

Training Physics Teachers at a Liberal Arts College

Rachele Dominguez

Randolph-Macon College

Chesapeake Section AAPT

Fall Meeting: Saturday October 29, 2016

NOVA Community College

Loudon Campus, Sterling, VA



RANDOLPH-MACON
COLLEGE

Building *Extraordinary* Science Teachers

NOYCE SCHOLARS

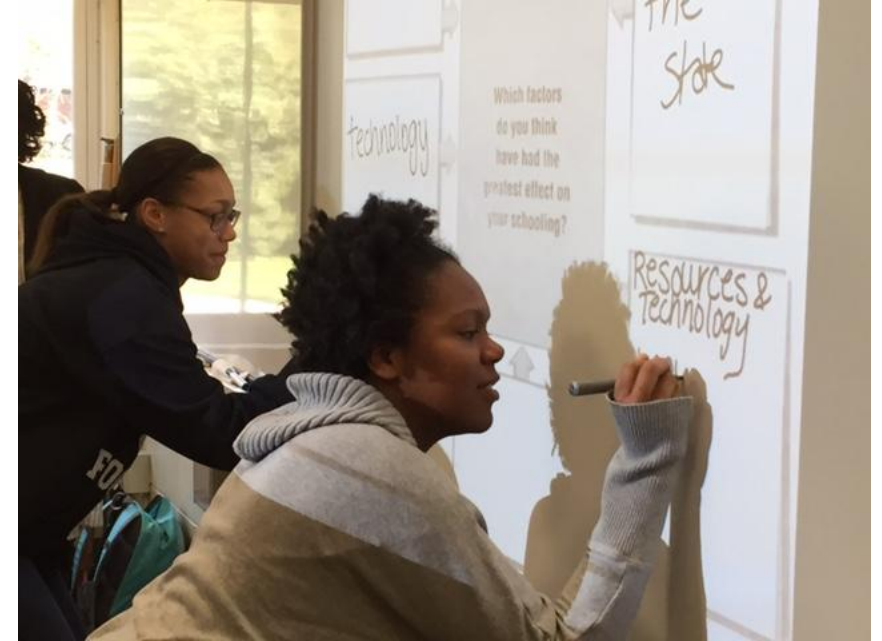


Outline

- Teacher Prep and at R-MC
- Physics Teacher preparation Initiatives at R-MC
 - Noyce teacher scholarship program
 - Physics Teacher Education Coalition (PhysTEC)
- Liberal arts curriculum consideration
- Wrap-up and lofty goals

MACON a teacher: R-MC Teacher Preparation Program

- VA Department of Education approved teacher prep program
- Endorsements in Elementary, Secondary, Special Education, and Music Education
- Students accepted into program Junior Year
- Certified and ready to teach after 4 years
- Approximately 90% of students secure a full-time teaching position in the first year after graduation (with most of the remaining 10% pursuing masters-level education).



Science Teacher Preparation at R-MC

- In the past 7 years, only 3 of 100 students graduated from the program with a science major (0 physicists!)
- Several physics majors have gone on to teach high school

Robert Noyce Teacher Scholarship Program

- NSF funded initiative that responds to the critical need for K-12 science teachers
- Scholarship recipients must teach 2 years in a high needs school district for each year of funding
- Collect and disseminate information about effective teacher preparation (with AAAS)

R-MC Noyce:



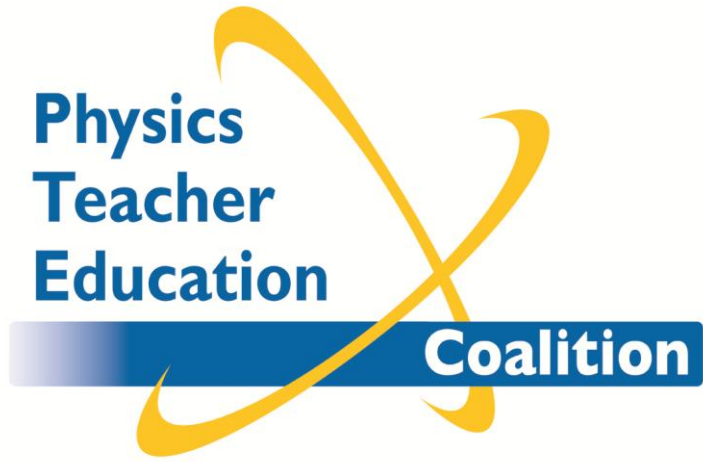
- Eligibility:
 - Current or entering student
 - Plan to major in **Physics, Chemistry, or Biology** and minor in **education**
 - Plan to teach high school science
- Benefits
 - Up to four years full tuition scholarship to R-MC
 - Paid summer opportunities
 - Job placement assistance and classroom start-up funds
- Obligations
 - Maintain a 3.0 GPA
 - Work for 4 years in a high needs school district

Year 1: Recruitment-
target 16 over 2 years
Year 2: First year scholars

- 1 physics major
- 2 Chemistry majors
- 3 Biology majors

- All Freshmen, except 1 Senior biology major
- All women





Member institutions:

- Support improving pre-service teacher education
- Are dedicated to resolving the physics teacher shortage.
- Collect and disseminate research
- Host member conferences
- Offer grant opportunities

Best practices in Physics Teacher Prep Programs (identified by PhysTEC)

