



Machining Technology with a Concentration in Tool, Die and Mold Making
Credential: Associate in Applied Science Degree in Machining Technology with a Concentration in Tool, Die and Mold Making
A5030A

Tool, Die and Mold Making is a concentration under the curriculum title of Machining Technology. This curriculum is designed to develop skills in the use of hand tools, computerized equipment and precision instruments for machine tooling used for the mass production of parts.

Students will learn to interpret blueprints, set up manual and Computer Numerical Controllers (CNC) machines and perform basic and advanced machining operations. Emphasis will be placed on the production of tooling used for punching, stamping and molding of parts.

Graduates should qualify for employment opportunities in manufacturing industries and Tool, Die and Mold Making industries.

Program Length: 6 semesters
 Career Pathway Options: Associate in Science in Machining Technology with a Concentration in Tool, Die and Mold Making
 Program Sites: Lee Campus - Day Program

Course Requirements for Machining Technology with a Concentration in Tool, Die and Mold Making

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| A. General Education Courses (15/16 SHC) | | C-L-SHC |
| ENG 110 | Freshman Composition OR | 3-0-3 |
| ENG 111 | Expository Writing AND | 3-0-3 |
| ENG 111A | Expository Writing Lab | 0-2-1 |
| ENG 114 | Professional Research and Reporting OR | 3-0-3 |
| ENG 116 | Technical Report Writing | 3-0-3 |
| MAT 120 | Geometry and Trigonometry | 2-2-3 |
| | Humanities/Fine Arts Elective | 3-0-3 |
| | Social/Behavioral Science Elective | 3-0-3 |

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| B. Required Major Core Courses (44 SHC) | | |
| BPR 111 | Blueprint Reading | 1-2-2 |
| BPR 121 | Blueprint Reading: Mechanical | 1-2-2 |
| MAC 111 | Machining Technology I | 2-12-6 |
| MAC 112 | Machining Technology II | 2-12-6 |
| MAC 113 | Machining Technology III | 2-12-6 |

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| Required Subject Areas | | |
| MAC 122 | CNC Turning | 1-3-2 |
| MAC 124 | CNC Milling | 1-3-2 |

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| Concentration Courses | | |
| MAC 153 | Compound Angles | 1-2-2 |
| MAC 243 | Die Making I | 2-6-4 |
| MAC 244 | Die Making II | 1-9-4 |
| MAC 245 | Mold Construction I | 2-6-4 |
| MAC 246 | Mold Construction II | 1-9-4 |

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| C. Other Major Hours Required for Graduation (17 SHC) | | |
| CIS 111 | Basic PC Literacy | 1-2-2 |
| MAC 151 | Machining Calculations | 1-2-2 |
| MAC 224 | Advanced CNC Milling | 1-3-2 |
| MAC 226 | CNC EDM Machining | 1-3-2 |
| MAC 241 | Jigs and Fixtures I | 2-6-4 |
| MEC 110 | Introduction to CAD/CAM | 1-2-2 |
| MEC 141 | Manufacturing Process | 2-2-3 |

Total Semester Hours Credit required for graduation: 76

Semester Curriculum for Machining Technology with a Concentration in Tool, Die and Mold Making

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| 1st Semester (Fall) | | C-L-SHC |
| BPR 111 | Blueprint Reading | 1-2-2 |
| CIS 111 | Basic PC Literacy | 1-2-2 |
| MAC 111 | Machining Technology | 2-12-6 |
| MAC 151 | Machining Calculations | 1-2-2 |
| MEC 141 | Manufacturing Process | 2-2-3 |
| | | <u>7-20-15</u> |

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| 2nd Semester (Spring) | | |
| BPR 121 | Blueprint Reading: Mechanical | 1-2-2 |
| ENG 110 | Freshman Composition OR | 3-0-3 |
| ENG 111 | Expository Writing | 3-0-3 |
| ENG 111A | Expository Writing Lab | 0-2-1 |
| MAC 112 | Machining Technology II | 2-12-6 |
| MAC 124 | CNC Milling | 1-3-2 |
| MAT 120 | Geometry/Trigonometry | 2-2-3 |
| | | <u>9-19/21-16/17</u> |

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| 3rd Semester (Summer) | | |
| MAC 113 | Machining Technology III Humanities/Fine Arts Elective | 2-12-6 <u>3-0-3</u> |
| | | 5-12-9 |

