VILLANOVA UNIVERSITY

Department of Electrical and Computer Engineering
Spring 2023 - Computer Engineering Registration Information

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Registration Procedure

The date you are to register for your Spring 2023 courses will be on your MYNOVA page under My Schedule and Registration.

- Included in this registration packet is the CPE curriculum for the Class of 2023, 2024, 2025 and 2026.

- The Registration Form is electronic and is available from your advisor or on Blackboard. In Blackboard, when you are looking at MyCourses, there is a category on the right called My Organizations. You should have College of Engineering Resources there. If you do not, under the Organization Catalog, click Browse Organization Catalog. Then in the search, type in College of Engineering Resources and hit enter. It doesn't look like it does anything, but it will give you a result on that page if you scroll down. You should see egr_resources under Organization ID. Hover over that and a menu pops up with enroll and an X. Click enroll and you are in.

  - Once you have the College of Engineering Resources, click it and then click on the folder ECE Spring 2023 Registration materials. You will find the EE and CPE packets as well as registration forms for each year and major.
  - Please check to make sure you have the correct form for your year and major and that you digitally sign it when you are done. First save the file, and then open in Adobe. Only Adobe acrobat or Adobe Reader works for this. There is one for each year for EE's and CPE's.
  - If you are very out of sequence, you can download the blank form and fill in all your classes that way. Otherwise, just highlight and strikethrough any courses you already took, and add classes not on the list in the blank lines.

- Meet with your academic advisor to discuss your overall academic plan (e.g. minor, ROTC, Electives, 5-year BS/MS Program, Study Abroad, pre-law, pre-med, work/study, etc.). Your academic advisor is found through MYNOVA.

- Depending on your academic plan, it may be possible for you to take one or more of your electives sooner rather than later in the curriculum (subject to prerequisites, of course). Your academic advisor can assist you in rearranging your electives to meet your academic plan.

- During this meeting, once you and your advisor agree to an academic plan for the upcoming semester, your advisor will also sign the form digitally. You will receive your NOVASIS Registration PIN either on this form or via email based on advisor and/or your preference.

- On your registration date, go to the MyNova, Log into Registration and enter your Spring pin.

- Please keep in mind that the ECE Departmental Registration Form is a commitment as to the courses you and your academic advisor have agreed upon for the upcoming semester. **Other than picking a different section of the same course, under no circumstance are you permitted to deviate from the courses on the registration form** without prior written (email is acceptable) approval from your academic advisor.

- All ECE forms can be found on Blackboard. Under My Courses, on the right hand side is link College of Engineering Resources. Click on that link, and then click on ECE Resources. Select the file you need and fill it out using Adobe.

Computer Engineering Curriculum – Class of 2023, 2024 and 2025

134 Credits

Freshman Year First Semester		Credits	Freshman Year Second Semester		Credits
CHM 1151	General Chemistry I	4	ACS 1001	Moderns	3
CHM 1103	General Chemistry Lab I	1	ECE 1620	Egr. Prog. & Applic.	3
ACS 1000	Ancients	3	ECE 1205	Egr. Interdisciplinary Proj. II	3
EGR 1200	Egr. Interdisciplinary Proj. I	3	MAT 1505	Calculus II	4
MAT 1500	Calculus I	4	PHY 2400	Physics I Mechanics	3
THL 1000	Christian Life and Faith	3			
EGR 1001	Freshman Career Compass	0.5	EGR 1002	Freshman Career Compass	0.5
Total Credits		18.5	Total Credits		16.5

Sophomore Year First Semester		Credits	Sophomore Year Second Semester		Credits
ECE 2044	Fund Comp Engineering II	3	CSC 1300	Discrete Structures	3
ECE 2045	Fund Comp Engineering II Lab	1	ECE 2042	Fund Comp Engineering I	3
ECE 2409	Fundamentals of MATLAB	2	ECE 2043	Fund Comp Engineering I Lab	1
ECE 2620	C++, Algorithms & Data Struct	4	ECE 2030	Electric Circuits	3
MAT 2705	Diff Equation with Linear Alg	4	ECE 2031	Electric Circuits Lab	1
PHY 2402	Physics II Elec & Magnet	3	ECE 2800	Prof. Dev. Seminar	2
			ELECTIVE	Science or Math	3
EGR 2003	Sophomore Career Compass	0.5	EGR 2004	Sophomore Career Compass	0.5
Total Credits		17.5	Total Credits		16.5

