Capstone Design ME/MSE/ID/BME/ECE

Common Studio Session #1

Date: 01/12/2026

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REMINDERS

- ALL Links and Slides are posted here: http://mecapstone.gatech.edu/students
- Update your profile on Capstone Marketplace: https://projects.gatech.edu/
  - How to guide: https://mecapstone.gatech.edu/howto
- Common MS Teams Support Network: https://mecapstone.gatech.edu/support
- Attend the 1st Lab on Wednesday, 14th January at 12:30pm in Exhibition Hall HomePark (2nd Floor) to:
  - Present your own project idea (if any)
  - Find team members

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Course Expectations

- CAPSTONE – Synthesize knowledge & skills acquired in UG curriculum
  - Identify & apply relevant topics from ***earlier courses***
  - Critically ***evaluate*** designs
- DESIGN – Address broad range of requirements
  - *Identify and specify design **requirements***
  - *Apply **systematic design process** to develop a design from problem to a detailed, proof-of-concept design meeting all of the specifications*
- *PROFESSIONAL EXPERIENCE*
  - *Clearly **communicate/document** design ideas and information*
  - *Work collaboratively and responsibly as a **team***
  - *Demonstrate ability to facilitate own learning by identifying design issues and questions that require additional investigation beyond basic undergraduate curriculum knowledge, then formulating appropriate courses of action.*

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What is Capstone Design all about?
Goals for the course project:

1. Identify an unmet need

   WHAT'S THE PROBLEM?
2. Invent/design something useful

   CREATIVITY, INNOVATION
3. Apply your analytical knowledge to design it

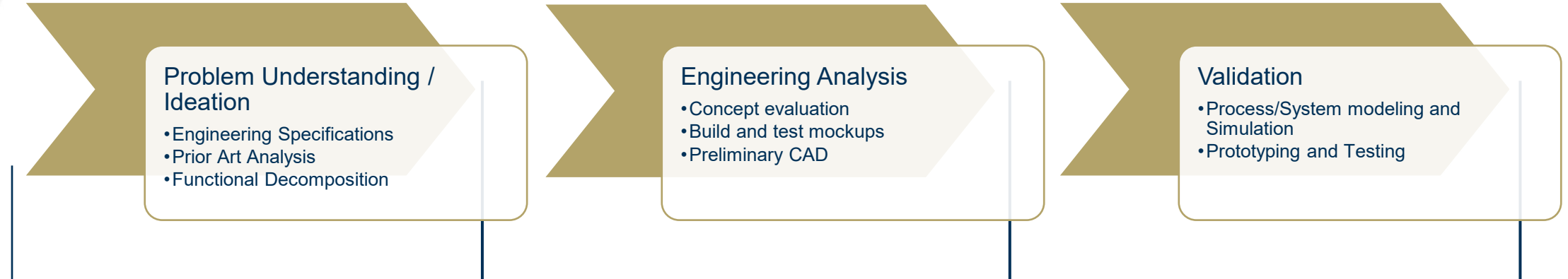
   ANALYTICAL SKILLS
4. Prove it will work (Simulate it, build it, test it, virtually, physically)

   MODELING AND HANDS-ON
5. Document your process (reports, presentations)
6. Demonstrate it at the Expo
7. Give to sponsor for use or patent it and start company

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Capstone Design Process Timeline

15 weeks | Teams update faculty and sponsors once per week



Report 1 due at Week #5

Report 2 due at Week #10

Final Report due at Week #15

Projects are awarded to the teams and teams are assigned to faculty and expert consultants during first week of the semester

Georgia Tech Capstone Design Expo

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Capstone Design Expo

Video from past Expo: https://youtu.be/G47o7SFTn7o













List of Past Projects since Summer 2020:
https://capstone.gatech.edu/past_projects

Tuesday, 28th April 4-8pm

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Course Logistics (starting next week)

- **Studios** on Mondays 12:30 – 2:25pm in CULC #144

  FOR MEs only. Other majors will follow their home school requirements.

