UNC CHARLOTTE

SHORT FORM
COURSE AND CURRICULUM PROPOSAL

To: Wesley Williams, Undergraduate Course and Curriculum Committee Chair

From: Kevin Lawton

Date: 2/13/2013

Re: Changing the order of two math courses and related changes to prerequisites

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SUMMARY:
The Department of Mechanical Engineering and Engineering Science proposes to swap the order in which students take MATH 2171 and MATH 2241, whereby the plan of study will have MATH 2171 in the third semester (instead of the fourth) and MATH 2241 in the fourth semester (instead of the third). This change also necessitates changes in prerequisites to some MEGR courses.

FOR CONSULTATION WITH OTHER DEPARTMENTS:

1. Does the proposed change affect other departments (including additions and/or changes to degree requirements or prerequisites offered in other departments)?
   _____Yes ____X____ No

2. If Yes, please list the other departments affected by the proposed change:

3. Have you consulted with each department listed in item 2 regarding the proposed change?

   _____Yes _____No

   Result(s) of Consultation(s) (please attach documentation):

For a new course or for major modification of an existing course, include Consultation on Library Holdings.

RESOURCES:

1. For a new course or revisions to an existing course, check all the statements that apply:
   ___ This course will be cross listed with another course.
   _X__ There are prerequisites for this course.
   _X___ There are co-requisites for this course.
   ____ This course is repeatable for credit.
   ____ This course will affect the number of credits hours for its program.
   ____This proposal results in the deletion of an existing course(s) from the degree program and/or catalog.
   This proposal will alter and agreement with a North Carolina community college.

   For all items checked above, applicable statements and content must be reflected in the proposed catalog copy.

2. Indicate the additional resources required, if any, to implement and maintain the proposed change.

CREDIT HOUR:

This change does not affect credit hours.

PROPOSED CATALOG COPY:

MEGR 2144. Introduction to Solid Mechanics. (3) Prerequisites: MEGR 2141 with a grade of C or above ~~and MATH 2241~~. Engineering theory of deformable solids and applications. Stress and deformation resulting from axial, torsion and bending loads. Shear and moment diagrams, Mohr's circle for stress and strain and buckling of columns.

MEGR 2156. Design Projects Laboratory I. (2) Prerequisites: ENGR1201, ENGR1202, PHYS 2102, MEGR 2141 with a grade of C or above~~, and MATH 2241~~. Corequisite: MEGR 2180 Manufacturing Systems. Introduction to design as well as the fundamentals of manufacturing, including computer-aided manufacturing (CAM). Emphasis will be placed on design visualization, functional analysis, and design prototyping. Student designs will be manufactured to verify design concepts.

MEGR 2180. Manufacturing Systems. (3) Prerequisites: ENGR 1202, PHYS 2102L, MEGR 2141 with a grade of C or above~~, and MATH 2241~~. Corequisite: MEGR 2156. The course will impart a broad overview of manufacturing materials, processes, and procedures. Topics include mechanical behavior and physical properties, basic materials, casting, rolling, forming, welding, cutting, surfaces, engineering metrology, quality assurance, and automation. Basic concepts of

engineering economics and cost estimating. The economics of manufacturing will also be introduced, including the time value of money, economic analysis, and cost estimating.

MEGR 2240. Computational Methods for Engineers. (3) Prerequisites: MEGR 2141 with a grade of C ~~or above and MATH 2241~~. Automated engineering analysis and synthesis techniques based on software engineering principles. Overview of data representation and computing languages. Program development using programming languages and off-the shelf software packages. Study of numerical methods, potential errors, and computational stability. emphasis on effective design, testing, and debugging practices.

MEGR 3171. Introduction to Measurements and Instrumentation. (2) Prerequisites: ECGR 2161 and MATH 2241, both with a grade of C or above. Corequisite: MEGR 3171L. Statistical analysis of experimental data, curve fitting. Operational amplifiers and signal conditioning techniques for remote monitoring. ~~Computer data acquisition, interfaces and techniques, RS-232 and GPIB interface buses.~~ Discussion of the principles involved in the use of sensors and transducers in measurements of linear and angular displacement, velocity and acceleration, temperature, force, pressure, torque and flow. Introduction to dynamic measurements and frequency analysis.

MEGR 3114. Fluid Mechanics. (3) Prerequisites: MATH 2241 and MEGR 3121, both with a grade of C or above. Basic concepts of a fluid and the fundamentals of ideal and real fluid flow. Topics include fluid statics, conservation principles, Bernoulli's equation, fluid flow in pipes, and measurement devices.

MEGR 3225. Introduction to Finite Element Analysis. (3) Prerequisites: MEGR 2144, ~~and~~ MEGR 2240, and MATH 2171, ~~both~~all with grades of C or above. *Technical Elective.* The basic concepts of finite element analysis (FEA) are introduced. The necessary concepts from linear algebra are reviewed. Simple elements such as truss and beam elements are emphasized, with an introduction to continuum elements for structural analysis. Introduction to heat transfer elements for steady state conduction and convection. Mathematics software is used to illustrate such concepts as the finite element assembly process, and the solution of the primary unknowns. A commercially available finite element code is also introduced.