Junior Year First Semester		Credits	Junior Year Second Semester		Credits
ECE 3600	Operating Systems	3	ECE 3476	Cybersecurity	3
ECE 3445	Computer Architecture	4	ECE 3245	Discrete-Time Signals & Sys	3
ECE 3450	Digital Electronics	3	ECE 3230	Discrete-Time Signals & Sys Lab	1
ECE 3720	Eng Probability & Statistics	3	ECE 3971	Design Seminar - ECE	2
ELECTIVE	THL course (2000 or above)	3	ECE 4470	Computer Networks	4
CSC 2014	Java Bootcamp	1	ELECTIVE	Ethics**	3
EGR 3005	Junior Career Compass	0.5	EGR 3006	Junior Career Compass	0.5
Total Credits		17.5	Total Credits		16.5

Senior Year First Semester		Credits	Senior Year Second Semester		Credits
ECE 4971	Design Project - ECE	3	ECE 4973	Design Project Report - ECE	1
ELECTIVE	Humanities from THL, PHI, ETH, PJ, EGR 2001	3	ELECTIVE	Technical*	3
			ELECTIVE	Elective***	3
ELECTIVE	Technical *	3	ELECTIVE	Elective***	3
ELECTIVE	Elective***	3			
ELECTIVE	Elective***	3	CSC 4181	Compiler Construction	3
			ELECTIVE	Free	3
Total Credits		15	Total Credits		16

* Technical electives chosen from the ECE departmental list of approved courses.
** Ethics-based Elective chosen from: ETH 2050, NS 4200, PHI 2115, PHI 2121, PHI 2130, PHI 2155, PHI 2180, PHI 2550,PHI 4125, PJ 5400, SBI 2006, and VSB 2007.
*** Professional Electives, pre-approved by student's Academic Advisor, for the pursuit of minors, concentrations, and other academic plans.

COMPUTER ENGINEERING CURRICULUM - CLASS OF 2026

131 credits

Freshman Year First Semester	Credits	Freshman Year Second Semester	Credits
ACS 1000 - Ancients	3	ACS 1001 - Moderns	3
THL 1000 - Faith, Reason, and Culture	3	MAT 1505 - Calculus II	4
MAT 1500 - Calculus I	4	PHY 2400 - Physics I Mechanics	3
CHM 1151 - General Chemistry I	4	ECE 1205 – ECE Freshman Projects	3
CHM 1103 - General Chemistry Lab I	1		
EGR 1200 - Egr. Interdisciplinary Proj. I	3	ECE 1260 - Egr Prog & Applic	3
		ECE 1261 - Egr Prog & Applic lab	1
EGR 1001 Freshman Career Compass	0.5	EGR 1002 Freshman Career Compass	0.5
Total Credits	18.5	Total Credits	17.5

Sophomore Year First Semester	Credits	Sophomore Year Second Semester	Credits
ECE 2170 – Fundamentals of CPE	3	ECE 2172 – Digital Systems	3
ECE 2171 – Fundamentals of CPE Lab	1	ECE 2173 – Digital Systems Lab	1
ECE 2160 – C++ Alg. & Data Structures	3	ECE 2030 – Circuits I	3
ECE 2161 – C++ Alg. & Data Structures lab	1	ECE 2031 – Circuits I Lab	1
MAT 2705 - Diff Equation with Linear Alg	4	ECE 2800 – Professional Development	2
PHY 2402 - Physics II Elec & Magnet	3	CSC 1300 – Discrete Systems	3
CSC 2014 – Java Bootcamp	1	ELECTIVE – Science or Math	3
EGR 2003 – Sophomore Career Compass	0.5	EGR 2004 – Sophomore Career Compass	0.5
Total Credits	16.5	Total Credits	16.5

Junior Year First Semester	Credits	Junior Year Second Semester	Credits
ECE 2292 – Probability and Statistics	3	ECE 3240 – Fund. Of Signal Processing	3
ECE 3600 – Operating Systems	3	ECE 3180 – Computer Networks	3
ECE 3170 – Computer Architecture	3	ECE 3476 – Comp. and Networks Security	3
ECE 3171 – Computer Architecture lab	1	ECE 3971 - Design Seminar - CPE	2
ECE 3450 – Digital Electronics	3	CSC 1700 – Analysis of Algorithms	3
ELECTIVE - THL course (2000 or above)	3	ELECTIVE - Ethics**	3
EGR 3005 – Junior Career Compass	0.5	EGR 3006 – Junior Career Compass	0.5
Total Credits	16.5	Total Credits	17.5

Senior Year First Semester	Credits	Senior Year Second Semester	Credits
ECE 4971 - Design Project - CPE	3	ECE 4973 - Design Project Report - CPE	1
ELECTIVE – Humanities (THL, PHI, ETH etc)	3	ELECTIVE – Elective***	3
ELECTIVE - Technical	3	ELECTIVE – Technical	3
ELECTIVE - Elective***	3	ELECTIVE - Elective***	3
ELECTIVE – Elective***	3	ELECTIVE - Free	3
Total Credits	15	Total Credits	13

Humanities and Theology

Computer Engineering majors are required to take:

1. Theology (THL). (2 required classes)
   a. THL 1000 - Christian Theology: An Introduction,
   b. One three-credit theology course at the 2000 level or above or a course with the CTHL attribute.

