



## Advanced and Biomedical Manufacturing

**Program Code:**

TE\_ABM

**Academic Area:**

Science, Technology, Engineering and Mathematics

**Type:**

Associate in Science

### Program Statement

This concentration prepares students to enter highly-automated manufacturing industries as automation specialists and manufacturing technicians or for technical positions in biotechnology and pharmaceutical manufacturing industries. In the advanced manufacturing option: Students learn to solve complex manufacturing problems using computer-aided design, evaluation and simulation techniques, and engineering principles. The curriculum covers such aspects of manufacturing engineering as materials processing (traditional and CNC), industrial automation, material science, hydraulics, computer-aided design and manufacturing (CAD/CAM), and computer-integrated manufacturing (CIM).

### Program Information

- This program is especially valuable to the person who wants technical diversity.
- Students should be in a Math (MTH) course every semester until they have completed their sequence.
- Recommended Program Electives:
  - **Advanced Manufacturing:** EGR 112: Automated Machining, EGR 211: Programmable Control Systems, CAD 211, and choose one EGR 190: Technical Projects, EGR 299: Engineering Projects, CAD 101: Computer Aided Drafting, CAD 112: Maker Space Projects and Advanced Mechanical Design or any Internship Program course.
  - **Biomedical Manufacturing:** BIO 121: Fundamentals of Biological Science I; either BIO 115: Survey of Human Anatomy and Physiology or BIO 233: Human Anatomy and Physiology I; and either BIO 126: Introduction to Biotechnology, BIO 240: Cell Biology, or CHM 113: Fundamentals of Chemistry I.
  - **Automation & Robotics:** EGR 113: Introduction to Robotics, EGR 171: Fluid Systems, and EGR 211: Programmable Control Systems.
- Completing courses in the summer will reduce fall and spring semester course loads.
- Oral Communication General Education Competency Infused.

### After Bristol

- Graduates of the biomedical option can enter the workforce as biomedical, bioprocess or pharmaceutical manufacturing technicians.
- Graduates work as automation specialists, manufacturing technicians, design technicians, CAD designers, engineering aides, field service technicians, technical representatives, and maintenance technicians. It will open employment doors to many jobs that require multidisciplinary competencies.
- If you are considering transferring to a four-year institution, speak with your advisor and visit Transfer Services for additional information.



## Degree Requirements

### General Courses

Course #	Title	Credits
CSS 101	College Success Seminar	1
ENG 101	Composition I: College Writing	3
ENG 102	Composition II: Writing about Literature	3
	HST 113 or HST 114	3

### Program Courses

Course #	Title	Credits
CAD 111	Mechanical Design with Solidworks	3
EGR 103	Computer Skills for Engineers and Technicians	3
EGR 151	Electrical Machinery	3
EGR 172	Material Science	4
EGR 215	Lean Six Sigma	3

### Elective Courses

Course #	Title	Credits
	Human Expression Elective	3
	Multicultural and Social Perspectives Elective	3

### Program Electives

Course #	Title	Credits
	Program Electives	13-16
	EGR 111 or EGR 115	3-4
	Two-course Math Sequence	7-8
	PHY 101, PHY 211 or EGR 113	4

### Recommended Course Sequence - Semester 1

Course #	Title	Credits
CSS 101	College Success Seminar	1
ENG 101	Composition I: College Writing	3
EGR 103	Computer Skills for Engineers and Technicians	3
	EGR 111 or EGR 115	3-4
	MTH 152, MTH 172 or MTH 214	3-4



## Recommended Course Sequence - Semester 2

Course #	Title	Credits
ENG 102	Composition II: Writing about Literature	3
CAD 111	Mechanical Design with Solidworks	3
	MTH 172, MTH 214 or MTH 215	4
	EGR 172 or Program Electives	6-7

## Recommended Course Sequence - Semester 3

Course #	Title	Credits
EGR 151	Electrical Machinery	3
EGR 215	Lean Six Sigma	3
PHY 101	Technical Physics I	4
	Program Elective	3
	Multicultural and Social Perspectives Elective or Human Expression Elective	3

## Recommended Course Sequence - Semester 4

Course #	Title	Credits
	HST 113 or HST 114	3
	Multicultural and Social Perspectives Elective or Human Expression Elective	3
	EGR 172 or Program Electives	6-7
	Program Elective	3
	<b>Total credits:</b>	<b>61</b>

## Category Descriptions

### HST 113 or HST 114

Credits: 3

Choose one of the following:

Course #	Title	Credits
HST 113	United States History to 1877	3
HST 114	United States History from 1877	3

### Human Expression Elective

Credits: 3



Choose one Human Expression elective.

## Multicultural and Social Perspectives Elective

Credits: 3

Choose one Multicultural and Social Perspectives elective.

## Program Electives

Credits: 13-16

*Choose the appropriate number of program electives to meet the overall credit requirement for your program.*

<b>Course #</b>	<b>Title</b>	<b>Credits</b>
BIO 115	Survey of Human Anatomy and Physiology	4
BIO 121	Fundamentals of Biological Science I	4
BIO 126	Introduction to Biotechnology	3
BIO 240	Cell Biology	4
CAD 112	Maker Space Projects and Advanced Mechanical Design with SolidWorks	3
CAD 211	Computer Aided Manufacturing	3
CHM 113	Fundamentals of Chemistry I	4
EGR 112	Automated Machining	3
EGR 113	Introduction to Robotics	4
EGR 171	Fluid Systems	4
EGR 190	Technical Projects	3
EGR 211	Programmable Control Systems	4
EGR 299	Engineering Projects	4
	Internship Experience	3

## EGR 111 or EGR 115

Credits: 3-4

Choose one of the following:

<b>Course #</b>	<b>Title</b>	<b>Credits</b>
EGR 111	Fundamentals of Manual Machining	4
EGR 115	Manufacturing Processes, Measurements and Quality	3

## Two-course Math Sequence

Credits: 7-8

Choose one two-course math sequence.



<b>Course #</b>	<b>Title</b>	<b>Credits</b>
	MTH 152 and MTH 172	7
	MTH 172 and MTH 214	8
	MTH 214 and MTH 215	8

## PHY 101, PHY 211 or EGR 113

Credits: 4

*For students with adequate Mathematics preparedness that are interested in transfer, choose PHY 211.*

Choose one of the following:

<b>Course #</b>	<b>Title</b>	<b>Credits</b>
PHY 101	Technical Physics I	4
PHY 211	General Physics I	4
EGR 113	Introduction to Robotics	4