

Manufacturing

Instrumentation & Controls Engineering Technology
Machining Technology
Manufacturing Engineering Technology
Welding Technology
(See Academic Degrees and Certificates 33-47)

Manufacturing

A Career Cluster is a grouping of occupations and broad industries based on commonalities. The Manufacturing career cluster is concerned with providing knowledge and skills related to planning, managing and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering. This would include careers related to Manufacturing, Nanotechnology, Robotics, Instrumentation and Controls, Machining, Plastics Engineering and Welding.

Every HCC Workforce Educational program contains a "capstone," an experience for the student to "put it all together." The capstone might consist of an external learning experience (e.g., co-op, clinical, etc.), a course especially designed to help students synthesize knowledge and skills, or a licenser exam as appropriate

INSTRUMENTATION AND CONTROLS ENGINEERING TECHNOLOGY

The HCC Instrumentation and Controls Engineering Technology program prepares individuals to apply basic engineering principles and technical skills in support of engineers engaged in developing control and measurement systems and procedures. Instruction stresses instrumentation design and maintenance, calibration, design and production testing and scheduling, automated equipment functions, applications to specific industrial tasks, and report preparation. The Instrumentation Technician troubleshoots, maintains, and installs process control equipment to produce quality products and ensure safe and cost effective operations.

The capstone for the AAS and Certificate in Instrumentation and Controls Engineering Technology is INTC 2436, Distributed Control, and Programmable Logic.

For more information, call 713-718-5293, 713-718-8316, or 713-718-5253, or john.galios@hccs.edu or alan.isaachsen@hccs.edu.

INSTRUMENTATION AND CONTROLS ENGINEERING TECHNOLOGY

AAS

TSI Testing is required prior to first enrollment.

FIRST YEAR

FIRST SEMESTER		CREDITS
INTC 1312	Introduction to Instrumentation and Safety Technology.....	3
INTC 1456	Instrumentation Calibration.....	4
CPMT 1407	Electronic and Computer Skills.....	4
ITSC 1309	Integrated Software Applications I.....	3
MATH 1314	College Algebra.....	3
Semester Total		17

SECOND SEMESTER		CREDITS
ENGL 1301	English Composition.....	3
MATH 1316	Trigonometry.....	3
INTC 1441	Principles of Automatic Control.....	4
CPMT 1403	Introduction to Computer Technology.....	4
XXXX #3##	Approved Humanities/Fine Arts General Education Elective.....	3
Semester Total		17

SECOND YEAR

FIRST SEMESTER		CREDITS
INTC 1343	Application of Industrial Automatic Control.....	3
SPCH #3##	Speech Elective.....	3
INTC 2330	Troubleshooting.....	3
XXXX #3##	Program-Related Elective.....	3
PHYS 1401	College Physics.....	4
Semester Total		16

SECOND SEMESTER		CREDITS
INTC 2436	Distributed Control and Programmable Logic.....	4
XXXX #3##	Math/Natural Science Elective.....	3
XXXX #3##	Social Science General Education Elective.....	3
XXXX #3##	Program-Related Elective.....	3
Semester Total		13
Program Total		63

INSTRUMENTATION AND CONTROLS ENGINEERING TECHNOLOGY

CERTIFICATE

FIRST YEAR

FIRST SEMESTER		CREDITS
INTC 1312	Introduction to Instrumentation and Safety Technology ...	3
INTC 1456	Instrumentation Calibration.....	4
MATH 1314	College Algebra.....	3
CPMT 1407	Electronic and Computer Skills.....	4
Semester Total		14

SECOND SEMESTER		CREDITS
INTC 1441	Principles of Automatic Control.....	4
CPMT 1403	Introduction to Computer Technology.....	4
MATH 1316	Trigonometry.....	3
Semester Total		11

THIRD SEMESTER		CREDITS
INTC 1343	Application of Industrial Automatic Control	3
INTC 2436	Distributed Control and Programmable Logic.....	4
Semester Total		7
Program Total		32

INSTRUMENTATION AND CONTROLS ENGINEERING TECHNOLOGY FUEL CELL SPECIALIZATION

Students will be introduced to the basic concepts and principles of hydrogen-based and related energy fuel cells. The program is designed to provide students with the competencies, education, skills, and training on fuel cells in industrial, institutional, or commercial transportation applications. Careers of the future are projected to include jobs in hydrogen manufacturing and power plants, working on distribution and storage networks and developing hydrogen-fueling stations.

