

Mechanical Engineering at Guelph

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Mechanical Engineering program details

- Co-op and regular programs offered
- Design is a cornerstone of our programs and is included in every year of all of our programs
- 1st year common to all programs and includes basic sciences and math courses along with an introduction to engineering design
- 2nd year mainly introduces basic engineering courses including materials, mechanics, fluids, etc.
- 3rd year expands on the 2nd year engineering courses and specific program stream courses begin
- 4th year is almost entirely program stream specific, capstone design courses and a major design project.



- Manufacturing
- Mechatronics
- Energy
- Biomechanics and Ergonomics
- “Build your own”.. General stream

Manufacturing

Ontario and in particular the “Golden Horseshoe Region” is home to a great concentration of manufacturing industries.

This program has been created to provide the student with the basic skills necessary to succeed as a “mechanical engineer” in a typical manufacturing environment.

Integrated Manufacturing Systems
Computer Aided Design and Manufacturing
Robotic Systems
Manufacturing Systems Design

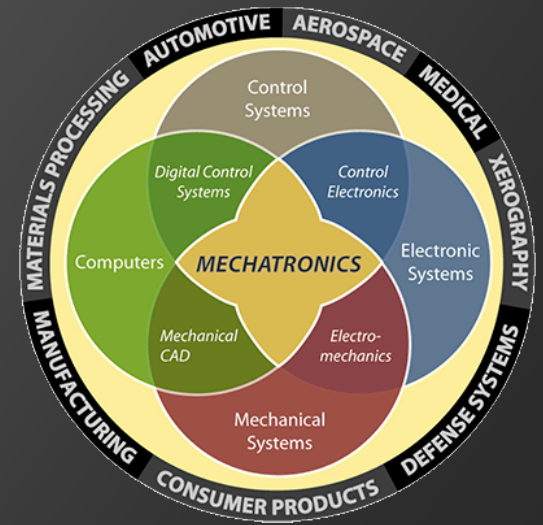


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Mechatronics

Mechatronics involves the integration of mechanical engineering with electronics, robotics and computers.



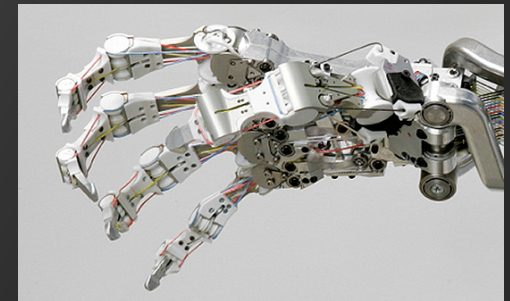
Introduction to Mechatronic System Design

Microcomputer Interfacing

Robotic Systems

Electromechanical Devices

Advanced Mechatronic Systems Design



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Energy



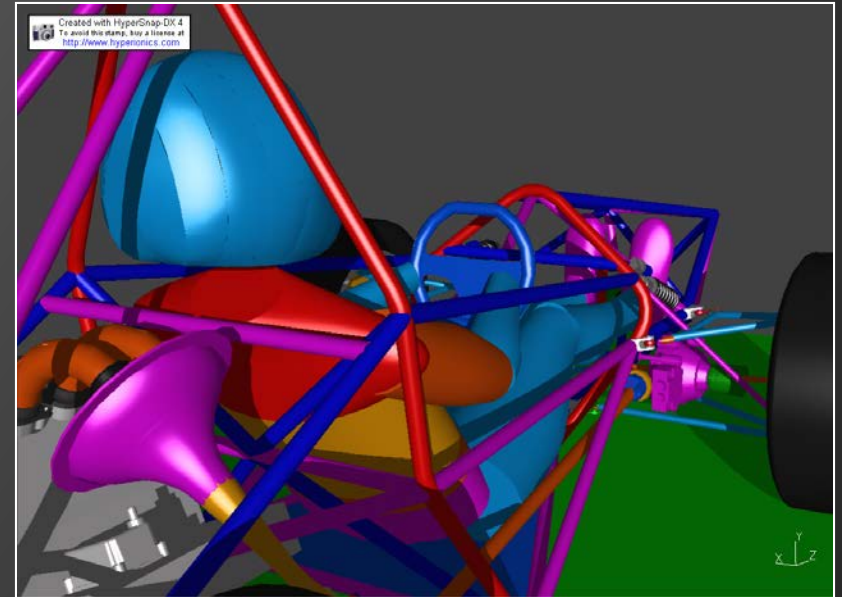
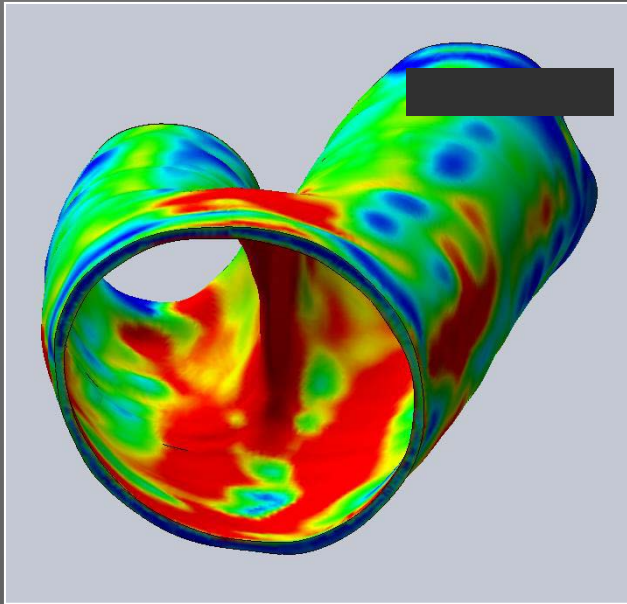
Energy Conversion
Energy Management and Utilization
Energy Resources and Technology
Sustainable Energy System Design



