

**MOREHOUSE COLLEGE**  
**DEPARTMENT OF PHYSICS & DUAL DEGREE ENGINEERING PROGRAM**  
**HEGR 101 FRESHMAN ENGINEERING DESIGN**  
**SPRING 2020**

**Instructor:** Dr. Emmanuel Karikari

E-mail: [Emmanuel.Karikari@morehouse.edu](mailto:Emmanuel.Karikari@morehouse.edu) or [karikariemmanuel85@gmail.com](mailto:karikariemmanuel85@gmail.com)

Office Phone: (470) 639-0652 Cell Phone: (770) 866-0385

**Office Hours:** M, W 1100 -1150, Dansby Hall Room 106-B

**Required text:** **Engineering Your Future, A Comprehensive Approach, by Oakes, Leone, and Potter, Great Lakes Press, 9<sup>th</sup> Edition.**

**Supplementary materials:**

1. Engineering Your Future, A Problem-Oriented Approach (2003), by Oakes, Leone, and Gunn, Great Lakes Press, 8<sup>th</sup> Ed.
2. Engineering Your Future, A Project-Oriented Approach (2004), by Gomez, Oakes, Leone, Great Lakes Press, 7<sup>th</sup> Ed.

**Class Time and Location:** M, W, F 1300 - 1350; Dansby Room 115

<b>Grading:</b>	Projects/Laboratory	30%
	Homework & Quizzes	30%* Quiz at the end of each class
	Midterm Exam	20%
	Final Exam	20%

**HEGR 101** course is a project-based introduction to engineering. Students will be introduced to major engineering concepts and also real-world case studies that resemble the problems that they would encounter in the field of engineering.

**Academic Integrity Policy:** The policies of Morehouse and the Department of Physics will be observed. Students who violate the departmental classroom policies can be withdrawn from class and could be subject to further disciplinary action from the College.

**\* No student will be allowed to use cell phone in class and during quizzes/exams.\***

### TENTATIVE COURSE OUTLINE

WEEK	DATE	TOPIC	READING ASSIGNMENT
1	01/15 - 01/17	Introduction	
2	01/20 - 01/24	History of Engineering Disciplines	Chapter 1
3	01/27 - 01/31	Presentation on Timelines	Chapter 1
4	02/03 - 02/07	Engineering Majors	Chapter 2
5	02/10 - 02/14	. Calculations involving linear and quadratic functions	
6	02/17 - 02/21	Succeeding in the Classroom	Chapter 6
7	02/24 - 02/28	Problem Solving	Chapter 7
8	03/02 - 03/06	MIDTERM WEEK	
9	03/09 - 03/13	<b>SPRING BREAK</b>	
10	03/16 - 03/20	Presentation - Exercise & Activity 7.4	
11	03/23 - 03/27	Teamwork Skills	Chapter 10
12	03/30 - 04/03	Engineering Design	Chapter 12
13	04/06 - 04/10	Computer Tools for Engineers	Chapter 9
14	04/13 - 04/17	Ethics and Engineering	Chapter 14
15	04/20 - 04/24	Ethics and Engineering	Chapter 14
16	04/27 - 04/29	Final Exams	

*Mark Kab*  
1/27/20

**MOREHOUSE COLLEGE**  
**DUAL DEGREE ENGINEERING PROGRAM – DEPARTMENT OF PHYSICS**  
**INTRODUCTION TO ENGINEERING GRAPHICS LECTURE & LAB**  
**(HEGR 103 & 103L) Spring 2020**

**Instructor:**           **Dr. Dwayne C. Joseph**  
E-mail: dwayne.joseph@morehouse.edu  
Office Phone: (470) 639-0721

**Office Location:**    Dansby Hall Room 106-A  
**Office Hours:**        MW 1300 - 1555  
                              (all other times are by appointment)

**Required text:**       **Engineering Graphics Essentials** with AUTOCAD 2018,  
Platenberg; SDC Publications, Mission, KS

**Required materials:**    **1 USB Memory Stick** (1GB preferred)  
                                  **Pencils** (#2, HB, mechanical), **Soft erasers**, **paper**  
                                  (square/isometric grid)  
                                  **Folder** (Two – pocket)