The capstone for the Instrumentation and Controls Engineering Technology Certificate - Fuel Cell Specialization is INTC 2473, Fuel Cell Instrumentation.

For more information, please call 713-718-5253 or 713-718-5293 or e-mail alan.isaachsen@hccs.edu or john.galiosos@hccs.edu.

FUEL CELL SPECIALIZATION CERTIFICATE

FIRST YEAR		CREDITS
FIRST SEMESTER		
CPMT 1407	Electronic and Computer Skills	4
MATH 1314	College Algebra.....	3
FCEL 1302	Introduction to Fuel Cell Technology.....	3
Semester Total		10

SECOND SEMESTER		
FCEL 2400	Fuel Cells Basic Operations and Maintenance	4
CPMT 1403	Introduction to Computer Technology	4
SCIT 1414	Applied General Chemistry I OR	
CHEM 1411	General Chemistry I.....	4
Semester Total		12

THIRD SEMESTER		
INTC 2473	Fuel Cell Instrumentation.....	4
INTC 1343	Application of Industrial Automatic Control	3
Semester Total		7
Program Total		29

MACHINING TECHNOLOGY

The Machining Technology Program is designed to meet industry's continued and growing need for trained machine operators and programmers. This program prepares students for employment in machine shops, manufacturing facilities and in the maintenance of industrial plants. The AAS degree in Machining Technology is designed to develop competent support technicians for employment in the field of machine shop and related occupations. The curricula are designed to provide a broad-based education with opportunities for specific employment and personal interest goals. The shop has more than sixty pieces of manual equipment (such as lathes and milling machines), seven pieces of computerized numerical control (CNC), turning and milling machines, six robotic arms, a computer integrated manufacturing (CIM) cell, hydraulic and pneumatic trainers, and sixty personal computers with up-to-date training materials. The program is also an Authorized Training Center (ATC) for Engineering Geometry Systems: FeatureCAM (CAD/CAM) software.

All of the courses in the 15 Semester Credit Hour (SCH) Basic Machining Technology Certificate apply toward the 31 SCH Machining Technology Certificate and the Machining Technology AAS degree.

The capstone for Machining Technology are as follows:

Machining Technology AAS: INMT 1380, Cooperative Education-Industrial/Manufacturing Technology/Technician.

Basic Machining Technology Certificate: MCHN 1391, Special Topics in Machinist/Machine Technologist.

Machining Technology Certificate: MCHN 1291, Special Topics in Machinist/Machine Technologist.

For more information, call 713-718-6805 or e-mail jimmy.vu@hccs.edu.

MACHINING TECHNOLOGY

AAS		
FIRST YEAR		
FIRST SEMESTER		CREDITS
MCHN 1201	Beginning Machine Shop.....	2
MCHN 1217	Machining I.....	2
MCHN 1211	Basic Lathe I.....	2
MCHN 1220	Basic Lathe II.....	2
MCHN 1214	Milling Machine I.....	2
MCHN 1221	Milling Machine II.....	2
MCHN 1391	Special Topics in Machinist/Machine Technologist	3
Semester Total		15
SECOND SEMESTER		
FIRST SEMESTER		CREDITS
MCHN 1230	Statistical Process Control for Machinist.....	2
MCHN 2231	Advanced Engine Lathe I.....	2
MCHN 2235	Advanced Engine Lathe II.....	2
MCHN 2230	Milling Machine III.....	2
MCHN 2238	Milling Machine IV.....	2
MCHN 2234	Tools and Fixtures I.....	2
MCHN 2239	Tools and Fixtures II.....	2
MCHN 1291	Special Topics in Machinist/Machine Technologist	2
Semester Total		16

