

# Engineering

Is the art of applying scientific and mathematical principles, experiences judgments and common sense to create or develop new products that benefit people and solve problems

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# Mechanical Engineering

- Anything that is mechanical or must interact with another machine or a human being
- Many do research, test and design work while others work in maintenance, technical sales and production operations
- Called the **Masters of Modern Machines**
- 2<sup>nd</sup> largest branch of Engineering

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# Mechanical Engineering

- Employment
  - Everywhere
    - Involved in design and manufacturing techniques that require creative products, industrial robots, nuclear reactors, and high speed trains

# Mechanical Engineering

- Schooling
- B.S. degree with major course work in mechanical engineering

# Mechanical Engineering

- Salary
  - Median salary in North Dakota
    - \$49,330
  - Median Salary in the Country
    - \$55,633

2004 [www.payscale.com/research](http://www.payscale.com/research)

# Civil Engineering

- Involved in the design and construction of large stationary structures.
- One of the oldest disciplines of engineering

# Civil Engineering

- Involved in:
  - Design and development of central city areas
  - Working with architects to design buildings
  - Helps create transportation systems, public utilities, and public services

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# Civil Engineering

- Employment
- Private companies
- City and Government

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# Civil Engineering

- Salary
  - Median salary in North Dakota
    - \$41,182
  - Median Salary in the country
    - \$55,458

2004 [www.payscale.com/research](http://www.payscale.com/research)

# Industrial Engineering

- Responsible for helping an organization use the people, materials, equipment, and information they have in the most efficient way possible to make or process a product (need to be able to work with people)
- More concerned with the processes involved than the product.

# Industrial Engineering

- Companies hire industrial engineers to increase productivity through:
  - Effective management
  - Organizational skills

# Industrial Engineering

- Some duties are:
  - Develop payment systems
  - Conduct time and motion studies
  - Ergonomic studies
  - Developing and using job evaluations
  - Determine the best layout of machines and equipment

# Industrial Engineering Employment

- Manufacturing
- Energy and Utilities
- Health Care / Hospitals
- Government
- Financial Institutions
- Retail Stores
- Transportation
- Entertainment

# Industrial Engineering

- Salary
  - Median salary in North Dakota
    - \$42,740
  - Median Salary in the country
    - \$57,951

# Environmental Engineering

- Involves developing methods to solve problems related to the environment
- Problems that can and do occur anywhere in the world

# Environmental Engineering

- Problems:

- Surface and groundwater pollution
- Air pollution
- Sanitary waste disposal
- Water treatment plants
- Recycling
- Hazardous waste disposal

# Environmental Engineering

- Schooling
- Technical School

# Environmental Engineering

- Salary
  - Median salary in North Dakota
    - \$40,050
  - Median Salary in the country
    - \$56,347

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2004 [www.payscale.com/research](http://www.payscale.com/research)

# Electrical Engineering

- A profession that requires knowledge of science, math, computers and other technology
- Strong problem-solving skills
- They design construct and maintain the many products, services and systems that run our world

# Electrical Engineering

- Work with devices and equipment ranging in size and power levels from
  - Very small (silicon-based integrated circuits)
  - Very large (power stations)
- They design, develop, test, and supervise the manufacturing of all types of electronic and electrical equipment

# Electrical Engineering

- The field grew and is now split into two sub fields:
  - Electrical = power stations and instrumentation
  - Electronic = solid state electronic, computer design and telecommunications

# Electrical Engineering

- Schooling
- B.S. degree
- Technical Schooling

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# Electrical Engineering

- Salary
  - Median salary in North Dakota
    - \$59,890
  - Median Salary in the country
    - \$62,209

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# Chemical Engineering

- To solve problems by creating new products or by using chemicals to connect science and manufacturing
- Uses several sciences like chemistry and physics

# Chemical Engineering

- Examples of their work
- Try to make new materials for clothing and carpeting that won't stain
- Take seawater and desalinate it
- Developing ceramic tiles to absorb heat for the space shuttle reentry

# Chemical engineering

- Employment
- Biotechnology
- City and Federal government
- Health Care
- Industry

# Chemical Engineering

- Education
  - Minimum B.S degree
    - Masters degree

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# Chemical Engineering

- Salary
  - Median salary in North Dakota
    - \$59,890
  - Median Salary in the country
    - \$62,209

# Nuclear Engineering

- Concerned with the design and construction and operation of nuclear reactors
- Involved with the control and maintenance of nuclear power plants

# Nuclear Engineering

- Employment
- Nuclear technology for medical diagnosis
- Development of submarines, ships and spacecraft (that will travel to Mars)
- Design waste management plants for hazardous waste material
- More than just Nuclear Weapons

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# Nuclear Engineering

- In 1996 there were 110 commercial reactors in 32 states
- 434 reactors in 33 countries
- U.S. greatest producer of Nuclear power
  - 31% of the worlds nuclear power
  - 22% of the energy in the U.S. comes from

# Nuclear Engineering

- U.S. greatest producer of Nuclear power
  - 31% of the worlds nuclear power
  - 22% of the energy consumed in the U.S. comes from nuclear power
  - 77% of the energy consumed in France comes from nuclear power
  - 6 states rely on nuclear power for more than 50% of their power
  - The closest reactor to us is in Minnesota
  - North Dakota get none of their power from Nuclear

# Nuclear Engineering

- Schooling
- B.S. Degree

# Nuclear Engineering

- Salary
  - Median salary in North Dakota
    - There are no jobs
  - Median Salary in the country
    - \$74,170

# Aerospace Engineering

- Combines aeronautical engineering (flights in our atmosphere) with astronautical engineering (flights in space).
- Involved in design of aircraft and spacecraft, propulsion systems, and spacecraft mission trajectories.

# Aerospace Engineering

- They have their roots in mechanical engineering
- Are experts in aerodynamics, propulsion, structures and astro-dynamics

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[www.enc.org/features/calendar/unit/0,1819,170,00.shtm](http://www.enc.org/features/calendar/unit/0,1819,170,00.shtm)

# Aerospace Engineering

- Types of Projects
  - Development of the space shuttle
  - New ways of delivering fuel to rockets
  - Protection of the shuttle from heat on reentry
  - Working on quieter, more fuel efficient airplanes

# Aerospace Engineering

- Schooling
- Masters degree

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# Aerospace Engineering

- Salary
  - Median salary in North Dakota
    - No information found
  - Median Salary in the country
    - \$46,289

# Suggestions

- Identify standards and benchmarks addressed by this information
- Make a title slide as your first slide (Course & Unit).
- Proof all the slides for grammar and spelling errors.