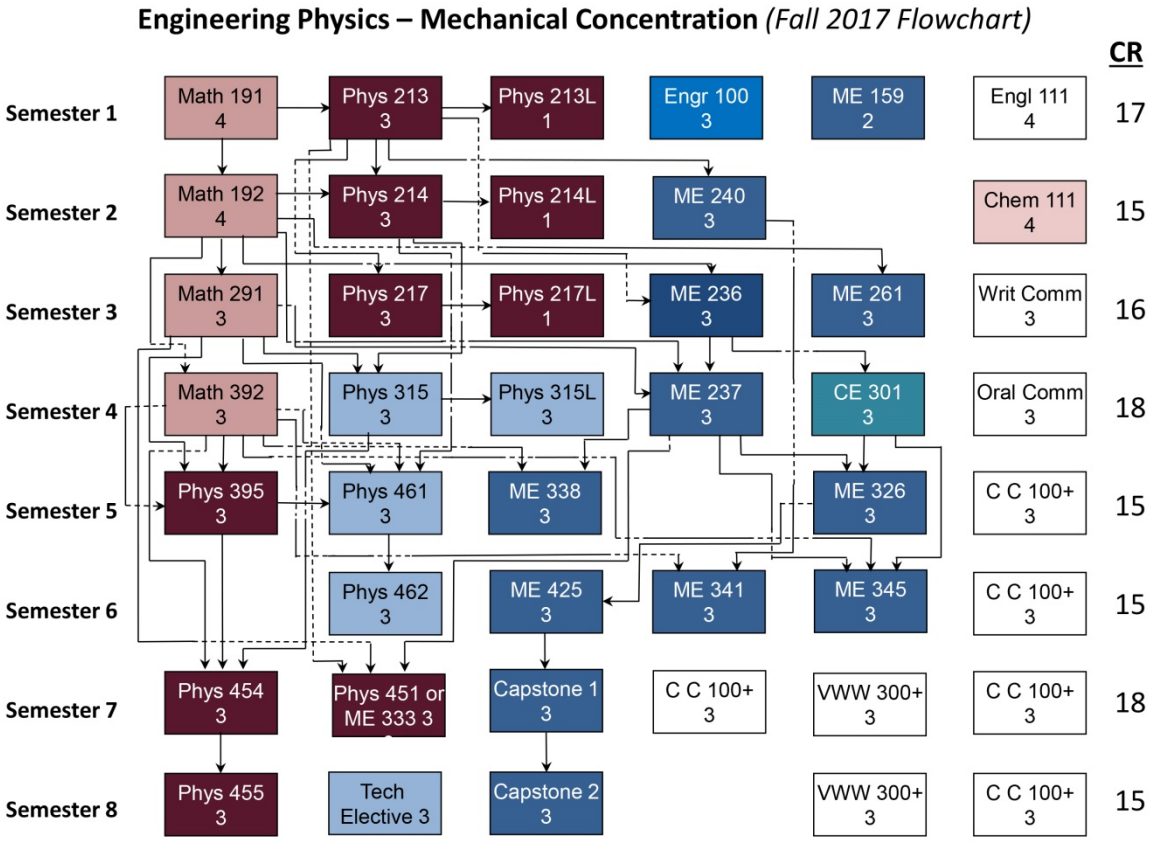

* Phys 471, Phys 475, or Phys 493

***Diagram 5.1.c.*** *Proposed Schedule for Engineering Physics with the Electrical Concentration. Arrows coming in from the top indicate pre-requisite requirements. Arrows from the side indicate co-requisites.*




* Phys 471, Phys 475, or Phys 493

***Diagram 5.1.d.*** *Proposed Schedule for Engineering Physics with the Mechanical Concentration. Arrows coming in from the top indicate pre-requisite requirements. Arrows from the side indicate co-requisites.*



*Describe how the program meets the requirements in terms of hours and depth of study for each subject area (Math and Basic Sciences, Engineering Topics, and General Education) specifically addressed by either the general criteria or the program criteria.*

**Math and Basic Sciences (39-49 credits)**

***Mathematics***

All students enrolled in the EP program at NMSU are required to complete four semesters of mathematics courses, including three semesters of calculus and analytical geometry and one semester of ordinary differential equations. Advanced mathematical methods that are needed for the upper-level physics courses are covered in PHYS 395 and this course is counted toward the physics requirements.

***Physics***

Students enrolled in each of the four EP concentrations are required to complete the core sequence of physics courses offered to the physics majors. The sequence includes 3 introductory level physics courses combined with physics laboratories, 2 intermediate level courses designed to prepare students for the upper division physics classes, and 5-7 advanced physics courses that cover a variety of subjects, including classical mechanics, quantum mechanics, electromagnetic theory, thermodynamics, and advanced physics laboratory. For the individual EP concentrations, the physics sequence is designed to complement, rather than duplicate, the engineering sequence so that students gain a broad physics background.

***Chemistry***

EP students enrolled in the *Aerospace*, *Electrical* and *Mechanical concentrations* are required to complete one semester of general chemistry. EP students with the *Chemical concentration* are required to complete 16 credits of chemistry.