- Collaboration
- Institutional Commitment
- Assessment
- Mentoring and Induction Support
- Early Teaching Experiences
- Recruitment
- Pedagogical Content Knowledge
- Champion
- Teacher-in-residence
- Learning Assistants

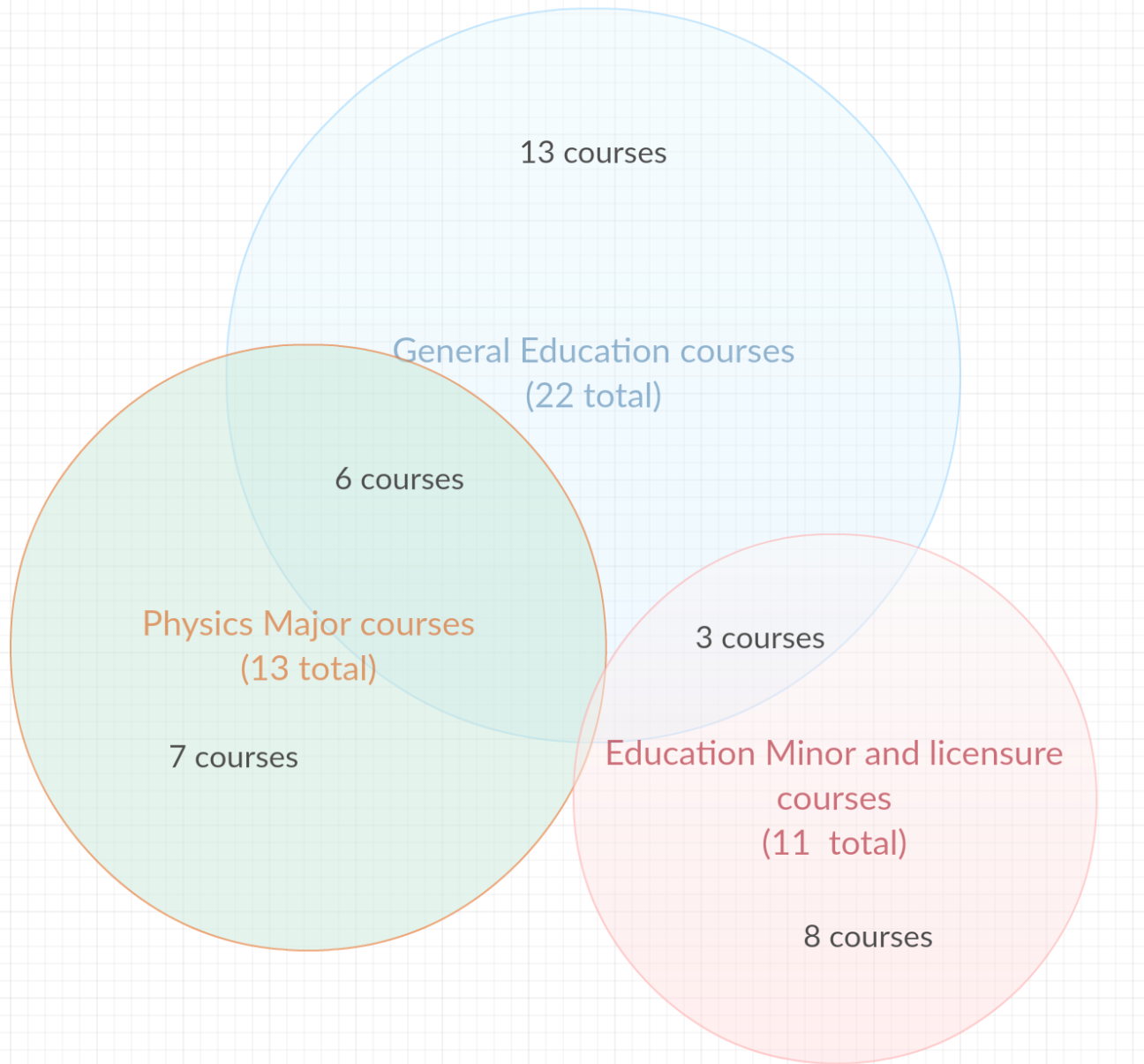
Difficult to support at R-MC

Building upon existing R-MC
Teacher Preparation Program

Noyce Support

- Financial support for developing existing structures
- Building a community of secondary science teachers in the region
- Targeted recruitment
- Support for me to develop courses that teach pedagogical content (Physics teaching tutorial/mentorship, Science for educators course)

Curriculum breakdown for physics teacher prep program



- Heavy academic load
 - Minimum 37 courses, 130 credits (with no incoming, transfer credit)
 - Compare to college graduation requirement of 34, 110 credits
- Highly sequenced program
 - Very careful long term planning required
 - Scheduling challenges
- Robust liberal arts education
 - Broad range of courses- great for teachers!
 - High percentage of gen ed courses
 - $22/37 = 59\%$ gen ed courses
 - $13/37 = 35\%$ gen ed courses that do not count towards major or minor

Wrap-up and lofty goals

- Noyce and PhysTEC initiatives are helping us strengthen our Physics Teacher Preparation program in many ways.
- A Liberal Arts Education is...
 - Broad, yet coherent
 - Interdisciplinary (not just multidisciplinary)
- Can we build a more coherent curriculum and maintain the integrity of the liberal arts mission that our institution values?

