

The Engineering Disciplines

Exploring Engineering, Joe King

Major Branches of Engineering

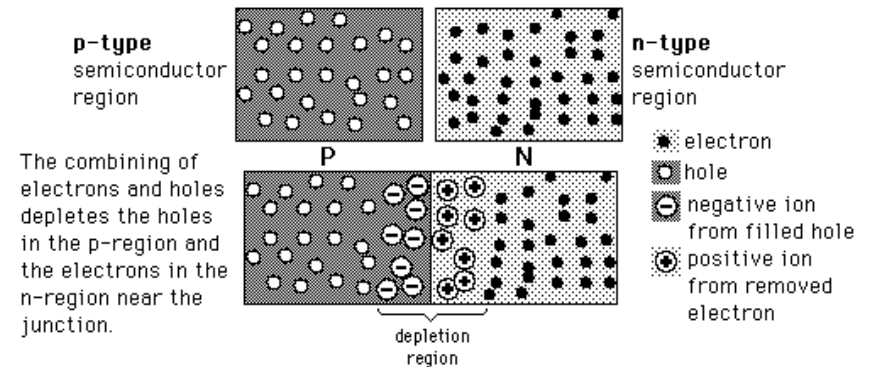
- Fairfield University School of Engineering
 - Electrical Engineering
 - Computer Engineering
 - Mechanical Engineering
 - Software Engineering
- Others
 - Civil Engineering
 - Industrial Engineering
 - Chemical Engineering
 - Aerospace Engineering
 - Etc.

Engineering Study Topics

- Physics
 - Electricity and Magnetism
 - Optics
 - Mechanics, Dynamics and Kinematics
 - Quantum Mechanics (Semiconductors)
- Mathematics
 - Calculus
 - Probability, Statistics
- Software
 - Testing
 - Embedded processors
- CAE – CAM - CAD

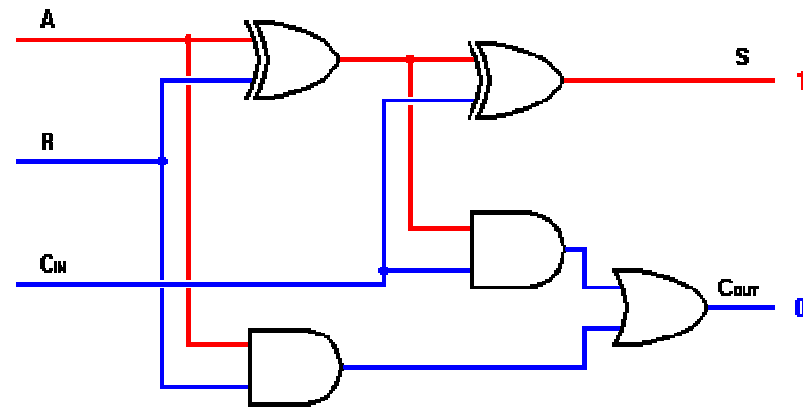
Electrical Engineering Specialties

- Power (PE desirable)
 - Generation and Transmission
 - Electronics
- Electronics
 - Consumer
 - Industrial
- Communications: Telecom., RF, Microwaves
- Computer Systems – see Computer Engineering
 - Digital Electronics
 - Peripherals
- IEEE



Computer Engineering

- Computer Systems
- Computer Networks
- Embedded Processors
- Programming
 - Software
 - Firmware
- IEEE, ACM



Mechanical Engineering

- Engines
 - Internal Combustion: Gasoline, Diesel
 - External Combustion: Jet, Gas Turbine, Steam
- Machines
- Materials
- Thermal: HVAC, packaging
- ASME, SAE



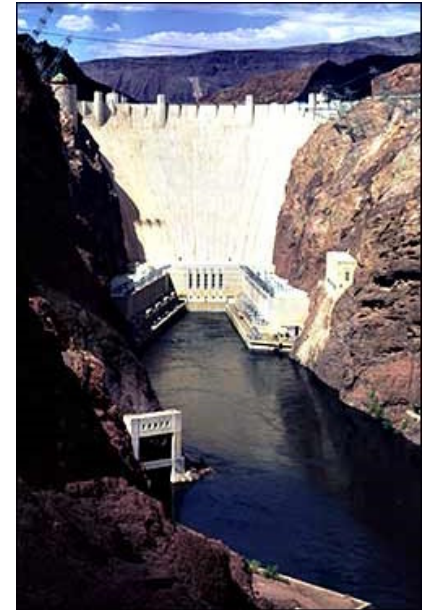
The Wankel Rotary Engine

Software Engineering

- Information Technology
 - Business processes
 - Client-Server applications
- Programming
 - System
 - Object Oriented
 - Embedded
- Distributed Computing
- IEEE, ACM

Civil Engineering

- Structures
 - Buildings
 - Airports
 - Bridges
 - Highways
 - Flood Control: Dams, Canals, Holding ponds, levees
- Sewage processing
- ASCE



The Hoover Dam

Industrial Engineering

- Production Methods
- Plant Facility Design
- Operations Research
(time-motion)
- Quality Control
- Cost Control

Chemical Engineering

- Processing Plant Design
 - Plastics
 - Oil Refineries
 - Fibers
 - Paper
 - Pollution Control
 - Waste Disposal



The Pascagoula Refinery, Mississippi

Aerospace Engineering

- Branches
 - Aeronautical: Aircraft Design
 - Aerospace: Spacecraft Design
- Complexity
- Interdisciplinary



A Boeing 777



The Columbia Space Shuttle

Others

- Environmental Engineering: specialized civil
- Materials Engineering: as stated
- Nuclear Engineering: energy generation
- Petroleum Engineering: specialized chemical
- Mining Engineering: specialized civil
- Biomedical Engineering: interdisciplinary & bio
- Agricultural Engineering: agri-science
- Manufacturing Engineering: Operations research, robotics
- Systems Engineering: A meta-specialty

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