- **Labs** on Wednesdays 12:30 – 3:15pm at location TBD
  - Labs are scheduled to work with your team AND discuss your project progress with your team's advisor.
  - Typically, teams meet with their advisor 30-60 minutes per week during this time slot
  - Specific plan (meeting time, date and activity) MAY VARY based on the Instructor assigned to your team

Capstone Design Topics

- Self Awareness and Team Formation
- User Needs, Stakeholders & Engr. Specifications
- Systematic Engineering Design Process
- Market Research & Marketing
- Prior Art Search and Intellectual Property
- Industrial Design – Ergonomics and Aesthetics
- Risk, Liability, Codes and Standards
- Prototyping Process
- Project Management
- Sustainability – Societal and Environmental Considerations
- Design for X – Assembly, Manufacturing, Service, etc.
- Intrapreneurship/Entrepreneurship





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Course Deliverables – Submit to your ***assigned*** team advisor

- Team Deliverables (75%)
  - Interim Report and oral presentations around week #5 and #10
  - Final Report, Final Presentation, Fab package after the Expo
  - Weekly lab deliverables (at the discretion of your assigned team advisor)
  - Studio-level assignments like Team Charter, Expo Teaser Video, and Expo Participation
- Individual Deliverables (25%)
  - Class participation & Studio level quizzes
  - Individual participation and presentation on behalf of the team
  - Peer & Instructor evaluation

- ***All team members need not receive the same grade!***
  - Check with your assigned team advisor for specific grading policies

  Faculty may assign a higher weightage to later written reports if they notice a substantial improvement.

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Barriers to success

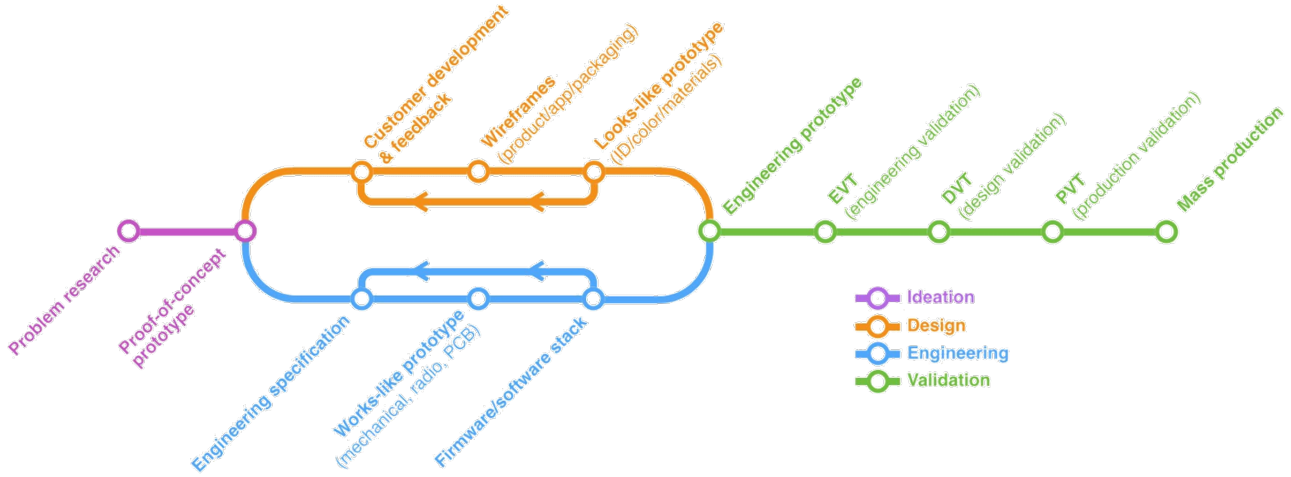
- Lack of commitment, initiative and anticipation
- “Is this what you want?” – expecting to be told what to do, rather than acting independently
- Lack of consideration and systematic evaluation of alternatives
- Dithering over alternatives and not selecting a final design
- Lack of questioning assumptions, preconceived notions, etc.
- Team Dysfunction
  - Lack of leadership
  - Lack of a shared and coherent vision
  - Lack of accountability and progress
  - Personality conflicts
  - And on and on…
- Confusion between role of student team, sponsors and faculty

