Pre-Senior Design Information Session

Dr. Dima Nazzal, Director of Professional Practice
Senior Design Coordinator and Examiner

Spring 2021
Topics

- What are 4106 and 4800?
- What you need to finish in 4800?
- When you need to do what?
# Faculty Team - ISYE 4800/4106 Summer 2021/Fall 2021

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Role</th>
<th>Function</th>
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<tbody>
<tr>
<td>Prof. Nazzal</td>
<td><a href="mailto:dima.nazzal@gatech.edu">dima.nazzal@gatech.edu</a></td>
<td>Coordinator</td>
<td>Info session, coordinate activities, point of contact on all matters related to Senior Design</td>
</tr>
<tr>
<td>Prof. Nazzal</td>
<td><a href="mailto:dima.nazzal@gatech.edu">dima.nazzal@gatech.edu</a></td>
<td>Co-Examiner</td>
<td>Project screening and evaluation</td>
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<tr>
<td>Prof. McGinnis</td>
<td><a href="mailto:leon.mcginnis@isye.gatech.edu">leon.mcginnis@isye.gatech.edu</a></td>
<td>Co-Examiner</td>
<td>Project screening and evaluation</td>
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What is Senior Design in ISyE?
Senior Design is not a typical course
“Senior design was advertised as the **culmination** of our journey at tech and was very much so. I will carry the lessons I learned into any future endeavor”
Analysis, Modeling, Design, Computing
Framing the Problem/Opportunity
Broadening your Knowledge
Professionalism
Technical and Professional Communication
High Expectations BUT a Lot of Help

…if you ask
Professionalism starts now!
Prerequisites for 4106 Senior Design

1. ISYE 3025, ISYE 3133, ISYE 3232, ISYE 3044 (and the prerequisites to these courses)

2. 4 of 6 ISyE concentration elective courses

3. Successful completion of ISYE 4800
   - Approved preproposal
     1. Team Composition
     2. Client Notification
     3. Project Pre-proposal
   - Sufficient contribution to an approved preproposal
Tasks in (or before) ISyE 4800

1. Register for ISyE 4800A/4800Q/4800R
   • Q is for students taking SOUP classes (summer only)
   • R is for study abroad students
   • A is for everyone else
   • If you already took 4800 before, you must re-take

2. Form team of size from 6 to 8

3. Find potential clients
   • Postings on ISyE website
   • Past senior design teams
   • Internships and co-ops
   • Cold-calling
   • Site visit (with COVID precautions) is required

4. Develop the pre-proposal and get approved
### 4800 Deliverables and Schedule

<table>
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<tr>
<th>Deliverable</th>
<th>Details</th>
<th>4800 Summer semester</th>
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<tr>
<td>Team composition report</td>
<td>Teams submit team members, liaison, and resumes</td>
<td>Monday in the week final exams starts in spring</td>
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| Client notification report                       | Teams submit a report listing the client's name and nature of the project | 3rd Monday in the ...
| NDA Routing Form                                 | If your client requires an NDA                         | As soon as you have talked to your client. Process for approval is lengthy |
| Initial pre-proposal                             | Teams submit initial pre-proposal                      | 7th Monday in the ...
| Meetings with project screener/examiner          | We will work with you to shape up the pre-proposal     | Weeks of July 5 & 12       |
| Revised pre-proposal                             | If the initial proposal is not approved, a team can submit a second one. It can be an enhanced version of the first or another project with a different client | 10th Monday July 19         |
| Peer evaluation                                  | Students assess every other team member (including themselves) for contribution | 12th Tuesday Aug 3          |
| Permit to ISYE 4106 to your section              | Registration permit to your section will be issued if you satisfy the requirements | Phase II registration during the 4106 semester |
Step 1: Build yourself a team

- **KEY: Be able to trust their work & work ethic**
- Similar academic goals: A for winners vs. D for done
- Diverse skill set: Cover all skills with one or two members
- Compatible 4106 class schedules: no classes conflict with one of two team class schedule: MWF or TWR sections

