# General Engineering Technologies

**Award:** Associate of Applied Science
**Length:** 63-65 credits

## CADD

**Award:** Certificate
**Length:** 40 credits

## Advanced Manufacturing

**Award:** Career Studies Certificate
**Length:** 28 credits

| PROGRAM CONTENT COMPARISONs | | | | | |
|---|---|---|---|---|---|
| | **General Engineering Technologies (AAS)** | **CADD (CERT)** | **Advanced Manufacturing (CSC)** | **Mechatronics Level 1 Concentration (Industry Certification Prep.)** | **Mechatronics Level 2 Concentration (Industry Certification Prep.)** |
| HUM EEE (3) | ● | | | | |
| ENG 111 (3) | ● | ● | | | |
| MTH 111 (3)<br>MTH 167 (5) | ● | ● | | | |
| PHY 131 (3) | ● | | | | |
| SOC EEE (3) | ● | | | | |
| SDV 108 (1) | ● | ● | ● | | |
| HLT 105 (1) | ● | | | | |
| EGR 110 (3) | ● | ● | | | |
| ELE 246 (3) | ● | | | | |
| EGR 135 (3) | ● | | | | |
| EGR 136 (3) | ● | | | | |
| EGR 216 (3) | ● | ● | ● | | |
| EGR 298 (1) | ● | | | | |
| MEC 119 (3) | ● | ● | | | ● |
| MEC 140 (3) | ● | | ● | ● | |
| MEC 165 (3) | ● | | | ● | |
| SAF 126 (3) | ● | | ● | | |
| Technical Electives (18) select any non-repeat | ● | CAD- 201, 202, 203, 232, 233, 241, 242, 243 | IND 101, 125, 195, 290, 295; MEC 112 | ETR 156; MEC 155, IND 243 | ELE 233; ETR 246, 266; IND 101, 295; INS 210 |

## General Engineering Technologies

**Award:** Associate of Applied Science
**Length:** 63-65 credits

**Purpose:** Provides the knowledge and skills leading to immediate employment in the field of engineering technologies and manufacturing related fields. People who wish to prepare for industry certification or qualify for promotion in a present position to another field may benefit from this program. Students may use their 18 credits of technical electives to explore a variety of technical electives but are strongly urged to pursue a concentration in one of four pathways:

**eneral Education Requirements (15-17 Credits):**

ENG 111 College Composition I (3)
HUM EEE Humanities Elective (3) *See pages 163-165*
MTH 111 Basic Technical Math (3)
[or MTH 167 PreCalculus with Trigonometry (5)]
PHY 131 Applied Physics (3)
SOC EEE Social Sciences Elective (3) *See pages 163-165*

**Core Program Requirements (30 Credits):**

| | | |
|---|---|---|
| EGR | 110 | Engineering Graphics (3) |
| ELE | 246 | Industrial Robotics Programing (3) |
| EGR | 136 | Strength of Materials for Engineering Technology (3) |
| EGR | 135 | Statics for Engineering Technology (3) |
| EGR | 216 | Computer Methods in Engineering (3) |
| EGR | 298 | Seminar and project (1) |
| HLT | 105 | Cardiopulmonary Resuscitation (1) |
| MEC | 119 | Basic CNC and CAM (3) |
| MEC | 140 | Introduction to Mechatronics (3) |
| MEC | 165 | Applied Hydraulics, Pneumatics and Hydrostatics (3) |
| SAF | 126 | Principals of Industrial Safety (3) |
| SDV | 108 | College Survival Skills (1) |

**Technical Electives (18 Credits)**

**Students may choose from ANY of these 18 technical electives OR may choose to complete one of the three pathways to a certification. Some prerequisites may be required.**

| CADD Certification | Advanced Manufacturing | Mechatronics Level I and II Industry Certification prep. |
|---|---|---|
| CAD 201 Computer Aided Drafting and Design I (3)<br>CAD 243 Parametric Solid Modeling III (3)<br>CAD 202 Computer Aided Drafting and Design II (3)<br>CAD 203 Computer Aided Drafting and Design III (3)<br>CAD 241 Parametric Modeling I (3)<br>CAD 232 Computer Aided Drafting II (3)<br>CAD 233 Computer Aided Drafting III (3)<br>CAD 242 Parametric Modeling II (3) | IND 195 Introduction to Manufacturing and Advanced Film Technology (3)<br>IND 101 Quality Assurance Technology (3)<br>MEC 112 Processes of Industry (3)<br>IND 125 Installation and Preventive Maintenance (3)<br>IND 295 Topics in Advanced Film Technology (3)<br>IND 290 Coordinated Internship (3) | ETR 156 Digital Circuits and Microprocessor (4)<br>IND 101 Quality Assurance Tech I (3)<br>IND 243 Principles and Applications of Mechatronics (3)<br>IND 246 Industrial Robotics Programming (3)<br>MEC 155 Mechanisms (3) |