Suggested Curriculum: B.S.M.E. Degree

First Year

Fall Semester

Course	Credits
CHEM 1251 Chemistry I	3
CHEM 1281L Chemistry I Lab	1
ENGL 1101 English I	3
ENGR 1201 Intro to Engineering I	2
LBS 110x Arts & Society	3
MATH 1241 Calc I	4

Spring Semester

Course	Credits
ENGL 1102 English II	3
ENGR 1202 Intro to Engineering II	2
MATH 1242 Calc II	4
PHYS 2101 Physics I	3
PHYS 2101L Physics I Lab	1
Science Elective	3

Second Year

Fall Semester

Course	Credits
ECON 2101 Principles of Econ – Macro	3
~~LBST 2101 Western Culture & Historic Awareness~~	~~3~~
~~MATH 2241 Calc III~~MATH 2171 Differential Equations	3
~~MEGR 2141 Eng Mechanics I~~	~~3~~
PHYS 2102 Physics II	3
~~PHYS 2102L Physics II Lab~~	~~1~~

Spring Semester

Course	Credits
~~ECOR 2161 Basic Electrical Eng~~	~~3~~
~~MATH 2171 Differential Equations~~MATH 2241 Calc III	3
~~MEGR 2144 Solid Mechanics~~	~~3~~
MEGR 2156 Design Project Lab I	2
~~MEGR 2180 Manufacturing Systems~~	~~3~~
MEGR 2240 Computational Methods	3

Third Year

Fall Semester

Course	Credits
MEGR 3111 Thermodynamics I	3
~~MEGR 3121 Dynamic Systems I~~	~~3~~
MEGR 3161 Eng Materials	3
~~MEGR 3171 Measurements & Instrumentation~~	~~2~~
MEGR 3171L Instrumentation Lab	2
~~ME Tech Elective~~	~~3~~

Spring Semester

Course	Credits
~~MEGR 3112 Thermodynamics II~~	~~3~~
MEGR 3114 Fluid Mechanics	3
~~MEGR 3116 Heat Transfer~~	~~3~~
MEGR 3122 Dynamic Systems II	3
~~MEGR 3152 Mechanics & Materials Lab~~	~~2~~
MEGR 3156 Design Project Lab II	2

Fourth Year

Fall Semester

Course	Credits
ENGR 3295 Prof Development	1
~~LBST 2102 Global & Intercultural Connections~~	~~3~~
MEGR 3221 Machine Analysis & Design	3
~~MEGR 3253 Thermals / Fluids Lab~~	~~2~~
MEGR 3255 Senior Design I	2
~~ME Tech Elective~~	~~3~~
Math Elective	3

Spring Semester

Course	Credits
LBST 221x Ethical Issues	3
~~MEGR 3216 Thermal / Fluids Design~~	~~3~~
MEGR 3256 Senior Design II	2
~~ME Tech Electives (2)~~	~~6~~

Total Credit Hours = 126

Suggested Curriculum: B.S.M.E. Degree with a Concentration in Energy Engineering

First Year

Fall Semester

Course	Credits
CHEM 1251 Chemistry I	3
CHEM 1251L Chemistry I Lab	1
ENGL 1101 English I	3
ENGR 1201 Intro to Engineering I	2
LBST 110x Arts & Society	3
MATH 1241 Calculus I	3

Spring Semester

Course	Credits
ENGL 1102 English II	3
ENGR 1202 Intro to Engineering II	2
MATH 1242 Calculus II	3
PHYS 2101 Physics I	3
PHYS 2101L Physics I Lab	1
Science Elective	3

Second Year

Fall Semester

Course	Credits
ECON 2101 Principles of Economics – Macro	3
LBST 2101 Western Cultural & Historic Awareness	3
~~MATH 2241 Calculus III~~MATH 2171 Differential Equations	3
MEGR 2141 Engineering Mechanics I	3
PHYS 2102 Physics II	3
PHYS 2102L Physics II Lab	1

Spring Semester

Course	Credits
EGGR 2161 Basic Electrical Engineering I	3
~~MATH 2171 Differential Equations~~MATH 2241 Calc III	3
MEGR 2144 Solid Mechanics	3
MEGR 2156 Design Projects Lab I	2
MEGR 2180 Manufacturing Systems	3
MEGR 2240 Computational Methods	3
MEGR 2299 Energy Engineering Clinic Introduction to Energy Engineering	1

Third Year

Fall Semester

Course	Credits
MEGR 3111 Thermodynamics I	3
MEGR 3121 Dynamic Systems I	3
MEGR 3161 Engineering Materials	3
MEGR 3171 Measurements and Instrumentation	2
MEGR 3171L Instrumentation Lab	2
Math Elective	3

