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| **C:\Users\zamanh\Documents\Miscellaneous\nsu-logo.png** | **Department of Electrical and Computer Engineering**  **North South University, Bashundhara, Dhaka-1229, Bangladesh**  **CSE499A/EEE499A/ETE499A, Section 5** |

**Course Number and Title:** CSE499A/EEE499A/ETE499A–KMM-Section-5, FALL 2022

**Credits:** 1.5 SCH

**Semester**: FALL 2022

**Course Type:** Required, Engineering, Lab

**Course Prerequisite(s):** Completion of at least 100 credit hours including the entire major core

courses, math and science courses, Ethics, Language and Communication related courses.

**Instructor(s)**: Dr. Mohammad Monirujjaman Khan

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**Grading policy**: *(Tentative)*

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| Attendance: | 10% |
| Beginning of semester  Project proposal and presentation: | 10+5=15% |
| Weekly design progress: | 5% |
| End of semester  Project demo:  Project status report and final presentation: | 35%  25% |
| Journal  Regularity:  Quality: | 5%  5% |
| Total | 100% |
| *Bonus points may be assigned on other class deliverables* |  |

**Course Schedule/Timing**: Lab hours – 1.5 Hours/week

M: 9:40 AM – 11:20 AM (SAC503)

**Office Hours and Location**:

Monday, Tuesday and Wednesday: 11:00- AM-1.00 PM

*You may also make an appointment to see me at a different time.*

*Office hour location is the same as the Instructor’s office location*.

**Textbook**: None

**Reference(s)**:

* Hyman, Barry, “Fundamentals of Engineering Design”, 2nd Edition, 2003, Prentice Hall, ISBN-13: 9780130467126
* Dieter, George and Schmidt, Linda C., “Engineering Design”, 5th Edition, 2013, McGraw Hill, ISBN-13 9780073398143

The instructor may provide more learning materials relevant to the topics time to time. In addition, students will utilize resources available from the worldwide web, device data sheets, manufacturer application notes, and the NSU Library.

**Catalog Description (Syllabus):** This is a senior level course, after a student has completed all the required major core courses, core math, and core science courses. This "capstone design course" involves multidisciplinary teams of students who build and test custom designed systems, components or engineering processes. Design projects selected from problems submitted by the students, faculty and local industry; Industry projects are given preference as they are best suited for meeting the course objectives; Instructional phase includes (not limited to): communications, report writing, visual aids, design process (requirements/specifications/objections, synthesis/analysis, design evaluation, implementation, maintainability, manufacturability, economic and social influences etc.), proposal preparation, estimating, project management and scheduling, contracts etc.; Performance phase includes (not limited to): design team formation and organization, design proposals, implementation of design process, project scheduling and management, design reviews, design simulation and testing, preparation of documentation, drawings, specifications, etc., written and oral presentation of completed projects.

**Course Description:** This course familiarizes students with the fundamental principles involved in the design process by doing a real design that solves a real world problem. Topics include problem identification and definition, mechanisms of technological problem-solving, design alternatives, and project planning, implementation, and proper documentation. The influence of cost, material resources, performance criteria, and relevant ethical and safety issues will be discussed. All students will work on a design project. **Students will be required to keep a journal of notes detailing their work and how the design process arrives at the solution**.

**Course Summary:** This is a senior level course, after a student has completed all the required major core courses, core math, and core science courses. This "capstone design course" involves multidisciplinary teams of students who build and test custom designed systems, components or engineering processes. Design projects selected from problems submitted by the students, faculty and local industry; Industry projects are given preference as they are best suited for meeting the course objectives; Instructional phase includes (not limited to): communications, report writing, visual aids, design process (requirements/specifications/objections, synthesis/analysis, design evaluation, implementation, maintainability, manufacturability, economic and social influences etc.), proposal preparation, estimating, project management and scheduling, contracts etc.; Performance phase includes (not limited to): design team formation and organization, design proposals, implementation of design process, project scheduling and management, design reviews, design simulation and testing, preparation of documentation, drawings, specifications, etc., written and oral presentation of completed projects.

