PROVOST INSTRUCTION 1531.88

From: Provost, U.S. Naval Academy

Subj: RULES GOVERNING ELECTIVES FOR THE DATA SCIENCE MAJOR

Ref: (a) PROVOSTINST 5420.20H

Encl: (1) Guidelines for Data Science Major Electives
     (2) Yearly Timeline for Management of Data Science Electives

1. **Purpose.** To establish procedures to guarantee that a robust set of electives are provided each year to meet the needs of midshipmen majoring in Data Science, and to establish processes for development and approval of courses as Data Science electives.

2. **Background**

   a. Data science applies analytical methods to data in order to provide actionable insights to decision makers. While data science is considered a technical academic discipline, it is used across multiple facets of society and is not limited in scope to one discipline alone. Students graduating as data science majors at USNA should not only have a technical understanding of data science, but also have the ability to apply their skills to a broad set of problems in which data science principles are needed and used.

   b. Data Science Major electives are grouped into two categories: (a) Electives taught within the Computer Science or Mathematics Department (CatA) and; (b) Electives taught outside of the Computer Science or Mathematics Department (CatB).

   c. Elective classes within CatA generally give students the opportunity to gain a deeper understanding of the technical foundations of data science. Elective classes inside CatB generally ensure students have the opportunity to learn about a problem within a domain, including its context, domain-specific restrictions, and unique forms of data, and then apply their data science skills to that contextualized problem. Data Science majors must select at least one of their four electives from CatA, and at least one from CatB, with the remainder coming from either category. As such, departments from across the yard, not just Computer Science and Mathematics, must offer appropriate Data Science electives.
d. Planning/scheduling for a sufficient number of CatA electives will be handled by discussions between the Computer Science and the Mathematics departments. In contrast, planning for a sufficient number of CatB electives requires a larger discussion across the yard, and thus requires a more involved process as described below.

3. Course Requirements to be Eligible as a Data Science Elective

a. The course must be at least three credits.

b. The course must not substantially overlap with other courses already required for the Data Science major.

c. The course must emphasize at least some of the following:

   (1) Technological techniques of use to data scientists

   (2) Data generation, manipulation, analysis, or interpretation

   (3) The use of data to solve applied problems within a domain

   (4) An introduction to a perspective on data science unique to a domain

d. The prerequisites and assumed prior knowledge must be appropriate for Data Science students.

e. Instructors of the courses must engage in all associated assessment activities, to include generation of documentation for ABET accreditation and participation in assessment meetings and discussions.

f. The course must be approved for elective status by the Data Science Curriculum Committee (DSCC) (see 4.b.(3), below).

4. Actions Required. Coordinated planning of electives for Data Science students will be carried out as follows.

a. The Associate Provost for Academic Affairs (APAA):

   (1) By the end of week 3 of each Fall semester, convene a discussion with the Chair of the DSCC, the Deans of the Schools of Humanities & Social Sciences, Math & Science, and Engineering & Weapons, as well as the Director of the Division of Leadership Education and Development. The group will use data regarding major caps, enrollment, and programmatic needs to determine planned contributions for Data Science electives in CatB across a minimum of the following two academic years. The timing of this meeting allows for experimental course CCRs to be generated for the following semester as needed.
(2) As needed, work with School/Division leaders to refine the proposed elective offerings for upcoming academic years to ensure that appropriate options are available for Data Science students during both the Fall and Spring semesters.

b. The Data Science curriculum committee (DSCC):

(1) Support interested faculty in submitting proposals for new electives.

(2) Maintain a list of fully approved Data Science electives, and courses in the development pipeline.

(3) By the end of week 1 of each fall and spring semester, complete the review of any new proposals for Data Science electives, and work with the proposing department to address any concerns.

(a) In the case of entirely new courses, the CCR should be submitted by the course instructor to the DSCC and the school curriculum committees in parallel. The DSCC will forward a recommendation for inclusion of the course as a Data Science elective to the associated School or Division Curriculum Committee, which will include that recommendation with the package that is passed to the Faculty Senate Curriculum Committee (see Ref (a) for details of the Curriculum Review Process).

(b) Requests for pre-existing courses to be considered for Data Science elective status are Routine changes per Ref (a). Such proposals should be routed through the DSCC directly to the Chair of the FSCC.

(4) By the end of week 2 of each fall semester, work with the APAA and Registrar to determine and refine the best estimate for total need (in terms of number of elective “seats”) for Data Science CatB electives for at least the next two academic years, based on the matrix needs of midshipmen currently majoring in Data Science.

(5) By the end of week 6 of each semester, notify faculty of academic requirements for new CatA and CatB Data Science electives, and of the next deadline to submit CCR proposals for such electives to the DSCC, which should normally be at the end of week 13 of each semester.

(6) Manage enrollment of Data Science Majors into major electives:

(a) Collect preferences from Data Science majors based on available electives.

