

Electrical Engineering at the University of Alberta

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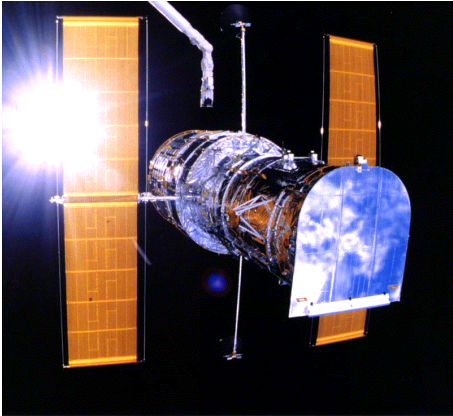
EE Program Director



**UNIVERSITY OF
ALBERTA**



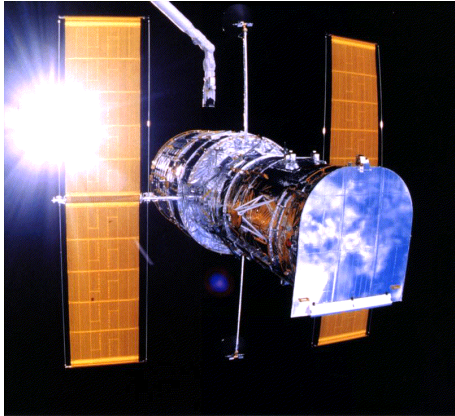
**ELECTRICAL AND COMPUTER
ENGINEERING**



Electrical Engineering Curriculum



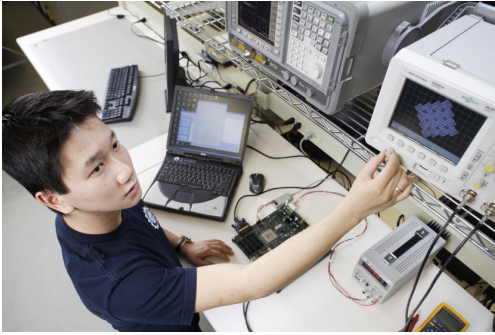
- Covers all core activities of the electrical engineering profession.
- The 4th year of the Program includes ~6 elective courses that allow students to explore their areas of interest.
- Lots of good job opportunities after graduation in Alberta and Canada.



Outline



- Second year
 - List of courses
 - Pre/co-requisite dependencies
 - What you will learn by the year end
- Third year
 - List of courses for Electrical and Electrical: Nanoengineering option
 - Pre/co-requisite dependencies
 - What you will learn by the year end
- Fourth year
 - List of courses for Electrical and Electrical: Nanoengineering option
 - Technical electives



Second Year



Common to both program options

Fall Term

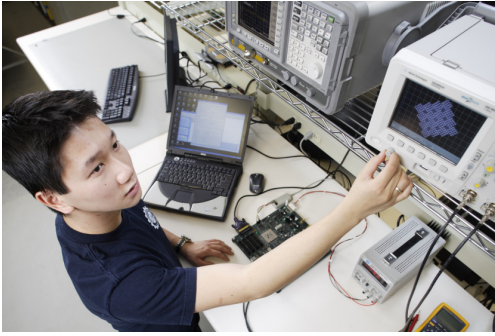
ECE 201: Today's course!
ECE 202: Electrical Circuits I
ECE 210: Introduction to Digital
Logic Design
Math 201: Differential Equations
Math 209: Calculus III
Group I (Interdisciplinary)
Program Elective *
English Elective

* From CH E 243, MAT E 201 and MEC E 250

Winter Term

ECE 203: Electrical Circuits II
ECE 212: Introduction to
Microprocessors
ECE 220: Programming for E. Eng
ECE 240: Cont. Time Signals and
Systems
PHYS 230: Electricity and
Magnetism
Complementary Studies Elective **

