

Program Information Report

Science, Computer Technology, Engineering & Math

Mechatronics (APMETR)

Associate in Applied Science Degree

Program Effective Term: Fall 2019

High Skill Occupation

This program prepares students for entry-level positions as an automated equipment technician who assembles, installs, programs, troubleshoots and maintains robotic and automated equipment. Students have a choice to follow any of three different specialty tracks which will prepare them for the various applications of automation. Each track features a variety of application level classes where the student performs lab-oriented practice for required skills. It is highly recommended that beginning students take at least one technical class during their first semester. See an advisor in the Industrial Technology department for assistance.

Students must select one of the concentrations to complete as a program requirement.

Program Concentrations

Fluid Power Specialty (FPWR)

- FLP 110 Fluid Power Fundamentals - II
- FLP 214 Hydraulic Circuits and Controls
- FLP 225 Fluid Power Motion Control
- FLP 226 Pneumatics

Industrial Electronics Specialty (IELC)

- ELE 211 Basic Electronics
- ELE 254 PLC Applications
- FLP 226 Pneumatics

Numerical Control Specialty (NCTL)

- NCT 110 Introduction to Computerized Machining (CNC) - II
- NCT 120 2D CAD CAM for Shape Cutting
- NCT 121 Manual Programming and NC Tool Operation
- NCT 123 2D CAD CAM CNC Programming for Mills and Lathes
- NCT 221 Advanced Manual Programming and NC Tool Operation

Articulation:

Eastern Michigan University, several BS degrees;
Wayne State University, several BS degrees.

Copies can be obtained from the Counseling Office, a program advisor, or from the Curriculum and Assessment Office Web site: <http://www.wccnet.edu/curriculum/articulation/levelone/colleges/>.

69

Minimum Concentration Credits Required for the Program:

Select a concentration for requirements and total credits required for the program.

Mechatronics Concentrations

| Fluid Power Specialty (FPWR) | | (69 credits) |
|-------------------------------------|---|---------------------|
| First Fall Semester | | (15 credits) |
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| Elective | Math Elective(s) | 3 |
| First Winter Semester | | (16 credits) |
| ELE 111 | Electrical Fundamentals | 4 |
| ROB 212 | Robotics II | 4 |
| MEC 100 | Materials and Processes | 3 |

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| | | |
|----------|--------------------------------|---|
| MTT 102 | Machining for the Technologies | 2 |
| Elective | Writing Elective(s) | 3 |

First Spring/Summer Semester (11 credits)

| | | |
|----------|-----------------------------------|---|
| FLP 226 | Pneumatics | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| Elective | Speech/Comp. Elective(s) | 3 |
| Elective | Soc. Sci Elective(s) | 3 |

Second Fall Semester (14 credits)

| | | |
|---------|-----------------------------------|---|
| ELE 224 | Programmable Controllers (PLCs) I | 4 |
| FLP 214 | Hydraulic Circuits and Controls | 4 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| MEC 201 | Mechanisms | 2 |

Second Winter Semester (13 credits)

| | | |
|----------|----------------------------|---|
| FLP 225 | Fluid Power Motion Control | 3 |
| MEC 224 | Robotics IV | 4 |
| Elective | Arts/Human. Elective(s) | 3 |
| Elective | Nat. Sci. Elective(s) | 3 |

Minimum Credits Required for the Concentration or Option: 69

Industrial Electronics Specialty (IELC) (70 credits)

First Fall Semester (15 credits)

| | | |
|----------|--------------------------------|---|
| ELE 111 | Electrical Fundamentals | 4 |
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| Elective | Math Elective(s) | 3 |

First Winter Semester (14 credits)

| | | |
|----------|-------------------------|---|
| ELE 211 | Basic Electronics | 4 |
| ROB 212 | Robotics II | 4 |
| MEC 100 | Materials and Processes | 3 |
| Elective | Writing Elective(s) | 3 |

First Spring/Summer Semester (11 credits)

| | | |
|----------|-----------------------------------|---|
| FLP 226 | Pneumatics | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| Elective | Arts/Human. Elective(s) | 3 |
| Elective | Soc. Sci. Elective(s) | 3 |

Second Fall Semester (16 credits)

| | | |
|---------|---|---|
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| ELE 224 | Programmable Controllers (PLCs) I | 4 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| MEC 201 | Mechanisms | 2 |
| MTT 102 | Machining for the Technologies | 2 |

Second Winter Semester (14 credits)

| | | |
|----------|------------------------------------|---|
| MEC 224 | Robotics IV | 4 |
| ELE 254 | Programmable Controllers (PLCs) II | 4 |
| Elective | Speech/Comp. Elective(s) | 3 |
| Elective | Nat. Sci. Elective(s) | 3 |

Minimum Credits Required for the Concentration or Option: 70

Program Information Report

Numerical Control Specialty (NCTL) (71 credits)

First Fall Semester (15 credits)

| | | |
|----------|---|---|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| Elective | Math Elective(s) Academic Math Level 4 or higher | 3 |

First Winter Semester (15 credits)

| | | |
|---------|---|---|
| ELE 111 | Electrical Fundamentals | 4 |
| ROB 212 | Robotics II | 4 |
| NCT 120 | Introduction to 2D CAD CAM Programming and Applications | 2 |
| MEC 100 | Materials and Processes | 3 |
| MTT 102 | Machining for the Technologies | 2 |

First Spring/Summer Semester (13 credits)

| | | |
|----------|---|---|
| NCT 123 | 2D CAD CAM CNC Programming for Mills and Lathes | 2 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| Elective | Arts/Human Elective(s) | 3 |
| Elective | Writing Elective(s) | 3 |
| Elective | Soc. Sci. Elective(s) | 3 |

Second Fall Semester (14 credits)

| | | |
|---------|--|---|
| ELE 224 | Programmable Controllers (PLCs) I | 4 |
| NCT 121 | Manual Programming and NC Tool Operation | 4 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| MEC 201 | Mechanisms | 2 |

Second Winter Semester (14 credits)

| | | |
|----------|---|---|
| MEC 224 | Robotics IV | 4 |
| NCT 221 | Advanced Manual Programming and NC Tool Operation | 4 |
| Elective | Speech/Comp. Elective(s) | 3 |
| Elective | Nat. Sci. Elective(s) | 3 |

Minimum Credits Required for the Concentration or Option: 71

Minimum Credits Required for the Program: 69

Notes:

*Students who have successfully completed FLP 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.

**Students who have successfully completed NCT 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.

See an advisor to assist in scheduling and planning for each semester as some classes have limited offering.

WCC General Education Requirements
Effective Fall 2018

Associate degree programs were updated to meet the revised WCC general education requirements below.

Course Distribution Requirements

Associate degree students must complete courses from each of six General Education content areas. The requirements vary, depending on which degree is being earned. The number of general education credit hours required for each degree is as follows.

| | AA | AS | AAS |
|---|-------------|-------------|-------------|
| Writing/Composition | 3-4 credits | 3-4 credits | 3-4 credits |
| 2nd Writing/Composition or Communication | 3-4 credits | 3 credits | 3 credits |
| Mathematics | 3-4 credits | 3-4 credits | 3-4 credits |
| Natural Sciences ¹ | 7-8 credits | 7-8 credits | 3-4 credits |
| Social & Behavioral Science ² | 6 credits | 6 credits | 3 credits |
| Arts and Humanities ³ | 6 credits | 6 credits | 3 credits |
| General Education Electives to reach 30 credits | 0-2 credits | 0-2 credits | N/A |
| Minimum | 30 credits | 30 credits | 18 credits |

¹ Two courses in Natural Science including one with laboratory experience (from two disciplines)

² From two disciplines

³ From two disciplines

Program Information Report

Mechatronics (APMETR)

Associate in Applied Science Degree

Program Effective Term: Fall 2018

High Skill Occupation

This program prepares students for entry-level positions as an automated equipment technician who assembles, installs, programs, troubleshoots and maintains robotic and automated equipment. Students have a choice to follow any of three different specialty tracks which will prepare them for the various applications of automation. Each track features a variety of application level classes where the student performs lab-oriented practice for required skills. It is highly recommended that beginning students take at least one technical class during their first semester. See an advisor in the Industrial Technology department for assistance.

Students must select one of the concentrations to complete as a program requirement.

Program Concentrations

Fluid Power Specialty (FPWR)

- FLP 110 Fluid Power Fundamentals - II
- FLP 214 Hydraulic Circuits and Controls
- FLP 225 Fluid Power Motion Control
- FLP 226 Pneumatics

Industrial Electronics Specialty (IELC)

- ELE 211 Basic Electronics
- ELE 254 PLC Applications
- FLP 226 Pneumatics

Numerical Control Specialty (NCTL)

- NCT 110 Introduction to Computerized Machining (CNC) - II
- NCT 120 2D CAD CAM for Shape Cutting
- NCT 121 Manual Programming and NC Tool Operation
- NCT 123 2D CAD CAM CNC Programming for Mills and Lathes
- NCT 221 Advanced Manual Programming and NC Tool Operation

Articulation:

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Wayne State University, several BS degrees.

