Engineering and Technology: Advisement for New Incoming Students

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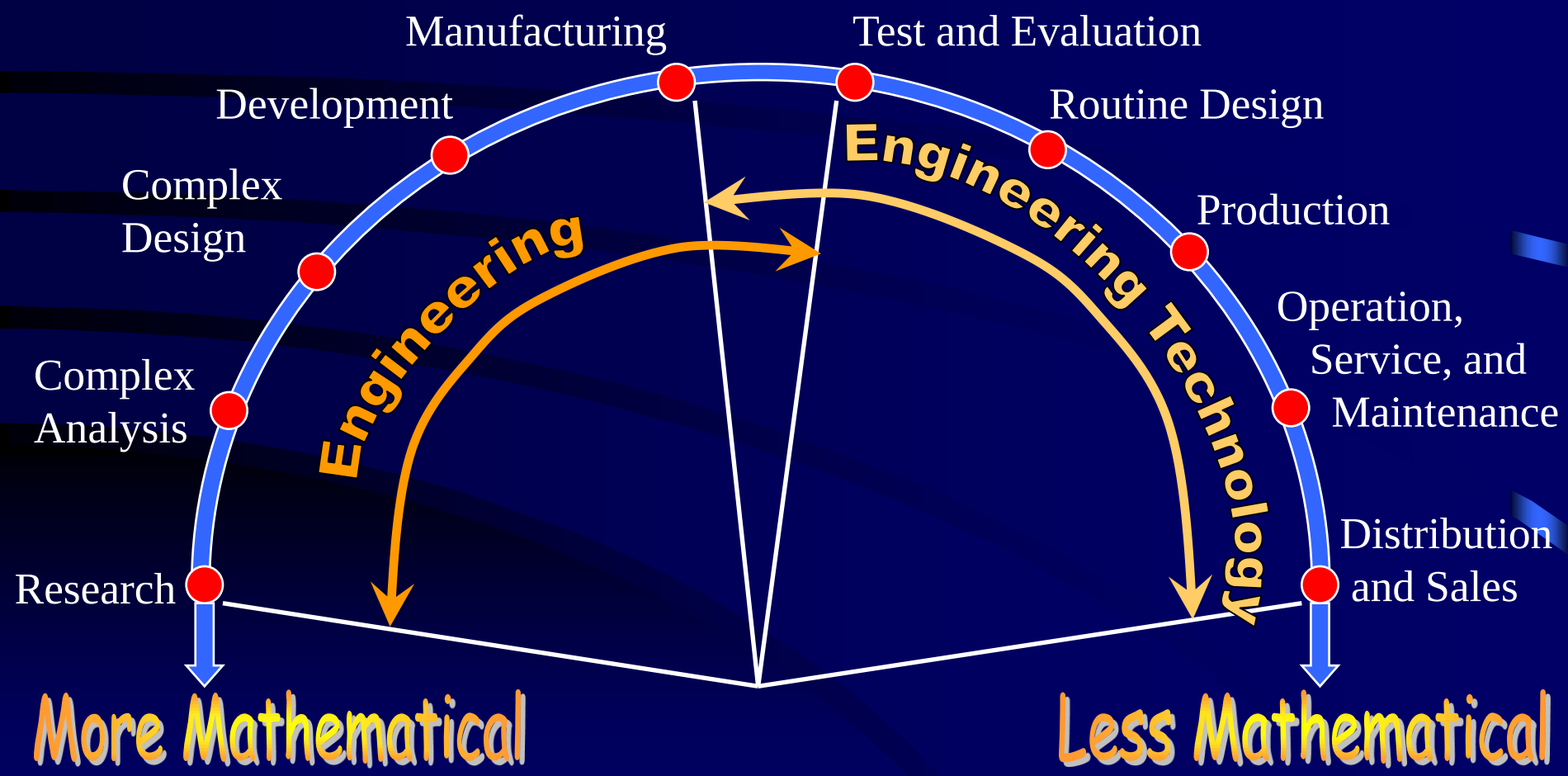
Why Engineering/Technology?

- The program I am here to advise on today is:
  - Engineering Science (ENR)
    - Associate of Science degree
    - Designed for Transfer
- I will also talk about Technology as another path to an engineering career:
  - Electrical Technology (ELT)
    - Associate of Applied Science degree
    - Designed for students to go to work or transfer to a technology program
- Why did YOU pick engineering?

Engineering and Technology
Two Different Career Paths*



*Source: American Society for Mechanical Engineers

Engineering and Technology

- Career differences?
  - Four-year Engineering Graduate
    - Will generally start with an entry level engineering position near the middle of the career spectrum.
    - Starting annual salaries will vary from approximately $50k to $65k.
  - Four-year Engineering Technology Graduate
    - Will generally start with an entry level engineering position to near to or to the right of the middle of the career spectrum.
    - Starting annual salaries will vary from approximately $45k to $55k.
  - Two-year Engineering Technology Graduate
    - Will generally start with an entry level technician position on the right side of the career spectrum.
    - Starting annual salaries will vary from approximately $32k to $40k.

