LaGuardia Community College
And
The City College of New York

Proposal for a Dual/Joint

AS/BE in Civil Engineering Science/Civil Engineering
AS/BE in Mechanical Engineering Science/Mechanical Engineering
AS/BE in Electrical Engineering Science/Electrical Engineering

The Department of Mathematics
LaGuardia Community College
Dr. Kamal Hajallie, Chairperson

School of Engineering
The City College of New York
Dr. Mohammad A. Karim, Dean

Program Proposal Approved by
Department Curriculum Committee: **3/17/2004**
College-Wide Curriculum Committee: **4/15/2004**
Senate: **4/28/2004**
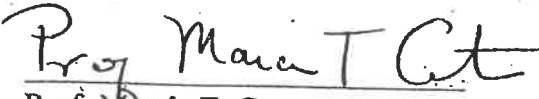
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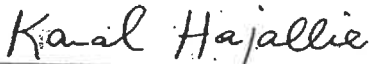This agreement is effective upon signature.

LaGuardia Community College

(signature)

Dr. John P. Bihn
Vice President
Office of Academic Affairs

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Dr. Paul Arcario
Dean
Office of Academic Affairs

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Prof. Marcia T. Caton
Acting Assistant Dean
Office of Academic Affairs

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Dr. Kamal Hajallie
Chairperson
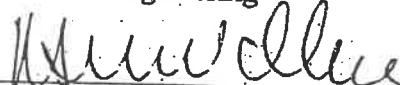Mathematics Department

The City College of New York

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Dr. Zeev Dagan
Provost
Office of Academic Affairs

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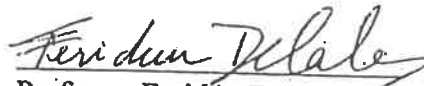
Dr. Mohammad Karim
Dean
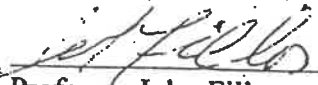School of Engineering

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Dr. Ardie D. Walser
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Professor Roger Dorsinville
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Professor Feridun Delale
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Department Mechanical Engineering

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Department of Civil Engineering

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Purpose and Goals

LaGuardia Community College (Lagcc) and the City College of New York (CCNY) propose to offer three dual/joint programs in Civil, Mechanical and Electrical Engineering Science (A.S.-B.E.). These will be jointly registered dual admission programs that are built upon existing Bachelor of Engineering in Civil, Mechanical, and Electrical Engineering (B.E./E.E.) at the City College of New York (CCNY). Those students graduating from Lagcc with at least a cumulative C average will have a seamless transition to the upper division of the baccalaureate program at CCNY. The dual/joint program will offer increased educational opportunities for underrepresented minorities in science and engineering fields who might otherwise be denied access to higher education. The academic requirements of dual/joint programs are more than sufficient to assure graduates' licensure in New York State as Professional Engineers. The bachelor's degree from CCNY is fully recognized by the Accreditation Board for Engineering and Technology (ABET), and is registered as licensure-qualifying by the New York State Department of Education

Need and Justification

Engineering has been defined, as the application of theory and principles of science and mathematics to the solution of practical technical problems. There is a growing demand for professionally trained engineers at many levels, as post-war infrastructure declines and as baby boom careers draw to a close. Many future engineers will find life's work in this ongoing redevelopment, while other engineering graduates will find multiple opportunities in research and development of high-tech products. However, it is well known—viz. the National Science Foundation's annual report, entitled *Women and Minorities in Engineering*—that minorities (classified as Hispanics, Black non-Hispanics, and American Indians or Alaskan Natives) are considerably underrepresented in the engineering workforce.

The US Department of Labor 's Bureau of Labor Statistics projects a 12-20% increase in employment opportunities for all engineering disciplines through 2010. More engineers will be needed to replace the aging baby boomers, to improve the country's aging infrastructure, and to research and develop cutting edge high-tech instruments necessary for manufacturers to stay competitive. Engineers will also be needed to improve or build new roads, bridges, water and pollution control systems, and other public facilities.