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Minimum Concentration Credits Required for the Program:

69

Select a concentration for requirements and total credits required for the program.

Mechatronics Concentrations

Fluid Power Specialty (FPWR) (69 credits)

First Semester (15 credits)

| | | |
|---------|---|---|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| | Math Elective(s) | 3 |

Second Semester (14 credits)

| | | |
|---------|-----------------------------------|---|
| ELE 111 | Electrical Fundamentals | 4 |
| MEC 100 | Materials and Processes | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| MTT 102 | Machining for the Technologies | 2 |
| | Writing Elective(s) | 3 |

Third Semester (13 credits)

| | | |
|---------|---------------------------------|---|
| FLP 214 | Hydraulic Circuits and Controls | 4 |
|---------|---------------------------------|---|

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| | | |
|---------|--------------------------|---|
| MEC 201 | Mechanisms | 2 |
| ROB 212 | Robotics II | 4 |
| | Speech/Comp. Elective(s) | 3 |

Fourth Semester (14 credits)

| | | |
|---------|-----------------------------------|---|
| ELE 224 | Programmable Controllers (PLCs) I | 4 |
| FLP 225 | Fluid Power Motion Control | 3 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| | Soc. Sci. Elective(s) | 3 |

Fifth Semester (13 credits)

| | | |
|---------|-------------------------|---|
| FLP 226 | Pneumatics | 3 |
| MEC 224 | Robotics IV | 4 |
| | Arts/Human. Elective(s) | 3 |
| | Nat. Sci. Elective(s) | 3 |

Minimum Credits Required for the Concentration or Option: 69

Industrial Electronics Specialty (IELC) (70 credits)

First Semester (15 credits)

| | | |
|---------|---|---|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| | Math Elective(s) | 3 |

Second Semester (15 credits)

| | | |
|---------|-----------------------------------|---|
| ELE 111 | Electrical Fundamentals | 4 |
| ELE 211 | Basic Electronics | 4 |
| MEC 100 | Materials and Processes | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| MTT 102 | Machining for the Technologies | 2 |

Third Semester (16 credits)

| | | |
|---------|-----------------------------------|---|
| ELE 224 | Programmable Controllers (PLCs) I | 4 |
| MEC 201 | Mechanisms | 2 |
| ROB 212 | Robotics II | 4 |
| | Arts/Human. Elective(s) | 3 |
| | Writing Elective(s) | 3 |

Fourth Semester (14 credits)

| | | |
|---------|------------------------------------|---|
| ELE 254 | Programmable Controllers (PLCs) II | 4 |
| FLP 226 | Pneumatics | 3 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| | Soc. Sci. Elective(s) | 3 |

Fifth Semester (10 credits)

| | | |
|---------|--------------------------|---|
| MEC 224 | Robotics IV | 4 |
| | Speech/Comp. Elective(s) | 3 |
| | Nat. Sci. Elective(s) | 3 |

Minimum Credits Required for the Concentration or Option: 70

Numerical Control Specialty (NCTL) (71 credits)

First Semester (15 credits)

| | | |
|---------|---|---|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |

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| | | |
|----------|--|---|
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| Elective | Math Elective(s) Academic Math Level 4 or Higher | 3 |

Second Semester (13 credits)

| | | |
|---------|---|---|
| ELE 111 | Electrical Fundamentals | 4 |
| MEC 100 | Materials and Processes | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| MTT 102 | Machining for the Technologies | 2 |
| NCT 120 | Introduction to 2D CAD CAM Programming and Applications | 2 |

Third Semester (16 credits)

| | | |
|---------|--|---|
| MEC 201 | Mechanisms | 2 |
| NCT 121 | Manual Programming and NC Tool Operation | 4 |
| ROB 212 | Robotics II | 4 |
| | Arts/Human. Elective(s) | 3 |
| | Writing Elective(s) | 3 |

Fourth Semester (15 credits)

| | | |
|---------|---|---|
| ELE 224 | Programmable Controllers (PLCs) I | 4 |
| NCT 221 | Advanced Manual Programming and NC Tool Operation | 4 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| | Soc. Sci. Elective(s) | 3 |

Fifth Semester (12 credits)

| | | |
|---------|---|---|
| NCT 123 | 2D CAD CAM CNC Programming for Mills and Lathes | 2 |
| MEC 224 | Robotics IV | 4 |
| | Speech/Comp. Elective(s) | 3 |
| | Nat. Sci. Elective(s) | 3 |

Minimum Credits Required for the Concentration or Option: 71

Minimum Credits Required for the Program: 69

Notes:

**Students who have successfully completed FLP 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.*

***Students who have successfully completed NCT 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.*

See an advisor to assist in scheduling and planning for each semester as some classes have limited offering.

done 1/24/18
NW

WASHTENAW COMMUNITY COLLEGE
GENERAL EDUCATION REVISION AAS PROGRAM CHANGE FORM 2018-2019

| | |
|--------------------------------|--------------------------------------|
| Program Code: APMETR | Program Name: Mechatronics |
| Division Code: ATP | Department: ITD |

This form is to be used only for General Education Revision Program Changes for Associate in Applied Science (AAS) programs. Any other program changes should be submitted separately using a standard Program Change Form.

Directions:

- Review each general education area under **Requested Changes** below and respond as needed.
- Attach the semester program layout showing the current program listing from the WCC catalog.
 - Indicate any changes to be made on the semester layout.
 - Draw a line through any courses that should be removed on the semester layout.
 - Write in any courses that need to be added on the semester layout.
- Submit this form and semester program layout to the Office of Curriculum and Assessment (SC 257).

| Current General Education Requirements | | Revised General Education Requirements 2018-2019 | |
|--|---------------|--|---------------|
| AAS | | AAS | |
| Writing | 3-4 credits | English Composition | 3 - 4 credits |
| Speech | 3 credits | 2 nd Course in English Composition or one course in Communication | 3 - 4 credits |
| Mathematics | 3 - 4 credits | Mathematics | 3 - 4 credits |
| Natural Sciences | 3 - 4 credits | Natural Sciences | 3 - 5 credits |
| Social & Behavioral Sciences | 3 credits | Social & Behavioral Sciences | 3 credits |
| Arts & Humanities | 3 credits | Arts & Humanities from | 3 credits |
| Critical Thinking | 0 credits | Total | 18 credits |
| Computer & Information Literacy | 3 credits | | |
| Total | 21-24 credits | | |

Please review each General Education Area in the chart below, and record the needed changes in the chart and on the attached semester program layout.

| REQUESTED CHANGES | |
|--------------------------|--|
| | General Education Area |
| <input type="checkbox"/> | English Composition – The requirement for one writing/English composition course remains the same. No changes will be made unless specifically requested below. (Use Writing Elective or ENG 111) |
| <input type="checkbox"/> | Optional Change: |
| <input type="checkbox"/> | 2nd Course in English Composition or one course in Communication WCC previously required both a second composition/writing course and a communication course. Your options are: <ol style="list-style-type: none"> Allow students to select any course that meets composition/writing or communication (<i>recommended</i>). Require students to take a specific composition course (identify course below and on semester layout). Require students to take a specific communication course (identify course below and on semester layout). |
| <input type="checkbox"/> | Requested Change: |

| | |
|--|--|
| | Mathematics – The requirement for one mathematics course remains the same. However, the courses that meet the MTA requirement have changed slightly. See the course listing for details |
| | Optional Change: |
| | Natural Sciences - The requirement for one natural science course remains the same. No changes will be made unless specifically requested below. |
| | Optional Change: |
| | Social & Behavioral Sciences – The requirement for one social and behavioral science course remains the same. No changes will be made unless specifically requested below. |
| | Optional Change: |
| | Arts & Humanities – The requirement for one arts and humanities course remains the same. No changes will be made unless specifically requested below. (Note: A department can designate a COM course as a requirement here. The same course cannot be counted in two areas.) |
| | Optional Change: |
| | Computer and Information Literacy The requirement for computer and information literacy has been removed. Your options are: <ol style="list-style-type: none"> 1. Continue to require a specific computer course. If a specific course is required in your program, we will leave it there. If you previously used "Computer and Information Literacy Course," you will need to specify either a specific course or a list of courses from which to choose. 2. Remove the computer and information literacy course if the program will still meet the minimum of 60 credit hours. 3. Remove the computer and information literacy course and replace the course with elective or other credits as needed to meet the minimum of 60 credit hours. |
| | Required Change: <i>N/A Internal to program</i> |

| Reviewer | Print Name | Signature | Date |
|--------------------------------|-----------------------|--------------------|-----------------|
| Initiator | <i>Tom Penico</i> | <i>Via Email</i> | <i>12/21/17</i> |
| Department Chair | | | |
| Division Dean/ Administrator | | | |
| Vice President for Instruction | <i>Kimberly Huens</i> | <i>[Signature]</i> | <i>1/16/18</i> |

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Program Information Report

School of Advanced Manufacturing Systems

Whether your interest is in manufacturing or automation, the programs in the School of Advanced Manufacturing Systems will fit your needs. Maintain and troubleshoot the machines that make commercial goods by specializing in one or more aspects of the machining industry. Develop entry level or advanced skills in electronics, automation hydraulics or numerical controls.

