Computer Science Advising Guidelines

Updated: October 23, 2023 Jonathan Cook, joncook@nmsu.edu

Undergraduate Degree Paths:

1. **Bachelor of Science in Computer Science** – (BS/CS) The BS/CS is the "traditional" CS undergraduate degree, heavier on math and science, and it **should be the default** choice for students who just want to major in Computer Science. It has the following concentration areas:

Concentration Area	
Algorithmic Theory	(concentrations require
Big Data and Data Science	selected CS 400-level
Computer Networking	electives and generally one
Cybersecurity	extra CS 400 elective)
Human Computer Interaction	
Software Development	

2. **Bachelor of Arts in Computer Science** – (BA/CS) The BA/CS degree is offered by many universities (and ours) as a more open degree plan **intended mainly** for students who want to combine CS with other interests; it is easier to combine with majors/minors in other departments such as business, creative media, social sciences, and many others. The BA is also often the shortest path for transfer students to finish, as more of their transfer credits can apply to open electives.
3. **Bachelor of Science in Cybersecurity –** (BS/Cyber/CYST) The BS in Cybersecurity is centered in the CS department but is a different degree than straight CS and is specialized in the area of cybersecurity; it will eventually be DHS certified (think "accredited").
4. **Bachelor of Science + Master of Science in Computer Science (5 years)** – (MAP/CS) students must apply after completing first two years of CS requirements, before they reach the CS 400 level courses, so that they can take the grad sections of specific requirements.

Math Prerequisites Differ by Degree

- The **BA/CS** allows any of the Calculus I courses on campus (MATH 1430G or 1511G)
- The **BS/CS only accepts** Engineering Calculus I (MATH 1511G).
- The **BS/Cyber** requires MATH 1511G (the 2021 catalog is **wrong)** and Cybersecurity students **must** continue on to 1521G Calc II.

General Recommendations for Beginning BA/BS in CS Students

The overriding goal must be to get new students into CS 172 as quickly as possible! Special care must be taken with placing a student into their first CS course, as it has the potential to extend a student's graduation date past four years. **Please note that CS 111 and CS 171G do not count towards the CS majors degree requirements.** The CS 172 prerequisites are changing to be: (A C- or better in either MATH 1220 or higher) OR (Math placement into MATH 1250 or higher) OR (A C- or better in CS 111). There is no longer any CS placement exam. **Feel free** to place any student that meets the above into CS 172, overriding the currently enforced prerequisites if needed.

- Placing into MATH 1215 (Intermediate Algebra) or below: Students cannot take any CS course yet. They might consider the BA/CS path, as it will be a shorter path to graduation. The BA/CS will also allow more elective credit, and the student can begin taking courses in other interest areas while preparing for their CS courses.
- Placing into MATH 1220G (College Algebra): Students cannot take CS 172 yet, so we **strongly** recommend them taking CS 111. Students at this level (past MATH 1215) can also take some of our

service courses on programming (e.g., CS 152 Java Programming or CS 153 Python Programming) to help build their background and confidence in programming, but these are not required for either major.

- Placing into MATH 1250G (Trigonometry & Pre-Calculus) or MATH 1430G (Applications of Calculus I): Students are eligible to take CS 172, but BS majors will need to take MATH 1250G in order to be able to proceed to MATH 1511G. If they would like a slower CS start, they can take CS 111, but this will not count towards a CS degree, as noted above, and may delay their graduation date.
- Placing into MATH 1511G. Calculus and Analytic Geometry I (or at least past the above): Students are eligible to take CS 172.
- Other common initial courses: The **BA/CS** and **BS/CS** degrees require COMM 1115G or 1130G; both degrees require a choice of ENGL 2210G Professional & Technical Communication (we are happy to substitute 2130G Advanced Composition and 2215G Advanced Technical and Professional Communication and will probably add these to the catalog).
- The state AP Computer Science mapping is poor: We **do not** recommend that a student scoring 4 or 5 on the AP CS A test skips CS 271, Intro to Object Oriented Programming, as listed on the HED website. Credit for CS 172 is good, but skipping both CS 172 and 271 will likely harm all but the very best students.