SECOND YEAR

FIRST SEMESTER CREDITS

ENGL 1301	Composition I.....	3
MATH 1314	College Algebra.....	3
PSYC 2302	Applied Psychology.....	3
HYDR 1309	Basic Fluid Power I (Hydraulics).....	3
HYDR 1315	Basic Fluid Power II (Pneumatics).....	3

SECOND SEMESTER CREDITS

ENGL 2311	Technical and Industrial Correspondence and Report Writing.....	3
MATH 1316	Plane Trigonometry.....	3
XXXX #3##	Approved Humanities/Fine Arts Elective.....	3
ENTC 1301	Robotics I.....	3
INMT 1240	Computer Integrated Manufacturing (Short Course).....	2
INMT 1241	Computer Integrated Manufacturing (Short Course).....	2
INMT 1380	Cooperative Education-Industrial/Manufacturing Technology/Technician.....	3
Semester Total		19
Program Total		65

BASIC MACHINING TECHNOLOGY

CERTIFICATE

FIRST SEMESTER CREDITS

MCHN 1201	Beginning Machine Shop.....	2
MCHN 1217	Machining I.....	2
MCHN 1211	Basic Lathe I.....	2
MCHN 1220	Basic Lathe II.....	2
MCHN 1214	Milling Machine I.....	2
MCHN 1221	Milling Machine II.....	2
MCHN 1391	Special Topics in Machinist/Machine Technologist.....	3
Semester Total		15
Program Total		15

MACHINING TECHNOLOGY

CERTIFICATE

Prerequisite: Basic Machining Technology

FIRST SEMESTER CREDITS

MCHN 1201	Beginning Machine Shop.....	2
MCHN 1217	Machining I.....	2
MCHN 1211	Basic Lathe I.....	2
MCHN 1220	Basic Lathe II.....	2
MCHN 1214	Milling Machine I.....	2
MCHN 1221	Milling Machine II.....	2
MCHN 1391	Special Topics in Machinist/Machine Technologist.....	3
Semester Total		15

SECOND SEMESTER CREDITS

MCHN 1230	Statistical Process Control for Machinist.....	2
MCHN 2231	Advanced Engine Lathe I.....	2
MCHN 2235	Advanced Engine Lathe II.....	2
MCHN 2230	Milling Machine III.....	2

MCHN 2238	Milling Machine IV.....	2
MCHN 2234	Tools and Fixtures I.....	2
MCHN 2239	Tools and Fixtures II.....	2
MCHN 1291	Special Topics in Machinist/Machine Technologist.....	2

Semester Total 16

Program Total 31

MANUFACTURING ENGINEERING TECHNOLOGY

The Manufacturing Engineering Technology Program is designed to develop competent support technicians for employment in the field of manufacturing engineering and related occupations. The curricula are designed to provide broad-based education with opportunity for specific employment and personal interest goals. The shop has more than sixty pieces of manual equipment: six computerized numerical control (CNC) machines, five robotics arms, a computer integrated manufacturing (CIM) cell, and a 1500 square foot computer lab space with fifty-eight networked computer stations. These computers are installed with up-to-date application software as well as CAD/CAM software packages. The program is also an Authorized Training Center (ATC) for Engineering Geometry System: FEATURE CAM software.

The capstone for the AAS degree and certificates is INMT 1380, Cooperative Education.

For more information, call 713-718-6805 or e-mail jimmy.vu@hccs.edu.

MANUFACTURING ENGINEERING TECHNOLOGY

AAS

FIRST YEAR

FIRST SEMESTER CREDITS

INMT 1248	Manufacturing Processes (Short Course).....	2
INMT 1249	Manufacturing Processes (Short Course).....	2
CETT 1409	DC-AC Circuits.....	4
XXXX #3##	Approved Humanities/Fine Arts General Education Elective.....	3
ENGL 1301	Composition I.....	3
MATH 1314	College Algebra.....	3

Semester Total 17

SECOND SEMESTER CREDITS

INMT 1242	CAD-CAM (Short Course).....	2
INMT 1243	CAD-CAM (Short Course).....	2
INMT 1244	Computer Numerical Controls (Short Course).....	2
INMT 1245	Computer Numerical Controls (Short Course).....	2
MATH 1316	Plane Trigonometry.....	3
XXXX #3##	Social Science General Education Elective.....	3
ENTC 1423	Strength of Materials.....	4

