

VISUAL AND INTERACTIVE COMPUTING, BSE

The Visual and Interactive Computing (VIC) program is an interdisciplinary major in the School of Engineering and Applied Science at Penn. As a full-fledged Bachelor of Science in Engineering (BSE) degree, it combines major coursework in computer graphics, human-computer interaction, and artificial intelligence within the Computer & Information Science Department and Fine Arts courses from Penn's School of Design. The program was designed for students who have an interest in animation, human-centered methods in interface design, AI-generated media and experiences, and the design of virtual reality environments and interactive technologies.

For more information: <https://www.cis.upenn.edu/visual-and-interactive-computing/>

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2026 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.

Curriculum

Code	Title	Course Units
Engineering		
CIS 1100 or CIS Elective ¹	Introduction to Computer Programming	1
CIS 1200	Programming Languages and Techniques I	1
CIS 1210	Programming Languages and Techniques II	1
CIS 2400	Introduction to Computer Systems	1
CIS 2210	Introduction to Artificial Intelligence	1
CIS 3200	Introduction to Algorithms	1
CIS 4600 or CIS 5600	Interactive Computer Graphics	1
Choose Two Intermediate VIC Courses:		2
CIS 4610 or CIS 5610 or CIS 4620 or CIS 5620 or CIS 3500 or CIS 4710 or CIS 5710 or CIS 4120 or CIS 5120	Advanced Rendering Advanced Computer Graphics Computer Animation Computer Animation Software Design/Engineering Computer Organization and Design Computer Organization and Design Introduction to Human Computer Interaction Introduction to Human Computer Interaction	
CIS 4970	DMD Senior Project	1
CIS Electives ¹		4
Math & Natural Science		
MATH 1400	Calculus, Part I	1
MATH 1410 or MATH 1610	Calculus, Part II Calculus for the Mathematical Sciences	1

ESE/ENM 2030 or ENM 2400	Linear Algebra with Applications to Engineering and AI Differential Equations and Linear Algebra	1
CIS 1600	Mathematical Foundations of Computer Science	1
ESE 3010 or STAT 4300	Engineering Probability Probability	1
MEAM 1100 & MEAM 1470 or PHYS 0150 or PHYS 0170	Introduction to Mechanics and Introduction to Mechanics Lab Principles of Physics I: Mechanics and Wave Motion Honors Physics I: Mechanics and Wave Motion	1.5
Select from the following list:		1.5
BIOL 1101	Introduction to Biology A	
BIOL 1121 & BIOL 1123	Introduction to Biology - The Molecular Biology of Life and Introductory Molecular Biology Laboratory	
CHEM 1012 & CHEM 1101	General Chemistry I and General Chemistry Laboratory I	
ESE 1120	Engineering Electromagnetics	
PHYS 0151	Principles of Physics II: Electromagnetism and Radiation	
PHYS 0171	Honors Physics II: Electromagnetism and Radiation	
SEAS Math (EUMA) or SEAS Natural Science (EUNS)		1
Attribute EUMA (https://catalog.upenn.edu/attributes/EUMA/)		
Attribute EUNS (https://catalog.upenn.edu/attributes/EUNS/)		
Fine Arts & Design Electives		
FNAR 0010 or FNAR 2090 or FNAR 2200 or FNAR 1080	Drawing I Hand-Drawn Computer Animation Drawing Investigations Figure Drawing I	1
DSGN 1030 or DSGN 2220	3-D Computer Modeling Immersive Media Studio	1
DSGN 2040 or FNAR 1050 or FNAR 2100	Environmental Animation Mixed Media Animation Computer Animation	1
Select 3 Fine Arts & Design Electives ²		3
General Electives ³		
Select 5 Social Science or Humanities courses		5
Social Science (EUSS) (https://catalog.upenn.edu/attributes/EUSS/)		
Humanities (EUHS) (https://catalog.upenn.edu/attributes/EUHS/)		
Select 2 Social Science or Humanities or Technology in Business & Society courses		2
Social Science (EUSS) (https://catalog.upenn.edu/attributes/EUSS/)		
Humanities (EUHS) (https://catalog.upenn.edu/attributes/EUHS/)		
Technology in Business and Society (EUTB) (https://catalog.upenn.edu/attributes/EUTB/)		
Free Elective ⁴		

Select 1 free elective 1
Total Course Units **37**

¹ A CIS Elective is a CIS or NETS engineering course at the 1000 level or above, or any of the following: ESE 3030, ESE 3600, ESE 5390, ESE 5460, or BMIN 5010. (NOTE: not all CIS/NETS courses are **engineering** courses; please see the SEAS Undergraduate Handbook (<https://ugrad.seas.upenn.edu/student-handbook/courses-requirements/engineering-courses/>.) At most, one CU of 1000-level coursework may be used as a CIS Elective.

