

MECHANICAL ENGINEERING UNDERGRADUATE PROGRAM HANDBOOK

DEPARTMENT OF MECHANICAL ENGINEERING
COLLEGE OF ENGINEERING, ARCHITECTURE &
COMPUTER SCIENCES

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HOWARD UNIVERSITY
WASHINGTON, DC 20059

From the Department Chairman

Welcome to Howard University and the Department of Mechanical Engineering. I am pleased that you chose to enroll and work towards a Bachelor of Science degree in mechanical engineering. Our undergraduate program in mechanical engineering is accredited by The Accreditation Board for Engineering and Technology (ABET). You should know that the department also offers the Master of Engineering and PhD degrees and you are encouraged to set your academic goals high enough to obtain advanced degrees in mechanical engineering.

Over the years, the department has produced a large number of outstanding engineers who have continued to excel in their chosen fields of work. Our graduates work with engineers and professionals from other disciplines to provide the fuel that drives this nations industries and government operations. They are also employed as leaders in academic institutions and other varied professions in the United States and across the world. With a good preparation in the fundamentals of mechanical engineering you should be in a position to take full advantage of the opportunities available in technology and enjoy a fascinating and rewarding career.

You will find in this Handbook a listing of courses designed for a four-year curriculum and a few other resources that you should find very useful. This Handbook does not provide a complete guide to information you need for your day-to-day stay here at Howard. You should consult other university and college publications such as the *H-Book*, *the Student Reference Manual and Directory of Classes* and the *Howard University Undergraduate Bulletin* for additional detailed information. You will be assigned an academic advisor shortly after registration and you should make a point to visit with your advisor from time to time for academic matters relating to your courses and career objectives. You should feel free to visit the Office of the Department of Mechanical Engineering in Room 2032 LKD Building, the Office of Student Services in Room 1114 LKD Building and acquaint yourself with other academic and non-academic resources that are available in the College. Many other resources that are available at the University are described in the *H-Book*.

The Department of Mechanical Engineering faculty and staff are committed to continuous improvements of our programs. We encourage your questions and comments on all aspects of our program. We are particularly interested in your comments regarding program educational objectives, learning outcomes and the curriculum.

Again, I welcome you to the Mechanical Engineering Department and invite your questions and comments.

H.A. Whitworth, D.Sc.
Professor and Chairman

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MECHANICAL ENGINEERING DEPARTMENT

MISSION

The mission of the department is to provide mechanical engineering majors a high-quality engineering education and to contribute new knowledge through research in mechanical engineering and allied disciplines. In addition, the department seeks to maintain recognition through scholarly work and service to the college, the university and the external community.

To achieve the mission of the department of mechanical engineering, the faculty of the department, with input from other constituents, established the following Undergraduate Program Educational Objectives:

UNDERGRADUATE PROGRAM EDUCATIONAL OBJECTIVES

I. Graduates of the Mechanical Engineering Program have acquired knowledge in mathematics, science and engineering and have developed problem solving skills necessary for productive careers in mechanical engineering and other professions and to pursue graduate, professional and life long education.

II. Graduates of the Mechanical Engineering Program have acquired concentrated knowledge in at least one area in mechanical engineering. Areas of concentration may include aerospace, applied mechanics, energy engineering, and manufacturing and robotics.

III. Graduates of the Mechanical Engineering Program can design and conduct experiments, analyze and interpret data, and effectively use modern technology in communication, research, and problem solving.

IV. Graduates of the Mechanical Engineering Program have the ability to formulate engineering problems and design a mechanical system or component to meet desired needs.

V. Graduates of the Mechanical Engineering Program have developed teamwork, leadership and communication skills to effectively solve engineering problems.

VI. Graduates of the Mechanical Engineering Program are exposed to issues dealing with people in relation to themselves, society and the environment and understand the need for social, professional and ethical responsibility in engineering practice.

