EECE401 Senior Design I

Electrical Engineering and Computer Science
Howard University

Instructor
Dr. Charles Kim
[ckim@howard.edu]

Fall 2017

Senior Design I - Fall 2017

- **EECE 401 (**3 credit hours)
  - Class Hours: W 1310 – 1600
  - Classroom: LKD 1002
- **Instructor**
  - Dr. Charles Kim
  - (202)806-4821
  - ckim@howard.edu
  - Office Hours (LKD3014): Open Door Policy
    - MTR 1400 – 1600
- **Web ---Syllabus, Notes, etc**
  - **Classes and material of previous academic years**
  - www.mwftr.com/SD.html [*Note: case-sensitive]
  - Then choose 2017- 2018 academic year

"Senior Design" – brief definition

- Is
  - Culmination of EE/CpE Education, Training, etc
  - Solving a problem (or meeting needs/demands)
  - **Design *experience*** that requires adequate consideration of
    - **Knowledge**
    - **standards,**
    - **Constraints, and**
    - Should be related to the **electrical/computer engineering discipline**.
  - ***Process*** to final product (through Senior Design II)
  - Usually team-based problem solving, inventing, etc.
  - A part of a long-term research project as in VIP
- Is NOT
  - Further expansion of a class project
  - Final product only

“Design” – Full Definitions

- ABET
  - “The **process** of devising a system, component, or process to meet desired needs,” which involves
  - “A **decision-making** process (often iterative), to convert resources optimally to meet the stated needs” by applying basic sciences, mathematics and engineering, adequately considering
  - knowledge, standards, and constraints related to the electrical/computer engineering discipline.”
- Industry
  - (1)“Determine that a need exists with a customer for specific goods or services and how much that customer is able and willing to pay for it.
  - (2)Then determine if the product or service is compatible with the competencies of the company and if it can be manufactured at a cost that is less than the customer will pay.
  - (3)If so, proceed by designing to match the company’s ability to manufacture, rather than basing the design on state-of-the-art technologies.
  - (4)Finally, prior to full implementation, prepare a pilot demonstration”

Course Objectives and Topics

- **Objectives**
  - Learn and use design process to meet needs
  - Becoming to be aware of Technology Impact to Society
  - Becoming an effective team member
  - Becoming an effective communicator
  - Enjoy Design Experiences
- **Topics of the course**
  - Engineering Design Processes
  - Teamwork
  - Communication
  - Professional (or “soft”) Skills
  - Industry Experts and Guest Speakers

Course Outcomes

- **Course Outcomes (ABET)**
  - (c) Design a system component, process, or system –
    - Throughout the class, we learn the design process and apply it and integrate to a working system which solves customers' problem
  - (g) Effective communicator –
    - Presentations and report writing will enhance verbal, written, and slide communication
  - (i) a recognition of the need for, and an ability to engage in life-long learning –
    - Awareness of the continued, non-stop learning of new technology
  - (j) a knowledge of contemporary issues –
    - Understand the issues related with the project and their impact to society and the project itself.