Semester Total 18

SECOND YEAR

FIRST SEMESTER CREDITS

INMT 1391	Special Topics-Plant Layout.....	3
INMT 1391	Special Topics-Time and Motion Study.....	3
PHYS 1401	College Physics.....	4
ENGL 2311	Technical and Industrial Correspondence and Report Writing.....	3
HYDR 1309	Basic Fluid Power 1 (Hydraulics).....	3
HYDR 1315	Basic Fluid Power 2 (Pneumatics).....	3

Semester Total 19

SECOND SEMESTER		CREDITS
INMT 1391	Special Topics-Principles of Tool Design	3
INMT 1317	Industrial Automation	3
INMT 1240	Computer Integrated Manufacturing (Short Course).....	2
INMT 1241	Computer Integrated Manufacturing (Short Course).....	2
ENTC 1301	Robotics I	3
INMT 1380	Cooperative Education - Industrial/Manufacturing Technology/Technician	3
Semester Total		16
Program Total		70

MANUFACTURING ENGINEERING TECHNOLOGY

CERTIFICATE

FIRST SEMESTER		CREDITS
INMT 1248	Manufacturing Processes (Short Course).....	2
INMT 1317	Industrial Automation	3
INMT 1249	Manufacturing Processes (Short Course).....	2
INMT 1244	Computer Numerical Controls (Short Course).....	2
INMT 1245	Computer Numerical Controls (Short Course).....	2
HYDR 1309	Basic Fluid Power 1 (Hydraulic).....	3
HYDR 1315	Basic Fluid Power 2 (Pneumatics).....	3
Semester Total		17

SECOND SEMESTER		CREDITS
ENTC 1301	Robotics I	3
INMT 1391	Special Topics-Principles of Tools Design.....	3
INMT 1391	Special Topics-Plant Layout.....	3
INMT 1240	Computer: Integrated Manufacturing (Short Course).....	2
INMT 1241	Computer: Integrated Manufacturing (Short Course).....	2
INMT 1242	CAD-CAM (Short Course).....	2
INMT 1243	CAD-CAM (Short Course).....	2
INMT 1380	Cooperative Education - Industrial/Manufacturing Technology/Technician.....	3
Semester Total		20
Program Total		37

MANUFACTURING PROCESSES

CERTIFICATE

FIRST SEMESTER		CREDITS
INMT 1240	Computer Integrated Manufacturing (Short Course).....	2
INMT 1244	Computer Numerical Controls (Short Course).....	2
INMT 1245	Computer Numerical Controls (Short Course).....	2
INMT 1242	CAD-CAM (Short Course).....	2
INMT 1243	CAD-CAM (Short Course).....	2
MCHN 2234	Tools and Fixtures I.....	2
MCHN 2239	Tools and Fixtures II.....	2
Semester Total		14

SECOND SEMESTER		CREDITS
ENTC 1301	Robotics I	3
INMT 2334	NC/CNC Programming	3
INMT 1380	Cooperative Education-Industrial/Manufacturing Technology.....	3
INMT 1291	Special Topics-Lathe Programming	2
INMT 1241	Computer Integrated Manufacturing II	2
ENTC 1391	Special Topics-Engineering Technology-Lathe Operation.....	3
Semester Total		16
Program Total		30

MANUFACTURING ENGINEERING TECHNOLOGY-PLASTIC ENGINEERING TECHNOLOGY SPECIALIZATION

The Plastic Engineering Technology (PLTC) program prepares students for high performance in plastic manufacturing employment opportunities. This program trains the student to operate and program the equipment used within plastic manufacturing environments. Students can earn an Associate of Applied Science and/or a one-year Certificate of Completion in Plastic Engineering Technology.

The capstone courses for Manufacturing Engineering Technology are as follows:

Plastic Engineering Technology AAS: PLTC 1445, Plastic Processes I.

Plastic Engineering Technology Certificate: PLTC 1343, Mold Design and Maintenance.

