

THE INTEGRATED CHEMISTRY CURRICULUM: IMPROVING A FOUR SEMESTER SEQUENCE

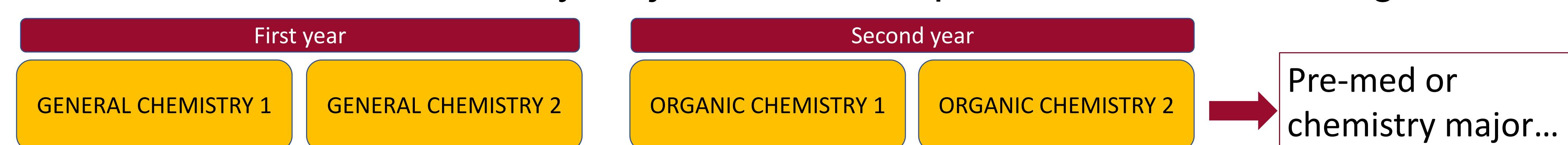
Xavier Prat-Resina PhD, Associate Chemistry Professor at The Center for Learning Innovation

THE CHALLENGE

The problem elsewhere:

Nationwide the “pre-med” 4-semester chemistry sequence is a challenge

- These courses serve too many majors and its sequence cannot be changed

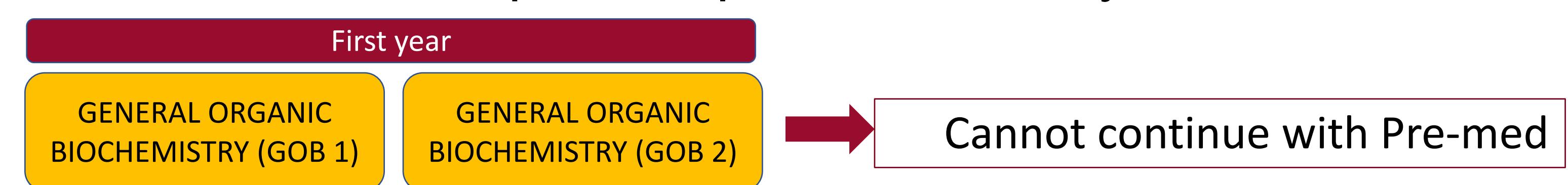


Quantitative chemistry for first years
No biological/health context
High DFW. Seen as “weed out”

Physics and engineering majors

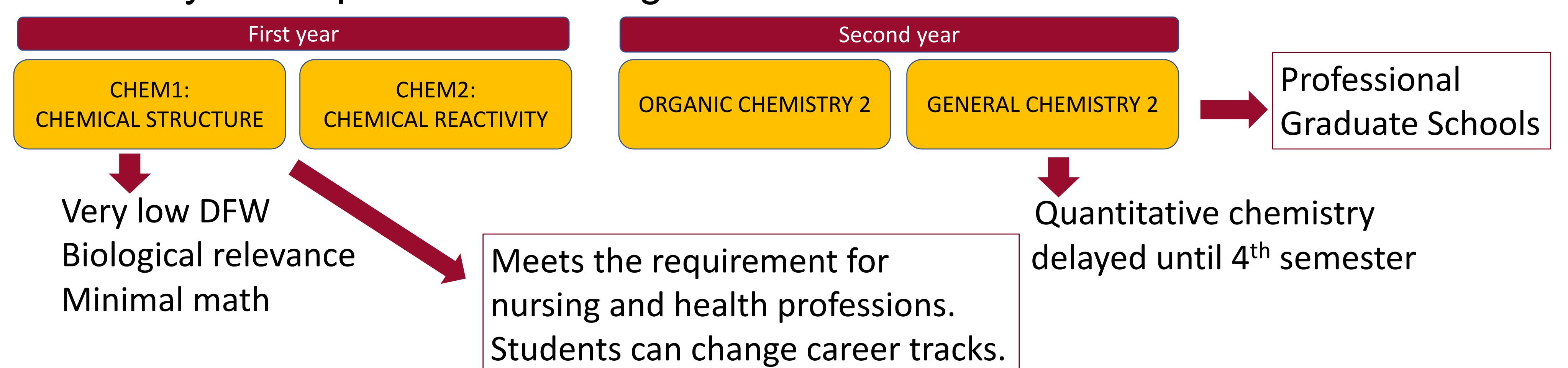
Taught for chemistry majors
Little biology/health relevance

- Departments must create alternative paths for nursing and health professions.
But those are not accepted for pre-med as they sacrifice too much content.