² Fine Arts & Design Electives must come from the department-approved course list (<https://www.cis.upenn.edu/fine-arts-design-elective-list/>).

³ **Must include a Writing Seminar from the list below:**
 WRIT 0020 (H), WRIT 0021 (SS), WRIT 0100 (H), WRIT 0110 (H), WRIT 0120 (H), WRIT 0130 (H), WRIT 0140 (H), WRIT 0150 (H), WRIT 0160 (SS), WRIT 0170 (SS), WRIT 0220 (TBS), WRIT 0230 (H), WRIT 0250 (H), WRIT 0260 (H), WRIT 0270 (H), WRIT 0280 (SS), WRIT 0300 (H), WRIT 0310 (TBS), WRIT 0320 (-), WRIT 0330 (H), WRIT 0340 (SS), WRIT 0370 (SS), WRIT 0380 (SS), WRIT 0390 (H), WRIT 0400 (TBS), WRIT 0410 (H), WRIT 0480 (SS), WRIT 0490 (H), WRIT 0500 (SS), WRIT 0550 (SS), WRIT 0570 (H), WRIT 0580 (H), WRIT 0590 (SS), WRIT 0650 (TBS), WRIT 0670 (H), WRIT 0680 (H), WRIT 0730 (H), WRIT 0740 (TBS)

⁴ Penn Engineering undergraduates may not use courses on this list toward their degree:

- ASTR 0001
- CHEM 1011
- CIS (CSE)
- EAS 5030 (SEAS UG students may register for EAS 4030 for TBS credit)
- EAS 5050 (SEAS UG students may register for EAS 3010 for TBS credit)
- Education (inter-session courses)
- MATH 1300, MATH 1700
- MCIT courses
- Military Science
- Naval Science (except NSCI 1020, NSCI 2010, NSCI 2020, NSCI 3010, NSCI 4010, NSCI 4020)
- Organizational Dynamics (DYNM) courses
- PHYS 1100, below PHYS 0140 (except PHYS 0050, PHYS 0051)
- Statistics below 4300 (Note: effective Fall 2021 STAT 4050 and STAT 4220 can only be used as free electives)
- Perelman School of Medicine (MED courses)
- Wharton Global Youth Pre-Baccalaureate courses
- The Green Program (TGP) study abroad

First Year		Course Units
Fall		
CIS 1100	Introduction to Computer Programming	1
MATH 1400	Calculus, Part I	1
Drawing Requirement (FNAR 0010, FNAR 2090, FNAR 2200, or FNAR 1080)		1
Writing Seminar		1
Course Units		4.00

Spring		
CIS 1200	Programming Languages and Techniques I	1
CIS 1600	Mathematical Foundations of Computer Science	1
MATH 1410	Calculus, Part II	1
Visualization Requirement (DSGN 1030 or DSGN 2220)		1

Second Year		
Fall		
CIS 1210	Programming Languages and Techniques II	1
CIS 2400	Introduction to Computer Systems	1
PHYS 0150 or MEAM 1100 and MEAM 1470	Principles of Physics I: Mechanics and Wave Motion or Introduction to Mechanics and Introduction to Mechanics Lab	1.5
Animation Requirement (FNAR 1050, DSGN 2040, or FNAR 2100)		1
Course Units		4.50

Spring		
CIS 4600	Interactive Computer Graphics	1
CIS 2210	Introduction to Artificial Intelligence	1
Fine Arts & Design Elective (see approved list)		1
General Elective		1
General Elective		1
Course Units		5.00

Third Year		
Fall		
CIS 3200	Introduction to Algorithms	1
CIS Elective		1
STAT 4300 or ESE 3010	Probability or Engineer Probabili	1
Fine Arts & Design Elective		1

General Elective		1
	Course Units	5.00
Spring		
CIS Elective		1
Intermediate VIC Course (CIS 3500, CIS 4610, CIS 5610, CIS 4620, CIS 5620, CIS 4710, CIS 5710, CIS 4120, or CIS 5120)		1
Linear Algebra (ESE 2030/ENM 2030 or ENM 2400)		1
Natural Science with lab (BIOL 1101, BIOL 1121 + BIOL 1123, CHEM 1012 + CHEM 1101, ESE 1120, PHYS 0151, or PHYS 0171)		1.5
General Elective		1
	Course Units	5.50
Fourth Year		
Fall		
CIS Elective		1
Intermediate VIC Course (CIS 3500, CIS 4610, CIS 5610, CIS 4620, CIS 5620, CIS 4710, CIS 5710, CIS 4120, or CIS 5120)		1
Fine Arts & Design Elective (see approved list)		1
Math or Natural Science Elective		1
General Elective		1
	Course Units	5.00
Spring		
CIS 4970	DMD Senior Project	1
CIS Elective		1
General Elective		1
Free Elective		1
	Course Units	4.00
	Total Course Units	37.00