Spring Semester

Course	Credits
MEGR 3112 Thermodynamics II	3
MEGR 3114 Fluid Mechanics	3
MEGR 3116 Heat Transfer	3
MEGR 3122 Dynamic Systems II	3
MEGR 3152 Mechanics and Materials Lab	2
MEGR 3156 Design Project Lab II ~~(Energy Engineering Area)~~	2

Fourth Year

Fall Semester

Course	Credits
ENGR 3295 Professional Development	1
~~LBST 2102 Global and Intercultural Connections~~	~~3~~
MEGR 3221 Machine Analysis and Design	3
~~MEGR 3251 Thermal/fluids Lab~~	~~2~~
MEGR 3455 ~~Energy Engineering Clinic II~~Energy Senior Design I*	2
~~Energy Engineering Electives (2)~~	~~6~~

Spring Semester

Course	Credits
~~LBST 221x Ethical Issues~~	~~3~~
MEGR 3216 Thermal / Fluids Design	3
~~MEGR 3456 Energy Engineering Clinic III~~Energy Senior Design II*	2
Energy Technical Electives (2)	6

Total Credit Hours = 127

Suggested Curriculum: B.S.M.E. Degree with a Concentration in Motorsports Engineering

First Year

Fall Semester

Course	Credits
CHEM 1251 Chemistry I	3
~~CHEM 1251L Chemistry I Lab~~	~~1~~
ENGL 1101 English I	3
~~ENGR 1201 Introduction to Engineering I~~	~~2~~
LBST 110x Arts and Society	3
~~MATH 1241 Calculus I~~	~~4~~

Spring Semester

Course	Credits
~~ENGL 1102 English II~~	~~3~~
ENGR 1202 Introduction to Engineering II	2
~~MATH 1242 Calculus II~~	~~4~~
PHYS 2101 Physics I	3
~~PHYS 2101L Physics I Lab~~	~~1~~
Science Elective	3

Second Year

Fall Semester

Course	Credits
PHYS 2102 Physics II	3
~~PHYS 2102L Physics II Lab~~	~~1~~
MEGR 2141 Engineering Mechanics I	3
~~MATH 2241 Calculus III~~MATH 2171 Differential Equations	3
ECON 2101 Principles of Economics – Macro	3
~~LBST 2101 Western Cultural and Historic Awareness~~	~~3~~

Spring Semester

Course	Credits
~~ECGR 2161 Basic Electrical Engineering~~	~~4~~
~~MATH 2171 Differential Equations~~MATH 2241 Calc III	3
~~MEGR 2144 Solid Mechanics~~	~~3~~
MEGR 2156 Design Project Lab I ~~(Automotive Eng Area)~~	2
~~MEGR 2180 Manufacturing Systems~~	~~3~~
MEGR 2240 Computational Methods	3
~~MEGR 2299 Motorsports Engineering Clinic Introduction to Motorsports Engineering~~	~~1~~

Third Year

Fall Semester

Course	Credits
MEGR 3111 Thermodynamics I	3
MEGR 3121 Dynamic Systems II	3
MEGR 3161 Engineering Materials	3
MEGR 3171L Measurements and Instrumentation	2
MEGR 3171L Instrumentation Lab	2
Motorsports Technical Elective	3

Spring Semester

Course	Credits
MEGR 3112 Thermodynamics II	3
MEGR 3114 Fluid Mechanics	3
MEGR 3116 Heat Transfer	3
MEGR 3122 Dynamic Systems II	3
MEGR 3152 Mechanics and Materials Lab	2
MEGR 3156 Design Project Lab II ~~(Automotive Eng Area)~~	2

Fourth Year

Fall Semester

Course	Credits
ENGR 3295 Professional Development	1
LBST 2102 Global and Intercultural Connections	3
MEGR 3221 Machine Analysis and Design	3
MEGR 3251 Thermal/Fluids Lab	2
MEGR 3355 ~~Motorsports Engineering Clinic~~ HMotorsports Senior Design I	2
Motorsports Technical Electives (2)	6

Spring Semester

Course	Credits
LBST 221x Ethical Issues	3
MEGR 3216 Thermal/Fluids Design	3
MEGR 3356 Motorsports Engineering Clinic HMotorsports Senior Design II	2
Math Elective	3
Motorsports Technical Elective	3

Total Credit Hours = 127

STUDENT LEARNING OUTCOMES: If applicable, please indicate what SLOs are supported by this course or whether this curricular change requires a change in SLOs or assessment for the degree program.

These changes do not impact the student learning outcomes of the program.

TEXTBOOK COSTS: It is the policy of the Board of Governors to reduce textbook costs for students whenever possible. Have electronic textbooks, textbook rentals, or the buyback program been considered and adopted?

These changes do not impact choices of textbooks.

IMPORTANT NOTE: A Microsoft Word version of the final course and curriculum proposal should be sent to facultygovernance@uncc.edu upon approval by the Undergraduate Course and Curriculum Committee and/or Graduate Council chair.