** See Sec. 84.6 of Calendar for a list of courses



Second Year's Pre/Co-Requisite Dependencies



Electrical (& Electrical: Nanoeng Option)																	
Year 2																	
	<table border="1"> <thead> <tr> <th>Term 3</th> <th>Term 4</th> </tr> </thead> <tbody> <tr> <td>ECE 201 (1 day)</td> <td>ECE 203 (3-1s-3/2)</td> </tr> <tr> <td>ECE 202 (3-1s-3/2)</td> <td>ECE 212 (3-0-3/2)</td> </tr> <tr> <td>ECE 210 (3-0-3/2)</td> <td>ECE 220 (3-0-3/2)</td> </tr> <tr> <td>MATH 201 (3-0-1)</td> <td>ECE 240 (3-1s-0)</td> </tr> <tr> <td>MATH 209 (3-0-1)</td> <td>PHYS 230 (3-0-3/2)</td> </tr> <tr> <td>Group I Program Elective</td> <td>Complementary Studies</td> </tr> <tr> <td>English Elective (3-0-0)</td> <td>Elective</td> </tr> </tbody> </table>	Term 3	Term 4	ECE 201 (1 day)	ECE 203 (3-1s-3/2)	ECE 202 (3-1s-3/2)	ECE 212 (3-0-3/2)	ECE 210 (3-0-3/2)	ECE 220 (3-0-3/2)	MATH 201 (3-0-1)	ECE 240 (3-1s-0)	MATH 209 (3-0-1)	PHYS 230 (3-0-3/2)	Group I Program Elective	Complementary Studies	English Elective (3-0-0)	Elective
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Group I Program Elective	Complementary Studies																
English Elective (3-0-0)	Elective																
Math 101 → Math 102 →	(Arrows from Term 3 courses point to Term 4 courses: ECE 202 to ECE 203, ECE 210 to ECE 212, MATH 201 to ECE 240, MATH 209 to PHYS 230)																

(Information as general guideline only; always consult the UofA Calendar.)



At the end of the second year you will:

- Have a good understanding of **electrical circuits**
 - Circuits are the bread and butter of electrical engineering
 - Very important in future courses in electronics, power systems, etc.
- Have a good understanding of **digital systems**, including how computers and most digital systems work (digital clocks, audio systems, etc.)
- Be competent **programming** and using computers in engineering applications.
- Understand the concept of **electric signals**, and mathematical **models of dynamical systems**.
 - very important for understanding of radio transmission.
 - also important to the understanding of control systems.



Third Year Regular Program



Fall Term

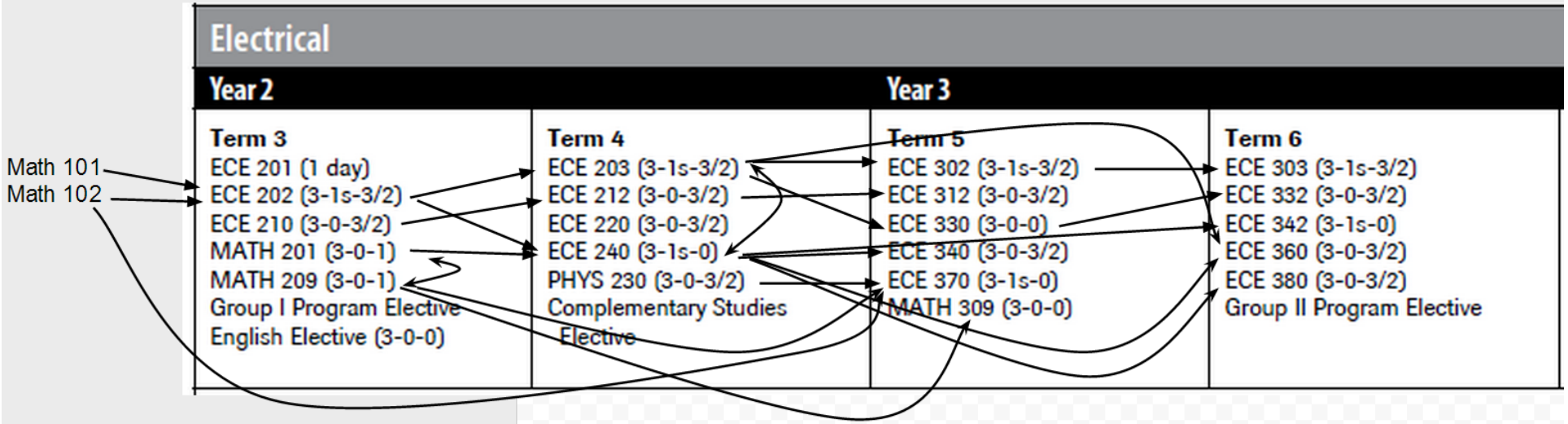
ECE 302: Electronic Devices
ECE 312: Embedded System
Design
ECE 330: Introduction to Power
Engineering
ECE 340: Discrete-time Signals
and Systems
ECE 370: Eng. Electromagnetics
Math 309: Math Methods for EE

Winter Term

ECE 303: Analog Electronics
ECE 332: Electric Machines
ECE 342: Probability for ECE
ECE 360: Control Systems I
ECE 380: Introduction To
Communication Systems
Group II Program Elective