Engineering and Technology

- What's the difference? In idealistic terms …
  - Engineering graduates are the ones who conceive, design and develop the products and systems of our technological society.
  - Engineering technology graduates produce, operate, test, sell and service these products and systems.

Engineering and Technology

- What's the difference? In practical terms …
  - Work in conception, design and development often requires an advanced degree (Master's or PhD).
  - Four-year graduates of both engineering and engineering technology programs are typically hired as engineers but the excelling engineering students will more likely get hired further to the left of the career path spectrum upon graduation.

Engineering and Technology

- What's the difference? In terms of problem solving approaches …
  - Engineering graduates are trained to have a very analytical approach to problems. Research and analysis of the problem come first.
  - Technology graduates are trained with a hands-on, applied approach to problems. Getting involved with the problem (i.e. tool, people, process) comes first.

Engineering and Technology

- Curriculum differences?
  - Engineering is more **analytical**.
    - Entry math level : *Calculus I*
    - Most **four-year** engineering degrees require Calc I, Calc II, Calc III, Differential Equations, Calculus-based Physics (minimum 2 semesters), College Chemistry (minimum 1 semester). Often requires an additional math and perhaps science elective.
    - Since engineering is more analytical, engineering programs work to develop a very strong foundation in math and science in the first two years of the degree and thus provide *limited opportunities for hands-on technical work in the engineering field of interest* in the first two years.

Engineering and Technology

- Curriculum differences?
  - Technology is more **applied**.
    - Entry math level: *College Algebra*
    - Math and science requirements for **four-year** technology degrees vary but generally they do not require as many math or science courses as engineering and the science courses are generally not calculus-based. **Four-year** degree generally requires Calc I, Calc II, and Applied Differential Equations.
    - Since technology is more applied, engineering technology programs work to develop strong hands-on technical skills and therefore these programs *provide extensive hands-on technical work in the technical field of interest* throughout all four years of the degree.

Engineering and Technology

- How important is the math?
  - Cannot move on to next course without a grade of C or better.
  - Getting a C is a strong indicator that you will not get a C or better in the next course!
  - For **ENR**: MUST start in MAT221 and earn a C or better in Fall semester or add a year to degree completion. Also, really need a B or better through Calculus II.
  - For **ELT**: MUST start in MAT184 in Fall semester or add a year to degree completion from that point.
- Math Sequence at DCC
  - MAT091 Beginning Algebra
  - MAT099 Intermediate Algebra
  - MAT184 Algebra and Trig for Precalculus
  - MAT185 Precalculus
  - MAT221 Calculus I
  - MAT222 Calculus II
  - MAT223 Calculus III
  - MAT224 Differential Eq.

Engineering and Technology

- How important is the science?
  - For **ENR**: Although not a deal-breaker, would need to take two additional courses at DCC if you did not take Regents-level Chemistry and Regents-level Physics in high school.
    - To complete the degree in two years, must be ready for PHY151 Engineering Physics I in your second semester which means that you must have taken Calculus I before the second semester and have had Regents-level Physics in HS or taken PHY121 General Physics in your first semester.
    - Except for Chemical Engineers, you can take CHE121 General Chemistry I at any time in the program but you must have had Regents-level Chemistry in HS or taken CHE111.
  - For **ELT**: Although it is helpful to have had science in high school, it is not required.
    - Every ELT student takes PHY121 General Physics.
    - Pick a second science course from this list: CHE111, CHE121, PHY122

Engineering and Technology

- How important is time management?
  - Many community college students hold jobs while attending college.
  - For **ENR**: With the ENR program normal course load, it is difficult to work more than 10-15 hours/week and earn ‘A’s and ‘B’s.
  - For **ELT**: depending on your work ethic, you may work 20-25 hours/week and still earn ‘A’s and ‘B’s.
- BEFORE the 10th week of a semester, if you are finding you cannot give your most important courses the time required to get the needed grades to move on to the next course, WITHDRAW from a non-technical course.

Engineering and Technology

- Which is right for you?
  - When you have a problem to solve, do you prefer to research first, work out problems using theory followed by hands-on work?
    - If yes, then you lean towards being more **analytical** and thus **engineering**.
    - Must succeed in challenging, upper level math courses in order to develop the analytical skill expected in the engineering program.
  - When you have a problem to solve, do you prefer to get your hands-on the problem first and tinker with it prior to an analytical investigation?
    - If yes, then you lean towards being more **applied** and thus **technology**.
    - Math skills do not need to be at such an advanced level as engineering in order to succeed.