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Team Composition Report template

• Each team submits one report to course website by the team liaison

Under extenuating circumstances, the coordinator might change the team membership
Client Composition
Step 2: Finding a project: Sample of past project topics

- Capacity management
- Customer service enhancement
- Demand/price forecasting
- Distribution network design
- Energy usage reduction
- Equipment replacement planning
- Facility layout/redesign
- Flow management
- Inventory planning
- Manufacturing line/cell design
- Materials handling

- Money/capital management
- Pricing strategy
- Preventative maintenance scheduling
- Process design/redesign
- Production scheduling
- Supply chain design
- Technology integration
- Vendor selection
- Waste reduction
- Workforce scheduling
- Flow of material, people, documents
### Step 2: Finding a project: Last two years of clients

|Aaron's| Fiserv| Peachtree Presbyterian Church|
|ABW| Floor and Décor| PIVOT|
|Adidas| Fox Theatre| Polygon|
|Amazon| General Electric| PPG Industries|
|American Woodmark| Georgia Division of Family and Child Services| Prime Revenue|
|Annheuser Busch| Georgia Tech Capital Planning| Prisma Health|
|Atlanta Braves| Georgia Tech Dining Services| Robins Air Force Base|
|Atlanta Department of Transportation| Georgia World Congress Center| Rogers Electric|
|Atlanta Hawks| Goodr| Scientific Games|
|Atlanta Humane Society| HD Supply| Shepherd Center|
|Bonduelle| Honeywell| Smith+Nephew|
|BrandSafway| JetBlue| Starbucks|
|Buffalo Wild Wings| Kenco| The Boys and Girls Club of Metro Atlanta|
|C4 Belts (Niche Digital Brands)| Kimberly Clarke| The Coca Cola Company|
|Cardlytics| Kinaxis| The Home Depot|
|Chick-fil-a| Kliklok-Woodman| Tindall|
|Children’s Healthcare of Atlanta| KS2 Technologies| Under Armour|
|Christian Dior| Logility| UPS|
|CISCO| LW Scientific| UPS Healthcare|
|Cox Automotive| Manheim| Veritiv|
|Cox Communications| MARTA| Waffle House|
|CVS Pharmacy| McKenney’s| Walmart Health|
|Dell| Mix Tape Venture| Water Mirror/Heibao Logistics|
|Delta Airlines| NAPA Autoparts| WestRock|
|Emory Healthcare| Nolan Transportation Group| Williams-Sonoma|
|Emory Midtown Cafeteria| Northside Hospital| |
Step 2: Finding Project: Requirements

• Design
  • Make recommendations to change an existing system or design a new system, not just a tool or an analysis or a model

• ISyE knowledge/methods

• Magnitude
  • 12 hrs/person/week = 1080-1440 hrs total (full-time job ≈ 2000 hrs)

• Value to client
  • Part of Senior Design is learning to identify which problems are worth your time to fix and which are not...

• Also...
  • Should be very interesting to you
Step 2: Finding a project

Approaching potential clients

• How to approach companies for a project
  • Engineers, managers, etc. – they have the work to be done!
    • Not human resources or university relations
    • It’s better to have a higher-level (VP, Director, or higher) project sponsor/advocate
  • Ask in a way they understand
  • Make a personal approach
    • Personal visit, phone call
  • Be prepared
    • “Elevator speech” & details
    • Information about Senior Design & you
Expectations of Project Clients

- Commitment to providing access to data & site
- Responsiveness; your graduation depends on getting timely responses
- Selection of a primary contact for team
  - Client-side organization (meetings, site visits, data, questions, etc.)
- True interest in project
  - Real value, not busy work!
Risk and reward factors in project/client selection

- Consulting firms
- Startups
- Small operations
- Access
  - Information and Data
  - Response time
  - Location
Deliverable 2: Client Notification Form

- Organization Name
- Client Contact Name, Email, Phone
- Describe the Organization and Division you will work with
- **Describe your client’s primary concern**
- **Describe the system you propose to study, design, re-design**
- Describe the problem/opportunity at a high level
  - What is the problem/opportunity?
  - What can be done about it?
  - Connect it to the client’s primary concern
- Describe the relationship of your potential project to the ISyE curriculum
Deliverable 3: Pre-proposal
Project Pre-Proposal

- Convince project examiners/screeners that your project is appropriate
  - Design content, ISyE methodology, difficulty magnitude, value

- Convince with evidence: **data/analysis, not just (buzz) words**!
  - Writing quality (spelling, grammar, typos) counts too!