**Specialized Engineering Topics (52-60 credits)**

A broad-based foundation in technical and engineering courses prepares EP graduates for a variety of employment opportunities. The EP program at NMSU offers students a selection of four different concentrations: *Aerospace, Chemical*, *Electrical*, and *Mechanical*. All EP students are required to complete the ENGR 100 "Introduction to Engineering" course. In addition to that, students electing the *Mechanical concentration* are required to complete 17 mechanical engineering, civil engineering, laboratory, and capstone design courses. The *Electrical concentration* requires students to complete 16 electrical engineering, laboratory, and capstone design courses. Students enrolled in the *Aerospace concentration* must complete 18 aerospace engineering, mechanical and civil engineering, laboratory, and capstone design courses. The *Chemical concentration* requires students to complete 16 chemical engineering, laboratory, and capstone design courses. The selection of specialized courses is aligned with the *Educational Objectives* of the EP program at NMSU.

**General Education Courses (25 credits)**

***English and Communications***

EP students are required to complete two courses in English (*ENGL 111G* and typically *ENGL 218G*) and one course in Communication (typically: *COMM265G – Technical Writing*).

***General Education Courses in Common Core Areas IV and V***

The general education requirements at NMSU specify that students of all majors select courses that inherently expose them to diversity, and both global and societal issues. These requirements are now part of the New Mexico State Common Core so that these credits can be transferred between institutions. Students are required to take a total of 25 credit hours of humanities and social science electives, as well as complete courses in composition and rhetoric, technical writing, and oral communications.

**Viewing a Wider World Courses (6 credits)**

In addition to general education courses, students are required to complete 6 credits of Viewing a Wider World courses. The Viewing a Wider World program fosters intelligent inquiry, abstract logical thinking, critical analysis, and the integration of knowledge.

*Describe the major design experience that prepares students for engineering practice. Describe how this experience is based upon the knowledge and skills acquired in earlier coursework and incorporates appropriate engineering standards and multiple design constraints.*

Capstone design courses are project-based courses typically centered on a societal or engineering need. This is the students' opportunity to put their skills to test by addressing *Program Outcomes (h) - Societal Impact* and *(j) - Contemporary Issues*. The capstone design course challenges the student to reflect on prerequisite topics and apply cumulative knowledge that have previously been developed as part of *Program Outcome (a) - Scientific Expertise*, *Program Outcome (e) - Problem Solving*, and *Program Outcome (k) - Technical Know-how*. However, such background itself is not enough, as capstone projects require students to build on their backgrounds through research and development therefore *Program Outcomes (i) - Lifelong learning*, Prog*ram Outcome (b) - Experimental Training* and, most importantly, *Program Outcome (c) - Design Abilities.* Moreover, capstone courses require that students work in teams, often with students who have different backgrounds, thus addressing *Program Outcome (d) – Teamwork* and Program Outcome (g) – Communication Skills. The need to work in teams also develops the students' sense of *Program Outcome (f) - Professional Responsibility*. In other words, capstone design courses expose students (often for the first time) to demands and expectations that they would likely encounter in their future profession.

The College of Arts & Sciences still enforces a 10-student minimum for undergraduate courses, and this poses a problem for a still relatively small program, such as EP where we currently have just ~4-5 seniors, who take the capstones in the same semester. Moreover, this number is further diluted by the fact that our EP students are distributed over the four different concentrations. The low number of EP students does not pose a problem for lecture courses and instructional labs, since these are taken by the physics majors as well. The 10-student minimum is the main reason why most of EP students take capstone design courses in the participating engineering departments, where sufficient enrollment is ensured due to the much larger numbers of their majors. While each engineering capstone consists of 3-5 students, the engineering departments offer all their capstones under one course number, thus easily escaping the 20-student minimum requirement.

The College of Engineering has started exploring the introduction of a college-wide capstone courses that will allow students from different engineering programs (including EP) to participate in joint design projects.

*If the program allows cooperative education to satisfy curricular requirements specifically addressed by either the general or program criteria, describe the academic component of this experience and how it is evaluated by the faculty.*

Cooperative education experience does not currently fulfill any part of the EP curriculum requirements. However, individual faculty members work with both, students and employers, to help facilitate appropriate internship opportunities.

*Describe the materials (course syllabi, textbooks, sample student work, etc.), that will be available for review during the visit to demonstrate achievement related to this criterion. (See the 2018-2019 APPM Section I.E.5.b.(2) regarding display materials.)*

Display materials include two sets of folders for each course taken by EP students as part of the program requirement: the *Instructor Notebooks* and the *Course Notebook*s. The actual contents of such folders are described in greater detail in *Criterion 4 – Continuous Improvement*. The folders will contain general information, instructional material and student work verifying compliance with ABET criteria for the categories indicated above. Textbooks, laboratory manuals and other instructional materials are also available at the time of the review visit.

## B. Course Syllabi

*In Appendix A of the Self-Study Report, include a syllabus for each course used to satisfy the mathematics, science, and discipline-specific requirements required by Criterion 5 or by any applicable program criteria.*

Course syllabi of all required and the most popular elective courses are provided in *Appendix A*.