However, while the demand for highly skilled engineers is greatly increasing, minorities and women are not well represented in the engineering workforce. The most recent (2000) edition of "Women and Minorities in Science and Engineering" raises these issues of concern: Minority full-time first-year enrollment in engineering decreased 5 percent from 1992 to 1996. Challenges to affirmative action threaten minority enrollment in engineering and science. Black and Hispanic students are less likely than white or Asian students to complete bachelor's degrees (in any field) within five years. Forty-eight percent of whites and 47% of Asians, compared with only 34% of blacks and 32% of Hispanics, who entered undergraduate programs in 1989 had received bachelor's degrees by spring 1994. Thirty-seven percent of both blacks and Hispanics,

Even more recent data ("Engineering Education by the Numbers," Community College Week, June 24, 2002, Vol. 14 No. 23), show there is still significant under-representation of women and minorities in the field of Engineering: only 20% of engineering bachelor degrees were awarded to women, 6.4 % to Hispanics, and below 5% to African Americans. While educators have worked hard in recent years to increase the participation of minorities and women, these numbers

continue to promote dialogue concerning the new engineering initiative with the principals, guidance counselors, faculty, staff and students from these high schools.

Based on the result of the survey conducted in the neighborhood high schools and the college, the projected enrollment for the first five years of the proposed programs in Engineering Science, is presented in Table I. The following is based on the assumptions of the projected enrollment:

- There is a pool of more than 250 currently enrolled students who have identified Engineering Science as their career choice.

- There is a potential pool of neighborhood high school students who have identified Engineering Science as their career choice.

Table I: Five Year Projected Enrollment

	Year 1	Year 2	Year 3	Year 4	Year 5
Full-Time	28	39	49	60	70
Part-Time	12	16	21	25	30

Recruitment

The engineering committee conducted a survey of students in high school and of students currently at the college to ascertain interest in engineering, and the results (see Appendix C) revealed a potential source of applicants within the college and its community. The college will vigorously seek out graduating students in the high schools of western Queens for recruitment. Initial recruitment endeavors will be directed at the three high schools (International High School, Middle College High School, and Robert F. Wagner Institute for the Arts and Technology) on LaGuardia's campus. The recruitment drive will extend to Aviation High School, and at several other large high schools within a two-mile radius of the college. Principals, counselors, and Mathematics and Science teachers in these high schools will be informed about the engineering program. Open houses will be held at the high schools on career nights for students to explore the opportunities available in the fields of engineering. Faculty will meet one-on-one with interested students. Prospective Engineering Science students will be invited to the College's periodic Open House/Poster Sessions, designed to promote the College to high school students. Current student and alumni engineering projects will be showcased and prospective students will be provided a tour of our engineering laboratory.

The Engineering Science Programs at LaGuardia will be listed in the College catalog and a website will be developed that will highlight the LaGuardia-CCNY dual/joint program.. This will be linked to the College website. The LaGuardia Engineering faculty will visit high schools in Queens to disseminate information about the program and to create possible pipelines so that students interested in Engineering can move smoothly from High School to Community College to Senior College. Additionally, LaGuardia and City College will collaborate in tracking the number of students who complete their program of study.

CURRICULUM
(CIVIL ENGINEERING)

COURSE REQUIREMENTS AT LAGUARDIA COMMUNITY COLLEGE	
Course & Title	**Credits**
General Education (Liberal Arts, Math, Science, Distribution) Courses:	
HUA 101: Introduction to Art	3
HUM 101: Introduction to Music	3
SSN 187: Urban Sociology	3
ENG101: Composition I	3
ENG 210: Journalism or ENG 256: Humor in Literature	3
SCC201: Chemistry 1(3L, 1R, 2Lb)	4
SCC202: Chemistry 2(3L, 1R, 2Lb)	4
SCP231: General Physics 1	4
SCP232: General Physics 2	4
MAT201: Calculus 1	4
MAT202: Calculus 2	4
MAT203: Calculus 3	4
MAT204: Differential Equations	4
*MAT210: Linear Algebra	3
SUBTOTAL:	**50**
Specific Program Requirements (including Prerequisites):	
COOP Prep for Engineering Science	0
EGR 101: Engineering Lab. 1/Internship I	1
EGR 103: Engineering Lab. 2/Internship II	2
**CIS 125: C/C++ Programming	3
EGR 213:Electrical Circuits	3
EGR 219: Thermodynamics I	3
SUBTOTAL:	**12**
TOTAL:	**62**