**Minimum required for degree: 63-65 Credits**

**Students should consult their faculty advisor to discuss program options**.

**Potential Industry Certifications:**
A student may elect to take an industry specific certification/ license exam. Examinations generally require a testing fee paid by the student. After completion of this program, a student will be academically prepared to take the following exams:

- CADD Certification pathway: **Autodesk Certified User for Inventor**, **Autodesk Certified User for Revit;**
- Advanced Manufacturing pathway: **Certified Production Technician;**
- Mechatronics preparation pathway:
  - Level 1: **Siemens Certified Mechatronic Systems Assistant**
  - Level 2: **Siemens Certified Mechatronic Systems Associate**

**Occupational Objectives:**
The associate degree in engineering technology qualifies graduates for an entry-level position as a technician. Concentration in one of the three pathways will prepare a graduate for more specific roles such as engineer's assistant, supervisor trainee, manufacturing specialist, quality assurance auditor, CAD technician, maintenance lead person, team leader, and computer controlled process technician.

**Advancement Options:**
Program specializations offer Siemens Mechatronic System Certification. Old Dominion University offers graduates of this program advanced credit transfer options for completing a baccalaureate degree.

**Core Program Learning Outcomes:** A student will be able to:

- apply basic principles of engineering design;
- demonstrate effective engineering communication skills in geometric analysis and spatial relationships of fundamental geometric elements; points, lines, planes and solids;
- demonstrate proficiency in mathematical skills to calculate static equilibrium and perform structural analysis on rigid bodies;
- demonstrate proficiency in scientific reasoning to understand the engineering design process through the basics of hydraulic, electrical, computer, and mechanical systems;
- demonstrate advanced level experience in using a computer as a tool for solving technical problems and performing office functions.

Students are encouraged to enroll early for **summer semester classes** to satisfy general studies and core course program degree requirements.

## CADD

**Award:** Certificate
**Length:** 40 credits

**Purpose:** Students learn to use advanced computer workstations with various CADD software applications. Students will receive instruction and practice in the planning, design, and preparation of high quality technical drawings for a variety of projects. In addition to technical courses, there are supporting courses in communications, mathematics, and social sciences. These courses serve to broaden the student's general education background and thus better prepare students for employment and advancement in the career field.

**Program Learning Outcomes:** Program graduates have generic and specific occupational skills to be competitive in technical drawing creation and manipulation positions (CADD positions) in a variety of manufacturing, engineering, architectural and civil settings. Graduates demonstrate proficiency in 21st Century skills and use of current technological tools of the profession.

**Occupational Objectives:** Graduates may seek immediate employment or continue their education in the General Engineering Technology Degree program at PHCC. The curriculum is designed to provide educational background and skills training that would be required for students seeking employment in entry level architectural and industrial drafting such as architectural drafting technician, engineering drafting technician, engineering assistant, CAD operator or CAD drafter.

**General Education Requirements (6 Credits):**

ENG 131 Technical Report Writing I (3)
[or ENG 111 College Composition I (3)]
MTH 111 Basic Technical Math (3)

**Program Requirements (34 Credits):**

CAD 201 Computer Aided Drafting and Design I (3)
CAD 243 Parametric Solid Modeling III (3)
CAD 202 Computer Aided Drafting and Design II (3)
CAD 203 Computer Aided Drafting and Design III (3)
MEC 119 Introduction to Basic CNC and CAM (3)
CAD 232 Computer Aided Drafting II (3)
CAD 233 Computer Aided Drafting III (3)
CAD 241 Parametric Modeling I (3)
CAD 242 Parametric Modeling II (3)
EGR 110 Engineering Graphics (3)
EGR 216 Computer Methods in Engineering Technology (3)
SDV 108 College Survival Skills (1)

**Minimum required for certificate: 40 credits**

## Advanced Manufacturing

**Award:** Career Studies Certificate
**Length:** 28 credits

**Purpose:** This program is provided to meet the demands for an emerging technical workforce and is a direct response to local workforce and industry demand. Therefore, implementation of this program will expand employment and educational opportunities for area citizens.