Washtenaw Community College offers programs at several levels for students who want to begin new careers, or advance in their existing careers. The first level is the certificate, which can vary from nine to thirty-six credits, depending on the field. Certificates generally prepare students for entry-level jobs.

After completing a certificate, students can progress to the next level, the advanced certificate. The credit hours required for these programs also vary. This type of certificate provides a more specialized level of skill development, and often allows students to upgrade their positions at their places of employment.

The next level, an Associate in Applied Science, is available for some programs. For some career fields, it is possible to earn a certificate, advanced certificate, and an Associate in Applied Science degree in the same field. In these cases, the credit hours from the certificate and advanced certificate can be applied to the credit hours needed for the Associate in Applied Science degree.

Alternatively, students can earn an AAS in Occupational Studies by completing a certificate, an advanced certificate (if one exists) and General Education requirements.

Automation

Are you looking for a career as a hydraulic technician or an introduction to manufacturing engineering? Consider the field of automation.

Program Information Report

Mechatronics (APMETR)

Associate in Applied Science Degree

Program Effective Term: Fall 2016

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This program prepares students for entry-level positions as an automated equipment technician who assembles, installs, programs, troubleshoots and maintains robotic and automated equipment. Students have a choice to follow any of three different specialty tracks which will prepare them for the various applications of automation. Each track features a variety of application level classes where the student performs lab-oriented practice for required skills. It is highly recommended that beginning students take at least one technical class during their first semester. See an advisor in the Industrial Technology department for assistance.

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- FLP 214 Hydraulic Circuits and Controls
- FLP 225 Fluid Power Motion Control
- FLP 226 Pneumatics

Industrial Electronics Specialty (IELC)

- ELE 211 Basic Electronics
- ELE 254 PLC Applications
- FLP 226 Pneumatics

Numerical Control Specialty (NCTL)

- NCT 110 Introduction to Computerized Machining (CNC) - II
- NCT 120 2D CAD CAM for Shape Cutting
- NCT 121 Manual Programming and NC Tool Operation
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Copies can be obtained from the Counseling Office, a program advisor, or from the Curriculum and Assessment Office Web site: www.wccnet.edu/departments/curriculum/articulation.php?levelone=colleges.

Minimum Concentration Credits Required for the Program:

70

Select a concentration for requirements and total credits required for the program.

Mechatronics Concentrations

Fluid Power Specialty (FPWR) (70 credits)

First Semester (15 credits)

| | | |
|---------|---|---|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| | Math Elective(s) | 3 |

Second Semester (16 credits)

| | | |
|---------|-----------------------------------|---|
| ELE 111 | Electrical Fundamentals | 4 |
| MEC 100 | Materials and Processes | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| MTT 102 | Machining for Auto Applications | 2 |
| | Writing Elective(s) | 3 |

Third Semester (13 credits)

| | | |
|---------|---------------------------------|---|
| FLP 214 | Hydraulic Circuits and Controls | 4 |
|---------|---------------------------------|---|

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| | | |
|---------|--------------------|---|
| MEC 201 | Mechanisms | 2 |
| ROB 212 | Robotics II | 4 |
| | Speech Elective(s) | 3 |

Fourth Semester (14 credits)

| | | |
|---------|----------------------------|---|
| ELE 224 | Introduction to PLCs | 4 |
| FLP 225 | Fluid Power Motion Control | 3 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| | Soc. Sci. Elective(s) | 3 |

Fifth Semester (14 credits)

| | | |
|---------|-------------------------|---|
| FLP 226 | Pneumatics | 3 |
| MEC 224 | Robotics IV | 4 |
| | Arts/Human. Elective(s) | 3 |
| | Nat. Sci. Elective(s) | 4 |

Minimum Credits Required for the Concentration or Option: 70

Industrial Electronics Specialty (IELC) (71 credits)

| | | |
|---------|---|---|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| | Math Elective(s) | 3 |

Second Semester (15 credits)

| | | |
|---------|-----------------------------------|---|
| ELE 111 | Electrical Fundamentals | 4 |
| ELE 211 | Basic Electronics | 4 |
| MEC 100 | Materials and Processes | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| MTT 102 | Machining for Auto Applications | 2 |

Third Semester (14 credits)

| | | |
|---------|----------------------|---|
| ELE 224 | Introduction to PLCs | 4 |
| MEC 201 | Mechanisms | 2 |
| ROB 212 | Robotics II | 4 |
| | Speech Elective(s) | 3 |
| | Writing Elective(s) | 3 |

Fourth Semester (14 credits)

| | | |
|---------|-----------------------|---|
| ELE 254 | PLC Applications | 4 |
| FLP 226 | Pneumatics | 3 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| | Soc. Sci. Elective(s) | 3 |

Fifth Semester (14 credits)

| | | |
|---------|-------------------------|---|
| MEC 224 | Robotics IV | 4 |
| | Arts/Human. Elective(s) | 3 |
| | Nat. Sci. Elective(s) | 4 |

Minimum Credits Required for the Concentration or Option: 71

Numerical Control Specialty (NCTL) (72 credits)

First Semester (15 credits)

| | | |
|---------|---|---|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |

Program Information Report

| | | |
|----------|--|-----|
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| Elective | Math Elective(s) Academic Math Level 4 or Higher | 3-4 |

| | | |
|--------------------------------------|---|---|
| Second Semester (1.5 credits) | | |
| ELE 111 | Electrical Fundamentals | 4 |
| MEC 100 | Materials and Processes | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| MTT 102 | Machining for Auto Applications | 2 |
| NCT 120 | Introduction to 2D CAD CAM Programming and Applications | 2 |

| | | |
|-------------------------------------|--|---|
| Third Semester (1.5 credits) | | |
| MEC 201 | Mechanisms | 2 |
| NCT 121 | Manual Programming and NC Tool Operation | 4 |
| ROB 212 | Robotics II | 4 |
| | Speech Elective(s) | 3 |
| | Writing Elective(s) | 3 |

| | | |
|--------------------------------------|---|---|
| Fourth Semester (1.5 credits) | | |
| ELE 224 | Introduction to PLCs | 4 |
| NCT 221 | Advanced Manual Programming and NC Tool Operation | 4 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| | Soc. Sci. Elective(s) | 3 |

| | | |
|-------------------------------------|---|---|
| Fifth Semester (1.5 credits) | | |
| NCT 123 | 2D CAD CAM CNC Programming for Mills and Lathes | 2 |
| MEC 224 | Robotics IV | 4 |
| | Arts/Human. Elective(s) | 3 |
| | Nat. Sci. Elective(s) | 4 |

Minimum Credits Required for the Concentration or Option: 72

Minimum Credits Required for the Program: 70

Notes:

*Students who have successfully completed FLP 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.

**Students who have successfully completed NCT 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.

See an advisor to assist in scheduling and planning for each semester as some classes have limited offering.

PROGRAM CHANGE OR DISCONTINUATION FORM

Program Code: **APMETR** Program Name: **Mechatronics**
 Division Code: **ATP** Department: **INTD Industrial Technology**

Effective Term: **Fall 2016**

Directions:

1. Attach the current program listing from the WCC catalog or Web site and indicate any changes to be made.
2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet.
3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using a Master Syllabus form, but should be submitted at the same time as the program change form.

Requested Changes:

- | | |
|---|---|
| <input type="checkbox"/> Review | <input type="checkbox"/> Program admission requirements |
| <input checked="" type="checkbox"/> Remove course(s): <u>NCT 249</u> | <input type="checkbox"/> Continuing eligibility requirements |
| <input checked="" type="checkbox"/> Add course(s): <u>NCT 120 and NCT 123</u> | <input type="checkbox"/> Program outcomes |
| <input type="checkbox"/> Program title (title was _____) | <input type="checkbox"/> Accreditation information |
| <input type="checkbox"/> Description | <input type="checkbox"/> Discontinuation (attach program discontinuation plan that includes transition of students and timetable for phasing out courses) |
| <input type="checkbox"/> Type of award | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Advisors | |
| <input type="checkbox"/> Articulation information | |

Show all changes on the attached page from the catalog.

Rationale for proposed changes or discontinuation:

Splitting NCT 249 into two courses, NCT 120 and NCT 123 to provide an opportunity for Welding students to take NCT 120.