**Course Objectives:** The objective of this course are to

1. identify an engineering and/or computing problem, build appropriate strategy to solve the problem in a systematic way with given constraints of resources, budget, time etc.
2. design a system, component, or process to meet desired needs within realistic constraints
3. use the techniques, skills, and modern engineering tools necessary for engineering practice.
4. identify the usability, manufacturability, and sustainability of a system/subsystem that is going to be developed under the project
5. creat an environment to work effectively in a group on multidisciplinary project to accomplish a common goal
6. identify and validate the impact of economic, environmental, social, political, ethical, health and safety considerations and constraints in the project development phases.
7. demonstrate engineering/computing project development phases through various written reports such as project proposal, time-line chart, requirement analysis report, design reports, final reports, etc.
8. demonstrate an understanding of ethical and professional responsibility in a project development phases

**Course Outcomes (COs):**

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

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| Sl. | **CO Description** | **Weightage (%)** |
| CO1 | **illustrate** an engineering and/or computing problem, build appropriate strategy to solve the problem in a systematic way with given constraints | **20** |
| CO2 | design a system, component, or process to meet desired needs within realistic constraints | **15** |
| CO3 | use the techniques, skills, and modern engineering tools necessary for engineering practice | **15** |
| CO4 | identify and validate the impact of economic, social, political, health and safety and legal considerations and constraints in the project development phases | **15** |
| CO5 | defend engineering/computing project development phases through various reports writing and oral presentation | **20** |
| CO6 | demonstrate an understanding of ethical and professional responsibility in a project development phases | **15** |

**Mapping of CO-PO:**

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| **Sl.** | **CO Description** | **POs** | **Bloom’s taxonomy**  **domain/level** | **Delivery methods**  **and activities** | **Assessment**  **tools** |
| CO1 | **Illustrate** an engineering and/or computing problem, build appropriate strategy to solve the problem in a systematic way with given constraints | **b** | Cognitive/ Understand | Design | Project Proposal and Report |
| CO2 | **Design** a system, component, or process to meet desired needs within realistic constraints | **c** | Cognitive/ Create | Design | Project Report |
| CO3 | **Use** the techniques, skills, and modern engineering tools necessary for engineering practice | **e** | Psychomotor/ Precision | Lectures | Demonstration |
| CO4 | **Identify** and validate the impact of economic, social, political, health and safety and legal considerations and constraints in the project development phases | **f** | Affective/ Valuing | Lectures | Project Report |
| CO5 | **Defend** engineering/computing project development phases through various reports writing and oral presentation | **k** | Cognitive/ Evaluate | Lectures | Project Report and Presentation |
| CO6 | **Demonstrate** an understanding of ethical and professional responsibility in a project development phases | **h** | Affective/ Valuing | Lectures | Project Report, Homework |

**Instructional Methodologies**:

* **Google Classroom:** All class participants must enroll in the online classroom. Here are the steps:
  + Get your NSU email if you haven’t already done so. NSU email address (\*\*\*\*\*@northsouth.edu) can be collected from Information Services Department (ISD) on Library Building (Level-5).
  + Go to <https://classroom.google.com> using your NSU email id and password
  + Join the class using the class code “6q1u20s”
* **Resource Area:** The instructor may provide course materials in the university resources area (accessible from the university computing network at the IT Web Portal <http://172.16.254.8>). Materials will be available under ECE/ area. The students are requested to make sure early in the semester that they have access to the resources area.

**Journal Policy:**

The journal will consist of notes taken by the student of their work. A portion of the journal could consist of notes taken during lectures. Another portion of the journal could consist of notes taken regarding reading assignments from the text. However, the major portion of the journal should consist of the student’s ideas that the Labs generate and what you did with those ideas. These ideas should be set off, starred, asterisked, or otherwise denoted from the rest of the information in the journal. The journal would consist of a record of how the student’s ideas progress through the design process. The journal should be kept current; entries should be dated; and, usually, entries should be made prior to the student leaving a lab. The journal is to be submitted at the end of the semester for grading; then it will be returned to the student. The final version of the journal should be submitted at the end of the continuation course “Senior Design II” for the purpose of final journal grading.

**Design Project Topics:**

* Students should propose topics of their own.
* Project topics may also be suggested by the instructor
* The topics need to be approved by the instructor before the students can begin working on the projects
* The topics should try to solve industry oriented, real world problems, which may of national or international type.
* Topics should be chosen such that the design aspect of the course is fulfilled.
* If possible, project outcomes should include tangible things which can be showcased in an event.
* A really successful projects may have the following characteristics (not limited to):
  + They may lead entrepreneurial endeavors, i.e., some students may start companies where they may manufacture, create, and/or market their own product or product ideas generated from the capstone project
  + They may be featured in national news outlets (such as newspapers, TV channels, etc.) as new innovation solving real world problems
  + They may lead to conference and/or journal publications.

**Student’s Role:**

* Students will form groups of three members.
* Each group will meet the assigned instructor each week during the assigned lab time (attendance will be taken)
* Besides meeting the instructor, the groups should also work on their projects during the lab time
* It is expected that groups will do most of the work at their own free times outside the assigned lab times.

