Electronic & Electrical Engineering

Information for Stage 1 Students
March 2017

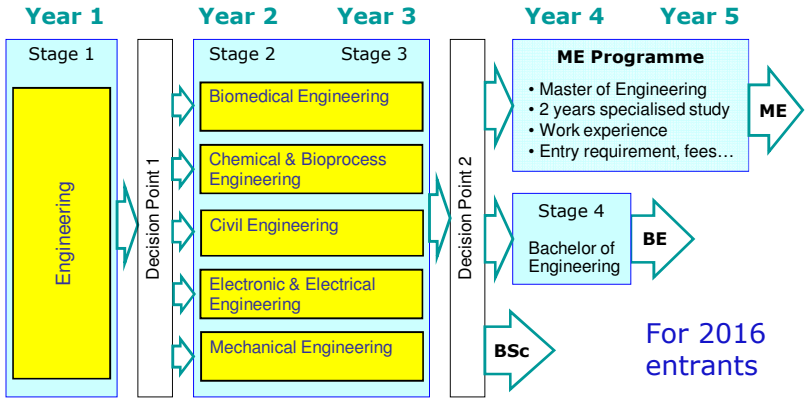
UCD School of Electrical and Electronic Engineering

Scoil na hInnealtóireachta Leictrí agus Leictreonaí UCD

Introductions

- Professor Tom Brazil – Electronic Engineering
- Professor Federico Milano – Electrical Engineering
- Ellen Le Bas – Stage 3 E&E student
- Deividas Rainys – final year ME student
  - Electrical Energy Engineering
- Robert Gilmore – final year ME student
  - Electronic & Computer Engineering
- Brian Mulkeen
  - lecturer, electronic engineering
  - programme coordinator, BE E&E engineering

UCD Engineering Pathways – DN150



For 2016 entrants

Why Choose Electronic/Electrical?

- Interesting and exciting field
  - technology is changing all the time
  - making possible new products, new systems…
  - you have an opportunity to be part of that!
- Broad field – specialise further later
  - within degree programme (more on this later…)
  - after graduation – where you work, what you do…
- Difficult field? ⇒ expertise is highly valued!
  - depends on your aptitude and interests
  - relies heavily on maths – design, analysis, etc…
  - computer – use as a tool, solve complex problems…
    - also write software, design hardware…

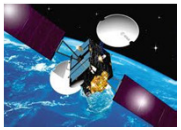
Electrical Engineering



- Electricity as a form of energy
  - for heat, light, transport, machines, etc.
  - usually large scale, high power…
- Electricity generation – renewable and other
- Electrical machines, electrical installations
  - in every building, domestic, commercial, industrial…
- Electricity transport – national and international
  - electricity grid is critical infrastructure in 21st century
  - "smart grid" also involves control, communications, optimisation, etc.

5

Electronic Engineering



- Electricity for information
  - computers – storing and processing information…
  - telecommunications – moving information…
  - entertainment – delivering content, gaming…
- Electricity for control
  - electronic controls in aircraft, cars, washing machines…
  - often hidden, now becoming connected…
- Usually low power – do more with less energy?

6

E&E Stage 2

- Solid-State Electronics
- Computer Engineering
- Digital Electronics
- Electronic & Electrical Circuits
- Multivariable Calculus

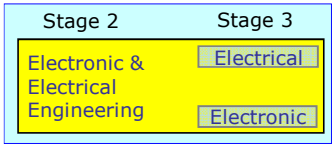
- Electronic Circuits
- Engineering Electromagnetics
- Electrical Energy Systems
- Statistics & Probability

Choose one of:
- Applied Dynamics
- Communication Systems

- Fundamentals of Electronic/Electrical Engineering
  - both areas build on the same principles
  - start to apply knowledge to real-world problems
  - lots of lab work, mostly in groups of two…

7

E&E Stage 3



Core modules:
- Multivariable Calculus 2
- Circuit Theory
- Computer Science for Eng. 2
- Signals & Systems
- Electromagnetic Waves
- Analogue Electronics
- Signal Processing
- Modelling and Simulation

Choose two of:
- Electrical Machines
- Power Systems Engineering
- Digital System Design
- Communication Theory

- Specialise further: Electrical or Electronic
  - by choosing two option modules
- More complex topics, but more interesting…
  - still plenty of laboratory & computer work

8

Study Abroad

- Usually in Stage 3
  - arranged through UCD International…
- Need GPA at least 3.0
  - same for all Engineering students
- 2014-15: 11 students
  - California, Maryland, Purdue, Texas, Montreal, Melbourne, Ningbo, Singapore
- 2015-16: 18 students
  - USA (13), Australia, Canada, China (2), Singapore
- 2016-17: 5 students
  - Australia, New Zealand, USA (2), Canada

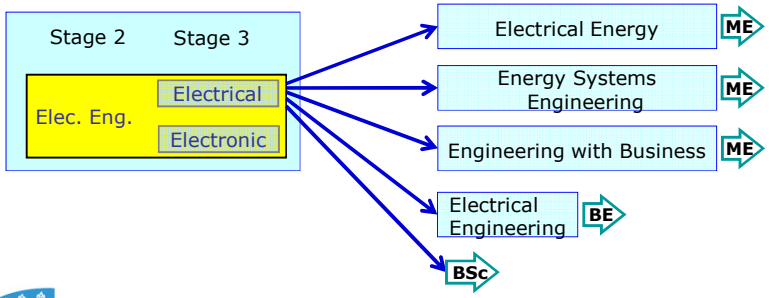
9

Decision at end of Stage 3

- Continue towards BE (bachelor of engineering)
  - four years in total
  - traditional qualification for professional engineer
- Enter ME (master of engineering) programme
  - two years specialised study (five years total)
  - various options available…
  - entry requirement, fees…
- Option to graduate with BSc (Engineering Science)
  - not professional qualification
  - for work, further study in another area
  - or ME programme elsewhere