Design your ***product***…

… not your ***prototype***



Cardboard iPhone Scanner made by designer Kyle A Koch. Credit Image: Kyle A Koch



A typical Product Development Timeline (https://blog.bolt.io/ideation)



Prototyping is a means to an end and not an end in itself!

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Team Formation & Registration

1. Find team members or call for team members:
   - Based on project interest on https://projects.gatech.edu/
   - Based on skills and experience on https://projects.gatech.edu/
   - Introduce yourself using common MS Teams: https://mecapstone.gatech.edu/support
   - Self-identified/assembled during lab meeting on 14th January

2. Team sizes are **4-6** students per team.

3. Create your "Group" on the marketplace website before **5:00pm on Wednesday, 14th January.** You can change your group name for the expo at a later date!
   - Refer HOW TO guide for the marketplace here: https://mecapstone.gatech.edu/marketplace_howto

Welcome by GWW School Chair



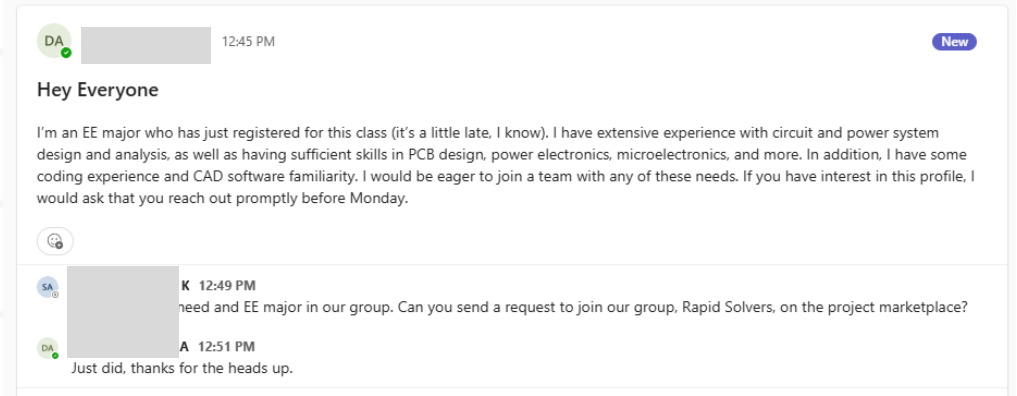
Carolyn Seepersad

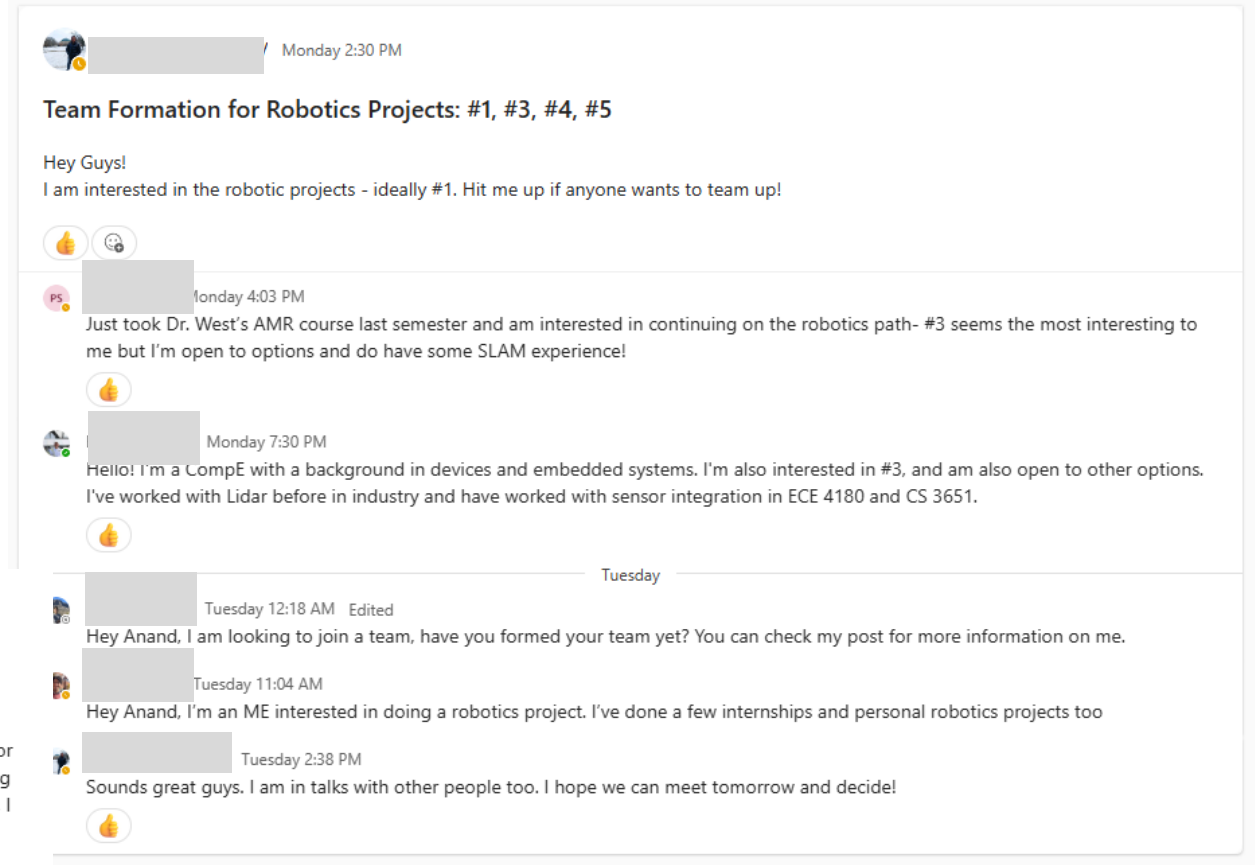
Eugene C. Gwaltney, Jr. School Chair, Professor

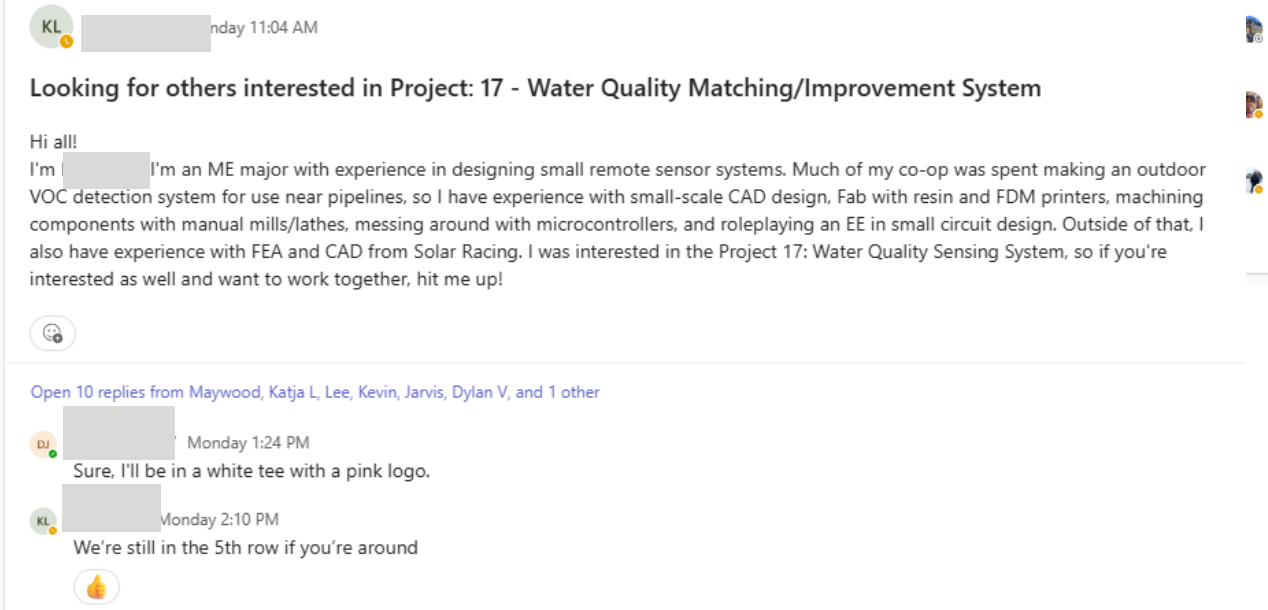
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https://mecapstone.gatech.edu/support