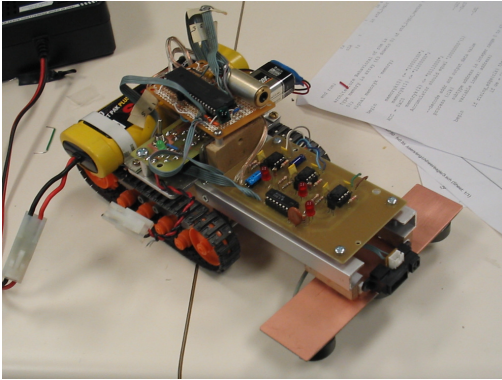


Second and Third Years' Pre/Co-Requisite Dependencies



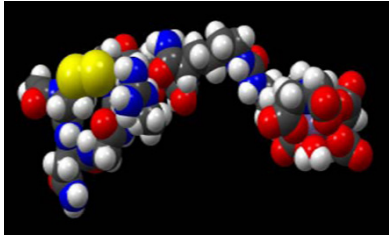
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- **Failing 2nd year courses can delay your graduation by a year!!**
- Among the 2nd year courses, Group I Program Elective, English Elective, and Complementary Studies Elective can be taken at a later time.
- In the 3rd year, failing ECE 302 or ECE 330 is most consequential.

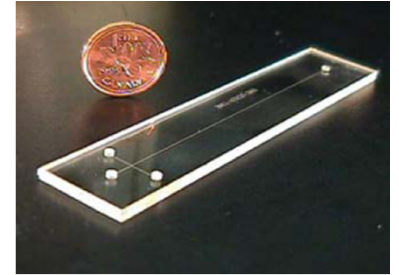


At the end of the third year you will:

- Have a good understanding of **electronic devices** and how to use them to implement electronic circuits.
 - you will have the opportunity to design (and see working!) an amplifier and a power supply.
- Understand **power systems**, power distribution, and power machines (electric motors, generators, transformers, etc.)
- Understand how **communication systems** work (AM, FM signals, digital communications, etc.)
- Understand **electromagnetic radiation**.
- Understand **digital signals** and how to manipulate them.
- Understand **control systems**.



Third Year Nanoengineering Option

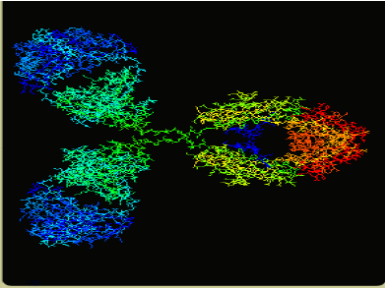


- The third year in the Nano Option is very similar to that in the regular program.
- Students in this option do Not take ECE 330 Power Systems and ECE 332 Power Machines. Instead they take:

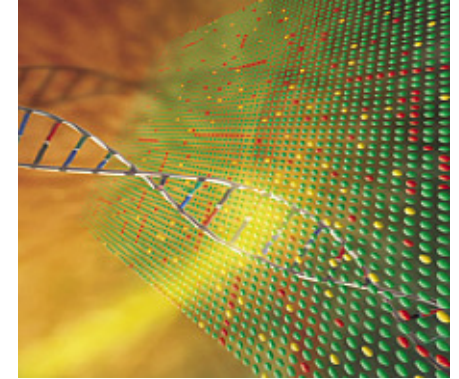
ECE 341: Analytical methods in EE

ECE 450: Nanoscale phenomena in electronic devices

ECE 456: Introduction to nanoelectronics

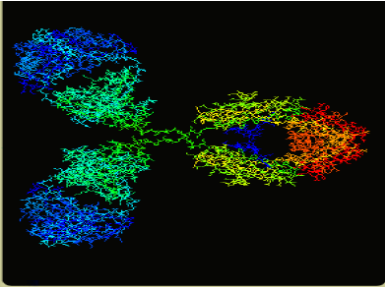


Fourth Year Regular program

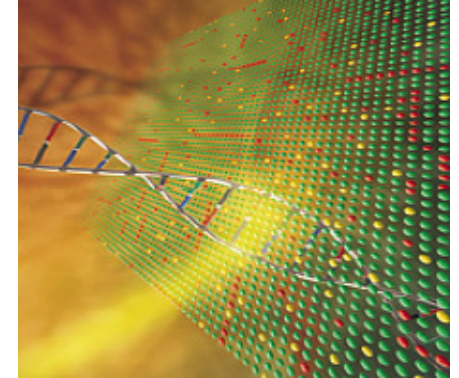


- Capstone design ECE 490 and ECE 491
- The rest of the courses and primarily technical electives.

