

PROCESS A CURRICULUM PROPOSAL

SCC #

04 05 -

PROPOSAL TITLE: Introduction to Automotive Engineering

Sponsor(s): Krishan Kumar Bhatia E-Mail: bhatia@rowan.edu Ext: 5346
E-Mail: _____ Ext: _____
E-Mail: _____ Ext: _____

DEPARTMENT: Mechanical Engineering

COLLEGE: Engineering

If Liberal Arts & Sciences CHECK : History/Humanities Math/Sciences Social/Behavioral Sciences

UNDERGRADUATE GRADUATE

THE ATTACHED **NON-GEN-ED** PROPOSAL IS BEST DESCRIBED BY THE ITEM(S) CHECKED.

- New non-gen-ed course
- Short-term non-gen-ed course
- Minor curricular changes (fewer than three)
- Existing non-gen-ed course
- Non-gen-ed degree requirements
- Major
- Minor, specialization, concentration, track, certificate program

The following signatures REPRESENT APPROVAL

Department Chair: _____ Date: Feb 7, 2005
 Department Curriculum Chair: _____ Date: _____
 Academic Dean: Deanne Dole Date: 2-10-05

UNIVERSITY CURRICULUM COMMITTEE

College Chair Date: 4/1/05 College Chair Sig: _____
 Senate Curriculum Chair Signature: _____ Date: Senate Announcement/Vote: 4/14/05

Comments: _____

EXECUTIVE VICE PRESIDENT/PROVOST Signature: _____ Date: 5/24/05

Approved ~ Not Approved due to the following: Student Cr Hrs Faculty Load Hrs Equalized Cr Hrs

REGISTRAR

Date: 5/31/05 Course Description Received & Approved ~ Hegis Taxonomy & Course 0910-444

Registrar Signature: _____

NOTIFICATION FORWARD

SCC Chair Academic Dean Department Chair Registrar Sponsor(s)

Trans. 6/14/05

10/13/05
6/24/05

SCC# __ - __ - ____

NEW COURSE PROPOSAL

Details

a. Course Title:

Introduction to Automotive Engineering

b. Sponsor

Dr. Krishan Kumar Bhatia, Mechanical Engineering

c. Credit Hours – 3

d. Course Level: Undergraduate

e. Prerequisites: Dynamics (0901.291), Machine Design (0910.241), Mechanical Design and Synthesis (0910.341), Engineering Thermodynamics II (0910.312), Fluid Mechanics II (0901.313), Transfer Process I: Heat (0906.311) or with instructor permission.

f. Suggested Time and Scale of Implementation: To be offered every year starting Spring 2006.

Curricular Effect

The proposed course will be offered as an undergraduate level elective for Mechanical Engineering students. Undergraduate mechanical engineering students are required to take four mechanical engineering electives in their senior year. This course will serve as one of these electives. Other engineering students with the required prerequisites may also enroll in this course.

The proposed course will require no additional staff, space or other resources. The only library resources required for this course will be access to the electronic journals already maintained by the Library.

Rationale

The automobile is one of the most interesting platforms for engineering study. In this everyday machine, principles from dynamics, thermodynamics, fluid mechanics, heat transfer, controls, and electronics are combined to meet a simple human transportation need. However, in order for success, modern automobiles must meet increasingly stringent demands from customers as well as governmental regulatory agencies. These include: an aesthetically appealing interior and exterior, an emotionally captivating driving experience, long term reliability and quality, durability in all climactic conditions, and crash safety. This remarkable machine must do this while still maintaining a relatively affordable price. Furthermore, increasing environmental awareness is now forcing manufactures to not only question how vehicles are designed for pollution control, but how they are built, how they are used, and how they are disposed of at the end of their product cycle. The proposed course would address how engineering principles are used in vehicle design. Students will be given the opportunity to learn the scientific and engineering principles behind modern vehicle design, and apply these principles to automotive engineering challenges.

Essence of the Course

a. Objectives

The goal of this course is to present an introduction to (1) the scientific principle involved in the automobile, (2) the challenges of modern automotive engineering, and (3) the methods for solving current and future vehicle design problems. Topics will include vehicle use, automobile dynamics, handling, power plant, power transmission, and advanced energy storage.

b. Topical Outline/Content

Week	Topic	Projects/Exams
1	Introduction: Automobile Use, Design, and Aesthetics	Vehicle Build Competition
2	Vehicle Road Loads	
3	Vehicle Dynamics	
4	Chassis/Suspension	Component Design Project
5	Handling and Steering	
6	Braking Systems	
7	Internal Combustion Engines: Thermodynamic Fundamentals	Mid-Term Exam
8	Internal Combustion Engines: Ignition, Cooling, and Engine Control	
9	Internal Combustion Engines: Forced Induction and Emissions	Concept Vehicle Design Project
10	Vehicle Transmission Design	
11	Vehicle Traction, 4WD, and All Wheel Drive	
12	Drivetrain Integration	
13	Batteries, Electric Motors, and Hybrid Electric Vehicles	
14	Hydrogen, Fuel Cells, and Fuel Cell Vehicles	
Finals		Final Exam

c. Evaluation of students and grading procedure

Students will be evaluated through in-class examinations, completion of homework problem sets, and hands-on design projects.

d. Course evaluation

The success of the course in meeting course goals will be determined through use of in-class examinations, the outcome of projects, and student evaluations.

Letters of Consultation

Automotive Engineering is a sub-field within Mechanical Engineering. Furthermore, the proposed introductory course involves topics of primarily a Mechanical Engineering nature. For this reason, the only attached letter of consultation is one of support from Library Resources.