UNDERGRADUATE PROGRAM LEARNING OUTCOMES

Graduates of the Mechanical Engineering Program at Howard University have:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility

- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- (l) an understanding of issues related to minorities and gender diversity, society and culture, and an historical awareness of Africa and its Diaspora
- (m) a knowledge of chemistry and calculus-based physics with depth in at least one
- (n) the ability to apply advanced mathematics through multivariate calculus and differential equations
- (o) a familiarity with statistics and linear algebra
- (p) the ability to work professionally in both thermal and mechanical systems areas including the design and realization of such systems

ACADEMIC POLICIES, HONORS AND DEGREE REQUIREMENTS

This information has been prepared as a convenience for undergraduate Mechanical Engineering students and their faculty advisors. It is not intended to replace the Howard University Bulletin that is the official University publication on all matters concerning academic policy. Students and their faculty advisors are encouraged to become familiar with information contained in the Howard University Bulletin and with information presented on the Howard University web site. Students are also encouraged to consult The *H-BOOK*, which is an official publication of the Office of Student Activities. The *H-Book* serves as a general resource for all Howard University Students.

Faculty Advisors

Students in the Department of Mechanical Engineering are assigned a faculty advisor at the beginning of their first semester in residence. Students should consult on a regular basis with their faculty advisor on all academic matters and career objectives. Continuing students must report to their faculty advisor to plan their program of study prior during the registration period. After the student and advisor plan a program of study, the advisor will issue a Personal Information Number (PIN) that allows the student to register via the Bison Web. A new PIN will be issued each semester.

Transfer Credit

Transfer credit is awarded after review of official transcripts from *all* of the student's previous institution by the Department of Mechanical Engineering. Courses for which transfer credit is given must be equivalent to Howard University courses in content, prerequisites, co-requisites, and credit hours. No credit will be transferred for courses that do not meet the prerequisites of courses in the mechanical engineering curriculum at Howard University. Only courses in which a grade of "C" or better was obtained at an

accredited institution are transferable. Credits for some courses offered by the College of Arts and Sciences are transferable from international institutions if those courses have been evaluated by the University and are considered equivalent to courses offered at Howard University. The Department also transfers credit for Advanced Placement level courses if the score meets the requirements set by the Department at Howard University offering a similar course. To apply for transfer credit, the student must provide official course descriptions and other supporting documentation, i.e. a current University Catalog from all institutions in which transfer credit is requested. Applications for transfer credit may be obtained from the office of the Department of Mechanical Engineering.

Consortium Courses

Howard University offers its qualified undergraduate and graduate degree students the opportunity to enroll in courses in the Washington Metropolitan Area Consortium of Universities (WMACU). Courses to be pursued through the Consortium must be courses not available at Howard University during the given semester or year. Details concerning enrollment in consortium courses are contained in the Howard University Student Reference Manual and Directory of Classes published each semester.

Dean's Honor Roll

Students with a grade point average of at least 3.0 based on a minimum load of 14 credits for the semester will have their names placed on the Dean's Honor Roll.

Attendance Regulations

All students are expected to attend classes regularly and promptly. Students who are absent from classes or laboratory periods are responsible for the entire work of the course. Members of the faculty will hold students responsible for regular and prompt class attendance.

Any student who does not take a scheduled mid-term or final examination must obtain the approval of his or her instructor in order to take a substitute examination. A student who does not secure such approval will receive a grade of zero for the examination missed.

Faculty members are responsible for reporting to the Assistant Dean of the College of Engineering, Architecture and Computer Sciences the names of students, whose repeated absences or tardiness are in their opinion, impairing the student's work. In such cases, the Assistant Dean will take appropriate action, which may include withdrawing the student from the course.

Academic Suspension and Readmission

The Department of Mechanical Engineering adheres to the policy published by the university. Details concerning academic probation, suspension and readmission after

suspension are published in the Howard University Bulletin and in the Student Reference Manual and Directory of Classes.

Graduation

Students must be recommended for graduation by the faculty of the College of Engineering, Architecture and Computer Sciences. Formal applications for graduation are required. Application forms may be obtained from the Office of the Assistant Dean, Room 1114 LKD Building. Application should be made approximately seven months in advance of the anticipated date of graduation. A copy of this application must be submitted to the Mechanical Engineering Department Office for filing. If a student does not graduate when expected, the student must reapply.

All students should consult with the Office of the Mechanical Engineering Department prior to the published deadline to add courses for the fall semester of the academic year in which they plan to graduate to assure that their proposed program of study will allow them to meet all academic requirements for graduation in that academic year.