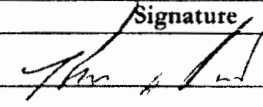
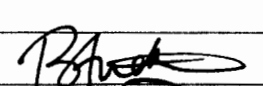
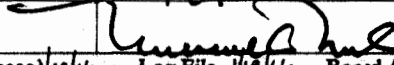
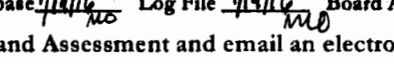
Financial/staffing/equipment/space implications:

Increase lecture hours by 15 and increase lab hours by 15

List departments that have been consulted regarding their use of this program.

Welding

Signatures:

| Reviewer | Print Name | Signature | Date |
|--------------------------------|----------------|--|------------|
| Initiator | Thomas Penird |  | 10/22/2015 |
| Department Chair | Thomas Penird |  | 11/10/15 |
| Division Dean/Administrator | Brandon Tucker |  | 11/25/15 |
| Vice President for Instruction | Michael Nealon |  | |

Do not write in shaded area. Entered in: Banner 11/11/15 C&A Database 11/11/15 Log File 11/11/15 Board Approval NA

Please submit completed form to the Office of Curriculum and Assessment and email an electronic copy to sjohn@wccnet.edu for posting on the website.

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Mechatronics (APMETR)

Associate in Applied Science Degree

Description

This program prepares students for entry-level positions as an automated equipment technician who assembles, installs, programs, troubleshoots, and maintains robotic and automated equipment. Students have a choice to follow any of three different specialty tracks which will prepare them for the various applications of automation. Each track features a variety of application level classes where the student performs lab-oriented practice for required skills. It is highly recommended that beginning students take at least one technical class during their first semester. See an advisor in the Industrial Technology department for assistance.

Students must select one of the concentrations to complete as a program requirement.

Program Concentrations

Fluid Power Specialty (FPWR)

FLP 110 Fluid Power Fundamentals - II
FLP 214 Hydraulic Circuits and Controls
FLP 225 Fluid Power Motion Control
FLP 226 Pneumatics

Industrial Electronics Specialty (IELC)

ELE 211 Basic Electronics
ELE 254 PLC Applications
FLP 226 Pneumatics

Numerical Control Specialty (NCTL)

NCT 110 Introduction to Computerized Machining (CNC) - II
~~NCT 120 2D CAD CAM for Shape Cutting~~
NCT 121 Manual Programming and NC Tool Operation
~~NCT 123 2D CAD CAM CNC Programming for Mills and Lathes~~
NCT 221 Advanced Manual Programming and NC Tool Operation
~~NCT 249 CAD/CAM CNC Programming~~

Articulation

Eastern Michigan University, several BS degrees;
Wayne State University, several BS degrees.

Copies can be obtained from the Counseling Office, a program advisor, or from the Curriculum and Assessment Office Web site:

www.wccnet.edu/departments/curriculum/articulation.php?levelone=colleges.

Requirements

Select a concentration for requirements and total credits required for program.

Fluid Power Specialty (FPWR)

Industrial Electronics Specialty (IELC)

Numerical Control Specialty (NCTL)

First Semester

| Class | Title | Credits |
|----------------------|--|----------------|
| <u>FLP 101</u> | Fluid Power Fundamentals - I | 2 |
| <u>FLP 110</u> | Fluid Power Fundamentals - II * | 2 |
| <u>NCT 101</u> | Introduction to Computerized Machining (CNC) - I | 2 |
| <u>NCT 110</u> | Introduction to Computerized Machining (CNC) - II ** | 2 |
| <u>ROB 101</u> | Robotics I - I | 2 |
| <u>ROB 110</u> | Robotics I - II | 2 |
| ✓ <u>Elective(s)</u> | <u>Math</u> <i>Academic Math Level 4 or higher</i> | 3-4 |
| Total | | 15 |

Second Semester

| Class | Title | Credits |
|----------------|-------------------------------------|----------------|
| <u>ELE 111</u> | Electrical Fundamentals | 4 |
| <u>MEC 100</u> | Materials and Processes | 3 |
| <u>MEC 101</u> | 3D Modeling and Blueprint Reading | 2 |
| <u>MTT 102</u> | Machining for Auto Applications | 2 |
| <u>NCT 120</u> | 2D CAD CAM for Shape Cutting | 2 |
| Total | | 13 |

Third Semester

| Class | Title | Credits |
|--------------------|--|----------------|
| <u>MEC 201</u> | Mechanisms | 2 |
| <u>NCT 121</u> | Manual Programming and NC Tool Operation | 4 |
| <u>ROB 212</u> | Robotics II | 4 |
| <u>Elective(s)</u> | <u>Speech</u> | 3 |
| <u>Elective(s)</u> | <u>Writing</u> | 3 |

Total 16

Fourth Semester

| Class | Title | Credits |
|--------------------|---|----------------|
| <u>ELE 224</u> | Introduction to PLCs | 4 |
| <u>NCT 221</u> | Advanced Manual Programming and NC Tool Operation | 4 |
| <u>ROB 222</u> | Robotics Simulation | 2 |
| <u>ROB 223</u> | Robotics III | 2 |
| <u>Elective(s)</u> | <u>Social and Behavioral Science</u> | 3 |
| Total | | 15 |

Fifth Semester

| Class | Title | Credits |
|---------------------------|------------------------------------|----------------|
| <u>NCT 249</u> | CAD/CAM CNC Programming | 4 |
| <u>NCT 123</u> | CAD CAM CNC Programming | 2 |
| <u>MEC 224</u> | Robotics IV | 4 |
| <u>Elective(s)</u> | <u>Arts and Humanities</u> | 3 |
| <u>Elective(s)</u> | <u>Natural Sciences</u> | 4 |
| Total | | 13 |
| Total Credits Required | | 72 |

Footnotes

*Students who have successfully completed FLP 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.

**Students who have successfully completed NCT 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.

See an advisor to assist in scheduling and planning for each semester as some classes have limited offering.

Program Information Report

Mechatronics (APMETR)

Associate in Applied Science Degree

Program Effective Term: Fall 2014

High Skill Occupation

This program prepares students for entry-level positions as an automated equipment technician who assembles, installs, programs, troubleshoots, and maintains robotic and automated equipment. Students have a choice to follow any of three different specialty tracks which will prepare them for the various applications of automation. Each track features a variety of application level classes where the student performs lab-oriented practice for required skills. It is highly recommended that beginning students take at least one technical class during their first semester. See an advisor in the Industrial Technology department for assistance.

Students must select one of the concentrations to complete as a program requirement.

Program Concentrations
 Fluid Power Specialty (FPWR)
 FLP 110 Fluid Power Fundamentals - II
 FLP 214 Hydraulic Circuits and Controls
 FLP 225 Fluid Power Motion Control
 FLP 226 Pneumatics

Industrial Electronics Specialty (IELC)
 ELE 211 Basic Electronics
 ELE 254 PLC Applications
 FLP 226 Pneumatics

Numerical Control Specialty (NCTL)
 NCT 110 Introduction to Computerized Machining (CNC) - II
 NCT 121 Manual Programming and NC Tool Operation
 NCT 221 Advanced Manual Programming and NC Tool Operation
 NCT 249 CAD/CAM CNC Programming

Articulation:
 Eastern Michigan University, several BS degrees.

Copies can be obtained from the Counseling Office, a program advisor, or from the Curriculum and Assessment Office Web site: www.wccnet.edu/departments/curriculum/articulation.php?levelone=colleges.

Minimum Concentration Credits Required for the Program: **70**
 Select a concentration for requirements and total credits required for the program.

Mechatronics Concentrations

Fluid Power Specialty (FPWR) (70 credits)

First Semester (15 credits)

| | | |
|---------|---|---|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| | Math Elective(s) | 3 |

Second Semester (14 credits)

| | | |
|---------|-----------------------------------|---|
| ELE 111 | Electrical Fundamentals | 4 |
| MEC 100 | Materials and Processes | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| MTT 102 | Machining for Auto Applications | 2 |
| | Writing Elective(s) | 3 |

Third Semester (13 credits)

| | | |
|---------|---------------------------------|---|
| FLP 214 | Hydraulic Circuits and Controls | 4 |
| MEC 201 | Mechanisms | 2 |
| ROB 212 | Robotics II | 4 |
| | Speech Elective(s) | 3 |

Program Information Report

| Fourth Semester | | (14 credits) |
|------------------------|----------------------------|---------------------|
| ELE 224 | Introduction to PLCs | 4 |
| FLP 225 | Fluid Power Motion Control | 3 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| | Soc. Sci. Elective(s) | 3 |

| Fifth Semester | | (14 credits) |
|-----------------------|-------------------------|---------------------|
| FLP 226 | Pneumatics | 3 |
| MEC 224 | Robotics IV | 4 |
| | Arts/Human. Elective(s) | 3 |
| | Nat. Sci. Elective(s) | 4 |