How to leverage MS Teams?







Project Types

1. External company sponsored
2. Faculty (**F** prefixed projects)
3. Student idea (**S** prefixed projects)

- For types #1 and #2, check out currently available projects (more are being added) here: https://projects.gatech.edu/
- For guidance on how to use the online portal, see this: http://mecapstone.gatech.edu/howto
- Examples of past projects are here: https://capstone.gatech.edu/past_projects

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More info: https://mecapstone.gatech.edu/sponsors/intellectual-property/

NDA and IP

NDA:

- In rare circumstances, a Company's proprietary information must be shared with Georgia Tech, such as with the faculty coordinators and/or Project Team's faculty mentor. In such cases, a confidentiality agreement with the Georgia Institute of Technology (GIT) might have been executed. Student teams working on such projects will be required to accept the GT NDA form (which will be sent after the project is assigned to the team)
- Some projects might only need an NDA between the student team and the company. in such cases, the student team would be required to accept an NDA directly with the company. The students will have to make sure to not disclose any company confidential information to anyone other than their own team (not even their faculty advisor).

IP:

- For the course, students working on the project typically own the resulting IP that they create, and not Georgia Tech. Hence, students (and not GT) can assign any resulting IP to the company.
- Most **sponsors prepare an IP assignment document** for students to accept at the start of the project.

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Elements of a Good Student Project

- What's the problem?
  - NOT "We're going to design a better mousetrap"
- Creative/Innovative - not just an assembly of off-the-shelf parts (room for concept exploration and evaluation)
- Lends itself to analysis
- Sufficient scope for senior design
- Team should have or acquire the skills to complete the project.
- Produce a proof-of-concept and learn from it
  - Design revisions
  - Validate design decisions
- Submit your project idea on the marketplace website before **5:00pm on Friday, 16th January**
- You can present your project to the class during this Wednesday's lab
  - Submit your project idea on the projects.gatech.edu site. NOTE that it takes a few hours before the project is made visible to the entire class, including yourself AND
  - Prepare a slide about the PROBLEM you are trying to solve

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What is a Good Bid?

CONVINCE us that you are the best group for the project.

- What is your understanding of the project?
- Why do you want the project?
- What are your skills, talents, and experiences relevant to the project?
- Anything else that is relevant

- Your team can…
  - Only assign one priority rank per project bid. A rank of “1” means your first choice
  - Submit bids for as many projects as available for your team
  - Your team will be required to work on the project for which a bid was submitted and was awarded by the faculty
  - You are required to submit a bid for your project idea as well
  - Create/Edit/Cancel bids anytime until **5:00pm on Saturday, 17th January**
  - Add/remove team members anytime until the same deadline as above

How are teams matched to projects?