Degree Requirements

To become a candidate for a bachelor's degree, the student must satisfy all entrance requirements; satisfactorily complete the course requirements of the department for the degree; have a cumulative Grade Point Average (GPA) of at least 2.0 for all work in which enrolled and at least a 2.0 GPA in the mechanical engineering major (all courses listed in the undergraduate mechanical engineering program curriculum with an MEEG prefix in the course number); achieve a grade of C or higher in at least five-sixths of the credits offered for graduation; complete in residence the last 30 credits of mechanical engineering courses in the curriculum which leads to the degree BSME, and be recommended for graduation by the faculty of the College of Engineering, Architecture and Computer Sciences.

Accreditation Requirements Regarding Course Prerequisites

Students enrolled in the Mechanical Engineering Program must follow the curriculum published by the department. The department must approve any deviation from the published curriculum, and it must be consistent with current curriculum criteria set by the Accreditation Board for Engineering and Technology, Inc. (ABET).

The ABET curriculum criteria requires a systematic progression through the curriculum by students enrolled in the program. This means that all students must complete lower level courses and satisfy prerequisite course requirements prior to enrolling in upper level courses. Prerequisites and co-requisites for courses in the mechanical engineering curriculum are listed in this Handbook.

Social Science and Humanities Electives

In the interest of making engineers fully aware of their social responsibilities and better able to consider related factors in the decision-making process, course work in the humanities, and social sciences is required as an integral part of the engineering program. Only one course in the social sciences and/or humanities may be taken at the basic level. Students must include courses at an advanced level rather than limit selections to unrelated introductory courses. Therefore, all students should consult closely with their faculty advisors to be certain that these requirements are met.

Social science and humanities electives are offered primarily through the College of Arts and Sciences. Electives may also be selected from the course offerings of the School of Education and the School of Business. All social science and humanities elective sequences require the approval of the student's major department.

Each student who entered the mechanical engineering program during the fall semester 2002 and later must complete at least 15 credits in the social science or humanities areas as follows:

- (1) Complete three credit hours (one course) per the university requirement in African-American studies; and
- (2) choose either the literature or non-literature area from the humanities electives in Table 1 and select six credits from that area. Three credits must be at the lower level and three credits must be at the upper level as indicated in Table 1; and
- (3) select an option consisting of six credit hours (a matching pair of the courses as listed) from the social sciences options listed in Table 2 to satisfy a depth requirement. As an example, if you select CLAS-104 Greek Civilization, the course which completes the pair is CLAS-105 Roman Civilization.

The requirement for Economics I is consistent with and supports the emphasis on the Product Realization thread. Some students will elect to satisfy the social science depth requirement by also taking Economics II (micro theory). Others may select a suitable humanities or social course which when combined with the required African-American Studies course can satisfy either the social science elective requirements or the humanities elective. In this case the remaining two courses in this thread will need to be selected to satisfy the remaining distributional requirements.

An exception to the above must be requested in writing to the Chairman of the Department for consideration, must be approved in writing prior to enrollment in the course(s).

Table 1. Humanities Options

HUMANITIES -- Literature Emphasis
Choose one of the following courses:
(Lower Level)

CLAS-101 Greek Literature in English
CLAS-102 Roman Literature in English
CLAS-108 Greek Drama in English
CLAS-109 Classical Mythology
CLAS-113 Women in the Ancient World
ENGL-054 African-American Literature
CLAS-014 Introduction to Humanities I
ENGL-014 Introduction to Humanities I
GERM-014 Introduction to Humanities I
SPAN-014 Introduction to Humanities I
GERM-101 Literature of Love
FREN-100 Francophone Literature in English
RUSS-100 Russian Short Stories in English
RUSS-101 Literature of Revolution
SPAN-100 Hispanic Literature in English
CLAS-016 Ideas in Antiquity

Plus one of the following courses:

(Upper Level)

CLAS-114 Love in Antiquity
SPAN-107 Women in Literature
GERM-107 Women in Literature
FREN-107 Introduction to Women's Studies
RUSS-103 Love and Hate in Literature
ENGL-055 African-American Literature
ENGL-180 Third World Literature
ENGL-168 Modern Caribbean Literature
CLAS-015 Introduction to Humanities II
ENGL-015 Introduction to Humanities II
GERM-015 Introduction to Humanities II
SPAN-015 Introduction to Humanities II

HUMANITIES -- Non-Literature Emphasis

(Lower Level)

GERM-100 Individual & Society
GERM-109 Northern Myths & Fables
GERM-111 Classic Films in English
RUSS-109 Slavic Mythology