Minimum Credits Required for the Concentration or Option: 70

Industrial Electronics Specialty (IELC) (71 credits)

| First Semester | | (15 credits) |
|-----------------------|---|---------------------|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| | Math Elective(s) | 3 |

| Second Semester | | (15 credits) |
|------------------------|-----------------------------------|---------------------|
| ELE 111 | Electrical Fundamentals | 4 |
| ELE 211 | Basic Electronics | 4 |
| MEC 100 | Materials and Processes | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| MTT 102 | Machining for Auto Applications | 2 |

| Third Semester | | (16 credits) |
|-----------------------|----------------------|---------------------|
| ELE 224 | Introduction to PLCs | 4 |
| MEC 201 | Mechanisms | 2 |
| ROB 212 | Robotics II | 4 |
| | Speech Elective(s) | 3 |
| | Writing Elective(s) | 3 |

| Fourth Semester | | (14 credits) |
|------------------------|-----------------------|---------------------|
| ELE 254 | PLC Applications | 4 |
| FLP 226 | Pneumatics | 3 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| | Soc. Sci. Elective(s) | 3 |

| Fifth Semester | | (11 credits) |
|-----------------------|-------------------------|---------------------|
| MEC 224 | Robotics IV | 4 |
| | Arts/Human. Elective(s) | 3 |
| | Nat. Sci. Elective(s) | 4 |

Minimum Credits Required for the Concentration or Option: 71

Numerical Control Specialty (NCTL) (72 credits)

| First Semester | | (15 credits) |
|-----------------------|---|---------------------|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| | Math Elective(s) | 3 |

Program Information Report

Second Semester (11 credits)

| | | |
|---------|-----------------------------------|---|
| ELE 111 | Electrical Fundamentals | 4 |
| MEC 100 | Materials and Processes | 3 |
| MEC 101 | 3D Modeling and Blueprint Reading | 2 |
| MTT 102 | Machining for Auto Applications | 2 |

Third Semester (16 credits)

| | | |
|---------|--|---|
| MEC 201 | Mechanisms | 2 |
| NCT 121 | Manual Programming and NC Tool Operation | 4 |
| ROB 212 | Robotics II | 4 |
| | Speech Elective(s) | 3 |
| | Writing Elective(s) | 3 |

Fourth Semester (15 credits)

| | | |
|---------|---|---|
| ELE 224 | Introduction to PLCs | 4 |
| NCT 221 | Advanced Manual Programming and NC Tool Operation | 4 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| | Soc. Sci. Elective(s) | 3 |

Fifth Semester (15 credits)

| | | |
|---------|-------------------------|---|
| NCT 249 | CAD/CAM CNC Programming | 4 |
| MEC 224 | Robotics IV | 4 |
| | Arts/Human. Elective(s) | 3 |
| | Nat. Sci. Elective(s) | 4 |

Minimum Credits Required for the Concentration or Option: 72

Minimum Credits Required for the Program: 70

Notes:

**Students who have successfully completed FLP 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.*

***Students who have successfully completed NCT 110 as part of their certificate do not need to take this course as a semester requirement. Course can only be taken once for credit.*

See an advisor to assist in scheduling and planning for each semester as some classes have limited offering.

PROGRAM CHANGE OR DISCONTINUATION FORM

Program Code: APATEC Program Name: Mechatronics (formerly Automation Technology) Effective Term: Fall 2014
 Division Code: ATP Department: INDT

Directions:
 1. Attach the current program listing from the WCC catalog or Web site and indicate any changes to be made.
 2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet.
 3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using a Master Syllabus form, but should be submitted at the same time as the program change form.

Requested Changes:

| | |
|--|---|
| <input type="checkbox"/> Review | <input type="checkbox"/> Program admission requirements |
| <input checked="" type="checkbox"/> Remove course(s): BMG241 CAD105 | <input type="checkbox"/> Continuing eligibility requirements |
| <input checked="" type="checkbox"/> Add course(s): MEC101, MEC201 | <input checked="" type="checkbox"/> Program outcomes |
| <input type="checkbox"/> Program title (title was <u>Automation Technology</u>) | <input type="checkbox"/> Accreditation information |
| <input checked="" type="checkbox"/> Description | <input type="checkbox"/> Discontinuation (attach program discontinuation plan that includes transition of students and timetable for phasing out courses) |
| <input type="checkbox"/> Type of award | <input type="checkbox"/> Other <u>ROB224 becomes MEC224 and AMS103 Becomes MEC100</u> |
| <input checked="" type="checkbox"/> Advisors | |
| <input type="checkbox"/> Articulation information | |

Show all changes on the attached page from the catalog. *Are they narrowing MTE concentration? yes*

Rationale for proposed changes or discontinuation:
 Renames Automation Technology program to a term now recognized by industry Mechatronic adds in (2) classes to meet needs for the new program name

Financial/staffing/equipment/space implications:
 None

List departments that have been consulted regarding their use of this program.

Signatures:

| Reviewer | Print Name | Signature | Date |
|--------------------------------|-------------------|--------------------------|------------|
| Initiator | Thomas Penird | <i>Thomas Penird</i> | 12/23/2013 |
| Department Chair | Thomas Penird | <i>Thomas Penird</i> | 12/23/2013 |
| Division Dean/Administrator | Marilyn Donham | <i>Marilyn Donham</i> | 1-7-14 |
| Vice President for Instruction | William Abernethy | <i>William Abernethy</i> | 1/23/14 |

Do not write in shaded area. Entered in: Banner _____ C&A Database 1/21/14 Log File 1/21/14 Board Approval _____

Please submit completed form to the Office of Curriculum and Assessment and email an electronic copy to sjohn@wccnet.edu for posting on the website.

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Assessment plan:

| Program outcomes to be assessed | Assessment tool | When assessment will take place | Courses/other populations | Number students to be assessed |
|---|------------------------|--|----------------------------------|---------------------------------------|
| Use multiple processes and types of equipment in the creation of a capstone project. | Capstone Project | Winter 2016 | MEC 224 | All |
| Develop systems logic to automatically gather data, machine, assemble and create a capstone project | Capstone Project | Winter 2016 | MEC 224 | All |

Scoring and analysis plan:

1. Indicate how the above assessment(s) will be scored and evaluated (e.g. departmentally-developed rubric, external evaluation, other). Attach the rubric.

Departmentally-developed rubric

2. Indicate the standard of success to be used for this assessment.

75% of the students will attain a minimum of 70% on their capstone project

3. Indicate who will score and analyze the data.

Department Faculty

MECHATRONICS (#####)

Associate in Applied Science Degree

Description

This program prepares students for entry-level positions as an automated equipment technician who assembles, installs, programs, troubleshoots, and maintains robotic and automated equipment. Students have a choice to follow any of ~~four~~ three different specialty tracks which will prepare them for the various applications of automation. Each track features a variety of application level classes where the student performs lab-oriented practice for required skills. It is highly recommended that beginning students take at least one technical class during their first semester. See an advisor in the Industrial Technology department for assistance.

Students must select one of the concentrations to complete as a program requirement.

Program Concentrations

Fluid Power Specialty (FPWR)

FLP 110 Fluid Power Fundamentals - II

FLP 214 Hydraulic Circuits and Controls

FLP 225 Fluid Power Motion Control

FLP 226 Pneumatics

Industrial Electronics Specialty (IELC)

ELE 211 Basic Electronics

ELE 254 PLC Applications

FLP 226 Pneumatics

~~Machine Tool Technology Specialty (MTTE) – Certificate or Occupational Studies~~

~~CAD 105 Blueprint Reading and Analysis~~

~~MTT 111 Machine Shop Theory and Practice~~

~~MTT 203 Advanced Machine Tool Operations~~

~~NCT 110 Introduction to Computerized Machining (CNC) - II~~

Numerical Control Specialty (NCTL)

NCT 110 Introduction to Computerized Machining (CNC) - II

NCT 121 Manual Programming and NC Tool Operation

NCT 221 Advanced Manual Programming and NC Tool Operation

NCT 249 CAD/CAM CNC Programming

Articulation

Eastern Michigan University, several BS degrees.

Copies can be obtained from the Counseling Office, a program advisor, or from the Curriculum and Assessment Office Web site:

www.wccnet.edu/departments/curriculum/articulation.php?levelone=colleges.

Contact Information

Division
Adv Tech/Public Serv Careers
Department
Industrial Technology Dept
Advisors
Tom Penird

Requirements

Select a concentration for requirements and total credits required for program.