**Program Learning Outcomes:** A student will be able to:

- demonstrate knowledge of safety, quality practices;
- processes and procedures, and preventive maintenance within the manufacturing production environment;
- demonstrate proficiency in applied mathematics, reading for information, and locating information;
- demonstrate understanding of and proficiency in machine operations especially those relevant to advanced films manufacturing, including coating, laminating, and web handling.

IND 101 Quality Assurance Technology I (3)
IND 125 Installation and Preventive Maintenance (3)
IND 195 Introduction to Manufacturing and Advanced Films Technology (3)
IND 290 Coordinated Internship (3)
IND 295 Topics in Advanced Films Technology (3)
EGR 216 Computer Methods in Engineering & Technology (3)
MEC 112 Processes of Industry (3)
MEC 140 Introduction to Mechatronics (3)
SAF 126 Principles of Industrial Safety (3)
SDV 108 College Survival Skills (1)

**Minimum required for career studies certificate: 28 credits**

**Advising Sheet Suggested Schedules:** Courses in advising sheets are displayed under the semester in which the courses are regularly offered. It is possible that a course shown on the schedule for a particular semester may not be offered due to low enrollment or other factors.

## Advising Sheet for AAS: General Engineering Technologies 2018 -2019

| Developmental English Pre-requisites met: _____yes _____no | | | |
|---|---|---|---|
| **Required** | ENF1 | ENF2 | ENF3 |
| **Met** | | | |

| Developmental Math Pre-requisites met: _____yes _____no | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Required** | MOD1 | MOD2 | MOD3 | | | | | | |
| **Met** | | | | | | | | | |

| **Fall Semester Courses:** | | | **Completed** |
|---|---|---|---|
| ENG 111 | College Composition I | 3.0 | _____ |
| MTH 111 / 167 | Basic Technical Math / MTH 167 – PreCalculus with Trig. | 3-5 | _____ |
| SAF 126 | Industrial Safety | 3.0 | _____ |
| MEC 140 | Introduction to Mechatronics | 3.0 | _____ |
| SDV 108 | College Survival Skills | 1.0 | _____ |
| TEC EEE | Technical Elective | 3.0 | _____ |
| | **Total** | 16-18 | |

**Next actions which follow or can be accomplished during the First semester**

1. During Early Bird Registration, meet with your academic advisor to enroll in the next semester.

| **Spring Semester Courses:** | | | **Completed** |
|---|---|---|---|
| ELE 246 | Industrial Robotics Programming | 3.0 | _____ |
| ERG 216 | Computer Methods in Engineering | 3.0 | _____ |
| CST 110 | Introduction to Communication | 3.0 | _____ |
| EGR 110 | Engineering Graphics | 3.0 | _____ |
| TEC EEE | Technical Elective | 6.0 | _____ |
| | **Total** | 18 | |

**Next actions which follow or can be accomplished during the Second semester**

1. During Early Bird Registration, meet with your academic advisor to enroll in the next semester.

| **Fall Semester Courses:** | | | **Completed** |
|---|---|---|---|
| EGR 135 | Statics for Engineering Technology | 3.0 | _____ |
| PHY 131 | Applied Physics | 3.0 | _____ |
| MEC 165 | Applied Hydraulics, Pneumatics and Hydrostatics | 3.0 | _____ |
| HLT 105 | Cardiopulmonary Resuscitation | 1.0 | _____ |
| SOC EEE | Social Sciences Elective | 3.0 | _____ |
| TEC EEE | Technical Elective | 3.0 | _____ |
| **Next actions which follow or can be accomplished during the Third semester** | **Total** | 16 | |

1. During Early Bird Registration, meet with your academic advisor to enroll in the next semester.
2. Meet with your academic advisor or transfer advisor to discuss four-year transfer options.
3. Apply for graduation.

| **Spring Semester Courses:** | | | **Completed** |
|---|---|---|---|
| EGR 136 | Strength of Materials for Engineering Technology | 3.0 | _____ |
| MEC 119 | Basic CNC and CAM | 3.0 | _____ |
| EGR 298 | Seminar and Project | 1.0 | _____ |
| TEC EEE | Technical Elective | 6.0 | _____ |
| | **Total** | 13 | |

**Advising Sheet Suggested Schedules:** Courses in advising sheets are displayed under the semester in which the courses are regularly offered. It is possible that a course shown on the schedule for a particular semester may not be offered due to low enrollment or other factors.