Plus one of the following courses:

(Upper Level)

CLAS-103 Classical Art
CLAS-111 Satire and Comedy in the Ancient World
ENGL-052 Introduction to Drama
MUSC-100 Introduction to Music
ARTH-161 Art Appreciation
THDF-010 Introduction to the Theater
FREN-106 African Cinema

Table 2. Social Science Options

CLAS-104 Greek Civilization
CLAS-105 Roman Civilization

HIST-001 Introduction to Study of Civilization I
HIST-002 Introduction to Study of Civilization II

HIST-005 Introduction to Black Diaspora I
HIST-006 Introduction to Black Diaspora II

HIST-101 World Geography
HIST-102 Economic Geography

RUSS-145 Cultural Life of Russia
RUSS-146 Politics of Culture

AFRO-005 Afro-American Studies I
AFRO-006 Afro-American Studies II

AFRO-131 Black Philosophy I
AFRO-133 Black Social & Political Protest

HIST-003 Europe & the Wider World I
HIST-004 Europe & the Wider World II

HIST-009 U. S. History to 1865
HIST-010 U. S. History since 1865

HIST-030 Introduction to African History
HIST-031 Introduction to African History

HIST-140 History of the Caribbean I
HIST-141 History of the Caribbean II

HIST-150 Introduction to European History
HIST-151 Introduction to European History

ANTH-110 Intro. to Cultural Anthropology
ANTH-120 Intro. to Biological Anthropology

SOCI-001 Introduction to Sociology
SOCI-198 Negro in America

POLS-001 Introduction to Political Life
POLS-003 Introduction to Comparative Politics

ECON-001 Principles of Economics I
ECON-002 Principles of Economics II

The following courses will satisfy the University's African-American course requirement for undergraduate students.

ENGL-054	African-American Literature
POLS-006	Pan-Africanism
HIST-005	Introduction to Black Diaspora
AFST-101	African World: Introduction to Contemporary Africa
AFRO-005	Introduction to Afro-American Studies
MUTP-100	Blacks in the Arts
FASH-102	African-American Dress
ARTH-193	Black Body Dress and Culture

The approved courses in the African-American Cluster are always listed in the STUDENT REFERENCE MANUAL AND DIRECTORY OF CLASSES.

Undergraduate students are required to complete two courses in Physical Education.

If in doubt about any information contained herein, students should consult the Howard University Bulletin and their Advisor when information is lacking. The final responsibility

for the fulfillment of **all** requirements for the degree lies with the student. Academic clearances for the degree BSME will be issued by the Department of Mechanical Engineering if and only if the candidate for graduation has satisfied *all* published requirements for the degree. The Department of Mechanical Engineering will not consider exceptions to these requirements.

The Mechanical Engineering Curriculum contained in this Handbook is designed for students to complete the program in four years.

**MECHANICAL ENGINEERING CURRICULUM
HOWARD UNIVERSITY¹**

FRESHMAN YEAR

First Semester

<u>Course No.</u>	<u>Course Title</u>	<u>Credit Hours (Lec-Lab-Crs)</u>
ENGL-002	Freshman Composition I	(3-0-3)
MATH-156	Analytic Geometry & Calculus I	(4-0-4)
CHEM-003	General Chemistry and Recitation	(4-0-4)
EGPP-101	Intro. to Engineering I	(2-0-2)
MEEG-103	Engineering Graphics	(2-0-2)
HHPL-xxx	Physical Education	(1-0-1)
Total Number of Credit Hours		(16-0-16)

Second Semester

<u>Course No.</u>	<u>Course Title</u>	<u>Credit Hours (Lec-Lab-Crs)</u>
ENGL-003	Freshman Composition II	(3-0-3)
MATH-157	Analytic Geometry & Calculus II	(4-0-4)
PHYS-013	Physics I Lec for Sci. and Engrg.	(3-0-3)
PHYS-023	Physics I Lab for Sci. and Engrg.	(0-1-1)
MEEG-102	Intro. to Engineering II	(1-0-1)
SYCS-165	Elementary Computation	(3-0-3)
HHPL-xxx	Physical Education	(1-0-1)
Total Number of Credit Hours		(15-1-16)

¹ This curriculum is effective for first time in college and transfer students who entered the mechanical engineering program fall 2002 or later. The Department of Mechanical Engineering will accommodate transfer students during the phase-in of this curriculum and the curriculum in place prior to the fall semester 2002.

