



Program Planning Guide

Computer-Integrated Machining Associate in Applied Science Degree (A50210)

Program Length: 6 semesters

Program Sites: Lee Main Campus - Day Program

Career Pathway Options: Associate in Applied Science Degree in Computer Integrated Machining

Suggested Course Schedule		Class	Lab	Work	Credits	Notes:
1st Semester (fall)						
BPR 111	Print Reading	1	2	0	2	
CIS 111	Basic PC Literacy	1	2	0	2	
MAC 111	Machining Technology I	2	12	0	6	
MAC 171	Measure/Material & Safety	0	2	0	1	
MAT 110	Math Measurement & Literacy	2	2	0	3	
MEC 142	Physical Metallurgy	1	2	0	2	
	Total Semester Hours	7	22	0	16	
2nd Semester (spring)						
BPR 121	Blueprint Reading-Mech	1	2	0	2	
ENG 111	Writing and Inquiry	3	0	0	3	
MAC 112	Machining Technology II	2	12	0	6	
MAC 124	CNC Milling	1	3	0	2	
MAC 152	Adv. Machining Calc	1	2	0	2	
	Total Semester Hours	8	19	0	15	
3rd Semester (summer)						
MAC 113	Machining Technology III	2	12	0	6	
Humanities/Fine Arts Elective		3	0	0	3	
	Total Semester Hours	5	12	0	9	
4th Semester (fall)						
ENG 114	Prof Research & Reporting	3	0	0	3	
MAC 122	CNC Turning	1	3	0	2	



MAC 153	Compound Angles	1	2	0	2	
MAC 241	Jigs & Fixtures I	2	6	0	4	
MAC 245	Mold Construction I	2	6	0	4	
	Total Semester Hours	9	17	0	15	
5th Semester (spring)						
MAC 224	Advanced CNC Milling	1	3	0	2	
MAC 226	CNC EDM Machining	1	3	0	2	
MAC 243	Die Making I	2	6	0	4	
MAC 246	Mold Construction II	1	9	0	4	
MEC 110	Intro to CAD/CAM	1	2	0	2	
	Total Semester Hours	6	23	0	14	
6th Semester (summer)						
MAC 244	Die Making II	1	9	0	4	
Social/Behavioral Science Elective		3	0	0	3	
	Total Semester Hours	4	9	0	7	
Total Semester Hours Credit Required for Graduation: 76						



Course Descriptions

BPR 111 Print Reading

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

BPR 121 Blueprint Reading: Mechanical

Prerequisite: 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

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 111 Writing and Inquiry

Corequisite ENG 011

Prerequisites: ENG 002 P1 grade and ENG 011

This course is designed to develop the ability to produce clear writing in a variety of genres and formats using a recursive process. Emphasis includes inquiry, analysis, effective use of rhetorical strategies, thesis development, audience awareness, and revision. Upon completion, students should be able to produce unified, coherent, well-developed essays using standard written English. This course has been approved for transfer under the CAA and ICAA as a universal general education transfer component (UGETC) course in English Composition.

ENG 114 Professional Research and Reporting

Prerequisite: 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. This course has been approved for transfer under the CAA and ICAA as a general education course in English Composition.

MAC 111 Machining Technology I

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

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

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

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

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 152 Adv Machining Calc

This course combines mathematical functions with practical machine shop applications and problems. Emphasis is placed on gear ratios, lead screws, indexing problems, and their applications in the machine shop. Upon completion, students should be able to calculate solutions to machining problems.

**MAC 153 Compound Angles**

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.

MAC 171 Measure/Material & Safety

This course introduces precision measuring instruments, process control and adjustment, inspection, material handling and workplace safety. Topics include properly identifying and handling various measurement instruments and materials, process control, adjustment and improvement, personal protective equipment (PPE) and OSHA safety regulations. Upon completion, students should be able to safely demonstrate effective measurement techniques, identify and handle various materials, and explain safe industry practices.

MAC 224 Advanced CNC Milling

Local Prerequisite: 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

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

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

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

Local Prerequisite: 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.

MAC 245 Mold Construction I

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

Local Prerequisite: 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.

MAT 110 Math Measurement & Literacy

Corequisite: MAT 010

Local RISE corequisites: MAT 010; Local RISE Prerequisites: Take one group: 1) MAT 003 P1; 2) DMA 010, DMA 020, DMA 030; 3) MAT 060; 4) DMA 025

This course provides an activity-based approach that develops measurement skills and mathematical literacy using technology to solve problems for non-math intensive programs. Topics include unit conversions and estimation within a variety of measurement systems; ratio and proportion; basic geometric concepts; financial literacy; and statistics including measures of central tendency, dispersion, and charting of data. Upon completion, students should be able to demonstrate the use of mathematics and technology to solve practical problems, and to analyze and communicate results.

MEC 110 Introduction to CAD/CAM

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 142 Physical Metallurgy

This course covers the heat treating of metals. Emphasis is placed on the effects of hardening, tempering, and annealing on the structure and physical properties of metals. Upon completion, students should be able to heat treat materials.



Approved Humanities/Fine Arts Electives Associate in Applied Science Degree/Diploma	Approved Social/Behavioral Science Electives Associate in Applied Science Degree/Diploma
ART 111 Art Appreciation ART 114 Art History Survey I ART 115 Art History Survey II DRA 111 Theatre Appreciation ENG 125 Creative Writing I ENG 231 American Literature I ENG 232 American Literature II ENG 241 British Literature I ENG 242 British Literature II HUM 110 Technology & Society HUM 115 Critical Thinking HUM 120 Cultural Studies HUM 122 Southern Culture HUM 150 American Women's Studies HUM 160 Introduction to Film MUS 110 Music Appreciation MUS 112 Introduction to Jazz PHI 240 Introduction to Ethics REL 110 World Religions REL 211 Intro to Old Testament REL 212 Intro to New Testament	ANT 210 General Anthropology ANT 220 Cultural Anthropology ECO 151 Survey of Economics ECO 251 Principles of Microeconomics ECO 252 Principles of Macroeconomics HIS 111 World Civilization I HIS 112 World Civilization II HIS 131 American History I HIS 132 American History II HIS 222 African-American History I HIS 223 African-American History II HIS 226 The Civil War HIS 236 North Carolina History POL 120 American Government PSY 150 General Psychology PSY 237 Social Psychology PSY 241 Developmental Psychology PSY 246 Adolescent Psychology PSY 281 Abnormal Psychology SOC 210 Introduction to Sociology SOC 213 Sociology of the Family SOC 220 Social Problems SOC 225 Social Diversity SOC 232 Social Context of Aging SOC 240 Social Psychology