**Required programs:** **Processing: Programming for Visual Designers and Artists**  
<https://www.processing.org/download>  
**Autodesk: Fusion 360**  
<https://www.autodesk.com/education/free-software/featured>

**Textbooks (PDFs):**   **Visualization, Modeling, and Graphics for Engineering Design**  
by Dennis K. Lieu, Sheryl A. Sorby  
**Processing: A Programming Handbook... 2<sup>nd</sup> Edition**  
By Casey Reas, Ben Fry

**Lecture time and location:** T, TH 0925 – 1040; Dansby Hall Room 200

**Lab time and location:** T or TH 1500 – 1750; Dansby Hall Room 109A

**Engineering Graphics Objective:** To introduce students to the engineering design process and how to communicate using graphic techniques.

**HEGR 201** is a **3-credit** hour course which identifies ideas, concepts, and processes at the heart of an engineering discipline that students should know and be able to do. Engineering drawings must be presented and arranged in a certain format so the information they contain can be interpreted.

Major ideas, concepts, and processes in Engineering Graphics that are to be understood:

1. Ideas, designs, and manufacturing/construction procedures and techniques are communicated by words, numbers, and visual images.
2. Freehand sketches and CAD are used to model 3D objects.

3. Engineering tasks are performed by teams.
4. Engineers must modify or create entirely new programming platforms in order to process information.

Upon completion of this course, students will be able to:

1. Interpret technical drawings, charts, and graphs.
2. Use the language of engineering design.
3. Sketch oblique, isometric and multiview objects.
4. Create 2D and 3D drawings using CAD.
5. Learn programming basics and implementation on engineering creativity.
6. Participate constructively in team engineering activities.

<b>Grading:</b>	Exams	25%
	Quizzes	15%
	Lab Assignments	25%
	Project	20%
	Final Exam	15%
	Participation (HW, etc)	10%
		110%

**Grading policy:**

- The following straight scale will be used
 

A+ = 98-100	C+ = 74-77
A = 92-98	C = 68-74
A- = 87-92	D+ = 64-67
B+ = 84-87	D = 60-64
B = 80-84	D- = 57-60
B- = 77-80	F = 0-57
- **Makeups will be given only under extreme circumstances.** It is expected that the student will contact the professor sufficiently in advanced of the exam or have a valid reason why they could not do so.
- **NO FOOD OR DRINK IS ALLOWED IN LECTURE OR LABORATORY**

**Exams:**

- In class written exams are accumulative and
  - Will take place in the lecture room
  - Tests your knowledge of concepts and terminologies discussed in lecture and lab
  - Will be closed book and closed notes
  - Must be completed in pencil
- No partial credit will be given to any problem that was on a previous exam or quiz
- There are no bathroom breaks during examinations
- Exams will be announced at least one week before they are taken
- Practice Exams will be posted at least two days before the exam

### **Homework Assignments:**

Homework assignments are not graded for their correctness, they are graded based on their completeness and the student's ability to follow directions. Once submitted, the concepts from that assignment are covered during lecture and the its solution is then posted. It is the student's responsibility to make sure they understand the assignment by asking questions and going over the solutions. Assignments are due by the start of class. If an assignment is submitted once class has started, it will be counted as **late**.

- For all assignments, the heading **must** be written in the top right corner of the first page and contain the following information:

Your Full Name

Graphics Assignment Name

Assignment Due Date

- Assignments will be posted during lecture or on Blackboard
- If an assignment is not posted at least 24 hours before lecture begins, students receive an extra 10% for its completion
- Assignments will be graded **only** if they are written neatly
- Assignments will be graded **only** if they are stapled together
- Assignments will be graded **only** if they are turned in at the start of class when they are due
- Assignments will be graded **only** if they are either typed or drawn in pencil
- Late assignments will only be worth 20%
- More than three (3) late assignments by the same student **will be worth 0%**
- If all assignments are submitted on time, student will receive an extra 5% for their HW grade
- If a student's assignment is used for a solution set, they will receive up to an extra 10% on that assignment

### **Quizzes:**

- Will cover theoretical and practical aspects related to previous lecture concepts
- May or may not be announced
- Will be open notes, excluding textbooks or laptops
- Must be completed in pencil
- The two lowest quizzes will be dropped

### **Lab Assignments:**

- **Labs start the week of 01/19**
- Problems given during lab are expected to be completed during lab
- Every completed computer assignment must be saved on your USB memory stick in a separate folder for Engineering Graphics
- Lab assignments may consists of the following:
  - In-lab sketches (worth 50%)
  - Programming/CAD Exercises (worth 10%)
  - Programming/CAD Problems (worth 40%)
- Sketches must be completed in lab, during lab.