SOPHOMORE YEAR

First Semester

<u>Course No.</u>	<u>Course Title</u>	<u>Credit Hours (Lec-Lab-Crs)</u>
ECON-001	Economics I	(3-0-3)
MATH-158	Analytic Geometry & Calculus III	(4-0-4)
PHYS-014	Physics II Lec for Sci. and Engrg.	(3-0-3)
PHYS-024	Physics II Lab for Sci. and Engrg.	(0-1-1)
MEEG-202	Product Development I	(2-0-2)
CIEG-202	Statics	(3-0-3)
Total Number of Credit Hours		(15-1-16)

Second Semester

<u>Course No.</u>	<u>Course Title</u>	<u>Credit Hours (Lec-Lab-Crs)</u>
MATH-159	Differential Equations	(4-0-4)
MEEG-203	Product Development II	(2-1-3)
MEEG-204	Solid Mechanics	(3-0-3)
MEEG-205	Thermodynamics	(3-0-3)
CIEG-302	Dynamics	(3-0-3)
Total Number of Credit Hours		(15-1-16)

JUNIOR YEAR

First Semester

<u>Course No.</u>	<u>Course Title</u>	<u>Credit Hours (Lec-Lab-Crs)</u>
MATH-189	Probability and Statistics	(3-0-3)
MEEG-307	Fluid Mechanics	(3-0-3)
MEEG-309	Material Science	(3-0-3)
MEEG-310	Mechanical Design I	(3-0-3)
EECE-310	Principles of Electronics	(2-0-2)
EECE-208	Intro. to Elect. Engrg. Lab.	(0-1-1)
Total Number of Credit Hours		(14-1-15)

Second Semester

<u>Course No.</u>	<u>Course Title</u>	<u>Credit Hours (Lec-Lab-Crs)</u>
xxxx-xxx	Required Afro-American Studies	(3-0-3)
MEEG-306	Applied Thermodynamics	(3-0-3)
MEEG-311	Mechanical Design II	(3-0-3)
MEEG-313	System Dynamics and Controls	(4-0-4)
MEEG-315	Experimentation I	(1-1-2)
Total Number of Credit Hours		(13-1-15)

SENIOR YEAR²

First Semester

<u>Course No.</u>	<u>Course Title</u>	<u>Credit Hours (Lec-Lab-Crs)</u>
xxxx-xxx	Social Science/Hum. Elective	(3-0-3)
MEEG-403	Heat Transfer	(3-0-3)
MEEG-415	Experimentation II	(1-1-2)
MEEG-441	Senior Project I	(0-3-3)
MEEG-xxx	Technical Elective	(x-x-3)
xxxx-xxx	Free Elective	(x-x-3)
Total Number of Credit Hours		(x-x-17)

Second Semester

<u>Course No.</u>	<u>Course Title</u>	<u>Credit Hours (Lec-Lab-Crs)</u>
xxxx-xxx	Social Science/Hum. Elective	(3-0-3)
xxxx-xxx	Social Science/Hum. Elective	(3-0-3)
MEEG-417	Experimentation III	(1-1-2)
MEEG-442	Senior Project II	(0-3-3)
MEEG-xxx	Technical Elective	(x-x-3)
xxxx-xxx	Free Elective	(x-x-3)
Total Number of Credit Hours		(x-x-17)

TOTAL CREDIT HOURS IN THE MECHANICAL ENGINEERING CURRICULUM: 128

² The number of Lecture (Lec.) and Laboratory (Lab.) credit hours offered during the senior year depends on the technical option and free electives chosen by the student.

