



Nanotechnology Educational Landscape

Nanotechnology:
*A Call to Action for
Community Colleges*

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Nanotechnology Educational Landscape

- National trend and Development
 - Wing Tsao, Dean, School of Science & Mathematics
- Blue Ribbon Task Force on Nanotechnology
 - Dhaval Brahmbhatt, Chairman, IEEE SF Bay Area Nanotechnology Council
- A Local Response
 - Robert Cormia, Professor, Foothill College



Overview

- Penn State Program
 - Center for Nanotech Education and Utilization
- Minnesota Program
 - Dakota County Technical College, Rosemount, MN
 - Deb Newberry
- New Mexico Program
 - Technical and Vocational Institute, Albuquerque, NM
 - Al West, Matt Pleil and Fabian Lopez
- Oregon Program
 - Chemeketa College, Salem, OR
 - Carmen R Watkins

Penn State Model

- Funded by NSF-ATE grant
- Taught at the Penn State Nanofabrication Facility
- 2+**2**+2 pathway articulated
- Capstone semester: 6 hands on courses, 18 Units
 - Material, Safety and Equipment for Nanofabrication
 - Basic Nanofabrication Process
 - Thin Films in Nanofabrication
 - Advanced Lithography and Patterning Technique
 - Material Modification in Nanofabrication
 - Characterization, Packaging and Testing of Nano Structures

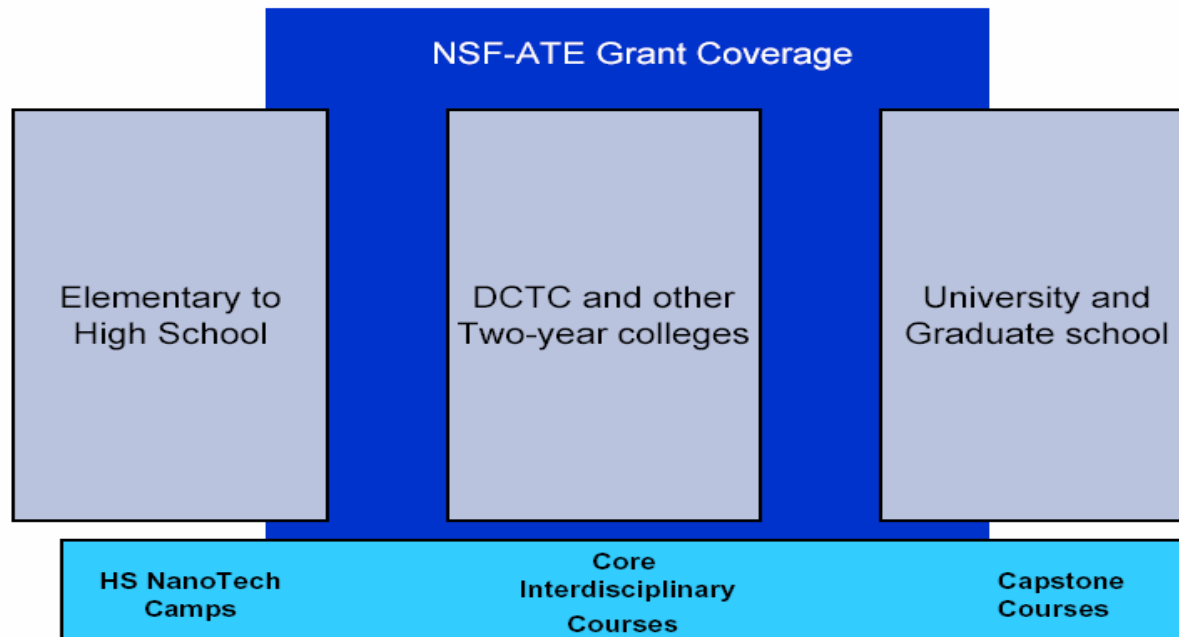
Minnesota Curriculum

72-CREDIT NANOSCIENCE CURRICULUM											
Semester 1 at DCTC			Semester 2 at DCTC			Semester 3 at DCTC			Capstone at the U of M		
Course #	Course Name	Credits	Course #	Course Name	Credits	Course #	Course Name	Credits	Course Name	Credits	
BIOL 1500	General Biology	4	CHEM	Chemistry	4	NANO 2100	Nanoelectronics	4	Basic and Advanced Fabrication	8	
MATS 1300	Algebra	4	PHYS 1020	Intro to Physics	4	NANO 2110	Nanobio/Agriculture	4	Thin Film Deposition	4	
COML 1400	Intro to Computers	3	MATS 1050	Statistics	4	NANO 2120	Nanomaterials	4	Introduction to Materials Characterization	3	
ENGL 1100	Writing & Research	3	SPEE 1020	Interpersonal Communications	3	NANO 2130	Manufacturing Quality Assurance Lecture and combined Nano-Equipment Lab	4	Micro and Nano Fabrication Lab	1	
NANO 1100	Fundamentals of Nanoscience I	3	NANO 1200	Fundamentals of Nanoscience II	3				Materials Characterization Lab	1	
			NANO 1210	Computer Simulation	1	NANO 2140	Industry Internship & Observation	1	Nanoparticles and Biochips Lab	1	
						NANO 2150	Capstone Preparation	1	Industry Internship Experience	2	
TOTAL CREDITS		17	TOTAL CREDITS		19	TOTAL CREDITS		18	TOTAL CREDITS		18

	Color
General Education – Minnesota Transfer Curriculum	29
Junior-Level Nanoscience courses	25
Advanced Nanoscience courses at University of Minnesota	18

Minnesota Program

Nanoscience Curriculum: A career path approach



New Mexico Program

- Introduction MEMS
- Design – 2 courses
 - Uses Sandia’s SUMMiT V and Conventor software
- Fabrication – 3 courses
 - Lithography, wet and dry etch
 - Thin film deposition
- Support
 - Packaging, testing, characterization

Oregon Curriculum *(quarter system)*

- Careers in Nanotechnology
- Introduction to MEMS *(1 unit, online)*
- MEMS Design I *(1 unit, online)*
 - Uses Sandia's SUMMiT V software
- MEMS Design 2 *(2 units, online)*
 - Uses Sandia's SUMMiT V software