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COURSE DESCRIPTION: INTRODUCTION TO AUTOMOTIVE ENGINEERING, 0910-444

This course deals with the engineering of automobiles at the undergraduate level. The course draws upon knowledge from the fields of dynamics, thermodynamics, fluid mechanics, heat transfer, and machine design. Topics covered include vehicle dynamics, internal combustion engines, power transmission, and advanced technology vehicles. The course includes appropriate exams and automobile related design projects.

Prerequisites: Dynamics (0901.291), Machine Design (0910.241), Mechanical Design and Synthesis (0910.341), Engineering Thermodynamics II (0910.312), Fluid Mechanics II (~~0901.313~~), Transfer Process I: Heat (0906.311) or with instructor permission.

0910-313

Rowan University
Campbell Library

Library Resources Form

Department/School: College of Engineering/ Mechanical Engineering

Proposed by: Dr. Krishan Bhatia

Program Title: Automotive Engineering (Undergraduate)

Anticipated Date for Course/Program Offering: Spring 2006

Resources that should be acquired

No additional resources are needed at this time.

Resources available in Campbell Library

The library has basic holdings in the Library of Congress area of Mechanical Engineering. An engineering approval plan is utilized to provide current materials in the engineering disciplines.

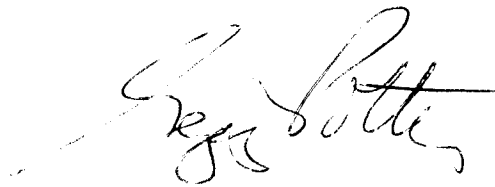
List key periodical resources

Campbell Library is fortunate to have access to online journal databases in a large number of academic subjects, including civil and environmental engineering, transportation, mathematics, and the physical sciences.

Of particular significance is the ASME database (American Society of Mechanical Engineers), which contains relevant full-text articles. In addition, both Engineering Village and Elsevier Science Direct provide journal articles, many full-text, on science and engineering. Also, MathSci + provides comprehensive coverage of international research in mathematics and mathematically related research in statistics, computer science, physics, operations research, engineering, biology, and related disciplines. Almost 2,000 journals are represented.

Librarian remarks

Given the library's current book holdings and online journal access, this course can be supported.

A handwritten signature in black ink, reading "Gregory C. Potter". The signature is written in a cursive style with a large initial "G" and "P".

Gregory C. Potter
Library Liaison

2/10/2005

Rowan University
LIBRARY RESOURCES
 to

SUPPORT A NEW COURSE or NEW PROGRAM PROPOSAL

The purpose of this form is to provide a channel of communication between the library and faculty designing new courses/programs. The information will be used to assess the resources available in the library, and to identify resources the library should acquire to support the course/program. The information will also provide rationale for institutional support for library acquisitions.

This form should be completed in a coordinated effort between the course sponsor(s) and the academic department liaison librarian.

- The sponsor(s) complete parts A & D
 If assistance is required to complete parts A & D, please notify the liaison librarian.
- Forward this form to the librarian who will complete parts B, C, & E

This form must be completed and attached to the original curriculum proposal before being approved by the Senate Curriculum Committee

A. College Engineering Department Mechanical Engineering

Proposed by: Krishan Kumar Bhatia Date: Jan. 31, 2005

Course Title: Introduction to Automotive Engineering

Anticipated Date for Course/Program Offering: Spring 2006

- B. Describe the resources available in the library to support this course/program, including reference, monographic, electronic databases, audio-visual materials, etc. A summary statement is sufficient.
- C. List key periodicals available in the library to support this course/program.
- D. List specific resources that should be acquired to support this course.
 None
- E. Librarian comments and recommendations:

PROCESS A

NON-GENERAL EDUCATION

Curriculum Proposals

- New non-general-education courses
- Short-term non-general-education courses
- Minor curricular changes (fewer than three) to:
 - a. existing non-general-education courses
 - b. non-General-Education degree requirements
 - c. majors
 - d. minors, specializations, concentrations, tracks, certificate programs

✓ CHECKLIST FOR ACCURATE FORMAT:

- _____ Check Correct Course Title
- _____ Correct Hegis Number
- _____ Letters of Consultation
- _____ New Course: Catalog Description on **separate page**
- _____ Changes to Programs: Attach new Advising Sheet (should show structure of program; **not** chronological order of classes taken)

PROCEDURES:

- **Department Curriculum Chair** will review all proposals for completeness, necessary changes and/or additions;
- **Department Chair** will review all proposals for completeness, necessary changes and/or additions;
- **College Dean** will review all college curriculum proposals for completeness, necessary changes and/or additions.
- **College Curriculum Chair** will meet with *College Curriculum Committee* to review and discuss proposals for completeness, necessary changes and/or additions, attach original letters of recommendation and forward to;
- **Senate Curriculum Committee Chair** and announcement to Senate

All Department signatures, College Curriculum Chair signature, and signature of the Dean must appear on the cover sheet.

THE ABOVE PROCESS MUST BE COMPLETE BEFORE SUBMITTING TO THE SENATE.

Submit ONLY the ORIGINAL PROPOSAL, COVER SHEET & ORIGINAL LETTERS to the Senate

SEND A DUPLICATE OF YOUR PROPOSAL via e-mail to: curriculum@rowan.edu

Please include: TITLE OF PROPOSAL

Upon receipt of the original curriculum proposal in the senate office, it will be assigned a reference number for tracking throughout the processing stages. Copies sent via e-mail will be assigned the same reference number as the original hard copy for tracking.

Copies of the cover sheets will be available in the Senate office, or can be sent upon request via e-mail for download and printing.

Curriculum Proposals will be sent via e-mail for open hearings so recipients can print a hard copy.

Original copy of Curriculum Proposals will remain in the Senate office until sent to the Provost.