**PREREQUISITES AND CO-REQUISITES
FOR COURSES LISTED IN THE
MECHANICAL ENGINEERING CURRICULUM**

Course	Prerequisites ³	Co-requisites
EGPP-101 Intro. to Engineering I	Admission to Howard University	
MATH-156 Calculus I	SAT or Other Placement Exam Scores	
CHEM-003 Chemistry I	ACAD-015 Basic Math II	
ENGL-002 Freshman English I	SAT and/or Other Placement Exams	
MEEG-102 Intro. to Engineering II	Co-requisite or Consent of Instructor	ENGL-002 Fresh. English I
MEEG-103 Engrg. Graphics	Admission to Howard University	
MATH-157 Calculus II	MATH-156 Calculus I	
PHYS-013 Physics I Lecture/Lab	MATH-156 Calculus I	
ENGL-003 Freshman English II	ENGL-002 Freshman English I	
SYCS-165 Elementary Computation	Co-requisite or Consent of Instructor	MATH-006 Algebra I
MEEG-202 Product Development I	EGPP-101 Intro. to Engrg. I; MEEG-102 Intro. to Engrg. II	
CIEG-202 Statics	MATH-157 Calculus II	PHYS-013 Physics I
MATH-158 Calculus III	MATH-157 Calculus II	
MEEG-203 Product Development II	MEEG-103 Engrg. Graphics	
PHYS-014 Physics II Lecture/Lab	PHYS-013 Physics I; MATH-157 Calculus II	
CIEG-302 Dynamics	CIEG-202 Statics	MATH-159 Diff. Eqns.
MATH-159 Differential Equations	MATH-157 Calculus II	
MATH-160 Adv. Cal. For Sci & Engrgs	MATH-158 Calculus III	
MEEG-204 Solid Mechanics	CIEG-202 Statics	MATH-159 Diff. Eqns
MEEG-205 Thermodynamics	PHYS-014 Physics II, MATH-158 Calculus III	
MATH-189 Probability & Statistics	MATH-158 Calculus III	
EECE-310 Electronics Lecture	MATH-159 Diff. Eqns; PHYS-014 Physics II	
EECE-208 Electronics Lab	MATH-159 Diff. Eqns.; PHYS-014 Physics II	EECE-310 Electronics Lec.
MEEG-306 Applied Thermodynamics	MEEG-205 Thermo.; MEEG-307 Fluid Mech.	
MEEG-307 Fluid Mechanics	MATH-159 Diff. Eqns; CIEG-302 Dynamics	
MEEG-308 Aerofluid Dynamics	MEEG-205 Thermo.; MEEG-307 Fluid Mech.	
MEEG- Aerofluid Dynamics Lab	MEEG-205 Thermo.; MEEG-307 Fluid Mech	MEEG-308 Aerofluid Dyn.
MEEG-309 Materials Science;	CHEM-003 Chemistry I; PHYS-014 Phys II; MATH-158 Calculus III	
MEEG-310 Mechanical Design I	MEEG-204 Solid Mechanics; MEEG-202 Product Development I & MEEG-203 Product development II	MEEG-309 Matl. Science.
MEEG-311 Mechanical Design II	MEEG-310 Mechanical Design I	
MEEG-313 System Dynamics & Controls	CIEG-302Dyn; MATH-159 Diff. Eqns.; & Familiarity with MATLAB	
MEEG-315 Experimentation I	EECE-310 Electron. Lec; EECE-208 Lab;& MATH-159 Diff. Eqns.	
MEEG-318 Propulsion	MEEG-205 Thermo.; MEEG-307 Fluid Mech; & MEEG-308 Aerofluid Dynamics	
MEEG-403 Heat Transfer	MEEG-205 Thermo.; MEEG-307 Fluid Mech.; & SYCS-165 Elem. Comp.	
MEEG-415 Experimentation II	MEEG-315 Experimentation I	
MEEG-416 Aerostructures	MATH-158 Calculus III; MATH-159 Diff. Eqns; MEEG-204 Solid Mech.; & SYCS-165 Elem. Com.	
MEEG-417 Experimentation III	MEEG-415 Experimentation II	
MEEG-418 Vibration Analysis	MEEG-313 System Dynamics and Controls	

Course	Prerequisites	Co-requisites
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³ **Note:** Junior and Senior Standing means that the student has completed either sophomore or junior course requirements in the Mechanical Engineering Curriculum, respectively.