Fluid Power Specialty (FPWR)

First Semester

| Class | Title | Credits |
|--------------------|--|---------|
| <u>FLP 101</u> | Fluid Power Fundamentals - I | 2 |
| <u>FLP 110</u> | Fluid Power Fundamentals - II * | 2 |
| <u>NCT 101</u> | Introduction to Computerized Machining (CNC) - I | 2 |
| <u>NCT 110</u> | Introduction to Computerized Machining (CNC) - II ** | 2 |
| <u>ROB 101</u> | Robotics I - I | 2 |
| <u>ROB 110</u> | Robotics I - II | 2 |
| <u>Elective(s)</u> | <u>Math</u> | 3 |
| Total | | 15 |

Second Semester

| Class | Title | Credits |
|--------------------|--|-------------------------------------|
| <u>Elective(s)</u> | <u>Computer and Information Literacy</u> | 3 |
| <u>Elective(s)</u> | <u>Writing</u> | 3 |
| <u>AMS 103</u> | Materials and Processes | 3 (CHANGE NAME MEC100) |
| <u>BMG 241</u> | Innovation: Process and Application | 4 (REMOVE THIS CLASS) |
| <u>MEC 101</u> | 3D Modeling and Blueprint Reading for Technologies | 2 (ADD THIS CLASS REPLACES CAD 105) |
| <u>ELE 111</u> | Electrical Fundamentals | 4 |
| <u>MTT 102</u> | Machining for Auto Applications | 2 |
| Total | | 14 |

Third Semester

| Class | Title | Credits |
|--------------------|---------------------------------|--|
| <u>Elective(s)</u> | <u>Speech</u> | 3 |
| <u>MEC 201</u> | Mechanisms | 2 (ADD THIS CLASS) |
| <u>FLP 214</u> | Hydraulic Circuits and Controls | 4 |
| <u>ROB 212</u> | Robotics II | 4 <i>meets computer literacy requirement</i> |
| Total | | 13 |

Fourth Semester

| Class | Title | Credits |
|--------------------|--------------------------------------|---------|
| <u>ELE 224</u> | Introduction to PLCs | 4 |
| <u>FLP 225</u> | Fluid Power Motion Control | 3 |
| <u>ROB 222</u> | Robotics Simulation | 2 |
| <u>ROB 223</u> | Robotics III | 2 |
| <u>Elective(s)</u> | <u>Social and Behavioral Science</u> | 3 |
| Total | | 14 |

Fifth Semester

| Class | Title | Credits |
|------------------------|----------------------------|----------------------------|
| <u>FLP 226</u> | Pneumatics | 3 |
| <u>ROB 224</u> | Robotics IV | 4 (CHANGE NAME TO MEC 224) |
| <u>(Elective(s))</u> | <u>Arts and Humanities</u> | 3 |
| <u>Elective(s)</u> | <u>Natural Sciences</u> | 4 |
| Total | | 14 |
| Total Credits Required | | 70 |

Industrial Electronics Specialty (IELC)

First Semester

| Class | Title | Credits |
|--------------------|--|---------|
| <u>FLP 101</u> | Fluid Power Fundamentals - I | 2 |
| <u>FLP 110</u> | Fluid Power Fundamentals - II * | 2 |
| <u>NCT 101</u> | Introduction to Computerized Machining (CNC) - I | 2 |
| <u>NCT 110</u> | Introduction to Computerized Machining (CNC) - II ** | 2 |
| <u>ROB 101</u> | Robotics I - I | 2 |
| <u>ROB 110</u> | Robotics I - II | 2 |
| <u>Elective(s)</u> | <u>Math</u> | 3 |
| Total | | 15 |

Second Semester

| Class | Title | Credits |
|---------------------------|---|---|
| <u>AMS 103</u> | Materials and Processes | 3 (CHANGE NAME MEC 100) |
| <u>BMG 241</u> | <u>Innovation: Process and Application</u> | <u>4</u> (REMOVE THIS CLASS) |
| <u>MEC 101</u> | 3D Modeling and Blueprint Reading for Technologies | 2 (ADD THIS CLASS REPLACES CAD 105) |
| <u>ELE 111</u> | Electrical Fundamentals | 4 |
| <u>ELE 211</u> | Basic Electronics | 4 |
| <u>MTT 102</u> | Machining for Auto Applications | 2 |
| Total | | 15 |

Third Semester

| Class | Title | Credits |
|--------------------|-------------------------------|---|
| Elective(s) | Writing | 3 |
| Elective(s) | Speech | 3 |
| MFC 201 | Mechanisms | 2 (ADD THIS CLASS) |
| ELE 224 | PLC Applications 4 | Introduction to PLCs |
| ROB 212 | Robotics II | 4 - meets computer literacy requirement |
| Total | | 16 |

Fourth Semester

| Class | Title | Credits |
|--------------------|-----------------------------------|---------|
| ELE 254 | Introduction to PLCs 4 | Applica |
| FLP 226 | Pneumatics | 3 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| Elective(s) | Social and Behavioral Science | 3 |
| Total | | 14 |

Fifth Semester

| Class | Title | Credits |
|------------------------|---------------------|----------------------------|
| ROB 224 | Robotics IV | 4 (CHANGE NAME TO MFC 224) |
| Elective(s) | Arts and Humanities | 3 |
| Elective(s) | Natural Sciences | 4 |
| Total | | 11 |
| Total Credits Required | | 71 |

~~Machine Tool Technology Specialty (MTTE)~~
 Numerical Control Specialty (NCTL)

First Semester

| Class | Title | Credits |
|-------------|--|---------|
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| FLP 110 | Fluid Power Fundamentals - II * | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II ** | 2 |
| ROB 101 | Robotics I - I | 2 |
| ROB 110 | Robotics I - II | 2 |
| Elective(s) | Math | 3 |
| Total | | 15 |

Second Semester

| Class | Title | Credits |
|---|--|-------------------------------------|
| <u>Elective(s)</u> Computer and Information Literacy | | 3 |
| AMS 103 | Materials and Processes | 3 (CHANGE NAME MEC100) |
| BMG 241 | Innovation: Process and Application | 4 (REMOVE THIS CLASS) |
| MEC 101 | 3D Modeling and Blueprint Reading for Technologies | 2 (ADD THIS CLASS REPLACES CAD 105) |
| ELE 111 | Electrical Fundamentals | 4 |
| MTT 102 | Machining for Auto Applications | 2 |
| Total | | 11 |

Third Semester

| Class | Title | Credits |
|-----------------------------------|--|--------------------|
| <u>Elective(s)</u> <u>Writing</u> | | 3 |
| <u>Elective(s)</u> <u>Speech</u> | | 3 |
| MEC 201 | Mechanisms | 2 (ADD THIS CLASS) |
| NCT 121 | Manual Programming and NC Tool Operation | 4 |
| ROB 212 | Robotics II | 4 |
| Total | | 16 |

Fourth Semester

| Class | Title | Credits |
|---|---|---------|
| ELE 224 | Introduction to PLCs | 4 |
| NCT 221 | Advanced Manual Programming and NC Tool Operation | 4 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| <u>Elective(s)</u> <u>Social and Behavioral Science</u> | | 3 |
| Total | | 15 |

Fifth Semester

| Class | Title | Credits |
|---|---------------------------|--|
| <u>Elective(s)</u> <u>Natural Sciences</u> | | 4 |
| <u>Elective(s)</u> <u>Arts and Humanities</u> | | 3 |
| NCT 249 | CAD/CAM CNC Programming 4 | 4 - <i>meets computer literacy requirement</i> |
| ROB 224 | Robotics IV | 4 (CHANGE NAME TO MEC224) |
| Total | | 15 |
| Total Credits Required | | 72 |

Footnotes

*Students who have successfully completed FLP 110 as part of their certificate do not need to take this course as a Major/Area requirement. Course can only be taken once for credit.

**Students who have successfully completed NCT 110 as part of their certificate do not need to take this course as a Major/Area requirement. Course can only be taken once for credit.

See an advisor to assist in scheduling and planning for each semester as some classes have limited offering.

PROGRAM CHANGE OR DISCONTINUATION FORM

Program Code: APATEC Program Name: Automation Technology Associate in Applied Science Degree Effective Term: Fall 2008
 Division Code: HAT Department: Industrial Technology (INTD)

- Directions:**
1. Attach the current program listing from the WCC catalog or Web site and indicate any changes to be made.
 2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet.
 3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using a Master Syllabus form, but should be submitted at the same time as the program change form.

Requested Changes:

Review

Remove course(s): FLP111, NCT 111, ROB 121

Add course(s): FLP 110, NCT 110, ROB 110

Program title (title was _____)

Description

Type of award

Advisors

Articulation information

Program admission requirements

Continuing eligibility requirements

Program outcomes

Accreditation information

Discontinuation (attach program discontinuation plan that includes transition of students and timetable for phasing out courses)

Other Alternative (Must Choose one) Certificate Tracks:

- Advanced Manufacturing (????) 30 credits
- Fluid Power (CTFLPW) 24 credits
- Industrial Electronics (CFIET) 16 credits
- ~~Industrial Electronics Technology (CVIET2) 12 Credits~~ *Not done New*
- Machine Tool (CTMTTC) 25 credits
- ~~Manufacturing and Industrial Computing (CTMIC) 27 credits~~
- Numerical Control Programming (CTNCPC) 26 credits

Show all changes on the attached page from the catalog.