- Programming (or CAD) Exercises/Problems must be completed by the time specified
- Anyone who is not present for lab is prohibited from the in-lab assignment, however they are still eligible to submit the computer-based assignment by the time specified.
- Every file that you save must have the following format
  - First name initial, last name, underscore, assignment name
  - Example: djoseph\_project1.jpeg
- Anyone more than 15min late for lab will be considered absent
- Lowest lab grade will be dropped
- Students exceeding one unexcused absence in lab risk failing lab

### **Preparation and Responsibilities:**

- Take initiative and participate actively in classroom activities.
- You are responsible for all sections in the book written in the outline of the course (even if not covered in class)
- You are responsible for all material presented in class (even if not covered in the book)
- You are responsible for all information that is on Blackboard
- Look over the material that will be covered in class before coming to class
- Review the book and class notes before coming to office hours
- All sketches must be completed in pencil
- Anything you do not understand it is your responsibility to ask. Do not assume
- Send questions and schedule appointments via email
  - Emails must include subject, greeting, body of content, complimentary closing, signature
  - If your email is not in the proper format, you will not receive a response
- Send a txt to inform me you that sent an email so that I may check my email promptly
- **Class Attendance** is 100% required – students exceeding three (3) unexcused absences in lecture risk failure of this course
- All work submitted must be your own
- Academic dishonesty will not be tolerated
- A comprehensive score of 85% or higher makes the final exam optional
- No sleeping or on cell phones during class
  - First time warning, second time **the student will be asked to leave and receive an absence for that day**
- **Absences are excused only when notice is given before the start of class**
- **Students must arrive on time. Tardiness will not be tolerated**
- **If food or drink is brought into the class, the student will be asked to leave and receive an absence for that day**
- **NO FOOD OR DRINK IS ALLOWED IN LECTURE OR LABORATORY**

## TENTATIVE COURSE OUTLINE

Week	Lecture	Topic
1	1	Introduction to Engineering Graphics
2	2	Presentation of Data
3	3	Technical Sketching Coded Plans
4	4	Visualization
		Exam 1
5	5	Orthographic Projection (OP)
6	6	Missing OP: Lines, Views
	7	Adv Visualization
7	8	Pictorials: Perspective drawings
	9	Engineering Design Process
		Exam 2
8		Spring Break
9	10	Dimensions Working on Team Project
10	11	Adv Dimensions
11	12	Tolerance
		Exam 3
12	13	Section Views
13	14	Assemblies & Working Drawings
14	16	Technical Animations
15		Reading period
16	Final	TBA

## TENTATIVE LAB OUTLINE

Lab	Topic
1	Graphical Communication Software downloads
2	Graphics Drawing Exercises Processing: Using Processing
3	Visualization Exercises Processing: Drawing geometric shapes
4	OP Exercises Processing: Conditional & logic statements
5	Adv Visualization Exercises Processing: Polar coordinates
6	Processing: Vectors
7	Dimension Exercises Processing: Project
8	Processing: Project
9	Autodesk: Conceptual Design
10	Autodesk: 3D Part Design
11	Autodesk: Detailed Component Design
12	Autodesk: Assemblies
13	Autodesk: Design Visualization

**Grievances Policy**

In the event of a course related disagreement with the course professor, the student is encouraged to first seek resolution with that professor. If a resolution cannot be reached between the student and course professor, the student may submit a departmental Grievance Form that can be obtained from the Departmental Admin. The Chair will then review the grievance, and if necessary, will meet with the student and professor to determine an amicable resolution as quickly as possible.

