"Mechatronics is really all about design of any physical system, where you integrate controls, electronics, and computers from the very start of the design process."

Kevin C. Craig, PhD.
Professor, Marquette University

Career Services

MACOMB COMMUNITY COLLEGE

FALL 2009 VOLUME 15 NUMBER 3

Mechatronics: It's All About Synergy

What is Mechatronics?

Mechatronics has been around for many years but has recently been brought to the forefront of the engineering world. Mechatronics is the combination of mechanics, electronics and computer technologies and is used in the development and design of high tech, efficient machines and products, and also in automated processes for manufacturing and industrial tasks. Mechatronics Engineers and Technicians are involved in robotics, automated manufacturing and packaging, transportation, construction, vehicle systems, communication systems, heating and cooling systems design, medical monitors manufacturing, food production processes, renewable energy fields, and the film industry, to name just a few.

One emerging trend is biomechatronics which incorporates biology and mechatronics to develop things like intelligent prostheses (artificial limbs with a "brain") that allow interaction between the human body and medical aids for information exchange. These devices provide a more lifelike feel and action for the patient. Heart pacemakers/defibrillators and cochlear implant hearing aids are two examples of biomechatronic devices.

Another emerging trend is micromechatronics, an area that focus on products/systems in the size range of one micro meter to one millimeter. Nano and Meso scale systems are even smaller! Automobile sensors for airbag deployment, and inkjet printer heads are two examples of micromechatronics.

Career Services

LOCATIONS: Center Campus: G-102
South Campus: S-147
HOURS: Monday and Tuesday • 8am – 7pm
Wednesday – Friday • 8am – 4:30pm
PHONE: 586.445.7321
EMAIL: careerservices@macomb.edu
WEB: www.macomb.edu

Macomb Community College

Mechatronics Engineer

Sources: www.careercruising.com • www.acinet.org • http://diplomaguide.com

Do you enjoy engineering activities? Do you have good communication skills and like to work as part of a team? Are you able to think creatively and solve problems? Are you interested in mechanical equipment, along with physics and math? If so, then a future in Mechatronics Engineering may be right for you.

What Do Mechatronics Engineers Do?

Mechatronics is the integration of mechanical, electrical, and computer technologies. Mechatronic Engineers are responsible for researching, planning, developing, designing and improving systems or products that combine the three areas of Mechatronics. They may modify existing systems, perform testing, and troubleshoot problems. Engineers may produce, compile, and review technical specifications, procedures, and manuals. They may also be responsible for maintaining or publishing reports.

Continued on page 2

Mechatronics Engineer

Continued from page 1

The devices they work on can help to make more efficient processes used to manufacture products, or to handle tasks that are too dangerous for humans to do. Mechatronics Engineers usually work under pressure and tight deadlines. They can work in many industries including automotive, manufacturing, gas and oil, mining, transport, defense, robotics, aerospace and aviation, and have a wide variety of skills that will allow them to fill traditional engineering positions.

What Type Of Education Is Required?

Mechatronic Engineers usually have at least a bachelor's degree in mechatronic engineering, although some employers will hire those with degrees in electrical, computer, or mechanical engineering. Most employers prefer at least two years of experience in the field.

How Much Do They Make?

Exact figures for the mechatronic field are not yet available since it is so new. However, in 2007, electrical engineers had a national salary range of $51,200 – $120,700 and mechanical engineers made between $46,600 and $108,700. The figures for mechatronic engineers should be somewhat comparable.

What's The Outlook?

Again, the exact outlook for mechatronic engineering is not available, but the employment outlook for engineers, in general, is good with about an 11% increase in the next ten years.

Where Can I Get More Information?

Society of Manufacturing Engineers
www.sme.org

National Association of Manufacturers
www.nam.org

For Macomb College Automated Systems Technology program information contact the Engineering and Advanced Technology Office at 586.445.7435

For Additional Information on Mechatronics Please Visit the Following Websites:

Job Postings:
http://designengineerjobzone.com

News, Information, and Resources:
www.mechatronics-mcc.com

News, Videos, and Job Postings
http://www.projectmechatronics.com

News, Blogs, Videos and Webcasts:
http://mechatronic-design.com
http://www.designnews.com
http://www.mechatronicszone.com/

Mechatronics Technician

Sources: www.careercruising.com • www.acinet.org • www.forecasting.tstc.edu

Do you understand and appreciate complex systems? Are you creative and able to think abstractly? Do you have good oral and written communication skills? Are you able to work collaboratively to solve problems? Do you have a strong work ethic? If so, maybe you should consider a career as a Mechatronics Technician.