2. One 3-credit course from (Listed as HUM elective):
   a. Theology (THL) course 2000 or above
   b. Any course with CTHL attribute
   c. Philosophy(PHI)
   d. Peace and Justice (PJ)
   e. ETH 2050 The Good Life: Ethics & Cont Prob
   g. EGR 2930 Catholic Social Teaching for EGRS
   h. CRM 1001 Intro to Criminology

3. One Ethics-based elective course selected from:
   a. ETH 2050 - The Good Life: Ethics & Cont Prob
   b. PHI 2115 - Ethics for the Health Care Profession
   c. PHI 2121 - Environmental Ethics
   d. PHI 2130 - Business Ethics
   e. PHI 2155 - Engineering Ethics
   f. PHI 2180 - Computer Ethics
   g. PHI 2550 - Technology and Society
   h. PHI 4125 - Bioethics
   i. PJ 5400 – Ethics, Justice and the Family
   j. NS 4200 - Leadership and Ethics
   k. SBI 2006 - Corporate Responsibility
   l. VSB 2007 – Corporate Responsibility and Regulation

Note that classes cannot be double counted, i.e. ETH 2050 can't satisfy both 2 and 3 above.

Science or Math Elective

This elective is chosen from the following list:
   AST 1072, 1074, 2120, 2121, 2122, 2123
   BIO 1055 – 9999
   CHM 1152 – 9999
   GEV 1050, 1051, 1750
   MAT 2500, 2600, 2930, 3000 – 9999
   MET 1221, 1222, 2001
   PHY 2414, 2416, 4000 – 9999

Computer Engineering Technical Electives

COMPUTER ENGINEERING SPRING 2023 SENIOR ELECTIVE OFFERINGS

COURSE	INSTRUCTOR	DAY / TIME
ECE 5170 Intro to Post Quantum Computing	Dr. Xie	TR 1:00 pm – 2:15 pm
ECE 5400 Applied Machine Learning	Dr. Jiao	MW 3:20 pm – 4:35 pm
ECE 5478 Eng Secure Cyber-Physical Systems	Dr. Gochhayat	TR 4:00 pm – 5:15 pm
ECE 5770 Organs on a Chip	Dr. Wynne	TR 10:00 am – 11:15 am
CSC 4480 Principles of Database Systems	Dr. Margapuri	MWF 9:35 am -10:25 am* OR MWF 12:50 pm -1:40 pm
CSC 4500 Artificial Intelligence	Dr. Klassner	T 6:15 pm – 8:45 pm
CSC 4700 Software Engineering	Dr. Obermyer	TR 10:00 am – 11:15 am * OR TR 11:30 am – 12:45 pm

* classes are CSC students only until that restriction is removed, probably around 11/14/21

Approval Needed for the following Graduate level courses:

COURSE	INSTRUCTOR	DAY / TIME
ECE 7231 Applied DSP	Dr. Amin	M 3:00pm – 5:30pm
ECE 8405 Computer Organization and Design	Dr. Hepler	W 6:15pm – 8:55pm
ECE 8448 Embedded Systems Architecture	Dr. Wang	R 3:00pm – 5:30pm
ECE 8450 Computer Organization and Design	Dr. Juretus	T 3:00pm – 5:30pm
ECE 8484 Cybersecurity Threats & Defense	Mr. Mayer	W 6:15pm – 8:55pm
ECE 8491 Blockchain Technology & Uses	Dr. Sudler	R 6:15pm – 8:55pm

ECE 8492   Mr. Mayer   M 6:15pm – 8:55pm
Secure Software Development

Other Computer Engineering Electives

Science or Mathematics Elective

A Science or Mathematics course, pre-approved by your Academic Advisor, for the pursuit of minors, concentrations, and other academic plans. **Please note that a lower-level course than coursework previously taken is not eligible as an elective. I.E. MAT 1250 will not count as this elective.**

Professional Electives

Electives, pre-approved by your Academic Advisor, for the pursuit of minors, concentrations, and other academic plans. They should all be in the same general category.

