All physics students at Carleton College must take Atomic and Nuclear Physics (PHYS.228) as the major’s second required course. Although the course is notoriously challenging, it also has a reputation for spurring significant academic and personal growth in those who take it. As a prospective physics major, Lucas took Atomic and Nuclear Physics (henceforth referred to as A&N) and developed his own opinion on the matter. The results were conclusive: although challenging, the course indeed inspired considerable maturation in Lucas as a student of physics and the liberal arts overall. Although Lucas will not declare his major until the final trimester of his sophomore year, his experience in A&N helped solidify his confidence in exploring the department.

I. ATOMIC AND NUCLEAR PHYSICS (PHYS.228)

The second course required for the Carleton College physics major is Atomic and Nuclear Physics (PHYS.228), commonly referred to as “A&N”. The course offers an academic experience of both more breadth and depth than that offered by the department’s introductory offerings, exposing students to “An elementary but analytical introduction to the physics of atoms and nuclei. Topics include the particle aspects of electromagnetic radiation, an introduction to quantum mechanics, the wave aspects of material particles, the structure of atoms, X-ray and optical spectra, instruments of nuclear and particle physics, nuclear structure, and elementary particles. One laboratory per week.” [1]
II. THE REPUTATION

The reputation A&N holds among current students is, as one distinguished faculty member puts it, “abysmal” [2]. Although this may be an overstatement, the course indeed holds a significant degree of notoriety.

Known for its academic rigor and the extensive outside preparation it requires, A&N is a common specter in the minds of many prospective physics majors. Its reputation stems largely from its difficult subject material (the course includes an elementary treatment of the quantum mechanics) and the high standards with which laboratory projects are assigned and assessed.

Common statements regarding the class include “Oh my gosh, that class was hard” [3]; “A&N” is definitely the hardest class in the major” [4]; “I think A&N was my single worst grade at Carleton” [5]; and, most elegantly, “That class ruined my life” [6].

All things considered, the apprehension, if not abject terror, characterizing many who are about to take A&N is entirely expected and confirmed via experiment.

III. THE CLASS

When Lucas finally took A&N, he realized that it both was and was not “that bad”. On the one hand, it was certainly a hard course. The hardest course he’d ever taken, in fact. By a long shot.

But it was also one of the most rewarding. Soon into the course, Lucas learned to turn the initial kicks of anxiety consequent to such quickly-paced learning into motivational thrills. Halfway through the course, he was genuinely proud of how much he’d learned. By the end, he realized that A&N had left him with a profound new perspective on reality itself, a gift he’d been hard-pressed to find in other settings.

A. Labs

Part of what made A&N such a challenging yet transformative experience for Lucas was the laboratory component of the course. Like many, Lucas found that the preparation required for this course’s labs was more extensive than that required by his previous physics course, and that the labs themselves required more critical thinking. Although Lucas doesn’t
consider himself a particularly strong lab student, he surprised himself with some of the epiphanies he had, and found himself studying some pretty cool things, witnessing both the wave and particle behaviors of light on a macro scale, for example.

B. Write-ups

Further adding to the difficulty of A&N’s lab component was the post-lab. After each project, students were required to write lab write-ups in the form of professional-quality journal articles, first in groups, then individually. In order to do so, students had to learn how to use LaTeX, a sort of word and equation processor. It is in the style of such write-ups that this report is written.

IV. LESSONS

Most significantly, A&N forced Lucas to learn how to work through his anxiety. Even on days where he had more technical reading due than he’d ever had in the past, and even when said reading would prove more or less incomprehensible until a second read-through after lecture, Lucas realized that the only way he was going to get through the course was to somehow stop putting time and energy into worrying about his work and dump it all into actually doing it.

He wasn’t entirely successful; as many who took the course before him, Lucas received his lowest college grade thus far in it. However, each step to that grade helped him let go of the notion of a pristine undergraduate transcript a little more, thus freeing more of his mind up to work on actually learning and appreciating the material at hand. Although his grade in A&N was his lowest yet, it’s also become the one he’s most proud of.

Finally, Lucas truly began to appreciate the value of attending office hours during A&N. As the course progressed, he found himself meeting with his professor more and more frequently, and he is certain that the time paid off. Furthermore, he developed better relationships with his professors, whom he is extremely fond of.
V. CONCLUSION

Although A&N is approximately as difficult as its reputation suggests, the value of the course and the enjoyment it offers is overlooked within the Carleton physics community. Additionally, one would suggest that the course be designated Writing-Rich, as it entails a significant amount of writing and revision.

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