Upper Level Concentration

Upper Level Concentration

The Upper Level Concentration (ULC) requirement is unique to the Computer Science department at the University of Maryland. Computer Science is highly interdisciplinary, so studying an area outside of CS that can complement your CS studies will set you apart from other candidates in interviews for internships and full-time positions. The ULC is a great opportunity to strengthen soft skills and discover how you can make your degree stand out. This is also a great opportunity for Computer Science students to be creative in how they incorporate other disciplines into their studies. For example, someone interested in game programming may do an upper level concentration in English to get more experience with creative writing, story telling, and building a narrative. **All Computer Science majors must complete 12 credit hours of 300-400 level courses in one discipline outside of Computer Science. Courses should be chosen in consultation with your advisor.**

- No CMSC courses, or courses cross listed with CMSC courses (e.g., AMSC460), are eligible for the Upper Level Concentration
    - No courses used for the Computer Science major can be used for the ULC (e.g. MATH401 is applicable to the major for students on the Machine Learning track, if this course is used

Frequently Asked Questions

Do all 12 of the ULC credits need to be in the same area?

Do CS students have to declare a minor because they have a ULC requirement?

How do I update my ULC courses in my degree audit?

I'm not sure what to focus on outside of CS. Where do I start?

- Only up to 6 transfer credits may be used
- Students pursuing a minor or a double major/dual degree may use those upper level credits in this area with the exception of a few majors/disciplines (e.g. Information Science)
- ULC does not need to be related to Computer Science
- ULC does not count as “overlapping courses” between a major/minor
- Courses with a grade of P can be used for the ULC **only** if they were taken in the Spring 2020 and Spring 2021 semesters
- ULC courses must be completed with a cumulative GPA of 1.7 or higher. Courses with a grade of D can be used for the ULC as long as the cumulative GPA for the ULC is at least 1.7
- If you are doing a second bachelor’s degree, usually the ULC can be satisfied with courses from your first degree. **Please consult with your advisor.**

The ULC is updated in your audit manually by your assigned advisor. If a course is not showing, please contact your advisor and ask them to update it.

Things to Note for the Upper Level Concentration Area

This is not an exhaustive list, so please consult with your advisor about each class you plan to ensure you will satisfy this requirement.

- If courses from different disciplines can be used for a minor, then those courses can also be used to satisfy the ULC
- Students using Math or Statistics courses for the ULC are able to mix and match their courses between MATH and STAT, however:
  - The first STAT4xx cannot be used for the ULC because it is required for the CS major.
  - Students in the STAT minor typically need to take an additional course to finish the ULC after they complete the minor

broken down by CS specializations?

Why is there a ULC component to the CS requirements?

- Students in the Astronomy minor will need to declare their minor early, and typically need to take an additional course to finish the ULC after they complete the minor
- Students using English courses cannot use the Professional Writing (FSPW) General Education Requirement course toward the ULC
- Students unsure of their ULC area can consult the Schedule of Classes (https://app.testudo.umd.edu/soc/) for a full list of course offerings, and
- Students can also consult the list of Minors (https://www.admissions.umd.edu/explore/majors/minors) offered at UMD (though a Minor is not required to complete the ULC)

Common Disciplines/Minors for the ULC with few lower level prerequisites:

- ACES Minor (HACS)
- African American Studies (AASP)
- American Studies (AMST)
- Anthropology (ANTH)
- Art History and Archaeology (ARTH)
- Asian American Studies (AAST)
- Atmospheric Chemistry (AOSC)
- Atmospheric Sciences (AOSC)
- Cinema and Media Studies (CINE)
- English (ENGL)
- Family Science (FMSC)
- Film Studies (FILM) [*only for courses taken in or before Fall 2021*]
- History (HIST)
- Human Development (EDHD)
- Information Risk Management, Ethics, and Privacy Minor at Shady Grove (INST) *[Only if declared in the minor, no exceptions]* [3]
- Israel Studies (ISRL)
- Jewish Studies (JWST)
- Linguistics (LING)

- Philosophy (PHIL)
- Philosophy, Politics, and Economics (PHPE)
- Public Policy (PLCY)
- Sociology (SOCY)
- Technology Entrepreneurship (ENES)
- Technology Innovation Leadership Minor at Shady Grove (INST) [*Only if declared in the minor, no exceptions*] [6]

Also acceptable but may require more courses to complete:

- Astronomy (ASTR)
- Biological Sciences (BIOL)
- Business Analytics Minor (BMGT)[1]
- Criminology and Criminal Justice (CCJS)
- Computational Finance (BUFN)
- General Business Minor (BMGT)
- Immersive Media Design (IMDM)[2]
- Innovation and Entrepreneurship Minor (BMGT)
- International Development
- Languages
- Lesbian Gay Bisexual Transgender Studies (LGBT)/Women, Gender, and Sexuality Studies (WGSS)
- Neuroscience/Psychology (NEUR/PSYC)
- Physics (PHYS)
- Robotics Minor [5]
- Sustainability Minor

[1]**Business Analytics Minor:** BMGT402 and BMGT431 are required courses for the Business Analytics minor and cannot be used for the ULC, so students thinking about the minor in Business Analytics will need to plan their courses for the minor/ULC cautiously, and may need to take additional courses beyond the minor requirements to fulfill the ULC.

cautiously with their advisor, and may need to take additional courses beyond the major requirements to fulfill the ULC.