- Get help from Dr. Blake, our technical communication director
Project Pre-Proposal (cont.)

• Show evidence that the project will be valuable...
  
  • This is a CRITICAL skill.
  
  • If you’re good at making the case that you’re worth paying, you’re likely to have a very successful career in any field.
  
• You must learn this... in Senior Design.

You will receive permit for 4106 only if your pre-proposal is APPROVED by the senior design examiners and your contribution is satisfactory.

We will guide you through the process but it’s on you to get your project into an approvable form. You don’t have a good project you will NOT get permit.
Preproposal Template

• Who is the Client?
• Client contact information
• What is the system?
• Is an NDA required?
• What is the Problem/Opportunity?
• What type of information you need to take on the challenge?
• What is the value of the opportunity you identified?
• What will you deliver to the client?
• What is the relationship to the ISyE curriculum?

First Draft Acceptance Rate:
• < 10% are accepted
• > 50% require major changes
• ~ 15% need to change client
What is the Problem or Opportunity?

• **WHY/motivation:** Why are you addressing this problem, now?
• **What concern will solving this problem address for the client?**
  • This is your **goal** (e.g., reduce cost, increase revenue, improve customer service, etc.) and this should be consistent with the motivation
• **How is this problem affecting the client’s concern (preventing them from achieving a goal)?**
• **How do you know that this is a problem?**
  • What’s the evidence? What are the symptoms?
• **The opportunity:** What do you bring to the table to achieve the goal? (e.g., an inventory control system, truck routing, consolidating shipments, predictive maintenance process, etc.)
  • How does this address the client’s concern?
• **Success Metrics:** How will we measure your success in the project? (e.g., percent decrease in labor cost)
• We will evaluate your work product based on the strength of the evidence that your proposed solution:
  • is the right **approach** to achieve the goal, and
  • the magnitude at which it **achieves** the goal
Tips and Pitfalls

• Goal vs. Tasks: You are not supposed to be given tasks. It’s your job to identify the tasks to achieve the goal
  • Start with the Client’s Concern
  • Logically dissect all the steps in the process that can help achieve the goal,
  • Identify the alternatives for exploiting them,
  • Prioritize based on impact and effort.

• Disparaging the Client will not be tolerated
  • Do NOT motivate your project by pointing the shortcomings of the current process
  • Focus on what you bring to achieve the goal not what the client is not doing
Warnings

• You must contribute to your team’s pre-proposal; being out of town is NOT an excuse.

• You cannot drop a team without Associate Chair approval
  • Once your pre-proposal has been submitted, individuals will not be allowed to switch teams.
    • Obvious exception: serious health issues, etc.
    • No exceptions for unhappiness with team, project, expected grade, etc.

• Failure to complete any ISyE required course or 4 of 6 concentration classes will result in you being dropped from your team
Client may share proprietary or confidential information

**Proprietary**
- Formula
- Financial info (salary)
- Methods or strategies
- Marketing plans
- Customer list
- IT system details
- ...

**Confidential**
- ID
- SSN
- Account info
- Intellectual property
- Patient information
- Passwords
- ...

Client may ask you to sign their legal agreement
What should you do?