MEEG-438 Environmental Control
MEEG-441 Senior Projects I
MEEG-442 Senior Project II
MEEG-443 CAD/CAM

MEEG-444 Robotics

MEEG-445 Undergraduate Research I
MEEG-446 Undergraduate Research II
MEEG-461 Energy I
MEEG-462 Energy II
ACCT-201 Accounting Principles I
ACCT-202 Accounting Principles II
MGMT-301 Mgmt. and Organ. Behavior
MGMT-302 Adv. Organ. Behavior
BIOL-101 General Biology I
BIOL-102 General Biology II
BIOL-200 Genetics
BIOL-320 Molecular Biology
BIOL-310 Cell Biology

Senior Standing
MEEG-311 Mechanical Design II
MEEG-441 Senior Project I
SYCS-165 Elem. Comp.;
MEEG-310 Mech. Design I; &
MEEG-313 Sys. Dyn. & Ctrls.
SYCS-165 Elem. Comp.; &
MEEG-313 Sys. Dyn. & Ctrls.
Consent of Instructor
Consent of Instructor
MEEG-205 Thermo.; MEEG-307 Fluid Mech.
MEEG-306 Applied Thermodynamics

ACCT-201 Accounting Principles I
ECON-001 Economics I & ECON-002 Economics II
MGMT-301 Mgmt. and Organ. Behavior

BIOL-102, 102 General Biology I & II
BIOL-200 Genetics
BIOL-200 Genetics

TECHNICAL OPTIONS

Manufacturing Engineering

Select two of the following mechanical engineering courses plus two free electives per consultations with your faculty advisor.

MEEG- 421 Product Data Management
MEEG- 443 Computer Aided Design/ Computer Aided Manufacturing (CAD/CAM)
MEEG- 444 Robotics
XXXX-xxx Free Elective
XXXX-xxx Free Elective

Energy

Select two of the following mechanical engineering courses plus two free electives per consultations with your faculty advisor.

MEEG-461 Energy Engrg. I
MEEG-462 Energy Engrg. II or
MEEG-438 Environmental Control
XXXX-xxx Free Elective
XXXX-xxx Free Elective

Applied Mechanics/Aerospace

Select two of the following mechanical engineering courses plus two free electives per consultations with your faculty advisor.

MEEG-308 Aerofluid Dynamics
MEEG-318 Propulsion
MEEG-416 Aerostructures
MEEG-418 Vibration Analysis
MEEG-447 Computational Fluid Dynamics
XXXX-xxx Free Elective
XXXX-xxx Free Elective

The Department proposes a two-semester sequence of undergraduate research. A student may select either or both of these courses as free electives. The two free electives may be selected at will provided the student meets the prerequisites for them; they are at least three credits; and they are designated by the offering department as junior level or higher. Students are encouraged to choose free electives that will enhance the degree program. Suggested areas include courses from mathematics, business, physical and life sciences, engineering, research, styling and design in fine arts, and information technology.

Mechanical Engineering faculty will suggest to their advisees that students contemplating graduate school should consider taking the two-semester sequence in Undergraduate Research;

those interested in engineering management and/or obtaining an MBA to consider MGMT (301 & 302) or ACCT (201 & 202). Similarly, those interested in a career in (a) Information Technology will be advised to take two courses in Computer Sciences; (b) Mechatronics to take two courses in Electrical Engineering; (c) Biomedical engineering, medicine or dentistry take two courses in life sciences; etc.

For convenience, students should use the table below to maintain a record of their progress through the mechanical engineering curriculum.