Rationale for proposed changes or discontinuation:
 Provide students with core courses of basics skills common to all INTD certificate and degree programs.

Financial/staffing/equipment/space implications:
 None

List departments that have been consulted regarding their use of this program.
 Business and Computer Technologies Division – Rosemary Wilson, Dean
 Vocational Technologies Division, - Bruce Greene, Dean

Signatures:

| Reviewer | Print Name | Signature | Date |
|--------------------------------|--------------------------|--------------------|---------|
| Initiator | Tom Penird/ Gary Schultz | <i>[Signature]</i> | 3/4/08 |
| Department Chair | Tom Penird/ Gary Schultz | <i>[Signature]</i> | |
| Division Dean/Administrator | Granville Lee | <i>[Signature]</i> | 2/27/08 |
| Vice President for Instruction | Roger Palay | <i>[Signature]</i> | 3/13/08 |
| President | Larry Whitworth | | |

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Please submit completed form to the Office of Curriculum and Assessment and email an electronic copy to sjohn@wccnet.edu for posting on the website.

Program Information Report

School of Advanced Manufacturing Systems

Automation

Automation Technology (APATEC)

Associate in Applied Science Degree

Program Effective Term: Fall 2008

This program prepares students for entry-level positions as an automated equipment technician who assembles, installs, programs, troubleshoots, and maintains robotic and automated equipment. Students have a choice to follow any of five different specialty tracks which will prepare them for the various applications of automation. Each track features a variety of application level classes where the student performs lab-oriented practice for required skills. It is highly recommended that beginning students take at least one technical class during their first semester. See an advisor in the Industrial Technology department for assistance.

Articulation:

Eastern Michigan University, several BS degrees

Copies can be obtained from the Counseling Office, a program advisor, or from the Curriculum and Assessment Office Web site: <http://www.wccnet.edu/departments/curriculum/articulation.php?levelone=colleges>.

General Education Requirements (18 credits)

| | | |
|-------------|-------------|-----|
| Writing | Elective(s) | 3-4 |
| Speech | Elective(s) | 3 |
| Math | Elective(s) | 3-4 |
| Nat. Sci. | Elective(s) | 3-4 |
| Soc. Sci. | Elective(s) | 3 |
| Arts/Human. | Elective(s) | 3 |

Core Courses (12 credits)

| | | |
|---------|--|---|
| AMS 103 | Materials and Processes | 3 |
| BMG 241 | Innovation: Process and Application | 1 |
| FLP 101 | Fluid Power Fundamentals - I | 2 |
| MTT 102 | Machining for Auto Applications | 2 |
| NCT 101 | Introduction to Computerized Machining (CNC) - I | 2 |
| ROB 101 | Robotics I - I | 2 |

*Core courses must be taken before Major/Area Requirements.

Major/Area Requirements (22 credits)

| | | |
|---------|---|-----|
| ELE 111 | Electrical Fundamentals | 4 |
| ELE 224 | Introduction to PLCs | 4 |
| FLP 110 | Fluid Power Fundamentals - II* | 0-2 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 0-2 |
| ROB 110 | Robotics I - II | 2 |
| ROB 212 | Robotics II | 4 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| ROB 224 | Robotics IV | 4 |

Minimum Option Credits Required for the Program: 12

Certificates are made up of the core courses listed above and the following option courses with the following exception: Industrial Electronics Technology (CFIET).

Automation Technology Options

Advanced Manufacturing Specialty (ADVM) (14 credits)

| | | |
|---------|-------------------------------|---|
| AMS 104 | Rapid Prototyping and Methods | 3 |
| AMS 105 | Lean Manufacturing Methods | 3 |
| AMS 204 | Innovations Application | 4 |
| AMS 205 | Build Concept Prototype | 4 |

Fluid Power Specialty (FPWR) (12 credits)

| | | |
|---------|---------------------------------|---|
| FLP 110 | Fluid Power Fundamentals - II* | 2 |
| FLP 214 | Hydraulic Circuits and Controls | 4 |
| FLP 225 | Fluid Power Motion Control | 3 |
| FLP 226 | Pneumatics | 3 |

Program Information Report

| Industrial Electronics Specialty (IELC) | | (15 credits) |
|--|----------------------------------|---------------------|
| ELE 211 | Basic Electronics | 4 |
| ELE 254 | PLC Applications | 4 |
| FLP 226 | Pneumatics | 3 |
| MTT 111 | Machine Shop Theory and Practice | 4 |

| Machine Tool Technology Specialty (MTTE) | | (13 credits) |
|---|---|---------------------|
| CAD 105 | Blueprint Reading and Analysis | 3 |
| MTT 111 | Machine Shop Theory and Practice | 4 |
| MTT 203 | Advanced Machine Tool Operations | 4 |
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |

| Numerical Control Specialty (NCTL) | | (14 credits) |
|---|---|---------------------|
| NCT 110 | Introduction to Computerized Machining (CNC) - II** | 2 |
| NCT 121 | Manual Programming and NC Tool Operation | 4 |
| NCT 221 | Advanced Manual Programming and NC Tool Operation | 4 |
| NCT 249 | CAD/CAM CNC Programming | 4 |

Minimum Credits Required for the Program: 64

Notes:

*Students who have successfully completed FLP 110 as part of their certificate do not need to take this course as a Major/Area requirement. Course can only be taken once for credit.

**Students who have successfully completed NCT 110 as part of their certificate do not need to take this course as a Major/Area requirement. Course can only be taken once for credit.

See an advisor to assist in scheduling and planning for each semester as some classes have limited offering.

Students must meet the Computer and Information Literacy Graduation Requirement. See General Education Graduation Requirements in the WCC Bulletin.

PROGRAM CHANGE OR DISCONTINUATION FORM

Program Code: APATEC

Program Name: Automation Technology degree

Effective Term: Fall '06

Division Code: HAT

Department: Industrial Technology

Directions:

1. Attach the current program listing from the WCC catalog or Web site and indicate any changes to be made.
2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet.
3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using a Master Syllabus form, but should be submitted at the same time as the program change form.

Requested Changes:

| | |
|--|---|
| <input type="checkbox"/> Review | <input type="checkbox"/> Program admission requirements |
| <input checked="" type="checkbox"/> Remove course(s): <u>MTT-101</u> | <input type="checkbox"/> Continuing eligibility requirements |
| <input checked="" type="checkbox"/> Add course(s): <u>CAD-105</u> | <input type="checkbox"/> Program outcomes |
| <input type="checkbox"/> Program title (title was _____) | <input type="checkbox"/> Accreditation information |
| <input type="checkbox"/> Description | <input type="checkbox"/> Discontinuation (attach program discontinuation plan that includes transition of students and timetable for phasing out courses) |
| <input type="checkbox"/> Type of award | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Advisors | |
| <input type="checkbox"/> Articulation information | |

Show all changes on the attached page from the catalog.

Rationale for proposed changes or discontinuation:
 MTT-101 and CAD-105 are both courses dealing with reading blueprints. We discovered we were competing for the same students in two departments.

Financial/staffing/equipment/space implications:
 None

List departments that have been consulted regarding their use of this program.
 Industrial Tech., CAD/Drafting, and the Business and Industry office have been contacted.

Signatures:

| Reviewer | Print Name | Signature | Date |
|--------------------------------|---------------|-----------------------|----------|
| Initiator | Gary Schultz | <i>Gary Schultz</i> | 9/1/05 |
| Department Chair | Gary Schultz | <i>Gary Schultz</i> | 9/1/05 |
| Division Dean/Administrator | Granville Lee | <i>Granville Lee</i> | 9/6/05 |
| Vice President for Instruction | Roger Palay | <i>Roger M. Palay</i> | 11/12/05 |

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Please submit completed form to the Office of Curriculum and Assessment.

PROGRAM CHANGE FORM

Program Code:

~~APATEC~~

Program Name:

Automation Technology

Effective Term:

F '04

Directions:

1. Attach the current program listing from the WCC catalog and indicate any changes to be made.
2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet.
3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using a Course Syllabus Form, but should be submitted at the same time as the program change form.

Requested Changes:

Remove See Attached course(s)

Add _____ course(s)

Total credits: Current credits 71 After changes 62

Title (title was Robotic Technology)

Description

Advisors

Articulation information

Program admission requirements

Continuing eligibility requirements

Program outcomes

Other _____

Show all changes on the attached page from the catalog.

Rationale for proposed changes:

The name "Automation Technology" better represents what the "Robotics Technology" program currently teaches. It is also more recognized in industry and more marketable. These changes will also allow the student to specialize in any of six areas while going through the associate degree program. Each of the specialty tracks has a certificate program as a part of the Associate degree. The six specialty tracks are Manufacturing and Industrial Computing, Fluid Power, Numerical Control, Machine Tool, Welding, and Industrial Electronics.

