

This transfer guide lists the BC3 courses required for the Nanofabrication Technology program and the Clarion equivalents as of the date of the printing of this guide. To transfer courses, students will need a grade of “C” or higher.

The curriculum provides the student with a comprehensive background in microelectronics and nanofabrication technology. The final semester of the program is administered at Penn State University, Main Campus. Extensive use of the facilities at the Penn State Electronic Materials and Processing Research Laboratory are included in the program. The student will study electronic device and circuit theory, basic chemistry, and nanofabrication techniques including ion implantation, neutral particle beam and vapor deposition epitaxy, photolithography, thin and thick-film deposition processes, metallization, and bipolar and MOS semiconductor device structure fabrication.

Employment opportunities include semiconductor manufacturing facilities, research laboratories, optoelectronic manufacturing facilities, and university and government nanofabrication laboratories.

## BUTLER REQUIREMENTS – 71 credits

## CLARION EQUIVALENT COURSES

### First Semester

ENGL 101: English I	3	ENG 110: Writing I
MATH 117: Technical Math I or MATH 101: College Math I (suggest MATH 221: Calculus & Analytic Geometry I)	3	Elective (MATH 270: Calculus I)
PHYS 101: Physics I (suggest PHYS 221: Engineering Physics I)	4	PH 251: General Physics I (PH 258 & 268: Introduction to Physics I & lab)
ELEC 110: Electrical Fundamentals*	7	Elective
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### Second Semester

MATH 118: Technical Math II or MATH 102: College Math II (suggest MATH 222: Calculus & Analytic Geometry II)	3	Elective (MATH 271: Calculus II)
ELEC 225: Digital Electronics	4	Grouped with ELEC 240
ELEC 221: Electronics I	5	Grouped with ELEC 222
CHEM 101: Chemistry I	4	CHEM 153 & 163: General Chemistry I & lab
PHED 125: Physical Wellness or Physical Education	2	HPE 185: Physical Fitness & Conditioning
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\*Part-time students may take DC Circuits (ELEC 101) and AC circuits (ELEC 102) in place of Electrical Fundamentals (ELEC 110).

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## BUTLER REQUIREMENTS

## CLARION EQUIVALENT COURSES

### Third Semester

ELEC 240: Fundamentals of Microprocessors	4	PH 456: Digital Electronics
METR 115: Statistics & Stat Processes	3	PH 1XX: Physics Elective
ELEC 222: Electronics II	5	PH 455: Analog Electronics
ENGL 102: English II or ENGL 106: Technical Writing (suggest ENGL 102: English II)	3	ENG 111: Writing II or Writing Elective (ENG 111: Writing II)
COMM 201: Speech	3	CMST 113: Public Speaking
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### Fourth Semester

#### (Courses offered at Pennsylvania State University, Nanofabrication Facility, Main Campus)

ELEC 272: Material Safety & Equipment Overview for Nanofabrication	3	PH 270: Condensed Matter Lab Practicum
ELEC 273: Basic Nanofabrication Processes	3	
ELEC 274: Thin Films in Nanofabrication	3	
ELEC 282: Lithography for Nanofabrication	3	
ELEC 283: Materials Modification in Nanofabrication	3	
ELEC 284: Characterization, Packaging & Testing of Nanofabricated Structures	3	
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### Residency Requirement

A minimum of 30 of the last 45 credits must be taken through Clarion University with at least 50 percent of major credits taken through Clarion.