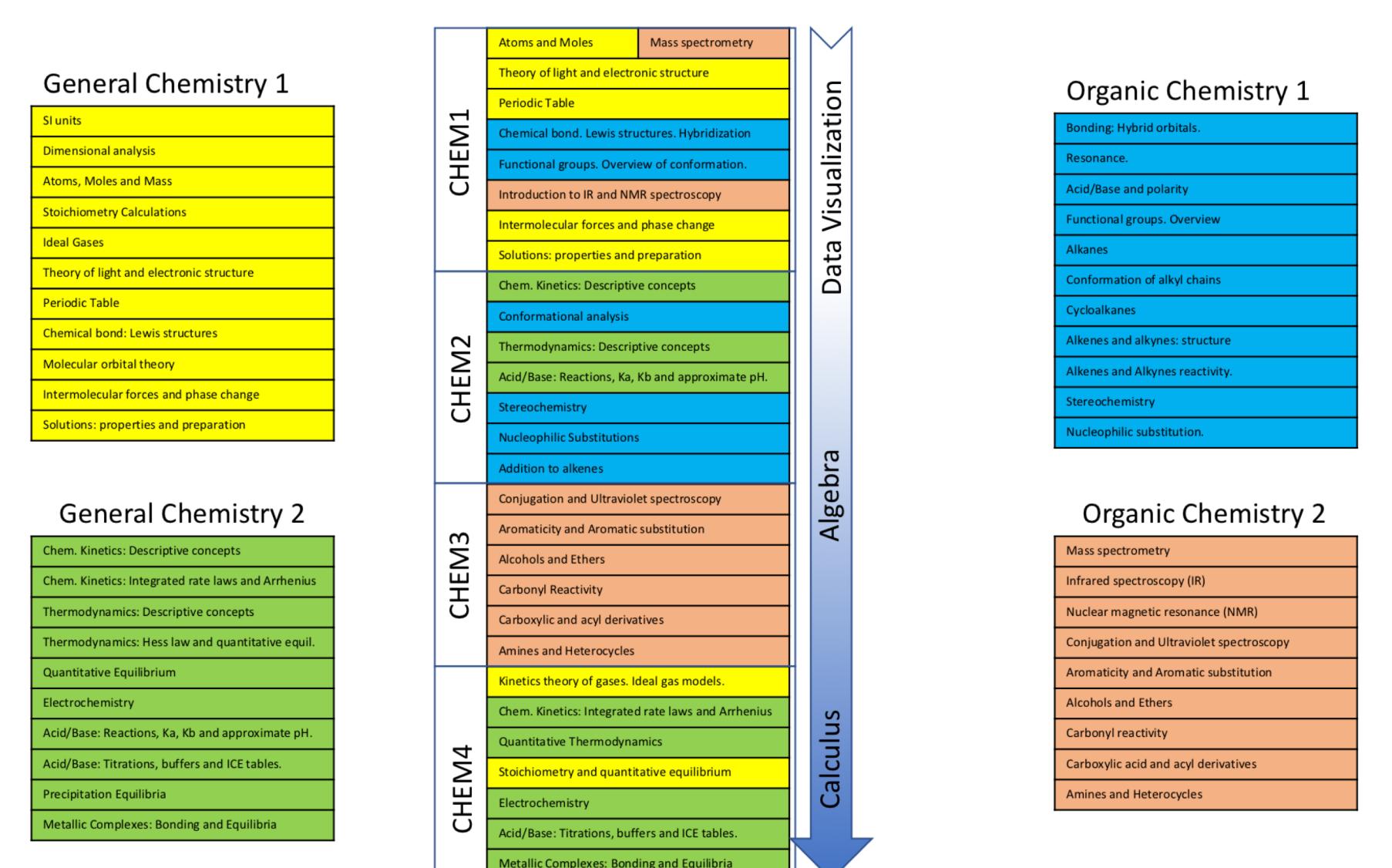


THE CHEMISTRY CURRICULUM AT UMR

At UMR chemistry courses do not have the pressure to serve too many majors, and have flexibility to adapt to the challenges.