What Do Mechatronics Technicians Do?

Mechatronics Technicians are responsible for supporting the design, installation, maintenance, repair, calibration and troubleshooting of equipment. They may perform routine and preventative maintenance, monitor the performance of equipment, and diagnose and correct problems according to procedures. If the technicians work in manufacturing they may develop tests that ensure products will work properly after they are made. They may also test machinery and equipment prior to use. Some techs work as customer service representatives and give technical support while others work as sales representatives selling products.

What Type Of Education Is Required?

For mechatronics technicians, the most common level of education is an associate degree, usually in automated systems, mechatronics technology, or mechanical or electrical engineering technology.

What Do They Make?

According to America's Career InfoNet, in 2007 electro-mechanical technicians earned an average salary between $30,800 and $70,400 nationally. In Michigan the salaries ranged from $35,800 to $80,100 in the same year.

What's The Outlook?

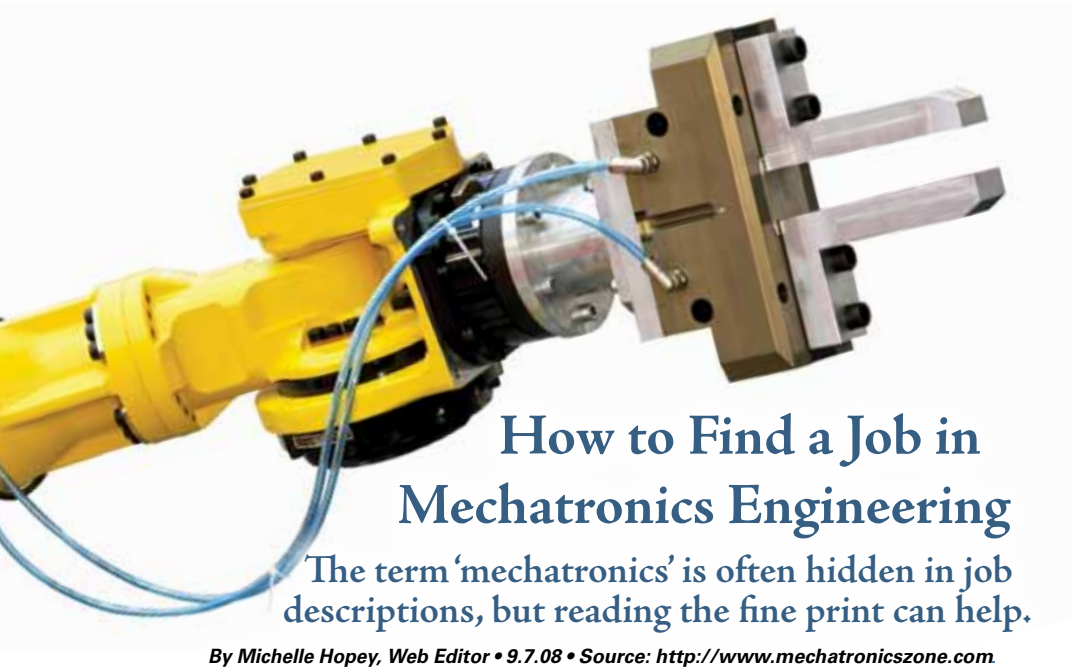
The growth rate for electro-mechanical, mechanical, and electrical engineering technicians is good, according to the US Department of Labor, Bureau of Labor Statistics, with an average growth rate of about 8% through the year 2016.

Where Can I Get More Information?

American Society of Certified Engineering Technicians (ASCET)
www.ascet.org

National Institute for Certification in Engineering Technologies (NICET)
www.nicet.org

For Macomb College Automated Systems Technology program information contact the Engineering and Advanced Technology Office at 586.445.7435



How to Find a Job in Mechatronics Engineering

The term 'mechatronics' is often hidden in job descriptions, but reading the fine print can help.

By Michelle Hopey, Web Editor • 9.7.08 • Source: http://www.mechatronicszone.com

So, you're looking for a job in mechatronics engineering or maybe you're just here because you're considering furthering your engineering career and want to see what's out there — what kind of job you could possibly get.

Rest assured, you've come to the right place. We scale and scroll for the best mechatronic jobs week in and week out, pretty much so you don't have to. Along the way we've picked up good tips we want to share with you, to make your job hunt in mechatronics that much easier.

