Department of Mechanical Engineering

A COMPREHENSIVE STRATEGY
FOR
UNDERGRADUATE STUDY AND BEYOND

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GUIDING PRINCIPLES

• If you have nothing nice to say, say nothing at all
• Time, effort & energy dedicated to building and nurturing internal & external network of people
• Commitment to lifelong learning
• Career planning - control your own destiny
• Work HARD & SMART!!!
• Contrarian Approach
TWO CRITICALLY IMPORTANT QUESTIONS

1. WHY ARE YOU HERE?

2. WHO IS THE BEST TEACHER?
   (Timeframe: All the way back to pre-school)

Which is the Most Critical Year in an Engineering Undergraduate Program? Why?
General Electric GE90 Jet Engine

- 115,000 pounds of thrust at sea level
- Exclusive power-plant for Boeing-777ER aircraft
JET ENGINE DESIGN SEQUENCE

- Establish Useful-Life Criteria (~30 Years)
- FAA Certification
- In-house Complete Engine Tests
- Component Tests (Fan, Compressor, Combustor, Turbine, etc...)
- Manufacture All Components
- Freeze Blue-prints
- Finish Final Design of All Systems & Sub-systems
- Finalize Thermodynamic Cycle
ANALOGY

JET ENGINE DESIGN SEQUENCE

&

EFFECTIVE EDUCATION STRATEGY
STRATEGY FOR UNDERGRADUATE STUDY

• You Are Here to Establish ~50 Years of Gainful Employment and an Outstanding Engineering Career

• Prepare for about 7 Career and 20 Job Changes

• Effective Interview Strategy Executed Masterfully
  – Is this a fundamentally sound, well-trained engineer?
  – Is there real and honest interest in my company and products?
  – Offer’s made only if the interviewer can have a convincing “YES!!!” as an answer to both questions

• Degree in Mechanical Engineering
  – Fundamentals mastered
  – Comfortable with both experimental & computational approaches

• Total Overhaul of Advising Strategy
ESTABLISHING REAL & HONEST INTEREST

- Tech Electives
- Free Electives
- Private Sector or Academic Research Internships
- Co-Op Program
- Undergraduate Honors Thesis
- NSF’s Research Experience for Undergraduates (REU)
- One-Two Semesters of Research for Credit or Pay
- Combination of Some or All of the Above
THE NEW ADVISING STRATEGY

“If you don’t control events, events will control you”

- Take ownership of your education & master info on two sheets
  - Year-by-year and semester-by-semester course listing
  - Bubble charts showing co-requisites and pre-requisites
- Must show up to your advising session with a proposal
- Course approval should ideally take about 3 minutes
- We’ll spend the remaining portion of the advising period developing a “custom tailored” program to establish a convincing story about real & honest interest for your interview, which will set-up ~50 years of gainful employment and an awesome engineering career.
THE NEW ADVISING STRATEGY (cont’d)

“What you want to become, you are becoming every day”

• Every day is precious
• Every lecture is precious
• Every homework set is precious
• Every project is precious
• Every test is precious
• Every course is precious
EFFECTIVE STUDY TECHNIQUE

• Read *(but DO NOT study!)* chapter
  – Top-down reading regardless of how clear the material

• Attend every lecture (never skip lectures)
  – Actively participate (==> ask/answer questions)
  – Involve as many senses as possible
  – Hearing yourself talk is magic!

• Study chapter
  – Serious effort to really understand the material (re-read, use additional references, see instructor during office hours, etc...)

• Complete all homework assignments
  – Team effort, hear yourself talk
ON BECOMING A GLOBAL ENGINEER

- Global economy
- Global competition
- Need for cultural sensitivity training
- Foreign language skills
- Know the color of money
  - Remember at all times that technical capability does not automatically imply economic feasibility
- Much, much, much expanded opportunities
We can recover from all sorts of problems, including technical issues and interpersonal conflicts, which are likely to arise during our academic and professional careers. No single issue can end it all, except INTEGRITY!!!
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