Civil Engineering
LaGuardia Program Schedule
Two-Year Course Plan

Fall I	**MAT201** Calculus I Pre: MAT200 4 cr.	**SCC201** Chemistry I Pre: CSE099, ENA/ENG099, MAT/MAB096 4 cr.	**HUA101** Intro/ Understanding Art 3 cr.	**ENG101** Eng. Comp. I Pre: CSE095, ENA/ENG099 Pre/Co: CSE099 3 cr.
Fall II	**C1S125**** C/C++ Programming,, Pre: MAT201 3 cr.	**CEP099** COOP Prep for Engineering Science 0 cr.		
Spring I	**EGR101** Engineering Lab I Pre: MAT200 1 cr.	**MAT202** Calculus II Pre: SCC201 4 cr.	**SCC202** Chemistry II Pre: SCC201 4 cr.	**SCP231** General Physics I Pre: CSE099, ENA/ENG099 MAT201 4 cr.
Spring II	**HUM101** Intro to Music 3 cr.			
Fall I	**MAT203** Calculus III Pre: MAT202 4cr.	**EGR103** Engineering Lab II Internship II/Mat lab Pre: EGR101 2 cr.	**SCP232** General Physics II Pre: MAT202, SCP231 4 cr.	**MAT210*** Linear Algebra Pre: MAT201 3 cr.
Fall 11	**MAT204** Elementary Differential Equations Pre/Co: MAT202/MAT203 4 cr. -			
Spring I	**SSN187** Urban Sociology Pre: 3 cr.	**EGR213** Electrical Circuits Pre: SCP232, MAT203 3 cr.	**EGR219** Thermodynamics Pre: SCP232, MAT203, SCC 101 3 cr.	ENG210: Journalism or ENG 256: Humor in Literature 3 cr.

ELECTRICAL ENGINEERING
LaGuardia Program Schedule
Two-Year Course Plan

FALL I	**MAT201** Calculus I Pre: MAT200 4 Cr.	**SCC201** Chemistry I Pre: CSE099, ENA/ENG099, MAT/MAB096 4 Cr.	**HUA101** Intro/ Understanding Art 3 Cr.	**ENG101** English Comp. I Pre: CSE095, ENA/ENG099 Pre/Co: CSE099 3 Cr.	**CEP099** COOP Prep for Engineering Science 0 Cr.
FALL II	**CIS125** C/C++ Programming Pre: MAT201 3 Cr.	**ENG106** Critical Writing Pre: ENG101 3 Cr.			
SPRING I	**EGR101** Engineering Lab I Internship I Pre: MAT200 1 Cr.	**MAT202** Calculus II Pre: MAT201 4 Cr.	**SCC202** Chemistry II Pre: SCC201 4 Cr.	**SCP231** General Physics I Pre: CSE099, ENA/ENG099 MAT201 4 Cr.	
SPRING II	**HUM101** Intro. to Music 3 Cr.				
FALL I	**MAT203** Calculus III Pre: MAT202 4 Cr.	**EGR103** Engineering Lab II Internship II / Matlab Pre: EGR101 2 Cr.	**SCP232** General Physics II Pre: MAT202, SCP231 4 Cr.	**MAT210** Linear Algebra Pre: MAT201 3 Cr.	
FALL II	**MAT204** Elementary Differential Equations Pre/Co: MAT202/MAT203 4 Cr				
SPRING I	**SSN187** Urban Sociology Pre: 3 Cr	**EGR211*** Eng. Mech: Statics Pre: SCP231, MAT202 3 Cr..	**EGR213** Electrical Circuits Pre: SCP232, MAT203 3 Cr.	**EGR219** Thermo-dynamics Pre: SCP232, MAT203, SCC201 3 Cr.	

2. Mr. Hendrick Delcham received a B.S. and an M.S. in Mechanical Engineering from the SUNY at Buffalo. He is currently completing his doctoral degree in Mathematics Education at Columbia Teachers College.

3. Abderrazak Belkharraz, Ph.D. received his Bachelor's and Master's Degrees from St. Petersburg Technical University, St. Petersburg, Russia, and his Ph.D. degree from the Graduate Center of the City University of New York. His research interest is in Aircraft Control Systems, and his recent work on eigenstruture assignment for fault tolerant control design was funded by a NASA Faculty Award under the supervision of Dr.Kenneth Sobel. Dr. Belkharraz worked as an Electrical Engineer at Sibelect Electric Repairs Inc. in Morocco. He worked as a teaching assistant at The City College of New York for three successive years. He received the best session presentation award at the American Control Conference, Denver, Colorado in June 2003. In October 2004, Dr. Belkharraz and Dr. Sobel received the CUNY Collaborative Incentive Research Grant in the amount of $92,000. Both will be conducting research on controls for sampled data systems.