For more information, call 713-718-6805 or e-mail jimmy.vu@hccs.edu

AAS

FIRST YEAR

FIRST SEMESTER		CREDITS
PLTC 1301	Introduction to Plastics.....	3
INMT 1248	Manufacturing Processes (Short Course).....	2
INMT 1249	Manufacturing Processes (Short Course).....	2
INMT 1391	Special Topics in Manufacturing Technology/Technician.....	3
ENGL 1301	Composition I	3
MATH 1314	College Algebra.....	3
XXXX #3##	Social Science General Education Elective	3
Semester Total		19

SECOND SEMESTER		CREDITS
XXXX #3##	Approved Humanities Fine Arts General Education Elective.....	3
MATH 1316	Plane Trigonometry.....	3
PLTC 1303	Plastics Composites.....	3
PLTC 1306	Plastic Quality Control.....	3
INMT 1242	CAD-CAM (Short Course).....	2
INMT 1243	CAD-CAM (Short Course).....	2
Semester Total		16

SECOND YEAR

FIRST SEMESTER		CREDITS
HYDR 1315	Basic Fluid Power II (Pneumatics).....	3
HYDR 1309	Basic Fluid Power I (Hydraulics).....	3
INMT 1380	Cooperative Education – Manufacturing Technology/Technician.....	3
ENGL 2311	Technical and Industrial Correspondence and Report Writing.....	3
INMT 1391	Special Topics in Manufacturing Technology/Technician.....	3
Semester Total		15

SECOND SEMESTER		CREDITS
INMT 1240	Computer Integrated Manufacturing (Short Course).....	2
INMT 1241	Computer Integrated Manufacturing (Short Course).....	2
PLTC 1343	Mold Design and Maintenance	3
PLTC 1445	Plastic Processes I.....	4
INMT 1391	Special Topics in Manufacturing Technology/Technician.....	3
INMT 1317	Industrial Automation	3
Semester Total		17
Program Total		67

PLASTIC ENGINEERING TECHNOLOGY

CERTIFICATE

FIRST SEMESTER		CREDITS
PLTC 1301	Introduction to Plastics.....	3
INMT 1248	Manufacturing Processes (Short Course).....	2
INMT 1249	Manufacturing Processes (Short Course).....	2
HYDR 1315	Basic Fluid Power II (Pneumatics).....	3
HYDR 1309	Basic Fluid Power I (Hydraulics).....	3
INMT 1391	Special Topics in Manufacturing Technology/Technician.....	3
Semester Total		16

SECOND SEMESTER		CREDITS
PLTC 1303	Plastics Composites.....	3
PLTC 1306	Plastic Quality Control.....	3
INMT 1242	CAD-CAM (Short Course).....	2
INMT 1243	CAD-CAM (Short Course).....	2
INMT 1317	Industrial Automation	3
INMT 1391	Special Topics in Manufacturing Technology/Technician.....	3
Semester Total		16

THIRD SEMESTER		CREDITS
INMT 1240	Computer Integrated Manufacturing (Short Course).....	2
INMT 1241	Computer Integrated Manufacturing (Short Course).....	2
PLTC 1343	Mold Design and Maintenance	3
Semester Total		7
Program Total		39

WELDING TECHNOLOGY

The Welding Technology Program is designed to offer students the necessary skills for entry-level positions in the construction, maintenance, structural plate, and pipe welding trades.

The shop has 68 booths. The cutting stations include GAS, Plasma, and MIG and TIG machines. The lab also has orbital automated welding equipment and shares 1500 square feet of computer lab with fifty-eight networked computer stations. These computers are installed with up-to-date application and testing program software for welding students.

The capstones for Welding Technology are as follows:

Basic Welding Helper Certificate: WLDG 1407, Basic Welding Processes.

Basic Welding Certificate: WLDG 2443, Advanced Shielded Metal Arc Welding (SMAW).

Welding Certificate-MIG Specialization: WLDG 2447, Advanced Gas Metal Arc Welding (GMAW).

Welding Certificate-Pipe Specialization: WLDG 2453, Advanced Pipe Welding.

Welding Certificate-TIG Specialization: WLDG 2451, Advanced Gas Tungsten Arc TIG Welding (GTAW).

For more information, call 713-718-6805 or e-mail jimmy.vu@hccs.edu.