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| 4th Semester (Fall) | | |
| MAC 122 | CNC Turning | 1-3-2 |
| MAC 153 | Compound Angles | 1-2-2 |
| MAC 241 | Jigs and Fixtures I | 2-6-4 |
| MAC 245 | Mold Construction I | 2-6-4 |
| ENG 116 | Technical Report Writing OR | 3-0-3 |
| ENG 114 | Professional Research and Reporting | <u>3-0-3</u> |
| | | 9-17-15 |

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| 5th Semester (Spring) | | |
| MAC 224 | Advanced CNC Milling | 1-3-2 |
| MAC 226 | CNC EDM Machining | 1-3-2 |
| MAC 243 | Die Making I | 2-6-4 |
| MAC 246 | Mold Construction II | 1-9-4 |
| MEC 110 | Introduction to CAD/CAM | <u>1-2-2</u> |
| | | 6-23-14 |

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| 6th Semester (Summer) | | |
| MAC 244 | Die Making II Social/Behavioral Science Elective | 1-9-4 <u>3-0-3</u> |
| | | 4-9-7 |

Total Semester Hours Credit: 76/77

COURSE DESCRIPTIONS

BPR 111 Blueprint Reading 1-2-2

This course introduces the basic principles of blueprint reading. Topics include line types, orthographic projections, dimensioning methods, and notes. Upon completion, students should be able to interpret basic blueprints and visualize the features of a part.

BPR 121 Blueprint Reading: Mechanical 1-2-2

Prerequisites: BPR 111 or MAC 131

This course covers the interpretation of intermediate blueprints. Topics include tolerancing, auxiliary views, sectional views, and assembly drawings. Upon completion, students should be able to read and interpret a mechanical working drawing.

CIS 111 Basic PC Literacy 1-2-2

This course provides an overview of computer concepts. Emphasis is placed on the use of personal computers and software applications for personal and fundamental workplace use. Upon completion, students should be able to demonstrate basic personal computer skills.

ENG 110 Freshman Composition 3-0-3

Prerequisites: RED 080 and ENG 090 or appropriate placement test scores

This course is the first course in a series of two designed to develop informative and business writing skills. Emphasis is placed on logical organization of writing, including effective introductions and conclusions, precise use of grammar, and appropriate selection and use of sources. Upon completion, students should be able to produce clear, concise, well-organized short papers.

ENG 111 Expository Writing 3-0-3

Prerequisites: RED 090 and ENG 090 or appropriate placement test scores

Corequisites: ENG 111A

This course is the required first course in a series of two designed to develop the ability to produce clear expository prose. Emphasis is placed on the writing process including audience analysis, topic selection, thesis support and development, editing, and revision. Upon completion, students should be able to produce unified, coherent, well-developed essays using standard written English. This course has been approved to satisfy the Comprehensive Articulation Agreement general education core requirement in English composition.

ENG 111A Expository Writing Lab 0-2-1

Prerequisites: RED 090 and ENG 090 or appropriate placement test scores

Corequisites: ENG 111

This writing laboratory is designed to apply the skills introduced in ENG 111. Emphasis is placed on the editing and revision components of the writing process. Upon completion, students should be able to apply those skills in the production of final drafts in ENG 111. The computer is used as a writing and design tool for this course.

ENG 114 Prof. Research and Reporting 3-0-3

Prerequisites: ENG 111

This course, the second in a series of two, is designed to teach professional communication skills. Emphasis is placed on research, listening, critical reading and thinking, analysis, interpretation, and design used in oral and written presentations. Upon completion, students should be able to work individually and collaboratively to produce well-designed business and professional written and oral presentations. The computer is used as a writing and design tool for

this course. This course has been approved to satisfy the Comprehensive Articulation Agreement general education core requirement in English composition.

ENG 116 Technical Report Writing 3-0-3

Prerequisites: ENG 110 or ENG 111

This course, the second in a series of two, introduces layout and design of technical reports used in business and industry. Emphasis is placed on audience analysis, data collection and analysis, technical writing style and organization, oral presentation or technical data, and the appropriate use of graphics in written and oral presentations. Upon completion, students should be able to produce written and oral reports using a variety of technical communication models.

MAC 111 Machining Technology I 2-12-6

This course introduces machining operations as they relate to the metalworking industry. Topics include machine shop safety, measuring tools, lathes, drilling machines, saws, milling machines, bench grinders, and layout instruments. Upon completion, students should be able to safely perform the basic operations of measuring, layout, drilling, sawing, turning, and milling.