4. Ahmad Khabil holds a B.E. degree and M.S. degree in mechanical engineering from the Lebanese University and Ohio University respectively. He is currently a Ph.D. candidate in Electrical Engineering at the CUNY Graduate School. He was awarded the Robert E. Gillleece Fellowship from 2000 to 2004 for graduate studies at the Graduate Center/CUNY. He has authored and co-authored more than 15 journals, and conference papers. He has conducted research in the areas of optical networking, routing and wavelength assignment algorithms, Traffic grooming Optical Networks, Multicast in Optical Networks for over three years. Apart from his doctoral research on Optical Networking, Ahmad also performed research on other areas prior to his dissertation work, such as Remote Sensing, Virtual Reality, and control and robotics.

Facilities and Equipment

An integral component of the program is a two-semester lab experience designed to give exposure to the basic principles of engineering as well as to test students' understanding of physical concepts. This laboratory experience will teach transferable and practical skills that will prove invaluable to students. Some experiments will teach students to recognize the electromechanical problems associated with industrial equipment and systems. Other experiments have been designed to stimulate students' technical thinking and awareness of product design and development.

The laboratory workstations will provide all the tools the students will need to perform the experimentation included in the course syllabi. A central component will be the availability of mini-robots attached to the computers. Students will posit a physical series of events and using specially designed software write the required program. They will be able to run a simulation of the action and, if successful, then transfer the programming to the robot to have the action take place and be observed. The laboratory experience will also include assignments on the structural analysis of materials, measuring material elasticity, and building and testing truss structures. Students will undertake theoretical analyses of circuits, design and build electronic filters, control motors, and conduct temperature experiments. The College will renovate an existing to serve as the engineering lab. The design calls for seven workstations accommodating 28 students and a faculty station. The details on the equipment required to outfit the laboratory are in the Budget/Cost Assessment section below.

Library and Instructional Manual

The LaGuardia College library has holdings of over 85,000 books and 500 current subscriptions to serial publications. The CUNY college libraries are linked via Internet with CUNY-

12	18	National Instruments PCI-6024E Low-Cost Multi. I/O and NI_DAQ for Windows 2000/NT/Me/9x/MAC
13	1	National Instruments Software Solutions Department Maintenance and License
14	18	National Instruments Kit, SC-2075 Prototyping Signal Accessory Box
15	18	National Instruments R6868 Ribbon Cable, 1 meter
16	6	Pasco Scientific CA-6912 Mechanics PASPORT System
17	6	Pasco Scientific PS-2766 PASPORT Standard Physics Bundle
18	2	Jensen Tools Fluke 190C ScopeMeter 1000 V CAT II and 600 V CAT III, 100 MHz Bandwidth
19	15	Jensen Tools Fluke 179 True-RMS Digital Multimeter and Deluxe Accessory Combo Kit
20	6	Jensen Tools Tektronix PS2520G Triple Output DC Power Supply
21	18	McMaster-Carr Supply Co. Water-Resistant U-Grip Digital Stopwatches Part No. 5770T9
22	6 Sets	McMaster-Carr Supply Co. Cast Iron Slotted Test Weights (1850T22-7) 0.5 - 20 kg Class F Metric Weights
23	6 Sets	McMaster-Carr Supply Co. Cast Iron Slotted Test Weights (1850T11-7) 0 - 50 Lb Class F English-units Weights
24	6	McMaster-Carr Supply Co. Starrett Electronic Outside Micrometers 0 - 1 inch (0 - 25 mm) Model No. 733XFL-1
25	6	Jensen Tools 6" (150 mm) Inch/Metric Electronics Calipers
26	6	McMaster-Carr Supply Co. Dial Hanging Scales (1753T2)
27	6	McMaster-Carr Supply Co. Miniature Brushless DC Motors
28	2	McMaster-Carr Supply Co. Compact Vibration Table
29	8	Computer Casework/Workstations