Class Schedule

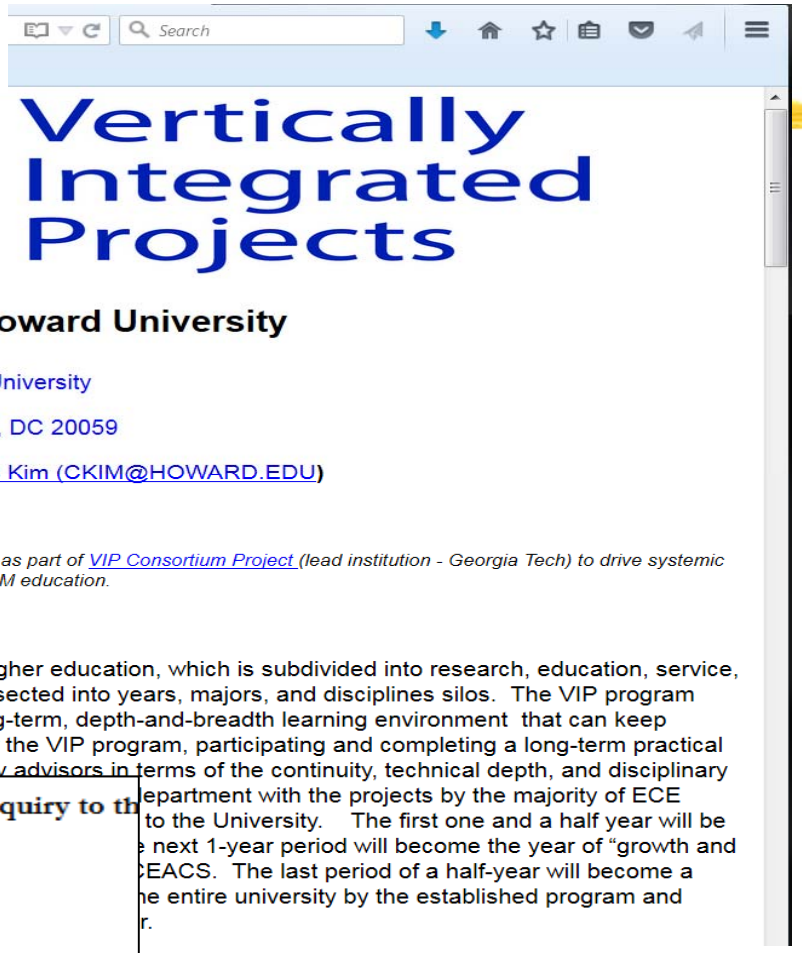
- Rough/Tentative/Soft Schedule to Follow
  - Join a VIP team (unless you're still not in)
    - Approval from the Instructor is required
    - No more than 5 senior students in a VIP team
  - Design Processes and Components: Aug-Sep 2014
  - Selection of **a (or a part of) "project"** for the school year for the class from the VIP team's long-term project : Sep-Oct 2014
  - Solution Presentation: Oct-Nov-Dec 2014
  - Design Implementation: Jan-Feb-Mar 2015
  - Design Evaluation: Jan-Feb-Mar-Apr 2015
  - Final Presentation: Apr 2015

VIP (Vertically Integrated Projects) Program

- **Integration** of Research, Education (Teaching & Training), and Service
- **Inclusion** of UG students in to Research and Innovation
- Faculty Initiated, **Research Project** Sprouted, **Long-Term** Project Based
- **Vertical Mentoring** from Faculty to GR to UG (SR to JR to SP)
- Students: Knowledge and **skill set** development for innovation from Long-term, 3- 5 year, (rather than 10-week summer long) participation
- Faculty: Exploration and Completion of long-term challenging research by multidisciplinary students
- University: **Broadening university community** for everyone to participate, which provides students with compelling reason to be on campus and on one's major

VIP at Howard

www.mwftr.com/VIPatHOWARD.html



Vertically Integrated Projects

VIP Program at Howard University

Howard University

Washington, DC 20059

Coordinator and PI: Dr. Charles Kim (CKIM@HOWARD.EDU)

This program is sponsored by The Leona M. and Harry B. Helmsley Charitable Trust as part of VIP Consortium Project (lead institution - Georgia Tech) to drive systemic reform of STEM education.

What is VIP?:

The VIP program was created to overcome the fragmented nature of higher education, which is subdivided into research, education, service, and economic development and, for student learning, fractured and dissected into years, majors, and disciplines silos. The VIP program intends to reverse the fragmentation, and introduces a new type of long-term, depth-and-breadth learning environment that can keep students engaged and improve learning and career preparation. Under the VIP program, participating and completing a long-term practical team project provides a significant benefit for the students and the faulty advisors in terms of the continuity, technical depth, and disciplinary
epartment with the projects by the majority of ECE
to the University. The first one and a half year will be
next 1-year period will become the year of "growth and
EACS. The last period of a half-year will become a
he entire university by the established program and
r.