*Morehouse College is committed to equal opportunity in education for all students, including those with documented disabilities. Students with disabilities or those who suspect they have a disability must register with the Office of Disability Services ("ODS") in order to receive accommodations. Students currently registered with the ODS are required to present their Disability Services Accommodation Letter to faculty immediately upon receiving the accommodation. If you have any questions, contact the Office of Disability Services, 104 Sale Hall Annex, Morehouse College, 830 Westview Dr. S.W., Atlanta, GA 30314, (404) 215-2636, FAX: (404) 215-2749.*

*A syllabus is not a contract between instructor and student, but rather a guide to course procedures. The instructor reserves the right to amend the syllabus when conflicts, emergencies or circumstances dictate. Students will be duly notified*



**MOREHOUSE COLLEGE**  
**DUAL DEGREE ENGINEERING PROGRAM – DEPARTMENT OF PHYSICS**  
**ENGINEERING STATICS HEGR 205 SPRING 2020**

**Instructor:** Dr. Emmanuel Karikari  
E-mail: Emmanuel.Karikari@morehouse.edu  
Office Phone: (470) 639-0652 Cell Phone: (770) 866-0385

**Office Hours:** M,W ,F 09:00 – 10:00 Dansby Hall Room 106 B

**Required text:** **Vector Mechanics for Engineers – Statics** (11<sup>th</sup> Edition), *Beer, Johnson, Eisenberg*, McGraw Hill, New York, NY

**Supplementary material:** Engineering Mechanics – Statics (14<sup>th</sup> Edition), *R.C. Hibbeler*, Pearson Prentice Hall, Hoboken, NJ (2016).

**Class Time and Location:** M,W,F 08:00 – 08:50 Dansby Hall Room 115

**Prerequisites:** Mechanics IPIIY 154

**Grading:**

Examinations (3/4)	45%
Final Examination	25%
HW & Quizzes/Lab	25%
<b>DDEP FACTS /SEMINARS</b>	5%

**Statics HPHY 205** as a 3-credit hour course that deals with the mechanics of rigid bodies at rest. The course is based on 4 fundamental principles, namely, Newton's first and third laws, parallelogram law of addition, and the principle of transmissibility. These principles will provide us with the necessary and sufficient foundation for the entire study of statics of particles, rigid bodies, and systems of rigid bodies.

**Academic Integrity Policy:** The policies of Morehouse and the Department of Physics will be observed. Students who violate the departmental classroom policies can be withdrawn from class and could be subject to further disciplinary action from the College.

*Morehouse College is committed to equal opportunity in education for all students, including those with documented disabilities. Students with disabilities or those who suspect they have a disability must register with the Office of Disability Services ("ODS") in order to receive accommodations. Students currently registered with the ODS are required to present their Disability Services Accommodation Letter to faculty immediately upon receiving the accommodation. If you have any questions, contact the Office of Disability Services, 104 Sale Hall Annex, Morehouse College, 830 Westview Dr. S.W., Atlanta, GA 30314, (404) 215-2636, FAX: (404) 215-2749.*

**Attendance Requirements:**

Students are expected to attend each class meeting. Students with more than 3 unexcused absences will be referred to the Office of Student Success and may be administratively withdrawn from the course. Failure to meet minimum attendance requirements may result in the loss of the student's financial aid in accordance with federal financial aid requirements.

**EEO & Disability Statement:**

Morehouse College is an equal opportunity employer and educational institution. Students with disabilities or those who suspect they have a disability must register with the Office of Disability Services ("ODS") in order to receive accommodations. Students currently registered with the ODS are required to present their Disability Services Accommodation Letter to faculty immediately upon receiving the accommodation. If you have any questions, contact the Office of Disability Services, 104 Sale Hall Annex, Morehouse College, 830 Westview Dr. S.W., Atlanta, GA 30314, (404) 215-2636.

**Academic Dishonesty:**

Morehouse College students are expected to conduct themselves with the highest level of ethics and academic honesty at all times and abide by the terms set forth in the Student Handbook and Code of Conduct. Instances of academic dishonesty, including, but not limited to plagiarism and cheating on examinations and assignments, are taken seriously and may result in a failing grade for the assignment or course and may be reported to the Honor and Conduct Review Board for disciplinary action.