Financial/staffing/equipment/space implications:

none

List departments that have been consulted regarding the use of this program.

Electrical, Industrial Technology, Welding

Signatures:

| Reviewer | Print Name | Signature | Date |
|--------------------------------|---------------|--------------------|---------|
| Program Change Initiator | Gary Schultz | <i>[Signature]</i> | 3/26/04 |
| Department Chair | Gary Schultz | <i>[Signature]</i> | 3/26/04 |
| Division Dean/Administrator | Granville Lee | <i>[Signature]</i> | 3/26/04 |
| Vice President for Instruction | Roger Palay | <i>[Signature]</i> | 4/6/04 |

RD 4.1.04

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Office of Curriculum & Articulation Services

Program Change Form 8-2003
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Office of Curriculum and Articulation Services

Industrial, Manufacturing, & Automation Technology

Automation Technology (APATEC) Associate in Applied Science Degree

Program Effective Term: Fall 2006

This program prepares students for entry-level positions as an automated equipment technician who assembles, installs, programs, troubleshoots, and maintains robotic and automated equipment. Students have a choice to follow any of six different specialty tracks which will prepare them for the various applications of automation. Each track features a variety of application level classes where the student performs lab-oriented practice for required skills. It is highly recommended that beginning students take at least one technical class during their first semester. See an advisor in the Industrial Technology department for assistance.

Continuing Eligibility Requirements:

Students must demonstrate basic computer literacy skills by successfully passing the Computer and Information Literacy Test. The test may be taken at any point during the program, but must be completed before graduating.

General Education Requirements

(18 credits)

| | | |
|-------------|-------------|-----|
| Writing | Elective(s) | 3-4 |
| Speech | Elective(s) | 3 |
| Math | Elective(s) | 3-4 |
| Nat. Sci. | Elective(s) | 3-4 |
| Soc. Sci. | Elective(s) | 3 |
| Arts/Human. | Elective(s) | 3 |

Core Courses

(28 credits)

| | | |
|---------|--------------------------|---|
| ELE 111 | Electrical Fundamentals | 4 |
| ELE 224 | Introduction to PLCs | 4 |
| FLP 111 | Fluid Power Fundamentals | 4 |
| ROB 121 | Robotics I | 4 |
| ROB 212 | Robotics II | 4 |
| ROB 222 | Robotics Simulation | 2 |
| ROB 223 | Robotics III | 2 |
| ROB 224 | Robotics IV | 4 |

**Minimum Concentration/Option Credits
Required for the Program:**

16

Students need to complete the required courses in one of the following options.

Minimum Credits Required for the Program

62

Notes:

Students must see an advisor to assist in scheduling and planning for each semester as some classes have limited offering.

Automation Technology Options

Fluid Power Specialty (16 Credits)

| | | |
|---------|----------------------------------|---|
| FLP 214 | Hydraulic Circuits and Controls | 4 |
| FLP 225 | Fluid Power Motion Control | 3 |
| FLP 226 | Pneumatics | 3 |
| MTT 111 | Machine Shop Theory and Practice | 4 |
| WAF 105 | Welding for Art and Engineering | 2 |

Industrial Electronics Specialty (16 Credits)

| | | |
|---------|----------------------------------|---|
| ELE 211 | Basic Electronics | 4 |
| ELE 254 | PLC Applications | 5 |
| FLP 226 | Pneumatics | 3 |
| MTT 111 | Machine Shop Theory and Practice | 4 |

Machine Tool Technology Specialty (18 Credits)

| | | |
|---------|--|---|
| CAD 105 | Blueprint Reading and Analysis | 3 |
| MTT 103 | Introduction to Materials | 3 |
| MTT 111 | Machine Shop Theory and Practice | 4 |
| MTT 203 | Advanced Machine Tool Operations | 4 |
| NCT 112 | Introduction to Computerized Machining (CNC) | 4 |

Manufacturing/Industrial Computing Specialty (20 Credits)

| | | |
|---------|--|---|
| CAD 105 | Blueprint Reading and Analysis | 3 |
| FLP 214 | Hydraulic Circuits and Controls | 4 |
| FLP 226 | Pneumatics | 3 |
| MTT 111 | Machine Shop Theory and Practice | 4 |
| NCT 112 | Introduction to Computerized Machining (CNC) | 4 |
| WAF 105 | Welding for Art and Engineering | 2 |

Numerical Control Specialty (23 Credits)

| | | |
|---------|--|---|
| CAD 105 | Blueprint Reading and Analysis | 3 |
| MTT 111 | Machine Shop Theory and Practice | 4 |
| NCT 112 | Introduction to Computerized Machining (CNC) | 4 |
| NCT 121 | Manual Programming and NC Tool Operation | 4 |
| NCT 221 | Advanced Manual Programming and NC Tool Operator | 4 |
| NCT 249 | CAD/CAM CNC Programming | 4 |

Welding Specialty (21 Credits)

| | | |
|---------|--|---|
| WAF 105 | Welding for Art and Engineering | 2 |
| WAF 106 | Blueprint Reading for Welders | 3 |
| WAF 111 | Welding I Oxy-Acetylene | 4 |
| WAF 112 | Welding II Basic ARC | 4 |
| WAF 123 | Welding III Advanced Oxy-Acetylene (OAW) | 4 |
| WAF 124 | Welding IV Advanced ARC (SMAW) | 4 |

**WASHTENAW COMMUNITY COLLEGE
PROGRAM CHANGE REQUEST**

(1) Program Title: ROBOTIC TECHNOLOGY Program Number: ROB Effective Term: F '93

(2) Change Information:

| Current Program Course Requirements: | | | Proposed Program Course Requirements | | |
|---|--------------|--------------|---|-------------------|--------------|
| Course Number | Course Title | Credit Hours | Course Number | Course Title | Credit Hours |
| ELE 123A | | 5 | | <i>changes to</i> | 4 |
| ELE 123B | | 5 | | | 4 |
| ELE 137 | | 3 | | | 4 |
| Current Total Credits: | | 68-69 | Proposed Total Credits: | | 67-68 |
| Non-Course Program Requirements: | | | Non-Course Program Requirements: | | |

(3) Rationale for Proposed Changes:

(4) Financial/Staffing/Resource Implications of Change

(5) Has this program change been reviewed by all affected instructional departments? yes no

| Signatures | Comments | Signature | Date |
|---|----------|--------------------|--------|
| Program Change Initiator | | | |
| Department Chair(s) or Area Director(s) | | <i>[Signature]</i> | 5/4/93 |
| Dean(s) | | <i>[Signature]</i> | 1/8/93 |
| VP for Instruction/Student Services | | <i>[Signature]</i> | 5/6 |

**Robotic Technology
Associate in Technical Studies
Degree Program: Code ROB**

Advisors: George Agin and Gary Schultz

This program trains automated equipment technicians in robotics to assemble, install and maintain electrical and electronic, electro-mechanical, pneumatic and hydraulic components on computer-assisted multi-purpose machinery and equipment using hand tools, electronic testing instruments, diagrams and prints. Students who complete the program will be prepared to enter the field with job entry skills. A prerequisite for entry into this program is a math level ability of MTH 151 or higher.

**Robotic Technology
Associate in Technical Studies
Degree Program: Code ROB**

| Course Number | Course Title | Credit Hours |
|--------------------------|--|-------------------------|
| First Semester | | |
| ELE 123A | Fundamentals of Electricity (A) | 4 |
| FLP 111 | Fluid Power Fundamentals..... | 4 |
| IND 100 | Technical Drawing | 4 |
| INM 111 | CIM Fundamentals or | |
| INM 121 | Robotics I | <u>3-4</u> |
| | | 15-16 |
| Second Semester | | |
| ELE 123B | Fundamentals of Electricity (B)..... | 4 |
| FLP 213 | Hydraulic Controls | 3 |
| FLP 214 | Basic Hydraulic Circuits | 3 |
| FLP 226 | Pneumatics | 3 |
| SCI 100 | Intro to Natural Sciences..... | 1 |
| Elective | Restricted Humanities Elective * | <u>1-3</u> |
| | | 15-17 |
| Spring Semester | | |
| ELE 137 | Switching Logic..... | 4 |
| INM 212 | Robotics II | <u>4</u> |
| | | 8 |
| Third Semester | | |
| ELE 224 | Introduction to PLC's | 4 |
| IND 107 | Mechanisms..... | 4 |
| INM 223 | Robotics III | 4 |
| PSY 150 | Industrial Psychology | <u>3</u> |
| | | 15 |
| Fourth Semester | | |
| ELE 139 | Microprocessors | 4 |
| ENG 100 | Communication Skills | 4 |
| INM 224 | Robotics IV | 4 |
| PLS 108 | Government and Society..... | <u>3</u> |
| | | 15 |

Total credit hours for program: 68-71

* Choose from list of Humanities courses that meet elements 13 and 14.