MAC 112 Machining Technology II 2-12-6

Prerequisites: MAC 111

This course provides additional instruction and practice in the use of precision measuring tools, lathes, milling machines, and grinders. Emphasis is placed on setup and operation of machine tools including the selection and use of work holding devices, speeds, feeds, cutting tools, and coolants. Upon completion, students should be able to perform basic procedures on precision grinders and advanced operations of measuring, layout, drilling, sawing, turning, and milling.

MAC 113 Machining Technology III 2-12-6

Prerequisites: MAC 112

This course provides an introduction to advanced and special machining operations. Emphasis is placed on working to specified tolerances with special and advanced setups. Upon completion, students should be able to produce a part to specifications.

MAC 122 CNC Turning 1-3-2

This course introduces the programming, setup, and operation of CNC turning centers. Topics include programming formats, control functions, program editing, part production, and inspection. Upon completion, students should be able to manufacture simple parts using CNC turning centers.

MAC 124 CNC Milling 1-3-2

This course introduces the manual programming, setup, and operation of CNC machining centers. Topics include programming formats, control functions, program editing, part production, and inspection. Upon completion, students should be able to manufacture simple parts using CNC machining centers.

MAC 151 Machining Calculations 1-2-2

This course introduces basic calculations as they relate to machining occupations. Emphasis is placed on basic calculations and their applications in the machine shop. Upon completion, students should be able to perform basic shop calculations.

MAC 153 Compound Angles 1-2-2

This course introduces the application of basic types and uses of compound angles. Emphasis is placed on problem solving by tilting and rotating adjacent angles to resolve an unknown compound angle. Upon completion, students should be able to set up and develop

compound angles on parts using problem-solving techniques. This course is a unique concentration requirement of the Tool, Die, and Mold Making concentration in the Machining Technology program.

MAC 224 Advanced CNC Milling 1-3-2

Prerequisites: MAC 124

This course covers advanced methods in setup and operation of CNC machining centers. Emphasis is placed on programming and production of complex parts. Upon completion, students should be able to demonstrate skills in programming, operations, and setup of CNC machining centers.

MAC 226 CNC EDM Machining 1-3-2

This course introduces the programming, setup, and operation of CNC electrical discharge machines. Topics include programming formats, control functions, program editing, production of parts, and inspection. Upon completion, students should be able to manufacture simple parts using CNC electrical discharge machines.

MAC 241 Jigs and Fixtures I 2-6-4

Prerequisites: MAC 112

This course introduces the application and use of jigs and fixtures. Emphasis is placed on design and manufacture of simple jigs and fixtures. Upon completion, students should be able to design and build simple jigs and fixtures.

MAC 243 Die Making I 2-6-4

Prerequisites: MAC 112

This course introduces the principles and applications of die making. Topics include types, construction, and application of dies. Upon completion, students should be able to design and build simple dies.

MAC 244 Die Making II 1-9-4

Prerequisites: MAC 243

This course provides continued study in the application and use of dies. Emphasis is placed on the design and manufacturing of complex dies. Upon completion, students should be able to design and build complex dies. This course is a unique concentration requirement of the Tool, Die, and Mold Making concentration in the Machining Technology program.

MAC 245 Mold Construction I 2-6-4

Prerequisites: MAC 112

This course introduces the principles of mold making. Topics include types, construction, and application of molds. Upon completion, students should be able to design and build simple molds.

MAC 246 Mold Construction II 1-9-4

Prerequisites: MAC 245

This course provides continued study in the application and use of molds. Emphasis is placed on design and manufacturing of complex molds. Upon completion, students should be able to design and build complex molds. This course is a unique concentration requirement of the Tool, Die, and Mold Making concentration in the Machining Technology program.

MAT 120 Geometry and Trigonometry 2-2-3

Prerequisites: MAT 070, MAT 080, MAT 121, MAT 161, MAT 171, or MAT 175 or appropriate placement test scores

This course introduces the concepts of plane trigonometry and geometry with emphasis on applications to problem solving. Topics include the basic definitions and properties of plane and solid geometry, area and volume, right triangle trigonometry, and oblique triangles. Upon completion, students should be able to solve applied problems both independently and collaboratively using technology.

MEC 110 Introduction to CAD/CAM 1-2-2

This course introduces CAD/CAM. Emphasis is placed on transferring part geometry from CAD to CAM for the development of a CNC-ready program. Upon completion, students should be able to use CAD/CAM software to produce a CNC program.

MEC 141 Introduction Mfg Processes 2-2-3

This course covers the properties and characteristics of manufacturing materials and the processes used to form them. Emphasis is placed on manufacturing materials, heat-treating processes, and manufacturing processes. Upon completion, students should be able to identify physical characteristics of materials and describe processes used to manufacture a part.