

Proposed New Program Catalog Entry  
**PC Rossin College of Engineering & Applied Science**  
For APC approval

New Catalog Entry

To add detailed description of Engineering Minor Program to Section III, Undergraduate Studies, of the Catalog prior to "music option" on page 44 of the 2008/09 catalog.

Program description (as it will appear in course catalog):

Engineering Minor

The college of engineering enables undergraduate students enrolled in the Colleges of Arts and Sciences and in the College of Business and Economics to earn a minor in engineering. This unique program provides students with insight into the world of engineers: who they are, what they do, and how they think. Students taking the Minor in Engineering develop an understanding of the tools and techniques engineers use on a day-to-day basis.

The mission of the minor is to educate non-engineering students about engineering methodology, specifically how engineers solve problems; how they design, manufacture, and analyze problems; and how other factors such as economics, safety, ethics, and environmental issues affect the engineering design process. Fifteen credit hours is required to fulfill the engineering minor.

The Program:

Core Pre-requisites: Students are required to have successfully completed Math 51 (or equivalent) and Physics 5 (or equivalent).

Required Courses: EMC1 and EMC2 are required courses for the program.

Electives: Three electives are required and must include one from the Engineering Fundamentals course group and one from the Integrated Engineering course group. The student is free to choose the third elective from either group.

Number of credits to fulfill minor is 15 credits

**Note: The Minor in Engineering is not open to RCEAS students.**

**Group A: Engineering Fundamentals**

EMC 105 Engineering Structures & Motin  
EMC 110 Energy Engineering  
EMC 115 Engineering Materials & Electronics  
EMC 120 Systems Engineering

**Group B: Integrated Engineering**

EMC 42 (CSE 42) Game Design  
EMC 150 Information & Knowledge Engineering  
EMC 155 Enterprise Engineering  
EMC 160 Computer Aided Engineering & Control Systems  
EMC 168 (IE 168) Production Analysis  
EMC 170 Software Engineering & Collaborative Environments  
EMC 171. (CHE 171, CEE 171, ES 171) Fundamentals of Environmental  
Technology EMC 174 Process Engineering

**Description of proposed change(s):**

Description of course for first time appearing in catalog. Adding the Engineering Minor Program to the catalog in a similar fashion to the Business Minor.

**Rationale for proposed change(s):**

Desirable to have this course listed in the catalog.

**Impact Statement:** EMC has been in existence for several years and therefore no new impact. Faculty from all engineering departments contribute to the EMC courses each year.

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 1 but never appeared in catalog.

Proposed course number and course description (as it will appear in course catalog):

**EMC 1 Macro and micro view of engineering - (3)**

A course designed to be exciting and stimulate a student's further interest in the engineering minor. Hands-on experience with engineering problem solving, modeling, simulation, and analysis tools. Macro view of what engineering is and what engineers do. Interaction with practicing engineers; visits to local engineering facilities.

Corequisite: a math course (Math 51 or equivalent).

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

Desirable to have this course listed in the catalog.

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Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 2 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 2 Engineering Practicum - (3)**

Techniques and processes used in the creation of engineered products. Exposure to engineering tasks and processes in a hands-on laboratory; mechanical and electronic manufacturing and fabrication techniques. Disassembly and reassembly of common engineered products to assess how they work and are manufactured.

Co Prerequisites: a math course (Math 51 or equivalent) and physics course (Physics 5 or equivalent)

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

Desirable to have this course listed in the catalog.

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 105 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 105 Engineering Structures and Motion - (3)**

Practical limits imposed on stationary or moving structures; why exceeding these limits can lead to failure. Basic principles governing both stationary structures; e.g. buildings and bridges, and things that move, e.g. cars and satellites, and how these principles apply in engineering practice. How a stationary structure effectively supports both its own weight and the weight of its users and why a structure will undergo deflections and deformations during use. How forces and energy are associated with a moving structure and how these affect the motion of the structure.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 110 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 110 Energy Engineering - (3)**

The amount of energy used by a modern society is quite staggering, and a clear understanding of energy processes and constraints is essential knowledge for every citizen. The basics of energy, its measurement, principles governing its use and conversion, methods of production, and the associated consequences on the environment. Fossil, nuclear, and renewable, energy sources. Energy utilization developed in a simple form and employed to examine the use of energy in large and small engineering systems and products, from power plants to air conditioners.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 115 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 115 Engineering Materials and Electronics - (3)**

"Materials" are the "stuff" from which we build TV's, cell phones, cars, skyscrapers, etc., and affect design, performance, costs, and environmental impacts. How electronics, communications, and structures depend on advances in materials engineering: materials behavior, modeling and simulation of materials properties and performance; methods and databases for materials selection; and engineering processes to control material composition and structure.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 120 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 120 Systems Engineering - (3)**