Program Evaluation

The College has a learning outcomes assessment plan and periodic program review (PPR) process in place; the Engineering Science program would be subject to these assessments, as all other programs are. As part of the PPR process, the Mathematics Department will review all course syllabi in conjunction with its Advisory Board, as well as CCNY engineering faculty, to ensure the currency of curricular content and approaches, assess learning outcomes in terms of programmatic objectives, and assess learning outcomes in terms of the College's required core competencies. The

7	Testing of Bridge Models
8	
9	Work Envelope of a Robot
	tivity related to careers in engineering II (Coop requirement)
10	Theoretical analysis of Work Envelopes using MATLAB
11	Gathering Information and Specifying the Design Process Programming the Robot to Perform a Task
12	Final Project Presentations

EGR 103 Engineering Lab 2

3 Lab Hours, 2 Credits

Prerequisite: MAT 202, SCP 231

Corequisite: MAT 204, SCP 232

Course Description:
The course begins with a review of some fundamental mathematical concepts and techniques using MATLAB. Students are introduced to computer-based methods for verifying analytic reasoning and experimental results. MATLAB, LABVIEW, and SIMULINK are used to model and analyze engineering systems.

Text:

Evaluations: Lab Reports	80%
Final Presentation	20%

EGR 103 Engineering Lab 2	
Week	**Topics**
1	Introduction to Matlab, Basic Algebra operations, Graphing Creating Interactive m-files with Loops
2	Array Operations; Functions and their graphs -Quadratic, Polynomials, Exponential, Trigonometric; Complex number operations; Vector Operations
3	Matrix operations, Introduction to Simulink, Modeling mechanical and electrical systems with Simulink

Prentice-Hall, Upper Saddle River, New Jersey.

Evaluations: Homework 10%
Three Examinations 60%
Final Examination 30%

EGR 211 - Engineering Mechanics: Statics.	
Week	Topics
1	General Principles Mechanics; Fundamental Concepts; Units of Measurement; The International System of Units; Numerical Calculations; Force Vectors Scalars and Vectors. Vector Operations; Vector Addition of Forces; Addition of a System of Coplanar Forces.
2	Force Vectors Cartesian Vectors; Addition and Subtraction of Cartesian Vectors; Position Vectors; Force Vector Directed Along a Line; Dot Product.
3	Equilibrium of a Particle Condition for the Equilibrium of a Particle; The Free-Body Diagram; Coplanar Force Systems; Three-Dimensional Force Systems.
4	Exam 1
	Force System Resultants Moment of a Force - Scalar Formulation. Cross Product; Moment of a Force - Vector Formulation; Force System Resultants Principle of Moments; Moment of a Force About a Specified Axis.
5	Force System Resultants Moment of a Couple; Equivalent System. Force System Resultants of a Force and Couple System. Reduction of a Simple Distributed Loading.
6 –7	Equilibrium of a Rigid Body Conditions for Rigid-Body Equilibrium; Free-Body Diagrams; Equilibrium of a Rigid Body; Equations of Equilibrium; Two- and Three-Force Members Equilibrium in Three Dimensions; Equations of Equilibrium; Constraints for a Rigid Body; Equilibrium of a Rigid Body; Constraints for a Rigid Body.
8	Exam 2
	Structural Analysis Simple Trusses; The Method of Joints; Zero-Force Members; Structural Analysis The Method of Sections; Frames and Machines.
9	Internal Forces Internal Forces Developed in Structural Members. Internal Forces; Cables; Friction Characteristics of Dry Friction.
10	Friction Problems Involving Dry Friction. Wedges; Center of Gravity and Centroid Center of Gravity and Center of Mass for a System of Particles; Center of Gravity, Center of Mass, and Centroid for a Body; Composite Bodies.
11	Moments of Inertia Definition of Moments of Inertia for Areas. Parallel-Axis Theorem for an Area; Radius of Gyration of an Area; Moments of Inertia Moments of Inertia for Areas by Integration; Moments of Inertia for Composite Areas.
12	Exam 3
	Virtual Work Definition of Work and Virtual Work. Principle of Virtual Work for Particle and a Rigid Body; Virtual Work Principle of Virtual Work for a System of Connected Rigid Bodies.
13	Final Examination