*** If you're interested in joining one of the teams below, please send inquiry to th**

HOWARD VIP Teams

Existing VIP Teams

- Link to VIP at Howard Teams (WWW.MWFTR.COM/VIPatHUteams.html)

www.mwftr.com/VIPatHUteams.html

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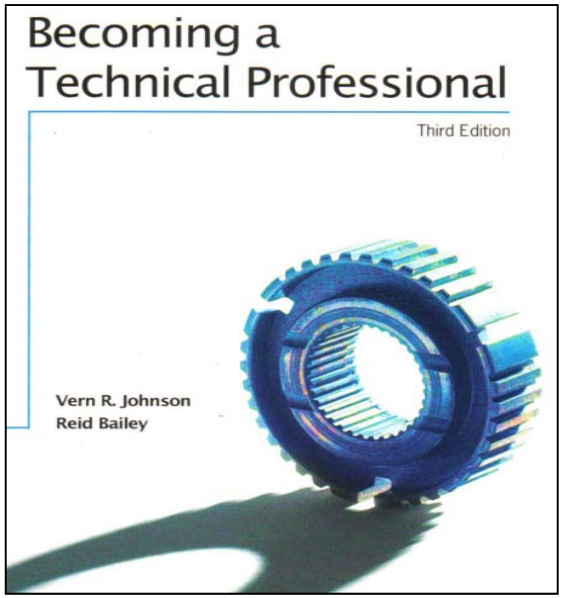
HOWARD VIP Teams

Project Team	Advisor	Contact	Project Description	Project Website
SLatES	Dr. Mohamed Chouikha (EE)	Vanessa Galani (Graduate Assistant) and Jason Rogers (CpE)	Sign Language to English 	www.VIPatSlate8.html
Intruder	Dr. Hassan Salmani (CpE)	Jonathan Goberdhan (EE)	Hardware Trojan Detection & Prevention for Health-Care Computer Systems 	www.VIPatIntruder.html
Wireless Sensor Network	Dr. Hassan Salmani (CpE)	Anthony Brandon(CpE)	Wireless sensor network development for temperature sensing	
HU Radio Telescope - Measuring the Galactic Rotation	Dr. Marcus Alfred (PHYS):	Dr. Marcus Alfred (PHYS)	This project will build a Radio Telescope following the MIT Haystack Radio Telescope which was later extensively modified, and presently working, University of Michigan version. EE, CpE, CS students for electronics, and ME and CV students for machining, and other students	VIPatHUscope.html

- At least 1 new VIP team is being formed now.

References

- No Textbook required



- *Becoming a Technical Professional*
  - Authors: Vern Johnson and Reid Bailey
  - Kendal/Hunt Publishing Co.
  - 3rd Edition
  - ISBN 13:978-0-7575-2765-4
  - Written for first-year engineering students
  - Process/Idea is same for seniors with actual application & implementation of the process & idea.
- *Creative Design of Products and Systems*
  - Author: Niku
  - Wiley

Engineering Design – Topics and Objectives

- Topics
  - Engineering Design Overview
  - **Problem Formulation**
  - **Problem Solving**
  - **Solution Implementation**
  - The Art and Science of Creativity
  - Project Management
  - Technical Presentation
  - Technical Writing
- Objectives
  - Understanding an engineering design process
  - Understanding the 3 phases of design and how design is an adaptive, systematic process
  - Applying a design process to meet a set of needs
  - Design under constraints
    - Budget
    - Time
    - Regulation/Standards

Course Grading and Expectation

- Expectation
  - Attendance
  - Active Participation (class and team activities out of the class)
  - Assignments
  - Active interaction with VIP team advisor
  - Everything counts
  - Professional manner
  - Teamwork

- **Grading**
  - **Individual Score (I):30%**
    - **Attendance (10%): only on-time arrival counts**
    - **Homework +Others (10%)**
    - **Final Exam (10%)**
  - **Group Score (G): 70%**
    - **Team activities (40%)**
    - **Team Assignments (10%)**
    - **Grade by team advisor (20%)**
  - **Peer Evaluation Score (P): 0 – 1.0**
  - **FINAL SCORE (F)**
    - **F = I+ G*[0.6+ 0.4*P]**

- **Grades**
  - **A: 90 – 100**
  - **B: 80 – 89**
  - **C: 70 – 79**
  - **D: 60 – 69**
  - **F: 0 - 59**

Things to do for the next few weeks

- Join a VIP team
  - ☒Approval from the Instructor is required
  - ☒No more than 5 senior students in a VIP team
- Discuss your VIP advisor for the “Senior Design Project portion” for 2017-2018 academic year from the long-term project goal.
- Recruit other students (of juniors and sophomores of Engineering, Computer Science, etc.) in to your team – helping hands