**Syllabus is not a Contract:**

A syllabus is not a contract between instructor and student, but rather a guide to course procedures. The instructor reserves the right to amend the syllabus when conflicts, emergencies or circumstances dictate. Students will be duly notified.

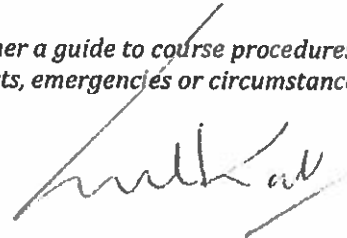
**Inclement Weather Policy:**

In the event of inclement weather, the College will announce any closures via the emergency notification system and/or through local news outlets. Absent an official closure, students are not excused from attending class due to weather and any absences will be considered unexcused.

## TENTATIVE COURSE OUTLINE

WEEK 1	01/15 – 01/17	<b>Review of Mechanics</b> Section 2.1 – 2.8
WEEKS 2&3	01/20 – 01/31	<b>Statics of Particles</b> Section 2.9 – 2.14  <b>Rigid Bodies</b> Section 3.1 – 3.8
WEEKS 4&5	02/03 – 02/14	<b>Rigid Bodies: Equivalent Force Systems</b> Section 3.12 – 3.16 Section 3.17 - 3.20 <b>EXAMINATION 1 [ ]</b>
WEEKS 6&7	02/17 – 02/28	<b>Equilibrium of Rigid Bodies</b> Section 4.1 – 4.5
WEEK 8	03/02 – 03/06	<b>Equilibrium of Rigid Bodies</b> Section 4.8 – 4.9 <b>MID-TERM EXAMINATION [ 03/06]</b>
WEEK 9	03/09 – 03/13	SPRING BREAK
WEEKS 10&11	03/16 – 03/27	<b>Analysis of Structures</b> Section 6.9 – 6.12 Section 6.7
WEEKS 12&13	03/30 – 04/10	<b>Forces in Beams</b> Section 7.1 – 7.5 <b>EXAMINATION 3 [ ]</b>
WEEKS 14&15	04/13 – 04/24	<b>Forces in Beams</b> Section 7.1 – 7.5  <b>EXAMINATION 4 [ ]</b>
WEEK 16	04/27-04/29	<b>REVIEW FOR FINAL EXAMINATION</b>

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Morehouse College  
Department of Physics / Dual Degree Engineering Program

**ENGINEERING DYNAMICS HEGR 308**

Spring 2020

**Time and Days:** 10:00 - 10:50 AM M, W, F Dansby 118

**Instructor:** Dr. Emmanuel Karikari  
[Emmanuel.Karikari@morehouse.edu](mailto:Emmanuel.Karikari@morehouse.edu)

470-639-0652 (Office) 770-866-0385 (Cell phone)

**Office / Hours:** Dansby 106-B M, W 09:00 AM - 10:00 AM & by appointment

**Text:** Vector Mechanics for Engineers – Dynamics: Beer, Johnston, Cornwell, 12<sup>th</sup> Ed., McGraw Hill, NY, NY 10020

**References:** Notes relating to topics that complement the lecture will be provided.

**Prerequisites:** HPHY 154 - Mechanics HEGR 205 - Statics

**POLICIES:**

1. **Respect:** You will have respect for the instructor and your fellow classmates at all times; your focus should be on the material presented.
2. **Class Attendance** is 100% required. Students exceeding three (3) **unexcused** absences risk failure of this course.
3. **Homework** will be assigned weekly to provide practice for any materials covered. Individual and group quizzes will be given regularly on the homework problems and materials taught in class.
4. **No head covering of any kind is allowed in the classroom.**
5. **Collaboration, Plagiarism, and Cheating:** Collaboration is encouraged, but duplication of work for homework and assignments is considered plagiarism, and cheating during quizzes and exams will be dealt with according to Morehouse Policies.
6. **Cell phones cannot be used during class or examination!!!!**

7. **Grades:**

	%	Scale
Tests (3/4)	45	A ≥ 90%
Homework/ Quizzes	25	80 <= B < 90%
		70 <= C < 80%
Final Exam	25	60 <= D < 70%
		F < 60%