6	Complete response of 1st order circuits (RL & RC)
7	Exam #2
	Series RLC circuit, Parallel RLC circuit,
8	Complete response of 2nd order circuits (RLC)
9	Sinusoidal Source & Response, Phasor circuit analysis, AC steady-state analysis
10 – 11	Exam #3
	Laplace Transform Analysis
12	s-domain circuit Analysis
	Final Exam

EGR 219-Thermodynamics I
3 Lecture Hours, 3 Credits

Prerequisite:
> SCP231/2, MAT203, SCC201

Co-Requisite:
> MAT204

Course Description:

This course introduces students to some physical concepts and some applications of thermodynamics as well as engineering processes and operations, with a major focus on the first and second law of thermodynamics.   Properties of pure substances. Basic principles governing the transformations of energy, particularly heat and work. Applications systems and control volumes. Mixtures of gases and vapors, air conditioning. Introduction to cycles: Carnot cycle, reversibility, power and refrigeration cycles.

Textbook: *Fundamentals of Classical Thermodynamics*, Van Wylen, G.J., Sontag, R.E., and Borgnakke, C. Published by J. Wyley & Sons, New York

Evaluations: Homework   15%
                          2 Exams   50%
                          Final   35%

EGR 219-Thermodynamics I	
Week	Topics
1	Thermodynamic systems and the control volume, macroscopic vs. microscopic point of view, properties and state of a substance, processes and cycles, units, zeroth law of thermodynamics, temperature scales
2	Pure substance, phase equilibrium, equations of state, tables of thermodynamic properties, thermodynamic surfaces.
3	Work, work done at the moving boundary, Heat, comparison of heat and work.
4	First law of thermodynamics, internal energy, enthalpy, constant-volume and constant pressure specific heat, conservation of mass and the control volume, 1st law of thermodynamic for a control volume

APPENDIX B: EXISTING COURSES DESCRIPTIONS

HUA101 Introduction to Art
3 credits; 3 hours

This course is designed to develop the students' ability "to see," while it examines the fundamental nature, meaning and humanistic value of art. Attention will be given to an examination of the creative process and to the role of the spectator as an active participant in the understanding of Art. Relevant readings will be discussed in relation to specific works of Art. The function of basic compositional elements will be examined. (Museum visits required.).
Prerequisite: CSE099, ENA/ENG099

HUM101 Introduction to Music
3 credits; 3 hours

This course is designed to develop an understanding and appreciation of various forms of music. Emphasis will be placed on the elements of musical organization, expression and style. Students will gain understanding by listening to selections and by discussing significant features of musical compositions from the Middle Ages to the present time.
Prerequisite: CSE099, ENA/ENG099

SSN187 Urban Sociology
3 credits; 3 hours

This course examines changing ideas about the city and the changing impact of the city on American lifestyles. With reference to New York City, the course explores the origins and the social structure of the city. It focuses on the relationship of class to family, gender, education, ethnicity, religion, politics and economics. Visits to housing projects, community organizations, or service delivery agencies will familiarize the students with the issues of planning and change in the city.
Prerequisite: ENA/ENG099, MAT095/MAB095, SSS100 or SSB110 or SSE101 or SSY101 or SSB102

ENG101 Composition I
3 credits; 4 hours

In this course students focus on the process of writing clear, correct and effective expository essays in response to materials drawn from culturally diverse sources. Emphasis is placed on using various methods of organization appropriate to the writer's purpose and audience. Students are introduced to argumentation, fundamental research methods and documentation procedures. Students write frequently both in and out of class. Admission to this course is based on college placement test scores.
Prerequisite: CSE095, ENA/ENG099
Pre-Corequisite: CSE099

ENG210 Journalism: Its Scope and Use
3 Credits; 3 hours

This course provides an overview of journalism with an emphasis on print and related areas, such as in-house publications and public relations writing. Also, to be covered are the history and impact of journalism, particularly the changing role of women and minorities in the press. News

This is the second calculus-based physics course. Topics covered include: wave motion; wave interference; propagation of light; diffraction; electric charge and electric field; Gauss' Law; electric potential; capacitance, and dielectrics; DC circuits; magnetism; Lenz's Law; AC circuits; electromagnetic waves; modern physics.
Prerequisite: SCP231, MAT202