- Two avenues
  - Bid for a sponsored project
  - Propose your own project
- Teams are matched to projects and to faculty (see the FAQ here)
- Even if you plan on bidding for sponsored projects, should have a “Plan B (C, and D)” project idea of your own

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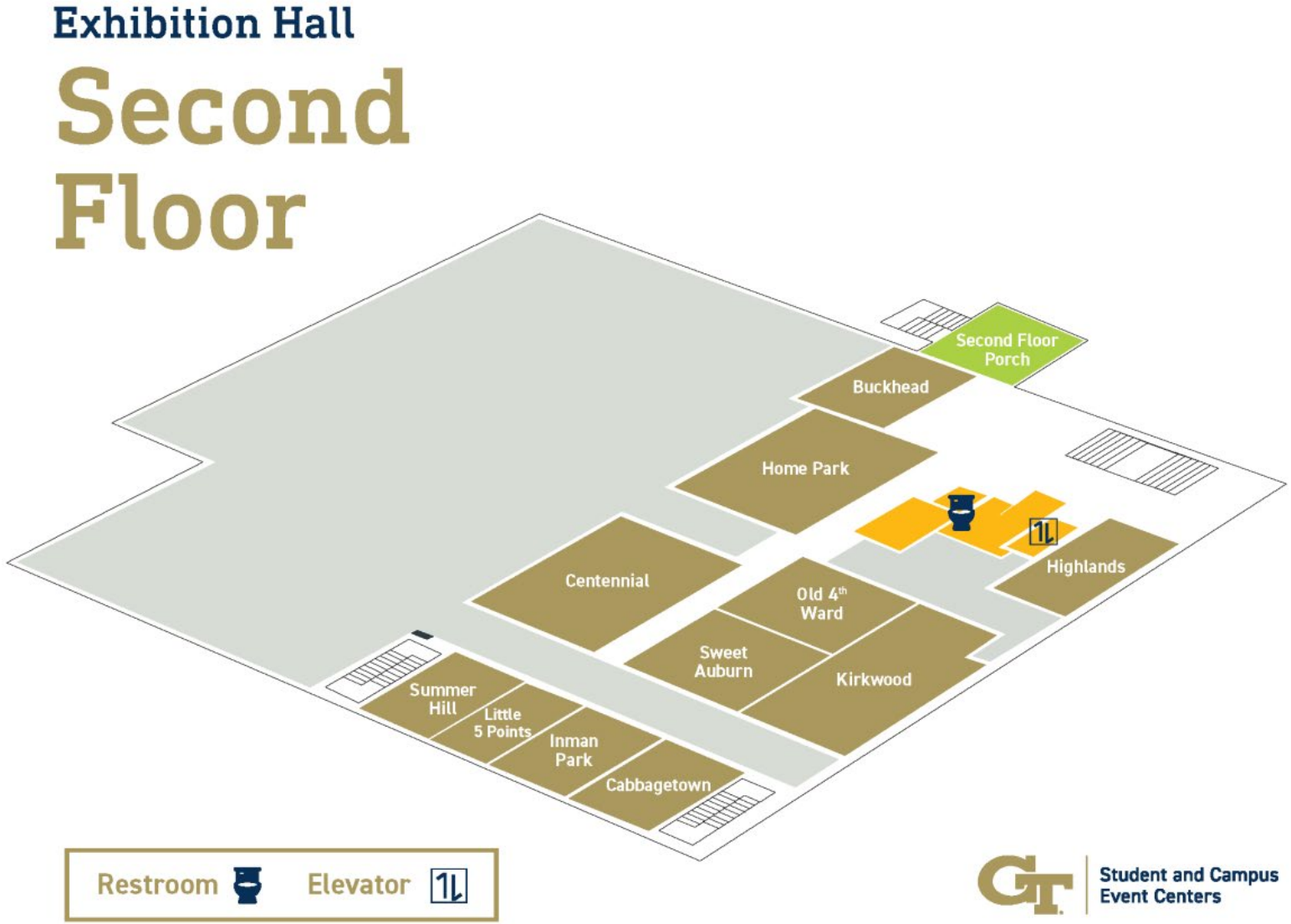
Plan for 1st lab on Wednesday, 14th January 2026