1. Ask the client to filter or mask the data to avoid the NDA. It is just a one-semester undergrad project.

2. Undesirable: Individually sign the client’s NDA
   1. GT employees are not allowed to sign client’s NDA
   2. It must allow GT employee acceptable access, or no grade!
   3. Quick and dirty in the short run, risk in the long run

3. Individually sign client’s NDA to allow access to data and at the same time start the GT-Client NDA process

4. **GT-Client NDA:** If you must have an NDA, below is the way to go.
Student NDA process

1. Check if client requires NDA
   - Yes: Coordinator will review, ask for more information, then send to GT legal
   - No: Sign individual NDAs with client (Must meet 3 conditions)²

2. Find another client

3. Negotiations successful?
   - Yes: GT legal negotiates with client
   - No: Coordinator sends PIAs for individual signatures and Signature Sheet

4. Students sign PIAs and send as one individual file back to coordinator
   - Coordinator sends you PIAs for individual signatures and Signature Sheet

5. Students acquire signatures of all GT employees who will access protected information²
   - Students return signature sheet to coordinator³

6. Done. Remember your NDA commitments

³ Try to avoid NDAs
² This step can be done throughout the ISYE 4106 semester
¹ As soon as all signatures are acquired and before final report submission
* Three conditions are:
  1. Client NDA cannot name GT as a party to the NDA (faculty cannot sign client’s NDA)
  2. NDA must permit GT students to discuss client’s info with teammates
  3. NDA must permit GT students to discuss with GT faculty & staff if faculty and staff need access to client’s info to advise or evaluate project
• Liaison fills out
  • Company’s contact info
  • Class/Project details
• Send it to me for my signature and date
• I will send it to GT Legal. Please do not contact GT Legal.
1. Liaison gets each member to fill out these 4 fields, and sign
2. Liaison combines into single file
3. Liaison sends the file to coordinator
The signature sheet SS (2nd page)

Please return a copy of this page with the appropriate signature(s) to:
matthew.riddle@legal.gatech.edu OR (fax) 404.894.3120 (NOTE: A cover page is not necessary.)

*NDA with: Atlanta National League Baseball Club, LLC
Attorney: SDE   GT OLA File: NDA-5150  POC: Dima Nazzal
GT Entity GIT   Effective Date: August 3, 2018   Termination Date: December 15, 2018
Term of Confidentiality: 3 years/initial date of disclosure   Pertaining to: customer traffic flow
during baseball games, including surveillance videos, customer feedback and transaction
data and the Point of Sale for the transaction. ISYE 4106, Fall 2018.

Required Signatures
The employees who have signed below acknowledge that they will have access to proprietary information
disclosed under the referenced NDA, have read the NDA and agree to comply with the terms and conditions thereof.

Signature: ____________________________  Name: ____________________________  Date: ____________________________
If Neither, Country of Origin: ____________________________
U.S. Citizen [ ]  Green Card [ ]  Neither [ ]

Signature: ____________________________  Name: ____________________________  Date: ____________________________
If Neither, Country of Origin: ____________________________
U.S. Citizen [ ]  Green Card [ ]  Neither [ ]

Bring with you to presentations
Get signatures
Submit with final report
We cannot read without having signed
Communications

- Meaningful email subject line
- Meaningful document name (pay attention to template)
  - Team: Liaison’s name
  - Preproposal: TeamNumber + ClientName + Type of submission
    - E.g. 11 Staples Pre-proposal (to be given)
- Canvas and Piazza
4800 FAQs

• Do I have to meet with an examiner after initial pre-proposal submission?
  • Yes, unless you live/work outside of driving distance.

• What if I live/work far away this semester?
  • You’re still expected to contribute to the project-finding and pre-proposal effort. Shirkers will be penalized; most semesters, one or more students have not been given a permit with the rest of their team.

• Will you have office hours?
  • Don’t wait for office hours. Time is of the essence, so ask your questions right away.
    • Send me your questions by email – wherever I am, I’ll be able to give you a pretty quick answer.
    • Piazza is an excellent way of communication on the course website (Canvas)

• What happens if we miss the deadline for pre-proposal submission?
  • 1/3 letter grade deduction from your ISYE 4106 grade.
Two Exciting Optional Pathways for ISyE Senior Design

CREATE-X

Serve-Learn-Sustain