Systems approach to problem solving in fields such as environmental planning, large-scale infrastructure systems, manufacturing, telecommunication, and delivery of services. Systems analysis concepts and their relation to the determination of preferred plans and designs of complex, large-scale engineering systems. Performance and cost in project engineering decisions that balance resource investments across the major stages of life of an engineering system. Development of functional requirements and satisfactory designs.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 150 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 150 Information and Knowledge Engineering - (3)**

How computers manage information for making decisions automatically or for advising decision makers. Characterization of database systems, of web technologies, of multimedia, and of the relationships among them. Representations of knowledge and the use of artificial intelligence techniques. Automated help-desk systems and computer generation of project plans.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 155 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 155 Enterprise engineering - (3)**

The key elements of modeling and engineering the corporation. Enterprise engineering, decision analysis, application of quantitative methods to facilities planning, engineering economy, production planning and control, forecasting, material requirements planning, and agile business practices.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 160 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 160 Computer aided engineering and control systems - (3)**

Use of computer-based technologies to design and manufacture products. The design cycle to create product concepts. Analysis of product design. Specifications for the control of manufacturing processes. How control systems are used in creating agile manufacturing environments: discrete and analog signals, analog to digital conversion, and application case studies. Hands-on application(s) and sample exercises from real world examples.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 168 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 168 (IE 168) Production Analysis - (3)**

A course for students not majoring in industrial engineering. Engineering economy; application of quantitative methods to facilities analysis and planning, operations planning and control, work measurement, and scheduling.

Prerequisite: Math 21 OR Math 51

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

Desirable to have this course listed in the catalog.

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 170 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 170 Software Engineering & Collaborative Environments - (3)**

Discover why building large software systems is very different from using large databases, or designing products such as automobiles with CAD, etc. Design and implementation of a large team project involving complex data management in a collaborative environment. Learn why and how collaborative environments are becoming essential to modern engineering projects and require the tools and techniques of software engineering to succeed.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

Desirable to have this course listed in the catalog.

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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 196 but never appeared in catalog, is being crosslisted with CEE 171, ChE 171, ES 171

Proposed course number and course description (as it will appear in course catalog):

**EMC 171. (CHE 171, CEE 171, ES 171) Fundamentals of Environmental Technology (4)**

Water and air quality; water, air, and soil pollution. Chemistry of common pollutants. Water purification, wastewater treatment, solid and hazardous waste management, environmental remediation, and air quality control. Global changes, energy, and the environment. Constraints of environmental protection on technology development and applications. Constraints of economic development on environmental quality. Environmental life cycle analysis and environmental policy.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog under EMC.

Rationale for proposed change(s):

Desirable to have this course listed in the catalog and crosslisted as above.

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Proposed New Course Catalog Entry  
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New Course Catalog Entry

Current course number and course description (from course catalog): N/A

Course has been taught under number EMC 195 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 174 Process Engineering - (3)**

Semiconductor process engineering, including technology to process raw silicon wafer to electronics integrated circuits (ICs). Crystal growth, thin film deposition, photolithography, doping technology.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

Desirable to have this course listed in the catalog.

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Kind of change, e.g., "change in title"

Crosslisting

**Current course number and course description (from course catalog):**

Course has been taught under temporary number EMC 197

**Proposed course number and course description (as it will appear in course catalog):**

**EMC 42 (CSE 42) Game Design- (3)**

From the early text-based, one-player computer games to the modern 3D games with thousands of gamers sharing the same virtual gaming world simultaneously, computer games have gone through a remarkable evolution. Despite this evolution, principles of computer game design are not well understood. In this course we will study the broad issue of game design, particularly tailored towards video games. We will present an experimental model for game design and analyze various modern computer games from the perspective of this model.

Corequisite: EMC 1 or EMC 2

**Description of proposed change(s):**

Crosslist with CSE 42.

**Rationale for proposed change(s):**

CSE 42 is a useful addition to the Engineering Minor, and the addition consumes no resources.

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Current course number and course description (from course catalog): N/A

Course has been taught under temporary number EMC 196 but never appeared in catalog

Proposed course number and course description (as it will appear in course catalog):

**EMC 156 Embedded Systems - (3)**

Use of small computers embedded as part of other machines. Limited resource microcontrollers and state machines from high-level description language. Embedded hardware: RAM, ROM, flash, timers, UARTs, PWM, A/D, multiplexing, debouncing. Development and debugging tools running on host computers. Real-Time Operating System (RTOS) semaphores, mailboxes, queues. Task priorities and rate monotonic scheduling. Software architectures for embedded systems.

Corequisite: EMC 1 or EMC 2

Description of proposed change(s):

Description of course for first time appearing in catalog.

Rationale for proposed change(s):

Desirable to have this course listed in the catalog.

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