MAT201 Calculus I
4 credits; 4 hours

This is the first course in a three-semester sequence, designed to give students an appreciation for the intellectual power and beauty of calculus, as well as a thorough grounding in computational techniques. Applications to economics, and the basic sciences will play an essential role. Topics to be covered include: limits, velocity and acceleration models, derivatives, Intermediate Value Theorem, Rolle's Theorem, and the Mean Value Theorem, implicit differentiation and related rates, Newton's Method, anti-derivatives, Fundamental Theorem of Calculus, and elementary integration.
Prerequisite: MAT200

MAT202 Calculus II
4 credits; 4 hours
This is the second course of a three-semester sequence, with the traditional focus on integration technique. Topics to be covered include: integration by substitution and by parts, trigonometric substitution, using a Table of Integrals, applications to volume, surface area, and arc length, solving elementary first and second order differential equations, sequences and series.
Prerequisite: MAT201

MAT203 Calculus III
4 credits; 4 hours
The third course in the Calculus sequence is intended to build on the concepts and techniques of MAT 201-202, and to provide a more rigorous conceptual grounding for the entire sequence. Topics to be covered include partial derivatives, critical points and generalized 2nd derivative test, 2- and 3- vectors in Euclidean coordinate systems, space curves and surfaces, double and triple integrals, parameterizations, and vector calculus as far as line integrals and Green's Theorem on closed curves.
Prerequisite: MAT202

MAT204 Elementary Differential Equations
4 credits; 4 hours
This course will consider selected problems and mathematical models which generate first and second order differential equations. Both numerical and analytical methods will be used to obtain solutions for first and higher order differential equations. Power series solutions will be emphasized, and where feasible, solutions utilizing computer methods will be explored.
Prerequisite: MAT202
Pre-Corequisite: MAT203

Appendix B: SURVEY QUESTIONNAIRE
ENGINEERING SCIENCE PROGRAM SURVEY

The Mathematics Department at LaGuardia Community College is developing an Associate of Science degree program in Engineering Science, with approximately 60 credits. This two-year degree program would prepare students for transfer to a senior college to continue their studies leading to a bachelor's degree in engineering. Please assist us in identifying students who would be interested in this program by completing the following questionnaire.

I am interested in a career in engineering.

 Yes   No

If you answer yes to question #1, please check the area of engineering in which you are most interested (please check only one).

 Civil Engineering   Electrical Engineering
 Mechanical Engineering   Other (please specify: _____)

Please check the highest academic degree you are planning to obtain.

 High School Diploma   Master's Degree
 Associate's Degree (2 years)   Doctoral Degree
 Bachelor's Degree (4 years)   Other (please specify: _____)

Please check all of the math courses you have taken or are currently enrolled in:

 Basic Math or MAT 095   Pre-Calculus or MAT 200
 Algebra or MAT 096   Calculus I or MAT 201
 Algebra II   Calculus II or MAT 202
 Geometry   Calculus III or MAT 203
 Trigonometry   Ordinary Differential Equations
 Statistics or MAT 120   Others: _____

Please check all the science courses you have taken or are currently enrolled in:

 Earth Science   Physics I
 Biology   Physics II
 Chemistry   Physics III
                                            Others: _____

Demographic Information: High School: _____ Class: _____
LaGuardia students please enter the number of credits completed: _____
Sex:

 Female   Male

Race:

 White   Hispanic
 African-American   Asian
                                            Other: _____

Name (optional): _____

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THE CITY UNIVERSITY OF NEW YORK
LAGUARDIA COMMUNITY COLLETE
MATHEMATICS DEPARTMENT
PROPOSAL FOR A NEW ACADEMIC PROGRAM IN ENGINEERING SCIENCE

Table I: Expenditure Estimates for the Proposed Program

1. Personnel	Year 1	Year 2	Year 3	Year 4	Year 5
Number of Full-Time Faculty	3	3	3	3	3
Total Compensation of Full-Time Faculty	$134,484	$134,484	$134,484	$134,484	$134,484
Number of Adjunct Faculty	0	1	1	2	2
Total Compensation of Adjunct Faculty		$8,000	$8,000	$16,000	$16,000
Number of Lab Technicians (1 CLT) & an half-time (ITLT)	1.0	1.0	1.0	1.0	1.0
Total Compensation of Adjunct Lab Technician	$6,200	$6,200	$6,200	$6,200	$6,200
Total Personnel Costs	$140,684	$140,684	$140,684	$156,684	$156,684
II. OTPS					
New Equipment & Supplies Purchases for Engineering Laboratory See Page 20-22	$150,000 Lab start-up	$47,300 Replacement cost for items #5,7,11,12,13, 14,16,17,18,20 See pg. 20-22	$10,000 Replacement cost for items #27,28 See pg. 20-22	$20,000 Replacement cost for items #11,13,14 See pg. 20-22	$40,000 Replacement cost for items #15,19,21 and new equipments See pg. 20-22