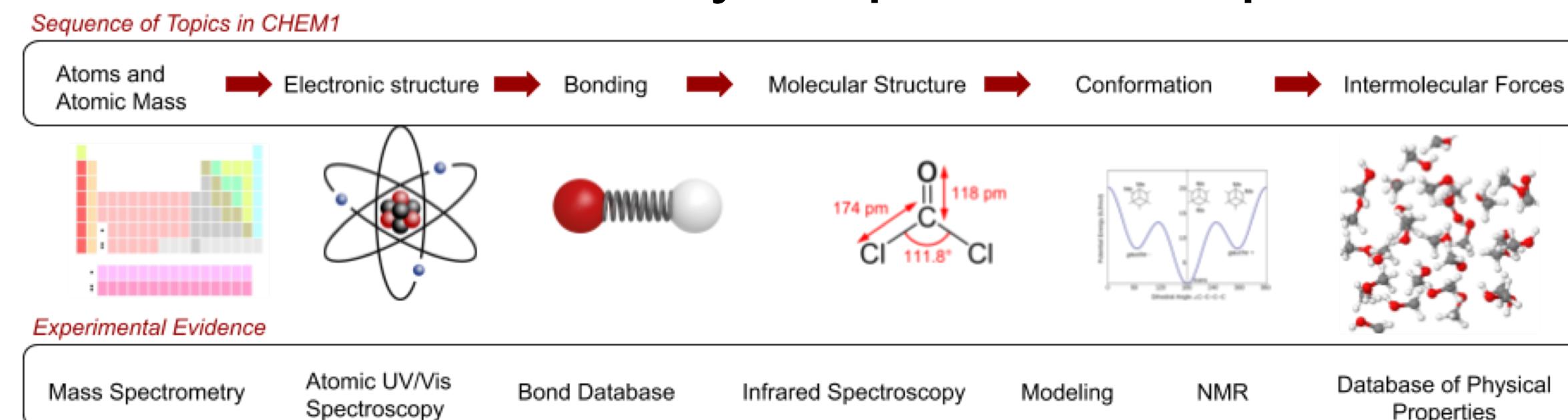


- In collaboration with math faculty, we progressively add more quantitative chemistry
- Rigor and content is not sacrificed, only rearranged and adapted to the needs of students as they shape their careers in Health Sciences
- The new courses transfer to other institutions. Professional and graduate schools accept them as the traditional curriculum.



IMPLEMENTING HIGH IMPACT PRACTICES

Using experimental evidence at every step of the sequence of topics



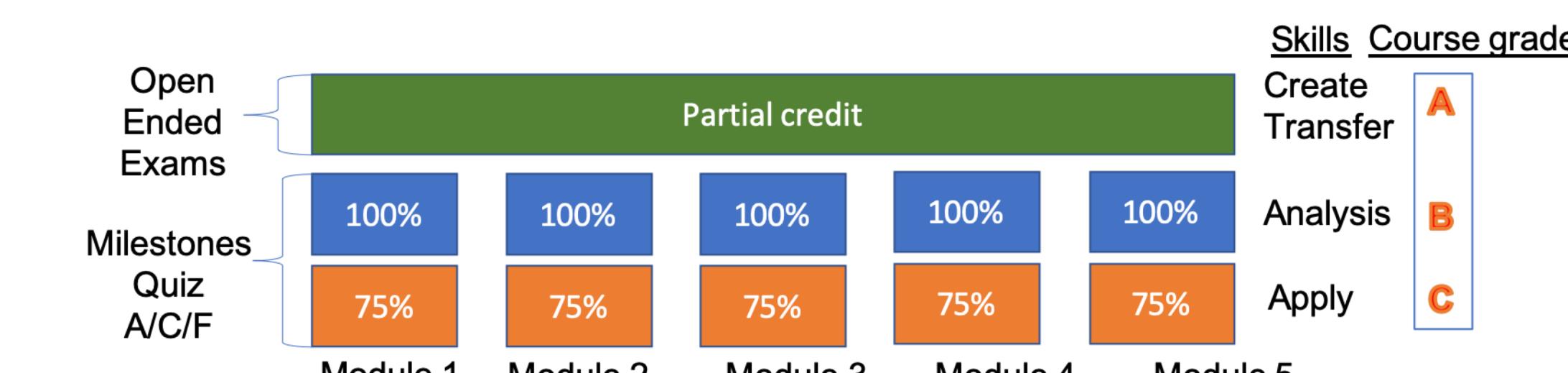
The flipped classroom model promotes active learning.