BASIC WELDING HELPER

CERTIFICATE

FIRST SEMESTER		CREDITS
WLDG 1421	Introduction to Welding Fundamentals	4
WLDG 1425	Introduction to Oxy-Fuel Welding and Cutting	4
WLDG 1428	Introduction to Shielded Metal Arc Welding (SMAW).....	4
WLDG 1407	Introduction to Welding Using Multiple Process.....	4
Semester Total		16
Program Total		16

BASIC WELDING

CERTIFICATE

FIRST SEMESTER		CREDITS
WLDG 1421	Introduction to Welding Fundamentals	4
WLDG 1425	Introduction to Oxy-Fuel Welding and Cutting	4
WLDG 1428	Introduction to Shielded Metal Arc Welding (SMAW).....	4
Semester Total		12

SECOND SEMESTER		CREDITS
WLDG 1413	Introduction to Blueprint Reading for Welders	4
WLDG 1457	Intermediate Shielded Metal Arc Welding (SMAW).....	4
WLDG 2443	Advanced Shielded Metal Arc Welding (SMAW).....	4
Semester Total		12
Program Total		24

WELDING - MIG SPECIALIZATION

CERTIFICATE

FIRST SEMESTER	CREDITS
WLDG 1421 Introduction to Welding Fundamentals	4
WLDG 1425 Introduction to Oxy-Fuel Welding and Cutting	4
WLDG 1428 Introduction to Shielded Metal Arc Welding (SMAW).....	4
Semester Total	12
SECOND SEMESTER	CREDITS
WLDG 1413 Introduction to Blueprint Reading for Welders	4
WLDG 1457 Intermediate Shielded Metal Arc Welding (SMAW).....	4
WLDG 2443 Advanced Shielded Metal Arc Welding (SMAW).....	4
Semester Total	12
THIRD SEMESTER	CREDITS
WLDG 1430 Introduction to Gas Metal Arc MIG Welding.....	4
WLDG 2447 Advanced Gas Metal Arc MIG Welding.....	4
WLDG 1417 Introduction to Layout and Fabrication.....	4
Semester Total	12
Program Total	36

WELDING - TIG SPECIALIZATION

CERTIFICATE

FIRST SEMESTER	CREDITS
WLDG 1421 Introduction to Welding Fundamentals	4
WLDG 1425 Introduction to Oxy-Fuel Welding and Cutting	4
WLDG 1428 Introduction to Shielded Metal Arc Welding (SMAW).....	4
Semester Total	12
SECOND SEMESTER	CREDITS
WLDG 1413 Introduction to Blueprint Reading for Welders	4
WLDG 1457 Intermediate Shielded Metal Arc Welding (SMAW).....	4
WLDG 2443 Advanced Shielded Metal Arc Welding (SMAW).....	4
Semester Total	12
THIRD SEMESTER	CREDITS
WLDG 1434 Introduction to Gas Tungsten Arc TIG Welding (GTAW) ..	4
WLDG 2451 Advanced Gas Tungsten Arc TIG Welding (GTAW).....	4
WLDG 1417 Introduction to Layout and Fabrication.....	4
Semester Total	12
Program Total	36

WELDING - PIPE SPECIALIZATION

CERTIFICATE

FIRST SEMESTER	CREDITS
WLDG 1421 Introduction to Welding Fundamentals	4
WLDG 1425 Introduction Oxy-Fuel Welding and Cutting	4
WLDG 1428 Introduction to Shielded Metal Arc Welding (SMAW).....	4
Semester Total	12
SECOND SEMESTER	CREDITS
WLDG 1413 Introduction to Blueprint Reading for Welders	4
WLDG 1457 Intermediate Shielded Metal Arc Welding (SMAW).....	4
WLDG 2443 Advanced Shielded Metal Arc Welding (SMAW).....	4
Semester Total	12
THIRD SEMESTER	CREDITS
WLDG 1435 Introduction to Pipe Welding.....	4
WLDG 2453 Advanced Pipe Welding.....	4
WLDG 1417 Introduction to Layout and Fabrication.....	4
Semester Total	12
Program Total	36