Gen-Ed Prerequisites Differ by Degree

- **BA** and **BS** students automatically satisfy Gen-Ed Areas 1 and 2. The BA has only the NMSU Gen-Ed Area 3 **science** requirement. However, the BA requires **two** upper-division courses from **one** other department (to ensure study in some other area); somewhat unfortunately, almost all BA students satisfy this by taking one extra VWW course, but if they are a double major or have a minor in some area, this should satisfy it also (and is what we hope to encourage). In general, BA students should **not** be encouraged to take CS 171G as a lab science course, it really won't further their education; however, it is allowed and if they already have it then it is acceptable.
- **BS/CS** requires three science courses from a **limited** selection. BS students automatically satisfy Gen-Ed Areas 1, 2, and 3. The BS in Computer Science has several **concentration** areas defined.). In general, the specific requirements for the concentration include selecting **specific** CS upper division electives and taking **one extra** CS upper division elective; some concentrations might require two extra courses.
- **BS/Cyber** no longer requires CS 171G and CS 111 as part of its requirements. Beginning students who do not have the prerequisites for CS 172 can take CS 111 and/or CS 171G for a stronger background in CS as they prepare for CS 172.

Transfer and Continuing students

After CS 172 there are four CS 200-level courses required for the BS/CS degree. We normally recommend students to take CS 271 and CS 272 together, then CS 273 and CS 278 together, and we normally recommend taking two of these at a time, spreading them over two semesters. However, **none of that is required!** Do not force very good students to go slower than they can – if they want to accomplish a heavier load and have the grades to show they can, then they should go for it; likewise, if a student's schedule does not allow CS 271 and 272 first, but they can fit 273 or 278 in, then let them.

Of the 300-level CS courses, CS 371 is probably the best one to take earlier; CS 370 is programming-heavy and has significant theory, and CS 372 is quite theory heavy. (CS 372 is an elective for the BA, but required for the BS).

The BS requires science courses from lists that are more restrictive than all of Gen-Ed Area 3. One of the BS science requirements is from a "core" phys/chem/bio list, and the two others are still from a restricted list. BA students must pay attention to how many upper division credit hours they are accumulating; where a choice is possible, such as the BA statistics requirement, taking an upper division course can be beneficial. If BS students are careful and are willing to do 1-2 extra math courses, they can easily pick up a math minor (and many do).

Students should be careful to try and balance technical and non-technical courses throughout their degree program, so that they do not end up with semesters near the end that are filled with all technical courses.

Upper division students

Most of our 400-level CS courses only have 200-level courses as prerequisites, in order for less prerequisite overrides for students doing minors or in odd scheduling situations, but **we expect that students do not take** their 400-level CS electives until after they do their CS 300-level courses. They need the maturity of waiting, so do not let students jump into 400-level CS courses too soon.

Good students at the 300-level should **start thinking about applying to the BS/MS program** (NMSU also calls it a Master's Accelerated Program, or MAP). Note that the BA degree is not eligible for this.

Incoming students (freshmen, sophomore, transfer) **should be encouraged to consider research experiences for undergraduates** in the CS field after finishing their 100-level CS courses, and definitely after their 200-level CS courses.

All students **should begin looking for summer internships** in the CS field after finishing their 200-level CS courses, and definitely after their 300-level CS courses.

All CS students must take Senior Project (CS 448) in their **last** semester. They also must take CS 419 Computing Ethics in their last **spring** semester (it is only offered in the spring).

All students **should begin looking for permanent positions** in the CS field after finishing their 300-level CS courses (2 semesters prior to graduation). Adjusting their course load to allow time to attend technical and professional development conferences is recommended.

Our website computerscience.nmsu.edu has a **3-year course rotation** schedule (under the Majors menu), which shows when we plan to offer all of our rotating upper division courses. It is important for students to pay attention to this as they plan for their desired electives.

Departmental Mentoring Checklist

1. Note degree selection and catalog year; if a student does not have a good reason to keep using an old catalog, encourage them to update to a newer catalog year (done at advising.nmsu.edu under "change major" menu).

2. Check course selections for balance, appropriateness, and progress towards degree. Students with double majors or minors may make choices that are appropriate for them but look odd for just a CS degree.

3. Watch for proper placement into first CS course (do not force students who qualify for CS 172 into CS 111 or CS 171), CS 471 (spring only), CS 448 (Senior Project, last semester), CS electives, and CS 419 (last spring semester). Watch for VWW course requirement satisfaction (different-college requirements).

4. Encourage attending career fairs and applying for summer internships and/or REUs. Ask them about career goals. Encourage participation in departmental events (interviewing workshops, etc.) clubs (programming club), and other campus activities and aides. Career fairs are extremely important to get them comfortable in talking with employers.

5. Encourage students to consider the Master's Accelerated Program. Make them aware that Teaching Assistantships could help fund their fifth year.

6. Some mentors ask students for a resume (which forces them to create one!). This is not a bad thing.

Important Links

https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/

https://catalogs.nmsu.edu/nmsu/arts-sciences/computer-science/

https://computerscience.nmsu.edu/majors/three-year-course-rotation.html

https://computerscience.nmsu.edu/majors/undergraduate-advising.html

https://advising.nmsu.edu/