10

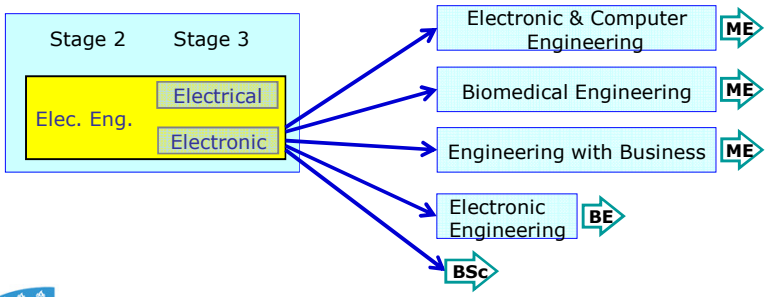
Electrical Engineering Choices



- Other options are possible…
  - these are the obvious paths in UCD at present
    - note ME Energy Systems also available from Mechanical route

11

Electronic Engineering Choices



- Other options are possible…
  - these are the obvious paths in UCD at present
    - note ME Biomedical also available from Biomedical route

12

BE - Electrical Engineering

- Core Modules
  - BE Project (15 credit)
  - Control Theory
  - Power System Operation
  - Power Electronics & Drives
  - Power System Design
  - Professional Engineering (Management)
  - Applications of Power Electronics
- Choose 3 options:
  - Renewable Energy Systems
  - Entrepreneurship in Engineering
  - Power Electronics Technology
  - Power System Dynamics & Control
  - Optimisation Techniques
  - Energy Economics & Policy
  - High Voltage & Protection Systems
  - Distributed Control & Optimisation
- Structures may change
  - list is for illustration only!

13

BE - Electronic Engineering

- Core Modules
  - BE Project (15 credit)
  - Control Theory
  - RF Electronics
  - Wireless Systems
  - Digital Communications
  - Professional Engineering (Management)
- Choose 4 options
  - Analogue Integrated Circuit Design
  - Digital & Embedded Systems
  - Processor Design
  - Photonic Engineering
  - Entrepreneurship in Engineering
  - Professional Engineering (Finance)
  - Power Electronics Technology
  - Advanced Signal Processing
  - Solid-State Electronics 2
  - Mixed-Signal Integrated Circuits
  - Neural Engineering
- Structures may change
  - list is for illustration only!

14

ME Programmes

- Two years of specialised study in chosen field
  - making five years in total
  - includes major project at Master level (20-25 credit)
  - includes work placement (usually 7 months, 30 credit)
    - UCD will arrange work placement!!
- Entry requirement
  - based on stages 2 and 3, weighted by factors 3 and 7
  - minimum GPA 2.8 (equivalent to C grade)
- Tuition fees
  - currently €7490 per year for EU students
  - may be able to pay for last year only…

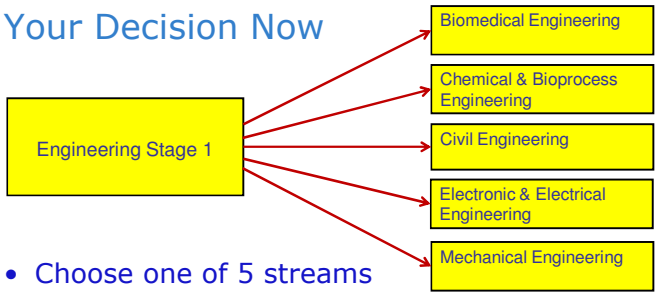
15

Scholarships

- Industry wants more graduates
  - so offering incentives to encourage more students
- Analog Devices Ireland
  - €2000 to one 3rd-year student continuing to BE Electronic or ME Electronic & Computer Engineering
  - €2000 to one student in 4th year, ME Elec. & Comp.
  - €2000 for best final result in ME Elec. & Comp.
- Intel Ireland
  - €3000 to each of 4 students with best Stage-3 GPA entering ME Electronic & Computer Engineering
- Terms and Conditions…

16

Your Decision Now



- Choose one of 5 streams
  - for stage 2 and following
  - all other decisions can be considered later
- Decision needed by Friday 7 April
  - electronic survey form
  - arranged by engineering programme office

17

Deividas Rainys
ME Electrical Energy Engineering

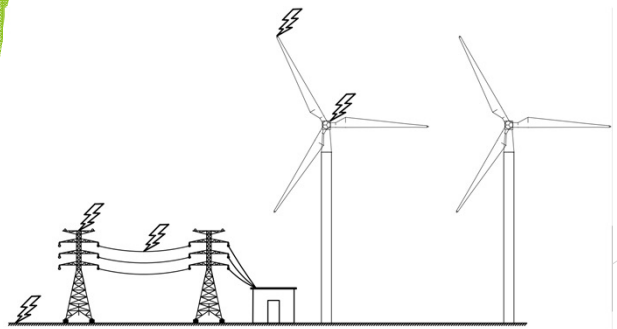
- Why electronic & electrical engineering?
- Stage 2 & 3
- BE/ME?
  - Necessary to become chartered in future
  - Internship
  - Taste for thesis writing
    - PhD?

Internship

premium power

- Taste for industry
- Work culture
- Arc Flash
- Power Quality

Development of a procedure for optimal protection of wind farms against lightning strikes



What's next?

- Finish writing thesis
- Continue working for Premium Power
  - Plenty of graduate positions everywhere