1

Pick a name tag that corresponds to your **major** per below, write you name and wear

- **ME**
- **ECE**
- **BME**
- **MSE**
- **ID**

2



Projects' Presentation by Sponsors

Presentation Sequence	Sponsor Name	Project Title
1	Design for Planet Impact	01-Arsenic Removal Filter Extension
2	Design for Planet Impact	02-Project Sight
3	Design for Planet Impact	03-Comfort Companion
4	Anheuser-Busch	04-Phorm Energy Production
5	Zola's World Inc	05-Zola™ AI Smart Doll – Designing the Future of Inclusive Play and Learning
6	GE Vernova	06-Gas Turbine Combustion Flame Test Rig – Particle Feeder
7	Rheem Manufacturing Company	07-Low power, pumpless, agitation system for storage water heaters
8	HMGMA (Hyundai Motor Group Metaplant America)	08-Implementation of a HUD for Manufacturing Vehicles to Avoid Human/Robot Collisions
9	HMGMA (Hyundai Motor Group Metaplant America)	09-Smart Vision-Based AMR Monitoring System for Pallet Delivery and AMR Traffic Management
10	Donaldson Company	10-Design and Validation of a Test Bench for Evaluating Wet-Out Performance in Sterile Membrane
11	Plasma Processes	11-Automation of Thermal Spray process for production
12	Freudenberg	12-Bottom Unfill Inspection
13	Freudenberg – NOK Sealing Technologies (FNST)	13-Split shaft with inverted direction of rotation
14	Proportion Air	14-Design and Validation of a Precision Low-Pressure, High-Flow Airflow Control Subsystem
15	Proportion Air	15-Design a high-temperature, precision-controlled superheated steam regulation system
16	Proportion Air	16-Benchmark Testing System for Electronic Pressure Regulators
17	Proportion Air	17-Silencing the Noise: System Level Design of Electronic Pressure Regulators for Peak Performance
18	Mercedes-Benz Vans, LLC	18-New Engine Preassembly AGV Line
19	DIU	19-Design and Validation of a Modular Shock Tube System for Transient Pressure Testing
20	DIU	20-Portable Counter UAS Kinetic Solutions
21	Limitless Inventions LLC	21-Adaptive Drumming Accessible Prototype Technology (A.D.A.P.T.)
22	IGSC.AI, LLC	22-AI-Powered Smart Mirror for Golf Swing Coaching
23	NYB, LLC	23-Smart Basketball Shooting Trainer
24	RidgeLine Flags	24-Condition-Based Optimization of Flag Repair Processes
25	RidgeLine Flags	25-Structural Redesign of Oversized American Flags
B01	Mayo Clinic	B01-Improved Hinged Knee Brace
B02	Emory University	B02-Smart Capsule for Noninvasive Screening of Esophageal Disorders
B03	Advanced Laparoscopic General and Weight Loss Surgery	B03-Next-Generation Dual-Energy Bipolar Electrosurgical Generator
F01	Shepherd Center	F01-Design and development of a seated postural measurement system
F04	GT EcoCAR Team	F04-Design of UpLift: A wheelchair lift providing autonomy to paraplegic drivers
I01	Wayne Li (Faculty)	I01-Moonshot: Adaptive "Smart" Athletic Shoes
I02	Wayne Li (Faculty)	I02-Recreational Hoverbike Controls + HUD Display
I03	Wayne Li (Faculty)	I03-Vehicle to Rapid Response Drone
I04	Wayne Li (Faculty)	I04-Full Radius Dance
I05	Wayne Li (Faculty)	I05-Thighs of Thunder

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