- On any given day an average of 85% of students have watched the assigned lecture videos. Strong correlation between video watching and student performance

Specifications grading: The A/C/F scale

- Eliminate partial credit on basic questions or skills. The A/C/F scale gives a clearer message on grades and allows students to calibrate effort and performance.

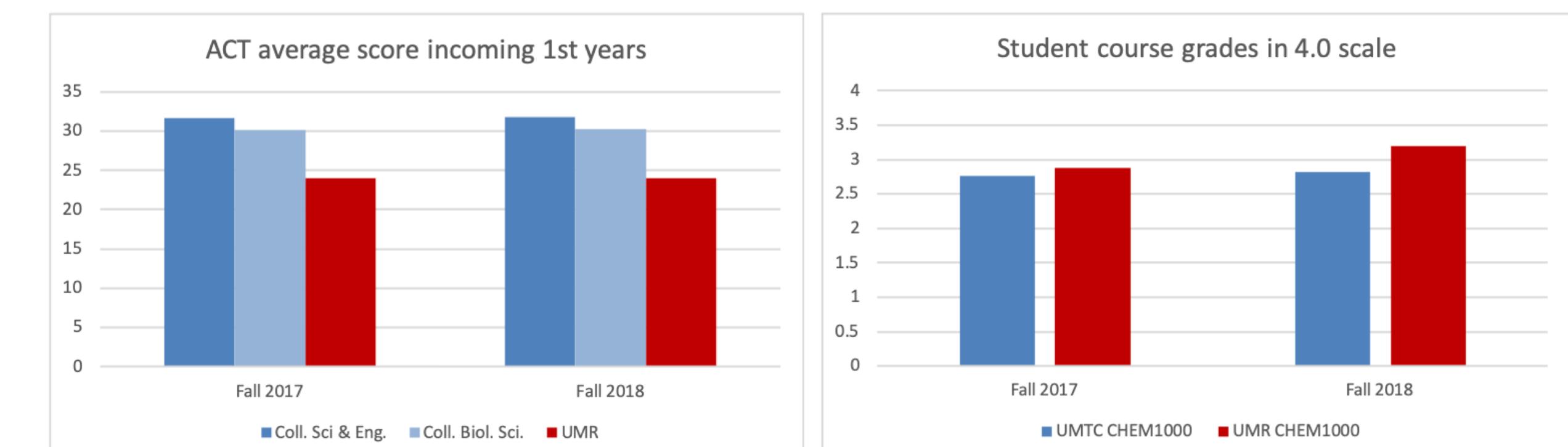


Co-teaching model

- Seven chemistry faculty members coordinate, design, implement, and deliver a very cohesive curriculum. The same curriculum is delivered in all sections even if taught by different faculty. At any given lecture there are two faculty members present.

RESULTS AND SUMMARY

On the first CHEM semester at UMR engagement and attendance is close to 100%. DFW is lower than 5%. As a measure of college readiness, while UMR incoming students have on average a significantly lower ACT composite scores than UMTC's (Science colleges) they close the gap of achievement and obtain similar or higher grades in first-year chemistry courses.



Source: <https://www.oir.umn.edu/student/characteristics> and <https://onestop.r.umn.edu/academics/class-search-resources>



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