**Instructor’s Role:**

* The instructor will supervise projects on a diverse array of topics, some of which may be completely out of the instructor’s areas of expertise.
* The instructor will focus more on project methodology and guide the students accordingly
* The instructor may give lectures during some lab times on project development methodologies. Some of the related topic (but not limited to) would be
  + - * + Creativity
        + Design Process
        + Design Planning
        + Legal Concepts for Engineers
        + Social Context of Design
        + Engineering Ethics
        + How to Write Project Proposal/Reports/Technical Manuals etc.

**Project Proposal:**

The project proposal must be written using Microsoft Word and submitted to the instructor by the due date. The report (6-10 pages) will consist of:

1. Description of the problem being solved
2. Review of existing similar systems
3. Feasibility study indicating at least two possible solutions
4. Solutions adopted and the reasons for that
5. Detailed diagrams for the complete system and all subsystems
6. Explanation of the functioning of the complete system, and all subsystems
7. Diagrams drawn using software showing the layout of the systems
8. Diagrams drawn using MS Word or MS Visio showing flow chart for processing
9. Graphs drawn using MS Excel
10. Figures and graphs showing inputs and outputs, as applicable
11. Tables showing input and output data, as applicable
12. Bill of materials required to build the circuit, and the approximate cost
13. MS Project charts including Gantt Charts showing the expected timeline of progress
14. Bibliography

**Project Status Report and Presentation**:

At the end of the semester, the current status of the project will be presented by the group to the entire class using Power Point slides. This presentation should be between 10-15 minutes, and each member of the team should present for at least 3 minutes. The slides must be emailed to the instructor by 11:59 pm the night before. The final status report (between 10 and 15 pages) will also be due at this time and it should include the following:

1. Cover page
2. Description of the problem being solved
3. Feasibility study indicating at least two possible solutions
4. Solution adopted and the reasons for that
5. Detailed diagrams for the complete system and all subsystems
6. Explanation of the functioning of the complete system, and all subsystems
7. Figures and graphs showing inputs and outputs, as applicable
8. Tables showing input and output data, as applicable
9. Bill of materials required to build the system, and the approximate cost
10. Suggestions for improvements
11. Suggestions for future work
12. Bibliography

**Course Policies**:

1. **Cell Phone Policy**: Use of cell phones in the lab is not permitted.
2. **Academic Honesty**: Students are expected to be honest and forthright in their academic endeavors. Academic dishonesty includes cheating, inventing false information or citations, plagiarism, tampering with computers, destroying other people’s property, or academic misconduct.
3. **Attendance Policy:** Attendance in classes is integral to the success of a student in this course. Nevertheless, **i**f a student needs to miss a class for unavoidable reasons, **the student must e-mail the instructor prior to the class period stating the reason for being absent**. In case the student fails to notify the instructor because of illness or other unavoidable reasons, certification such as a doctor’s certificate may be necessary to get the absence excused. A partial unexcused absence may result from the following behaviors:

* A weak excuse for missing the class for which a prior e-mail message was sent
* Coming late or leaving early
* Disruptive behavior that results in instructor asking the student to leave for the rest of the period.

**Continuation Course Information:**

Students who successfully complete this course should enroll in the continuation course “CSE/EEE/ETE 499B – Senior Design II” in the following semester under the same instructor.

**Abandoning Course**:

Grades F will be recorded for students who have not fulfilled academic obligations and have not obtained a grade, and for students who abandon their courses without officially withdrawing from a course.

**NSU Grading Policy:** Letter grades indicating the quality of course work completed is interpreted as follows.

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| **Numerical Scores** | **Letter Grade** | **Grade Points Per Credit** |
| 93 and above | A Excellent | 4.0 |
| 90 - 92 | A- | 3.7 |
| 87 - 89 | B+ | 3.3 |
| 83 - 86 | B Good | 3.0 |
| 80 - 82 | B- | 2.7 |
| 77 - 79 | C+ | 2.3 |
| 73 - 76 | C Average | 2.0 |
| 70 - 72 | C- | 1.7 |
| 67 - 69 | D+ | 1.3 |
| 60 - 66 | D Poor | 1.0 |
| Below 60 | F\* Failure | 0.0 |
|  | I\*\* Incomplete | 0.0 |
|  | W\*\* Withdrawal | 0.0 |
|  | R\*\* Retaken | 0.0 |

\*   Credits for courses with this grade do not apply towards graduation.  
\*\* Credits for courses with this grade do not apply towards graduation and they are not accepted in the calculation of the grade point average.  
  
The exact cut off points for assigning letter grades is at the, discretion of individual instructor. The same applies to the assignment of + or - after a letter grade. It is meant to give more flexibility so that shades of performance can be distinguished and rewarded. The + and - has a value of 0.3 grade point.

**Best of luck!**