Free Elective

Students can take any course listed in the University Catalog to fulfill their free elective requirement, provided the prerequisites are satisfied and it is not a lower level course that has been completed in that subject area.

Other Academic Plans

MINORS / CONCENTRATIONS

Computer and Electrical Engineering majors may use their Professional Electives, EE Science or Technical or Math Elective, and Free Elective in pursuit of a minor / concentration.

Please note that applying these electives towards a minor / concentration is not a requirement; other academic plans are permissible subject to the approval of your Academic Advisor.

It should be noted that some minors require more courses than the number of slots provided by the above electives; so, to accommodate the additional courses of a minor, a qualified student may need to overload during the regular academic year with permission of his/her Academic Advisor. Other options to accommodate the additional courses of a minor include using open slots created by Advanced Placement credits or from taking courses during the summer with pre-approval of your Academic Advisor and the ECE Department. As you can see, **it is very important to meet with your Academic Advisor early in your curriculum to discuss and schedule your academic plan.**

Note that minors do not appear on the diploma, only on the transcript. In addition, it is important to note that some minors / concentrations require that all of the required courses be taken at Villanova University. For other minors / concentrations, some transfer credits may apply. Therefore, **it is very important that you meet with the chair or academic advisor of the university department sponsoring the minor / concentration for specific details and requirements**.

Popular minors / concentrations of Electrical Engineering and Computer Engineering majors include but are not limited to the following:

Astronomy Minor
Bioengineering Minor
Business Minor or Summer Program for Business Minor
Cognitive Science Concentration or Minor
Computer Engineering Minor
Computer Science Minor
Cybersecurity Minor
Electrical Engineering Minor
Entrepreneurship Minor
Mathematics Minor
Mechatronics Minor
Physics Minor

Study Abroad

ECE Students interested in studying abroad should consult the International Studies website at:
http://www.villanova.edu/vpaa/intlstudies/
and meet as soon as possible with the ECE Study Abroad Advisor: Mr. Edward Char (Tolentine 408), for information and advisement.

Pre-Med Advising

ECE Students interested in pursuing post-graduate study in one of the health professions (e.g. medicine, veterinary medicine, etc.) should consult the Careers in Health Professions website at:
https://www1.villanova.edu/villanova/artsci/undergrad/resources/health.html
and meet as soon as possible with an advisor in Mendel Hall, Room 143 Phone: (610) 519-4833
Email: hpa@villanova.edu
Also, see:
https://www1.villanova.edu/villanova/artsci/undergrad/resources/health/events.html
for the calendar of meetings for students interested in the health professions.

Five-Year Bachelor's/Master's Program

Details regarding this program can be found at:
https://www1.villanova.edu/villanova/engineering/departments/ece/graduate/degreeRequirements-cpe.html
Note: if you are planning on double counting courses for both the CPE tech electives and the grad courses, for either the CPE or Cyber grad areas, the courses need to be included in the curriculum.

For the Masters in CPE, the list of approved classes are:

Required Core Courses
ECE 7428 - Computer Comm Networks
ECE 8448 - Embedded Systems Architecture
ECE 8473 - UNIX and C Programming

Area Courses (Choose at least three)
ECE 8405 - Computer Organ & Design
ECE 8408 - Mob Computing & Wireless Net
ECE 8007 - Matrix Theory
ECE 7428 - Computer Comm Networks
ECE 8408 - Mob Computing & Wireless Net
ECE 8408 - Mob Computing & Wireless Net
ECE 8410 - Trusted Computing
ECE 8415 - Cyber-Physical Systems
ECE 8420 - High-Performance Computing
ECE 8440 - Hardware Sys Des & Modeling
ECE 8455 - Adv. Digital Des. Using FPGAs
ECE 8460 - VLSI Design
ECE 8490 - Th. and Prac. of Comput. Appl.