## Advising Sheet for Certificate in Computer Aided Drafting & Design (CADD) 2018-2019

| Developmental English Pre-requisites met: _____yes _____no | | | |
|---|---|---|---|
| **Required** | ENF1 | ENF2 | ENF3 |
| **Met** | | | |

| Developmental Math Pre-requisites met: _____yes _____no | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Required** | MOD1 | MOD2 | MOD3 | | | | | | |
| **Met** | | | | | | | | | |

| **Fall Semester Courses:** | | | **Completed** |
|---|---|---|---|
| ENG 111 or ENG 131 | College Composition I/Technical Report Writing I | 3.0 | _____ |
| MTH 111 | Basic Technical Math | 3.0 | _____ |
| CAD 201 | Computer Aided Drafting and Design I | 3.0 | _____ |
| CAD 241 | Parametric Modeling I | 3.0 | _____ |
| SDV 108 | College Survival Skills | 1.0 | _____ |
| | | **Total** 13 | |

**Next actions which follow or can be accomplished during the First semester**

1. During Early Bird Registration, meet with your academic advisor to enroll in the next semester.

| **Spring Semester Courses:** | | | **Completed** |
|---|---|---|---|
| CAD 242 | Parametric Modeling II | 3.0 | _____ |
| CAD 202 | Computer Aided Drafting and Design II | 3.0 | _____ |
| EGR 216 | Computer Methods in Engineering Technology | 3.0 | _____ |
| CAD 232 | Computer Aided Drafting II | 3.0 | _____ |
| MEC 119 | Introduction to Basic CNC and CAM | 3.0 | _____ |
| | | **Total** 15 | |

**Next actions which follow or can be accomplished during the Third semester Total**

1. During Early Bird Registration, meet with your academic advisor to enroll in the next semester.
2. Meet with your academic advisor or transfer advisor to discuss four-year transfer options.
3. Apply for graduation.

| **Fall Semester Courses:** | | | **Completed** |
|---|---|---|---|
| CAD 243 | Parametric Solid Modeling III | 3.0 | _____ |
| CAD 203 | Computer Aided Drafting and Design III | 3.0 | _____ |
| CAD 233 | Computer Aided Drafting III | 3.0 | _____ |
| EGR 110 | Engineering Graphics | 3.0 | _____ |
| | | **Total** 12 | |

**Advising Sheet Suggested Schedules:** Courses in advising sheets are displayed under the semester in which the courses are regularly offered. It is possible that a course shown on the schedule for a particular semester may not be offered due to low enrollment or other factors.

## Advising Sheet for Career Studies Certificate in Advanced Manufacturing 2018-2019

| Developmental English Pre-requisites met: _____yes _____no | | | |
|---|---|---|---|
| **Required** | ENF1 | ENF2 | ENF3 |
| **Met** | | | |

| Developmental Math Pre-requisites met: _____yes _____no | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Required** | MOD1 | MOD2 | MOD3 | | | | | | |
| **Met** | | | | | | | | | |

| **Fall Semester Courses:** | | | **Completed** |
|---|---|---|---|
| IND 101 | Quality Assurance Technology I | 3.0 | _____ |
| SAF 126 | Principles of Industrial Safety | 3.0 | _____ |
| MEC 140 | Introduction to Mechatronics | 3.0 | _____ |
| IND 195 | Introduction to Manufacturing & Advanced Films Technology | 3.0 | _____ |
| SDV 108 | College Survival Skills | 1.0 | _____ |
| | | **Total** 13 | |

**Next actions which follow or can be accomplished during the First semester**

1. During Early Bird Registration, meet with your academic advisor to enroll in the next semester.

| **Spring Semester Courses:** | | | **Completed** |
|---|---|---|---|
| MEC 112 | Processes of Industry | 3.0 | _____ |
| IND 125 | Installation and Preventive Maintenance | 3.0 | _____ |
| IND 295 | Topics in Advanced Films Technology | 3.0 | _____ |
| EGR 216 | Computer Methods in Engineering and Technology | 3.0 | _____ |
| | | **Total** 12 | |

**Next actions which follow or can be accomplished during the First semester**

1. During Early Bird Registration, meet with your academic advisor to enroll ion next semester.
2. Apply for graduation

| **Fall Semester Courses:** | | | **Completed** |
|---|---|---|---|
| IND 290 | Coordinated Internship | 3.0 | _____ |
| | | **Total** 3 | |