Student Name _____ I.D. No. _____ Advisor _____

YEAR 1				YEAR 2				YEAR 3				YEAR 4			
FIRST SEMESTER		SECOND SEMESTER		FIRST SEMESTER		SECOND SEMESTER		FIRST SEMESTER		SECOND SEMESTER		FIRST SEMESTER		SECOND SEMESTER	
ENGL-002 FRES. COMPOSITION I		ENGL-003 FRES. COMPOSITION II		ECON-001 ECONOMICS I		MATH-159 DIFF. EQUATIONS		MATH-189 PROB. & STATISTICS		AFRO-AMERICAN STUDIES		SOCIAL SCI/ HUM. ELECTIVE		SOCIAL SCI/ HUM. ELECTIVE	
SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE
MATH-156 CALCULUS I		MATH-157 CALCULUS II		MATH-158 CALCULUS III		MEEG-203 PRODUCT DEVELOPMENT II		MEEG-307 FLUID MECHANICS		MEEG-306 APP. THERMODYNAMICS		MEEG-403 HEAT TRANSFER		SOCIAL SCI/ HUM. ELECTIVE	
SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE
CHEM-003 GEN. CHEMISTRY		PHYS-013 PHYSICS I LEC.		PHYS-014 PHYSICS II LEC.		MEEG-204 SOLID MECHANICS		MEEG-309 MATERIAL SCI.		MEEG-311 MECH. DESIGN II		MEEG-415 EXPERIMENTATION II		MEEG-417 EXPERIMENTATION III	
SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE
EGPP-101 INTRO. TO ENGR. I		PHYS-023 PHYSICS I LAB.		PHYS-024 PHYSICS II LAB.		MEEG-205 THERMODYNAMICS		MEEG-310 MECH. DESIGN I		MEEG-313 SYSTEM DYNAMICS & CONTROLS		MEEG-441 SENIOR PROJECT I		MEEG-442 SENIOR PROJECT II	
SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE
MEEG-103 ENGR. GRAPHICS		MEEG-102 INTRO. TO ENGR. II		MEEG-202 PRODUCT DEVELOPMENT I		CIEG-302 DYNAMICS		EECE-310 PRINCIPLES OF ELECTRONICS		MEEG-315 EXPERIMENTATION I		MEEG-XXX TECHNICAL ELEC.		MEEG-XXX TECHNICAL ELEC.	
SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE	SEM	GRADE
PHYSICAL EDUCATION		SYCS-165 ELEM. COMPUTATION		CIEG-202 STATICS				EECE-208 INTRO. TO ELEC. ENGR. LAB				FREE ELECTIVE		FREE ELECTIVE	
SEM	GRADE	SEM	GRADE	SEM	GRADE			SEM	GRADE			SEM	GRADE	SEM	GRADE
		PHYSICAL EDUCATION													
		SEM	GRADE												

FACULTY & STAFF DIRECTORY

Full Time Faculty

	Room	Telephone No.	e-mail address
Dr. H. A. Whitworth Professor and Department Chair	2032	806-6600	hwhitworth@howard.edu
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Dr. Robert Reiss, Professor Professor	2036-B	806-6608	rreiss@howard.edu
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Staff

Ms. Carolyn T. Drakeford Administrative Assistant	2032	806-6600	cdrakeford@howard.edu
Ms. Eliza J. Gibson Department Secretary	2032	806-6601	egibson@howard.edu
Mr. Hugh Lloyd Electronic Technologist	G-019	806-6632	hlloyd@howard.edu

DEPARTMENT BULLETIN BOARD

The Department of Mechanical Engineering keeps a bulletin board in order to maintain contact with students. On the bulletin board you will find the following:

- A listing of faculty advisors for all undergraduate students in the Mechanical Engineering Department,
- Opportunities for graduate studies at Howard and other institutions,
- Job opportunities
- Research opportunities at Howard University and at other Institutions,
- Request for students to report to the Department office for important information, and
- Any other information that is important to students in the mechanical engineering department.

It is important that all students in the Department of Mechanical Engineering check the bulletin board regularly.

STUDENT ORGANIZATIONS

Student Chapters of the American Society of Mechanical Engineering (ASME) and the American Institute of Aeronautics and Astronautics (AIAA) have charters in the Department of Mechanical Engineering at Howard. You are encouraged to participate in the activities of these organizations and take advantage of the opportunities provided to members. In addition, the College supports other student organizations that you may consider, which include the Society of Women Engineers (SWE) and the National Society of Black Engineers (NSBE).

OFFICE OF STUDENT SERVICES

The Office of Student Services (Room 1114 LKD) provides counseling, arranges for tutorial services, coordinates special programs, assists with admission and registration, and maintains student's records. Financial aid assistance, the Cooperative Education Program and several special academic programs are also administered by this office.

NOTES:

CODE OF ETHICS OF ENGINEERS*

The Fundamental Principles

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

- using their knowledge and skills for the enhancement of human welfare;
- being honest and impartial, and serving with fidelity the public, their employers and clients;
- striving to increase the competence and prestige of the engineering profession; and
- supporting the professional technical societies of their disciplines.

The Fundamental Canons

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
2. Engineers shall perform services only in the areas of their competence.
3. Engineers shall issue public statements only in an objective and truthful manner.
4. Engineers shall act in professional manners for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.
5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.
6. Engineers shall act in such a manner as to uphold and enhance the honor, integrity and dignity of the profession.
7. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional development of those engineers under their supervision.

* Accreditation Board for Engineering and Technology, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202,
http://www.abet.org/downloads/Code_of_Ethics_of_Engineers.htm