Electives
Any course from the area courses above may also count as an elective. At least two of the electives must be ECE courses. Courses not listed here may count as electives with approval of the advisor.
ECE 8007 - Matrix Theory

ECE 8476 - Cryptography & Netwk. Security
ECE 8484 - Cybersec. Threats and Defense
ECE 8485 - Control Systems Security
ECE 8486 - Ethical Hacking
CSC 8301 - Design and Ana of Algs
CSC 8470 - Computer Graphics
CSC 8490 - Database Systems
CSC 8580 - Network Mgmt & Perf
CSC 8610 - Multimedia Technology
CSC 9010 - Special Topics
MAT 7770 - Number Theory
MAT 8435 - Mathematical Modeling
ECE 9030 - Independent Study
ECE 9031 - Research I
ECE 9032 - Research II
ECE 9090 - ECE Project

For Cybersecurity, this list is:

Core Courses

ECE 8476 - Cryptography & Netwk. Security
ECE 8484 - Cybersec. Threats and Defense

Tracks and Courses (min of 4, up to 8 courses)

Systems Specialization

ECE 8410 - Trusted Computing
ECE 8485 - Control Systems Security
ECE 8492 - Secure Software Development
ECE 8498 - CyberPhysical System Security

Policy Specialization

ECE 8488 - Security Risk Assess. & Man.
ECE 8494 - Legal Aspects of Comp Security
ECE 8495 - Cybersec Behavioral Analytics

Operations Specialization

ECE 8486 - Ethical Hacking
ECE 8489 - Malware Analysis and Defense
ECE 8491 - Blockchain Techno and Uses
ECE 8496 - Computer Forensics

Electives: (upto 4 courses)
In addition to the above courses, any of the specialization area courses may be used as electives.
Courses not listed here may count as electives with approval of the advisor.
ECE 7428 - Computer Comm Networks

ECE 8405 - Computer Organ & Design
ECE 8408 - Mob Computing & Wireless Net
ECE 8448 - Embedded Systems Architecture
ECE 8473 - UNIX and C Programming
ECE 9030 - Independent Study
ECE 9031 - Research I
ECE 9032 - Research II
ECE 9090 - ECE Project
CSC 8301 - Design and Ana of Algs
CSC 8490 - Database Systems
CSC 8530 - Distributed Systems
CSC 9010 - Special Topics (with approval of the advisor)
MAT 7770 - Number Theory
MAT 8650 - Abstract Algebra

Select MBA Electives:

Selected MBA courses are also available as electives. Registration requires approval of the academic advisor and school of business. (These may change, check with the School of Business to make sure these are still acceptable).

MBA Required Courses offered to Engineering students
MBA 8150 - Perf Msrmt & Rep Global Acctng
MBA 8250 - Bus. Oper. in the 21st Century
MBA 8350 - Analyzing and Leveraging Data
MBA 8550 - Team Leadership & Grp Dynamics
MBA 8650 - Strategic Marketing Mgmt.
MBA 8710 - Info Tech as Strategic Lever
MBA 8720 - Ethical Business Practices
MBA 8730 - Mgmt. for Innov. & Creativity
MBA 8740 - Global Political Economy
MBA Elective Courses for Engineering students
MBA 8139 - Contemporary Topics
MBA 8144 - Mobile Applications
MBA 8147 - Analytics in Sports Business
MBA 8330 - Contemporary Topics Economics
MBA 8522 - Talent Management
MBA 8529-001 - Contemporary Mgt Topics
MBA 8529-002 - Contemporary Mgt Topics
MBA 8537 - Intro to Data Mining
MBA 8546 - Opp. Recognition & Pre Launch
MBA 8631 - Exec Level Selling C-Suite
MBA 8632 - Cons Psy Optimal Bus Solutions
MBA 8643 - Mgmt & Mkt of Services-Part I
MBA 8644 - Mgmt & Mkt of Services-Part II
MBA 8649 - TOP: Cons Psy for Opt Bus Sol
MBA 8649 - TOP: Cons Psy for Opt Bus Sol
MBA 8800 - Commercial Real Estate Invest.

Satisfactory/Unsatisfactory Option

- An ECE student may take **one non-major elective course per semester** on an S/U basis subject to the approval by the ECE Academic Advisor. **An ECE student cannot take a specified technical or non-technical course on an S/U basis**.
- A student must register on NOVASIS for the S/U option for the approved course before the end of the Drop/Add period.
- Grades of Satisfactory (equivalent to a "C" or better) and Unsatisfactory (equivalent to a "C-" or worse) are shown on the transcript but not included in the quality point average. Credits for courses with satisfactory grades are included in credits earned.
- Unsatisfactory grades need not be repeated.
- This does not apply to the Spring 2020 semester in which students had the right to select S or U grading for their classes.

Auditing a Course

- Subject to the approval of the student's Academic Advisor, a student may elect to audit a course to reinforce and strengthen his/her current knowledge or to explore new areas without the pressure of tests and grades.
- A student must register on NOVASIS for the Audit option for the approved course before the end of the Drop/Add period.
- No academic credit is earned for auditing a course. However, the audited course is noted on the student's official record.