(b) Determine how to distribute Data Science majors into the available electives for each semester.

(c) Work with the Registrar to carry out early pre-registration of these students into approved courses at least one week before the start of preregistration for the upcoming semester.
c. School Deans/Division Directors from the Schools of Humanities & Social Sciences, Math & Science, and Engineering & Weapons, and from the Division of Leadership Education and Development:

(1) Encourage departments to develop Data Science electives (via new courses or the appropriate use of existing courses), to submit such electives for approval by the Data Science curriculum committee, and to support the periodic offering of such courses.

(2) As needed, work with the APAA and DSCC to refine the proposed elective offerings for upcoming academic years to ensure that appropriate electives are offered during both the fall and spring semesters.

d. Department chairs (from departments proposing/offering category (a) or category (b) Data Science electives):

(1) As needed, work with the School leadership and DSCC to follow through on the development and execution of the course plan.

(2) When offering CatB electives, reserve sufficient space for Data Science majors to enroll in these courses, as consistent with the plan developed in 4.c.(2) above (for electives where students from other majors are likely to also enroll in the course). Where necessary, this may be accomplished by early pre-registration of Data Science majors in such electives, based on input from the chair of the DSCC.

(3) Also, when offering CatB electives, consult with the Computer Science department for scheduling to ensure deconfliction of these electives with other Data Science major courses.

5. Records Management

a. Records created as a result of this instruction, regardless of media and format, must be maintained and dispositioned for the standard subject identification codes (SSIC) 1 000 through 13000 series per the records disposition schedules located on the Department of the Navy/Assistant for Administration (DON/AA), Directives and Records Management Division (DRMD) portal page at https://portal.secnav.navy.mil/orgs/DUSNM/DONAA//DRM/Records-Information-Management/Approved%20Record%20Schedules/Forms/Allitems.aspx

b. For questions concerning the management of records related to this instruction or the records disposition schedules, please contact USNA records manager or the DON/AA DRMD program office.

6. Review and Effective Date. Per OPNAVINST 5215 .17 A, the Associate Provost for Academic Affairs will review this instruction annually on the anniversary of its effective date to ensure applicability, currency, and consistency with Federal, DoD, SECNAV, and Navy policy and statutory authority using OPNAV 5215/40 Review of Instruction.
Releasability and distribution: This instruction is cleared for public release and is available electronically via the Provost Instructions internet website:
https://www.usna.edu/Academics/Provost/Rules-Regulations/Instructions.php
Guidelines for Proposing Data Science Major Electives

Proposing Electives
Departments proposing an elective in accordance with PROVOSTINST 1531.88 for the DS major must submit a proposal with the following information for consideration and feedback from the Data Science Curriculum Committee.

1. Syllabus and learning objectives.
2. Explanation of how data/data sources will be used.
3. List of any majors likely to take this class other than Data Science students.
4. List of prerequisites and an explanation of how DS majors will be able to succeed (for example, if a history class, explain how the necessary history context and background will be conveyed).
5. Explanation of how data science techniques will be leveraged.
6. Plans for teaching coverage and number of sections / students to be offered.
7. Letter of support from the offering department chair.

Assessing Electives
It is important that all Data Science instructors understand the expectations of electives, and that departments offering Data Science electives receive feedback as to whether and how the class was successful. Program accreditation through ABET will be a formal part of this process, but there is also value in informal, in-house assessment. Instructors of electives will be invited to a debriefing meeting to perform this assessment. This meeting will include discussion of any assessment required for ABET accreditation. In addition, each faculty member who taught a DS class will briefly present a synopsis of the class and discuss what worked, what didn’t, and any proposed changes for a future offering of the course.
Each semester, generation and maintenance of the Data Science electives will be managed as follows by the Data Science Curriculum Committee (DSCC), Associate Provost for Academic Affairs (APAA), the Registrar, and the various School and Division leads:

- Week 1: DSCC completes review of proposals for DS electives from the previous semester. If a course is new, the DSCC forwards a recommendation to the FSCC. If the course is pre-existing, the DSCC notifies the Registrar of approvals.
- Week 2: DSCC updates estimates for needed Data Science CatB elective seats for at least the next two academic years.
- Week 3: as needed, APAA convenes discussion (including DSCC chair) with heads of M&S, HumSS, E&W, plus LEAD to determine their planned contribution of CatB electives for the following academic semester, in order to meet the total Data Science elective need.
- Week 4: M&S, HumSS, E&W, plus LEAD communicate their CatB DS elective plan (for following academic semester) to the APAA
- Week 6: DSCC reminds faculty of how to propose DS electives, deadline for proposal submission (Week 13)
- Week 13: deadline for faculty/departments to submit DS elective CCRs to the DSCC. If the course is new or being considerably changed, the CCR should be submitted in parallel to the DSCC and the school curriculum committee as per the normal CCR process. If the course is pre-existing, the proposal need only go to the DSCC.