

## 2022-23 Research Methodology & Ethics (TNCC MTH 245) Course Outline, Classroom Expectations, & Grading Policy

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### Class Schedule

P1, P2, P7, P8 Rm A67

### Materials You Must Bring to Each Class

- ❖ 2 Composition books
  - for taking all types of notes and information
  - to use as an engineering notebook
- ❖ One 3-ring binder for class handouts and your work
- ❖ Pencil(s) and pen, erasers, graduated straight edge
- ❖ Graphing calculator preferred (At a minimum TI-30, Casio fx-300 or better)

### Course Description and Course Outcomes

This year-long course provides junior STEM students with knowledges and experiences how to conduct scientific researches and engineering projects. Students will study contemporary issues in scientific research while conducting independent scientific research and engineering projects outside of class. Students are encouraged to select projects consistent with their strand or career goals. Course topics include research design strategies, data analysis and representation (with and without computer-assistance), norms of conduct for ethical research behavior, and the historical basis for current research regulations, among others. All students must conduct a review of the primary literature to support their research design assumptions, prepare and present a plan of their proposed research for institutional review and approval, conduct their studies and report their findings via formal technical paper as well as oral presentation. All students present posters in our junior science symposium, judged by professionals in various fields. Participation of regional Science and Engineering Fairs are highly encouraged.

Learning fundamental knowledge of the engineering method, design for human use, and entrepreneurship are requisite skills today to perform research, problem-solve, innovate, and create opportunities in the real world. The Engineering, Design, and Entrepreneurship module of the course requires that students first understand and then continuously improve their skills in the engineering method, the fundamentals of design for human use, and the mindset and skills of entrepreneurship. In their research and engineering projects, students

are tasked to identify real-world engineering problems or opportunities, to propose and seek client approval for their unique solutions or innovations, then to design, build, and demonstrate the potential value of their final products.

### Classroom Expectations

It is expected that each student and teacher will work to uphold and enhance every-one's opportunity for successful learning by:

- **Being Prepared & On-time** for class. Bring all necessary materials to class EVERYDAY.
- **Being Respectful** of self and all others. Disrespect may result in disciplinary actions.
- **Being Fully Present** -- Contributing one's best attention, effort, thoughts, ideas and questions. Cell phones and all other electronic devices must be turned off and put away.
- **Being Considerate** – Caring for the equipment and materials of GSST and others, and leaving a clean and neat area as one leaves.

### Evaluation and Grading Policy

Graded assignments include

- Tests and quizzes
- Notes and home works
- Research projects, including proposal, report, manuscript, presentation
- Other class assignments, term exam

Assignment due days will be posted on our course calendar on CANVAS. Paper-based assignments are due in class of the due date. Electronic assignments are due by 11:59 pm of the due date. Assignments may be required to be submitted via [www.turnitin.com](http://www.turnitin.com) for plagiarism prevention.

Course grades are assigned following the points scale

|       |        |       |       |       |     |
|-------|--------|-------|-------|-------|-----|
| %     | 90-100 | 80-89 | 70-79 | 60-69 | <60 |
| Grade | A      | B     | C     | D     | E   |

### Assignments and Class Work Policy

- Students can only use handouts and notes sanctioned by teacher for each test or quiz.
- Students with excused absences will be given an extension no more than one week to complete missed assignments.
- Late submissions of any assignments are generally not accepted. If the teacher is accepting a late assignment, the maximum points of such assignments will decrease by 10% per calendar day.
- All assignments must follow the appropriate guidelines. An assignment that does not follow the guideline or is illegible may be returned for a "Re-Do."
- All assignments will be posted on CANVAS. It is the students' responsibility to print the assignments if needed.

### Tips for Success and Extra Help

Asking questions in classes. Any question from you has potential of being a great question.

Do not procrastinate. The longer you wait, the more time it will need to finish the task.

Online information is useful and convenient. But use it wisely. Do not “copy” and “paste.”

- \_\_\_ Find a “Study Buddy,” exchange contact information and have peer tutoring.
- \_\_\_ Utilize the discussion feature of the course on CANVAS.
- \_\_\_ After School tutoring with teachers.

**A note from your instructors:**

Welcome to the Governor’s School for Science and Technology, and to the Research Methods and Ethics Course! I am pleased to introduce myself, Dr. Jiashi Hou, as your instructor. I earned my Ph.D. degree in mathematics and M.S. in applied mathematics from Rensselaer Polytechnic Institute (RPI). I have conducted research of modeling hydrated soft tissues in biomechanics. I have taught courses of all level at universities, from business calculus, statistics to partial differential equations. I have also taught data analysis and statistics at high school. During those years, I also served as mentor and advisor for several student research projects.

The Junior Research Methods and Ethics class will require you to write several papers and to design, implement and present your findings in an original research project, culminating in a Science Fair within GSST which will qualify certain students to compete in the Regional Science Fair. In past years, our GSST students have been chosen and participated in Regional, State and International Science Fairs Symposia. Their research experience has helped many in college admission and qualifying for scholarship.

Welcome to the Governor’s School for Science and Technology! I am Steve Walk (Prof. Walk), your instructor for the Engineering, Design, and Entrepreneurship module of the Junior Research Methods and Ethics class. I earned a MSEE at the University of Pittsburgh and a BSEET, summa cum laude, at the Pittsburgh at Johnstown. I completed post-graduate studies at Rensselaer Polytechnic Institute and Drexel University.

My most recent of three professional ‘careers’ has been teaching and tutoring high school physics, including AP physics and Modern Physics, for more than nine years. My second career included teaching engineering and conducting research at several US colleges and universities. And in my first career I worked as a research engineer in new product development and as a technical product manager.

The Engineering, Design, and Entrepreneurship module will require you to first understand and then continuously improve your skills in the engineering method, the fundamentals of design for human use, and the mindset and skills of entrepreneurship. No matter your chosen university major or career path, you will need to either master these skills yourself or work alongside other individuals whose mastery is in these skills, to assure the success of your personal and collaborative efforts.