Year 4	
Term 7 ECE 490 (1-0-3) Group I Program Elective Group II Program Elective Group II Program Elective Group II Program Elective Complementary Studies Elective (3-0-0)	Term 8 ECE 491 (1-0-3) ENG M 310 (3-0-0) or 401 (3-0-0) ENGG 400 (1-0-0) Group II Program Elective Group II Program Elective Group II Program Elective ITS Elective (3-0-0)



Fourth Year Nanoengineering Option



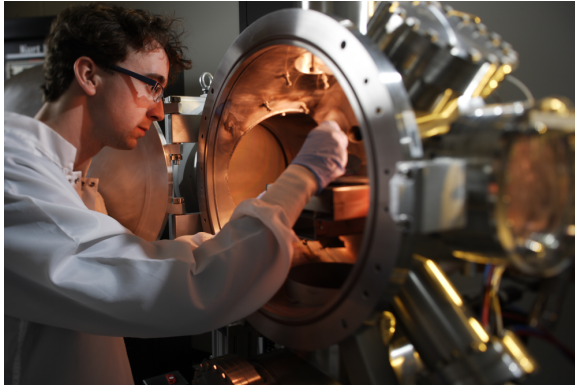
- Same as the regular program except that students in the Nano Option also take the following compulsory courses:

ECE 457: Microfabrication and Devices

ECE 471: Photonics I

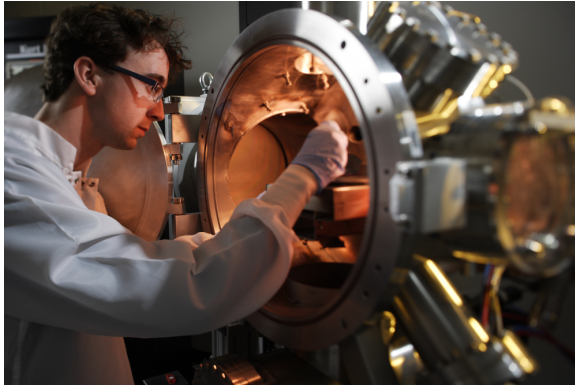
ECE 475: Optoelectronics and Photovoltaic Devices

Year 4	
<p>Term 7</p> <p>ECE 457 (3-0-2)</p> <p>ECE 471 (3-0-3/2)</p> <p>ECE 490 (1-0-3)</p> <p>Complementary Studies Elective (3-0-0)</p> <p>Group II Program Elective</p> <p>Group II Program Elective</p>	<p>Term 8</p> <p>ECE 475 (3-0-0)</p> <p>ECE 491 (1-0-3)</p> <p>ENG M 310 (3-0-0) or 401 (3-0-0)</p> <p>ENGG 400 (1-0-0)</p> <p>Complementary Studies Elective (3-0-0)</p> <p>Group II Program Elective</p> <p>Group II Program Elective</p>



Technical Electives (TEs)

- A lot to choose from – the department offers more than 40 TEs.
- **TEs cover all areas (power systems, control, electronics, multimedia systems, image processing, antenna design, etc.)**
- Choosing TEs you will have the opportunity to shape your career by focusing on the area(s) that you most like.
- **Sec. 84.5.4 Electrical of the Calendar** about Group II Electives:
*Of the seven program electives in this group, at least 3 must be from
ECE 304, 401, 402, 403, 410, 432, 433, 440, 442, 449, 450, 457, 460,
461, 471, 475, 485
and at most 2 program electives may be chosen from
BME 513
ECE 405, one of 408 or 409, 412, 413, 452, 487.
The other program electives may be chosen from
ECE 341, 430, 434, 456, 458, 464, 472, 474, 476, 478, 486, 489*



Technical Electives (TEs)

- **Sec. 84.5.4.2 Electrical: Nanoengineering Option of the Calendar**

about Group II Electives:

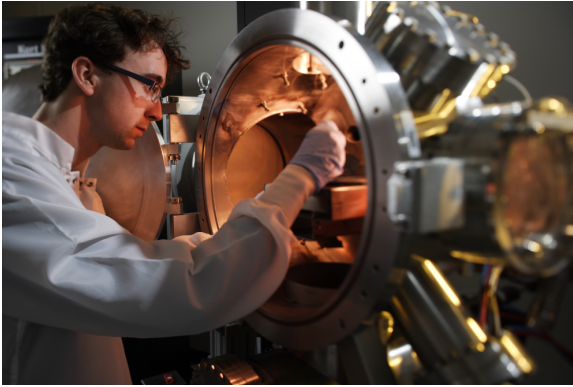
Of the 4 program electives in this group, at least 2 must be from

ECE 304, 452, 457, 458, 475

and the remainder from

BME 513, 553, 564

ECE 330, 332, 380, 401, 402, 403, 405, one of 408 or 409, 410, 430, 440, 449, 455, 460, 464, 472, 474, 476, 478.



Help with course selection

- There will be plenty of help provided to select your courses. Consult

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- Download this presentation:
<http://www.ece.ualberta.ca/~mtavakol> (click on Courses)