The College will outfit the cost for Laboratory

FACULTY

List the name and qualifications of each faculty member, for each course in the major and for each new required non-major course, using the tables on this following page. Graduate faculty must have an earned doctorate; otherwise demonstrate special competence. Faculty resumes should be available on request. These pages may be duplicated as needed.

Course Title (a)	No. of Credits (b)	Faculty Member(s) Assigned to Each Course. (Use "D" to Specify Program Director) (c)	Highest Earned Degree & Discipline, College or University (d)
Engineering Mechanics: Statics	3	Kamal Hajallie (D)	Ph.D., Mathematics
Thermodynamics	3	Abderrazak Belkharraz	Ph.D. Electrical Engineering
Engineering Lab I / Internship I & Electrical Circuits I	1 3	Hendrick Delcham	M.S., Mechanical Engineering Ph.D. candidate, Mathematics
Engineering Lab II / Internship II	2	Ahmad Khalil	Ph.D. candidate Electrical Engineering

CURRICULUM
(ELECTRICAL ENGINEERING)

COURSE REQUIREMENTS AT LAGUARDIA COMMUNITY COLLEGE	
Course & Title	**Credits**
General Education (Liberal Arts, Math, Science, Distribution) Courses:	
HUA 101: Introduction to Art	3
HUM 101: Introduction to Music	3
SSN 187: Urban Sociology	3
ENG101: Composition I	3
ENG 210: Journalism or ENG 256: Humor in Literature	3
SCC201: Chemistry 1(3L, 1R, 2Lb)	4
*SCC202: Chemistry 2(3L, 1R, 2Lb)	4
SCP231: General Physics	4
SCP232: General Physics 2	4
MAT201: Calculus 1	4
MAT202: Calculus 2	4
MAT203: Calculus 3	4
MAT204: Differential Equations	4
**MAT210: Linear Algebra	3
SUBTOTAL:	**50**
Specific Program Requirements (including Prerequisites):	
COOP Prep for Engineering Science	0
EGR 101: Engineering Lab. 1/Internship I	1
EGR 103: Engineering Lab. 2/Internship II	2
***CIS 125: C/C++ Programming	3
EGR 213:Electrical Circuits	3
EGR 219: Thermodynamics I	3
SUBTOTAL	**12**
TOTAL:	**62**

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SENIOR COLLEGE UPPER DIVISION COURSES REMAINING FOR

BACCALAUREATE DEGREE IN <u>MECHANICAL ENGINEERING</u>

CCNY

Semester 5	Credits	Semester 6	Credits
ME 14500 Computer Aided Drafting	2	ME 31100 Mechatronics	3
ME 24700 Engineering Mechanics II	3	ME 35600 Fluid Mechanics	3
ME 33000 Mechanics of Materials	3	ME 37100 Computer Aided Design	3
ME 32200 Computer Methods in Engr.	3	ME 46100 Engineering Materials	3
Eng 21007 Writing for Engineers	3	20000+ Liberal Arts/General Edu	3
Total	14	Total	15

Semester 7	Credits	Semester 8	Credits
ME 33100 Thermodynamics II	3	ME 47100 Energy Systems Design	3
ME 42100 Systems Control	4	ME 47300 Senior Design Project I	3
ME 43300 Heat Transfer	3	ME 40100 Review of F.E.	1
ME 46200 Manufacturing Processes	3	ME 43600 Aero-Thermal-Fluids Lab	1
ME 47200 Mech. System Design	3	Design Elective	3
		Design Elective	3
Total	16	Total	14

Semester 9			
Design Elective	3		
ME Elective	3		
ME 47400 Senior Design II	3		
20000+ Liberal Arts/General Edu	3		
Total	12		

TOTAL CCNY CREDITS   71

TOTAL DEGREE CREDITS 134
Bachelor of Engineering in Mechanical Engineering - BE(ME)