[3]**Information Risk Management, Ethics, and Privacy Minor at Shady Grove:** Only students who are declared in the minors offered at Shady Grove will be allowed to use INST prefixed courses. All other INST courses are not allowed, no exceptions. Students must be declared in the minor in order to use the courses towards the ULC. Accepted courses: INST364, INST366, INST455, INST456, INST461 only.

[4]**Math/Statistics Minor:** The STAT4xx course used toward the Statistics requirement for the Computer Science major cannot also be used toward the ULC, so students thinking about the minor in Math or Statistics will need to plan for an extra MATH4xx/STAT4xx than is needed for the minor to finish the ULC.

[5]**Robotics Minor:** ENAE450, ENEE467, and CMSC477 are required courses for the Robotics minor and cannot be used for the ULC, so students thinking about the minor in Robotics will need to plan their courses for the minor/ULC cautiously, and may need to take additional courses beyond the minor requirements to fulfill the ULC.

[6]**Technology Innovation Leadership Minor at Shady Grove:** Only students who are declared in the minors offered at Shady Grove will be allowed to use INST prefixed courses. All other INST courses are not allowed, no exceptions. Students must be declared in the minor in order to use the courses towards the ULC. Accepted courses: INST363, INST407, INST453, INST457, INST463 only.

Not Eligible for ULC:

- College Park Scholars
- Computer Engineering
- Honors
- Information Science

Courses Ineligible for Upper Level Concentration (click to expand)

This is not an exhaustive list. Courses should be chosen in consultation with your advisor.

ULC Areas	Course(s) Not Acceptable
AMSC	• 460 - Computational Methods • 466 - Intro to Numerical Analysis I
AOSC	• 447 - Machine Learning in Earth Science
AREC	• 380 - Data Science for Environmental and Resource Economics
BIOE	• 442 - Python: Introduction to Programming and Data Analysis
BSCI	• 411 - Bioinformatics and Integrated Genomics

BMGT	• 300 - Information Systems for Non-Business Majors • 301/301F - Introduction to Information Systems • 302/302F - Design Apps for Business Analytics • 400 - Data Visualization and Web Analytics • 402 - Database Systems • 403 - Systems Analysis and Design • 404 - Essential Data Skills for Business Analytics • 408E - Emerging Topics in Information Systems; Big Data and Artificial Intelligence for Business • 408C - Emerging Topics in Information Systems; Quality Web Development in Business (allowed for QUEST only) • 431 - Data Analytics (starting Fall 2022) • 408V - Emerging Topics in Information Systems; Data Visualization and Web Analytics (starting Fall 2022)
CPSP:Scholars	All
DATA	• 320 - Introduction to Data Science • 400 - Applied Probability and Statistics I
ECON	• 414 - Game Theory • 433 - Economics of Big Data

ENEE	• 350 - Computer Organization (effective Fall 2022) • 426 - Communication Networks (effective Fall 2022) • 436 - Machine Learning (formerly ENEE439M) • 446 - Digital Computer Design • 447 - Operating Systems • 457 - Computer Systems Security
ENGL	• 381 - MGA Legislative Seminar • All 39X FSPW Courses
GEOG	• 376 - Programming for Geospatial Analysis • 371 - Programming for Image Analysis • 461 - Machine Learning for Computational Earth Observation Science (CEOS) • 476 - Object-Oriented Programming for GIS • 470 - Algorithms for Geospatial Computing • 498I - Data Structures for Geospatial Computing
HONR/HNUH	All
IMDM	• 327 - Computational Virtual Reality • 390 - Collaborative Studio II: Experiential Computing • 498I - Introduction to Motion Capture

INST	All INST courses are not accepted as ULC unless students are declared in the following programs: • Information Risk Management, Ethics, and Privacy Minor at Shady Grove (”https://academiccatalog.umd.edu/undergraduate/colleges-schools/universities-shady-grove/information/information-risk-management-ethics-privacy/”) • Technology Innovation Leadership Minor at Shady Grove (”https://academiccatalog.umd.edu/undergraduate/colleges-schools/universities-shady-grove/information/technology-innovation-leadership/”) • IMD or Technology & Information Design Majors ONLY will be eligible to use INST398M
MATH	• 456 - Cryptography • 461 - Linear Algebra for Scientists and Engineers (after Spring 2020) • 475 - Combinatorics and Graph Theory
PHIL	• 408F - A Gentle Introduction to Machine Learning
PHPE	• 408J - A Gentle Introduction to Machine Learning
PHYS	• 457 - Introduction to Quantum Computing (cross-listed with CMSC457) • 474 - Computational Physics • 476 - Applied Machine Learning (After Fall 2020) • 486 - Machine Learning for Physicists
PSYC	• 417 - Data Science for Psychology and Neuroscience Majors

Robotics Minor	• ENAE450: Robotics Programming • ENEE457:Computer Systems Security • ENEE467: Robotics Project Laboratory • ENEE408I: Capstone Autonomous Robotics • CMSC477: Robotics Perception and Planning • All CMSC Technical Electives
STAT	• 426 - Introduction to Data Science and Machine Learning • 464 - Introduction to Biostatistics • The STAT4xx course used to fulfill the CS math requirements cannot also count towards the Upper Level Concentration requirements.

Contact Our Office

CS Undergraduate Office (https://undergrad.cs.umd.edu)
Brendan Iribe Center for Computer Science and Engineering
University of Maryland
8125 Paint Branch Drive
College Park, MD 20742
☎ (Phone) (301) 405-2672 (tel:3014052672)

Part of the

Department of Computer Science (https://www.cs.umd.edu)
Brendan Iribe Center for Computer Science and Engineering
University of Maryland
8125 Paint Branch Drive