Industry leaders say mechatronic jobs are in demand — and they are — but rarely does the word, "mechatronics" find its way into the job title. So, how do you go about finding such a job if it's not even in the title?

First, you've got to know what types of jobs are mechatronic. From our experience, many mechatronic jobs go under the title of project engineer, systems engineer, mechanical design engineer, controls engineer, electro-mechanical engineer, mechanical modeling and simulation engineer.

Second, you've got to know what industries utilize mechatronics. The big ones tend to be automotive, medical and manufacturing. But the best thing about mechatronics is that any industry that involves technology — whether it's electrical, mechanical and computer software — there is likely to be a mechatronic job.

Third, as always, read the fine print. If you read the job description closely, the phrases: "must have knowledge of mechatronics" and "experience in mechatronics is a plus," are there, but hidden in the text. Whenever you see electro-mechanical engineering, it's pretty much a sure bet they are seeking someone with mechatronics engineering in their background, so make sure you read on when you see this one.

Fourth, look for certain software. If you've spotted a job that requires MATLAB, LabVIEW, Simulink, SolidWorks (among many others) or some type of code or programming language like C++, it's likely you've stumbled upon a job that is mechatronic in nature. Nearly all mechatronics engineering positions require knowledge of such programs. If you've got these covered, know that you've got a leg up. If not, you might want to hit the books.

Fifth, finally, it's helpful to know that mechatronics can be an area of expertise for those in the technical field and a job for those who are engineers. So far, we can tell that both a mechatronics technician and a mechatronics engineer require a lot of the same skills and programs. The difference, however, is the level of experience and education.

A technician's job, which is the new blue collar wave of the future, (and it's not so blue collar anymore) is to make sure all components of a mechatronic system — electrical, mechanical and embedded software are working properly and know how to fix them. Many of these jobs are in industrial factories and deal with a lot of robotics.

A practicing mechatronics engineer who is designing large scale products needs to have the same skills, but they tend to have a bachelors, masters or Ph.D. in electro-mechanical, systems or mechatronics engineering. They also tend to have spent a considerable amount of time in the field. In many cases mechatronic engineers have much more mathematical expertise and they are able to design the systems and program systems using intricate algorithms.

Mechatronics Job Search

Mechatronics is a relatively new and emerging field, and while there are plenty of jobs out there, finding them can be tricky.

Here are some tips for job searching in the Mechatronics field:

- Use SEARCH ENGINES – go to any search engine (Google, Yahoo, etc) and type in "Mechatronics Jobs" to find thousand of sites with job postings.
- Use KEYWORDS when searching in Job Databases (Careerbuilder, MONSTER, MacombCareerLink, etc). Try some of the following: mechatronic, mechatronics, engineering, engineering tech, engineering technician (any of these to go with engineer/ engineer tech - electro-mechanical, electromechanical, electrical, electronic, mechanical, computer), robotics, automated system(s), tester, program names (VXWorks, Linux, Pro Engineer, MATLAB, LabView, Simulink, SolidWorks, etc), hydraulics, pneumatics, control. The list goes on, and the more job postings and descriptions you read, the more KEYWORDS you will find to help you with your job search.
- Check out Engineering or Engineering Technicians Organization Websites. A few examples would be:

IPC: Association Connecting Electronics Industries
www.ipc.org

American Society of Mechanical Engineers (ASME)
www.asme.org

Come Learn More About Career Services at Macomb!

Are you new to Macomb this semester? Having trouble finding a job and want to find out what help is available? Do you need to update your resume for the changing job market? Then come to one of Career Services Information Sessions to learn about the resources available to you!

To register for workshops, contact Career Services at: 586.445.7321 or careerservices@macomb.edu

Center Campus

09/14/09	Monday	5:30pm–6:30pm	G-102
10/21/09	Wednesday	11:00am–12pm	G-102
11/16/09	Monday	5:30pm–6:30pm	G-102
12/16/09	Wednesday	11:00am–12pm	G-102
01/25/10	Monday	5:30pm–6:30pm	G-102
02/17/10	Wednesday	11:00am–12pm	G-102

South Campus

09/17/09	Thursday	11:00am–12pm	S-147
10/20/09	Tuesday	5:30pm–6:30pm	S-147
11/19/09	Thursday	11:00am–12pm	S-147
12/15/09	Tuesday	5:30pm–6:30pm	S-147
01/28/109	Thursday	11:00am–12pm	S-147
02/16/10	Tuesday	5:30pm–6:30pm	S-147

AUTOMATED SYSTEMS TECHNOLOGY - MECHATRONICS

South Campus

The Automated Systems Technology - Mechatronics program is a field of study that focuses on the integration of mechanical, electrical (electronics), fluid power (hydraulics or pneumatics), and computer technologies to control machine movements. The new term for this is "Mechatronics." The students' studies begin with courses in mechanics, sensors, basic electronics, pneumatics, control logic and robot programming and control. The student goes on to learn how to program a specific Programmable Logic Controller (PLC), and then writes and troubleshoots programs to control seven machines. The seven tasks – Pick and Place Feeding, Gauging, Indexing, Sorting and Queuing, Servo Robot Assembly, Torquing, and Parts Storage – are integrated into an assembly line that produces a real product.