## TENTATIVE COURSE OUTLINE

Engineering Dynamics ----- Spring 2020

### Kinematics of Particles


Weeks 1 and 2`	1/15 – 1/24	Review of mechanics & rectilinear motion of Particles ---- 11.1 – 11.5
Week 3	1/27 – 1/31	Motion of several particles ---- 11.6
Week 4	2/3 – 2/7	Projectile Motion ---- 11.11 Exam 1 [ ]
Week 5	2/10– 2/14	Motion relative to frame in translation 11.1
Week 6	2/17 – 2/21	Tangential and normal components ---- 11.13 Radial and transverse components ---- 11.14

### Kinetics of Particles

Week 7	2/24 – 2/28	Newton's 2 <sup>nd</sup> Law ---- 12.1 – 12.3
Week 8	3/02 – 3/06	Newton's 2 <sup>nd</sup> Law ---- 12.3 – 12.6 Mid Term Exam [3/06]

**Week 9**                    **3/09 – 3/13 SPRING BREAK**

Week 10	3/16 – 3/20	Newton's 2 <sup>nd</sup> Law (cont'd)
Week 11	3/23 – 3/27	Angular momentum -----12.7 – 12.9
Week 12	3/30 – 4/03	Energy & momentum methods - 13.1 – 13.8 Exam 3 [ ]
Week 13	4/06 – 4/10	Impulse and momentum --- 13.10 – 13.11
Week 14	4/13 – 4/17	Impact ---- 13.12 – 13.15
Week 15	4/20 – 4/24	Rigid Bodies ---- 15.1 – 15.8 – 16 Exam 4 [ ]
Week 16	4/27 – 4/29	Review for Finals

  
1/27/20

## PHY 253L ELECTRICITY & MAGNETISM PHYSICS LABORATORY (SPRING 2020)

**TIME AND DATE:** 1:00 - 3:50PM and 7:00 – 9:50 on specified dates (see schedule below)  
**ROOM:** Dansby 119  
**INSTRUCTOR:** Prof. A.C. Johnson  
**EMAIL/CONTACT #:** [al.johnson@morehouse.edu](mailto:al.johnson@morehouse.edu) / (470) 639-0219  
**OFFICE/HOURS:** DH 102 / by appointment only  
**REQUIRED MANUAL (ON-LINE):** EXPERIMENTS FOR PHYSICS 253 by Physics Dept.

**GRADING:** Labs (best 7 of 9) 20% of course grade

### **COURSE OUTLINE:**

Date	Session	Lab Title	Lab Report Due
Thurs, 2/6	1	The Electric Field	Mon, 2/10 by 6pm in main office
Thurs, 2/13	2	Ohm's Law	Mon, 2/17 by 6pm in main office
Thurs, 2/20	3	The WheatStone Bridge	Mon, 2/24 by 6pm in main office
Thurs, 2/27	4	The Voltmeter & Ammeter	Mon, 3/2 by 6pm in main office
Thurs, 3/5	5	Capacitors	Mon, 3/9 by 6pm in main office
Thurs, 3/12		Spring Break (no classes or labs)	
Thurs, 3/19	6	The Magnetic Field	Mon, 3/23 by 6pm in main office
Thurs, 3/26	7 & 8	The Earth's Magnetic Field  Faraday's Law	Fri, 3/30 by 6pm in main office
Thurs, 4/2	9	Alternating Current	Mon, 4/6 by 6pm in main office

### **LABORATORY REGULATIONS:**

- No eating or drinking. No chewing (gum, tobacco, etc.) or smoking. No hats or inappropriate clothing.
- No cell phones or unauthorized technology including but not limited to camcorders, hand-held devices.
- Disrespectful behavior will **not** be tolerated. This includes tardiness, disruptions and sleeping.
- Academic dishonesty will **not** be tolerated and such infractions will be handled **severely**.
- Show your work on **all** laboratory reports and assignments.
- No work will be accepted in **pencil**. Pencil usage will constitute a "**zero**" for the corresponding laboratory.
- **Each student must read the corresponding laboratory at least twice prior to the scheduled laboratory period.**
- Documentation for excused absents are **due immediately** upon returning to class. The student absentee policy will be enforced (see student handbook for details).