What About Transfer (ENR)?

- ENR is designed for transfer with an excellent record of 2+2 transfers.
- Most common transfer schools are:
  - SUNY: Binghamton, Buffalo, New Paltz
  - RPI
  - Clarkson University
- SUNY seamless transfer
  (see https://www.suny.edu/attend/get-started/transfer-students/suny-transfer-paths/)

What About Excelsior Scholarship? (and if free, why start at DCC?)

- Beginning in Fall 2017, applies to families who earn $100,000 or less.
  - The income calculation is based on federal adjusted gross income, as reported on federal income tax forms, for the student and their family.
- Students must be enrolled in college full-time and average 30 credits per year (including Summer and January semesters).
- Students are required to ***maintain a grade point average*** necessary for the successful completion of their coursework.
- Students are required to reside in New York State for the same number of years in which they received the award.

How Transfer for ENR Works

- Look at program page and note the footnotes designed to provide advisement depending on the engineering field you are interested in.
- Most important is to make sure you have taken the proper prerequisite courses to take the first semester junior level courses at transfer school.
  - The more you know about your transfer school in advance, the easier transfer will be.

How Courses Transfer for ENR

- Calculus sequence – depends on the field
- Physics sequence
  - At DCC: PHY151, PHY152, PHY251, all four-credit calculus-based physics courses
  - At most other schools: only two physics courses which take what we do in three semesters and squeeze them (usually with limited success) in to one semester.
- Engineering Tech Electives – usually no problems.

Information about ELT

- Good overview of what to expect in ELT from promotional video on department page:
  - http://www.sunydutchess.edu/academics/departments/enact/
- Jobs information on following slides …

What About Jobs for ELT?

- Jobs – our students find work in a wide variety of small to large companies as technicians

Ametek – Rotron Products, Woodstock (sub-assemblies for military and aerospace customers)

Atlantis Energy Systems, Poughkeepsie (solar panels & shingles)

Central Hudson, Poughkeepsie (electric power distribution)

Chemprene Inc., Beacon (manufacturer of rubber coated textiles)

CIA Security, Fishkill (commercial instruments & alarm systems)

Dutchess Tel-Audio, Inc, Poughkeepsie (provider of sound & communication solutions)

Ebara Technologies, Fishkill (semiconductor manufacturing tools and support services)

EFCO, Poughkeepsie (fillings for baked goods and confectionaries)

FALA Technologies, Inc. (advanced technology products for semiconductor and solar industry), Kingston, NY

What About Jobs for ELT?

- Jobs – our students find work in a wide variety of small to large companies as technicians

Fryer Machine Systems, Patterson, NY (automated manufacturing machinery)

The Gap – Distribution Center, Fishkill (distribution system using advanced technology)

Globalfoundries, Malta (semiconductor manufacturing)

High Voltage, Inc., Copake (manufacturer of high voltage testing equipment)

Hipotronics, Inc., Brewster (manufacturer of high voltage testing equipment)

Hologic, Danbury, CT (women's health equipment technology)

Hudson Solar, Rhinebeck (solar & geothermal installations)

Hunter Panels, Montgomery (manufacturer of insulating panels)

Ioxus, Oneonta (high voltage electronic components)

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- Jobs – our students find work in a wide variety of small to large companies as technicians

Kohl's Distribution Center, Middletown (distribution system using advanced technology)
Marco Manufacturing, Poughkeepsie (electronic circuit boards)
Metal Container Corp., Newburgh (bottle manufacturer)
Mettrix Technology Corp, Hopewell Junction (short run printed circuit board assembly/ testing)
Metro-North Railroad (maintenance of railroad equipment)
Millrock Technology Inc., Kingston (manufacture freeze dryers)
MPI, Poughkeepsie (wax molding equipment)
Novel Approaches, Middletown (pole-mount solar panel installations)

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Simplex Grinnell, Harriman, Newburgh, and other locations (fire protection systems, Tyco company)

Sonotek, Milton (ultrasonic spray nozzles for thin film coatings)

Taylor Manufacturing, Poughkeepsie (manufacture machining equipment for wood product assembly)

Total Facility Solutions, Newburgh (facilities management for area IBM sites)

Wagner Technical, Newburgh (power system consulting)

Zumbach, Mt. Kisco (laser-based sensors used in cable manufacturing)

What About Transfer for ELT?

- Transfer
  - Smoothest transfer (2+2) is to a bachelor degree program in Electrical Engineering Technology
    - SUNY Farmingdale, Alfred, Polytechnic (Utica)
    - RIT, NYIT
  - Articulation agreement provides transition from ELT to EE at New Paltz
    - Requires one full-time year of study after completing ELT degree to enter as junior in electrical engineering at New Paltz.

For More Information …

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You can find this presentation online at

http://www.sunydutchess.edu/enact/