The courses in this program make extensive use of computers for class learning, PLC programming, machine control, troubleshooting and machine simulation.

The program provides the knowledge and skills for entry-level positions in automation-related jobs. Examples would be robot installation and maintenance, automation equipment installation, troubleshooting and maintenance, and PLC programming. Examples of industries using these skills are pharmaceuticals, food processing, beverage bottling, automated warehousing, oil production, packaging, electronics assembly, medical equipment production, and the military.

If you have questions about the program, contact the program advisors or call the Engineering and Advanced Technology Office at 586.445.7435.

Program advisors from Electronic Technology and Automated Systems Technology – Mechatronics are:

Professor Arthur Knapp
586.445.7209, office T-126-4
knappa@macomb.edu

Professor Anthony Ventura
586.445.7326, office T-126-4
venturat@macomb.edu

Program advisors from Applied Technology for AT courses are:

Professor Alan Manore
586.445.7544, office T-126-1
manore@macomb.edu

Professor John Wieczerza
586.445.7248, office T-126-3
wieczerzaj@macomb.edu

Articulation agreements allow students to get Macomb credit for related high school courses. Contact your high school teacher or counselor for details or call the Engineering and Advanced Technology Office at 586.445.7435.

Wordsearch:
Mechatronics

AUTOMATED-SYSTEMS
CONTROLS
ELECTRICAL
ENGINEERING
HYDRAULIC
MECHANICAL
MECHATRONICS
PNEUMATIC
ROBOTICS
SOFTWARE
TECHNICIAN
TECHNOLOGY

W	P	D	P	L	S	S	K	F	N	B	Z	S	L	Y	R	E	I	U	G
D	O	D	I	S	N	H	O	Y	N	E	J	T	J	I	O	N	C	H	W
L	C	K	J	U	R	C	M	F	E	V	L	K	Y	Y	B	G	K	X	J
D	M	V	H	K	W	K	S	E	T	Y	Y	F	J	Y	O	I	K	C	K
G	M	A	H	U	Q	O	B	C	C	W	T	H	E	S	T	N	I	Y	E
B	P	O	O	N	O	Z	I	M	E	H	A	I	R	Z	I	E	N	E	L
E	S	Q	H	J	J	T	I	L	Q	F	A	R	J	B	C	E	M	Y	N
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U	A	E	O	R	L	A	C	I	N	A	H	C	E	M	N	G	G	J	I
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L	Y	E	N	S	G	K	H	W	C	I	R	R	X	T	F	H	G	H	E
Z	I	G	Y	F	L	A	U	C	Q	N	S	A	R	G	B	B	J	K	T
K	A	Q	E	L	B	M	G	N	E	E	J	O	U	L	X	X	Q	D	R
G	R	Z	I	Z	T	Z	B	E	L	T	L	P	G	K	I	M	H	N	L
H	Y	D	R	A	U	L	I	C	V	S	M	K	X	M	M	S	B	X	Y
N	L	R	F	N	K	A	L	Z	U	Y	Z	R	T	B	Y	F	D	D	Z

Career Services offers:

- Online career research
- Career books, magazines, and multimedia resources
- College information and catalogs
- Annual job fair
- Current job listings posted daily by tri-county employers on the MacombCareerLink job database
- Resume and cover letter assistance
- Interview preparation

Visit us on the web! www.macomb.edu
South Campus, S-147 • Center Campus, G-102
Phone: **586.445.7321** • Email: **careerservices@macomb.edu**

Counseling & Academic Advising Services offers:

- Career testing and exploration
- Career decision making assistance
- Academic advising
- Transfer information
- Resource referral
- College success consultations

South Campus, H-316 • 586.445.7211
Center Campus, G-132 • 586.286.2228
www.macomb.edu

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The Fall 2009 edition of the Career Services News was compiled and edited by Liz Gawel and Karlene Kilburn.