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Biomechanics



Biomaterials
Engineering Biomechanics
Biomechanical Design

“Build your own”.. General stream

Don't see a program that suits you... then build your own program by choosing the courses that interest you most.

This stream will appeal to many students who want to broaden their engineering perspective and expertise.

Course requirements for this stream include:

- the core courses taken by all the engineering students**
- Mechanical Engineering compulsory courses**
- a number of engineering, science, design and complimentary electives that are necessary for you to reach the totals required for accreditation**

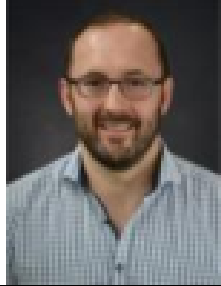
Mechanical Curriculum Content

	Number of Courses	%	
Science	10	22%	Math, Phys, Chem, etc
General Engineering	10	22%	Des, Sys, etc
Non-Engineering	6	13%	Compl. Studies, hist
Core Mechanical	11	24%	Thermo, fluid, heat, mech, ken
Technical Electives	8	18%	Both ME and non ME
Total	45	100%	

Faculty Major Areas of Research

Material/Solid Mechanics	Manufacturing	Thermofluid/Energy	Mechatronics
A. Bardelcik	F. Defersha	W. Ahmed	A. Gadsden
R. Clemmer	I. Deiab	A. Dutta	M. Biglarbegian
A. Elsayed	S. Moussa	M. Elsharqawy	
M. Hassan		S. Mahmud	
H. Simha		S. Tasnim	
M. Wells			

Materials/Solid Mechanics



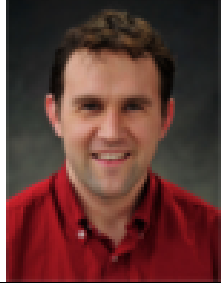
Alexander Bardelcik, Ph.D., EIT, Assistant Professor

Research:

Micro-Mechanics; Novel metal forming processes; Fracture characterization of automotive sheet metal alloys; Advanced Finite Element modeling;

Teaching:

Kinematics and Dynamics; Finite Element Analysis; Micro-Mechanics of Multi-Phase Materials; Hot Stamping;



Ryan Clemmer, Ph.D., P.Eng., Associate Professor

Research:

Metal-ceramic composites; Processing and sintering of porous powder compacts; Solid oxide fuel cell technology; Development of new materials;

Teaching:

Engineering & Design I; Materials Science; Fluid Mechanics; Engineering & Design III; Biomaterials; Fuel Cell Technology;



Abdallah Elsayed, Ph.D., EIT, Assistant Professor

Research:

Casting & solidification of light alloys; Characterization of metals & alloys; Molten metal treatment & processing; Defect and inclusion analysis of light alloys

Teaching:

Engineering Mechanics II; Materials Science; Solidification and Processing of Metals and Alloys;

Materials/Solid Mechanics



Marwan Hassan, Ph.D., P.Eng., Professor

Research:

Finite Element Analysis; Design; Fluid-structure Interaction; Material Deformation and modelling; Wear;

Teaching:

Mechanics; Machine Design; Finite Element Analysis; Vibration; Flow Induced Vibration; Advanced Dynamics;



Hari Simha, Ph.D., P.Eng., Assistant Professor

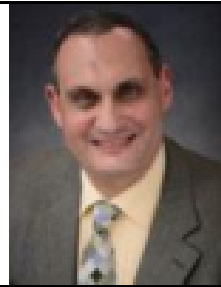
Research:

Inverse methods for mechanics; Finite elements for fracture and discontinuous fields; Structural integrity; Damage and deformation of engineering alloys;

Teaching:

Machine Design; Interdisciplinary Mechanical Engineering Design; Advanced Solid Mechanics

Manufacturing



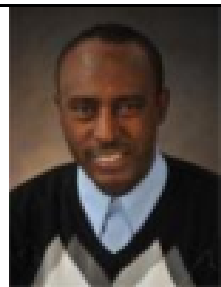
Ibrahim Deiab, Ph.D., P.Eng., Professor

Research:

Metal cutting, modeling of Machining processes; fixture dynamics, machinability of Difficult-to-Cut materials; Sustainable machining, CAD/CAM/CAE;

Teaching:

Introduction to Manufacturing Processes; Manufacturing System Design; Interdisciplinary Mechanical Engineering Design; Advanced Manufacturing;



Fantahun Defersha, Ph.D., P.Eng., Associate Professor

Research:

Manufacturing system analysis; flexible manufacturing systems; reconfigurable machine tools; vehicle routing; supply chain modeling and simulations;

Teaching:

Mechanics; Kinematics and Dynamics; CAD/CAM; Integrated Manufacturing Systems; Optimization in Engineering; Production Planning and Control;



Soha Moussa, Ph.D., P.Eng., Associate Professor

Research:

Flexible and cellular manufacturing systems; Part sequencing and scheduling; Production and Inventory Control; Supply Chain Management;

Teaching:

Engineering Analysis; Engineering Economics; Optimization; Quality Control;

Mechatronics



Andrew Gadsden, Ph.D., P.Eng., Associate Professor

Research:

Intelligent systems; Estimation theory; Robust control strategies; Fault detection and diagnosis; Unmanned systems; Machine learning;

Teaching:

Engineering and Design II; Advanced Mechatronic Systems; Advanced Estimation Theory; Electromechanical Devices;



Mohammad Biglarbegian, Ph.D., P.Eng., Associate Professor

Research:

Design, Modeling, and Control of Mechatronics Systems; Intelligent and Nonlinear Control; Robotics; Multi-Agent Systems; Vehicle Dynamics;

Teaching:

Electromechanical Devices; Introduction to Mechatronics Systems Design; Advanced Mechatronics; Control Systems;

Thermofluid/Energy



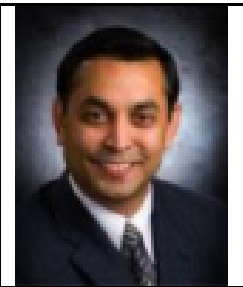
Wael Ahmed, Ph.D., P.Eng., Professor

Research:

Multiphase Flow; Modeling & Experimentation of Thermo-fluid Systems; Sustainable Energy Systems; Turbomachines;

Teaching:

Thermodynamics; Energy Management and Utilization; Multiphase Flow; Engineering Measurement; Fluid Power Control Systems;



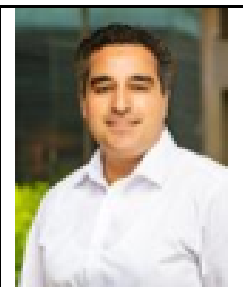
Animesh Dutta, Ph.D., P.Eng., Professor

Research:

Thermochemical conversion; Renewable and cleaner energy technologies; Supercritical water gasification for energy and fuel; Life cycle analysis

Teaching:

Energy Conversion; Sustainable Energy System Design; Biomass Conversion and Biofuel; Thermodynamics;



Mostafa Elsharqawy, Ph.D., P.Eng., Assistant Professor

Research:

Geothermal Energy; Salinity Gradient Energy; Solar Energy; Porous Media; Heat Exchangers; Waste Energy Recovery, Desalination and Water Purification

Teaching:

Mechanics; Machine Design; Finite Element Analysis; Thermodynamics; Interdisciplinary Mechanical Engineering Design; Heat Exchanger Design;

Thermofluid/Energy



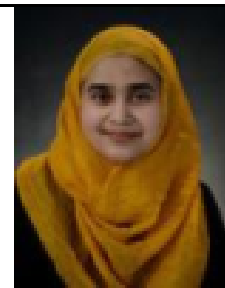
Shohel Mahmud, Ph.D., P.Eng., Professor

Research:

Direct Energy Conversion; Refrigeration and Air-Conditioning; Thermal Energy Storage; Advanced Electromechanical Device;

Teaching:

Heat and Mass Transfer; Applied Fluids and Thermodynamics; Engineering and Design II; Advanced Heat Transfer; Advanced Electromechanical Devices;



Syeda Tasnim, Ph.D., EIT, Assistant Professor

Research:

Clean energy conversion using thermoacoustic devices; Energy and sustainable building; Energy storage and phase change process; Porous media modelling;

Teaching:

Fluid Mechanics; Mechanics; Thermodynamics; Engineering Analysis; Energy Management and Utilization; Computational Fluid Dynamics; Vibrations;

Program Counsellors



- Kim Thompson, P.Eng.
- Room 1410



- Katherine McLean, P.Eng.
- Room 1412



- Andrew Isaak, P.Eng.
- Room 1408

Technical Staff



- **Ken Graham**
- Welder/Machinist
- Room 1021



- **David Wright**
- Research Machinist
- Room 1019

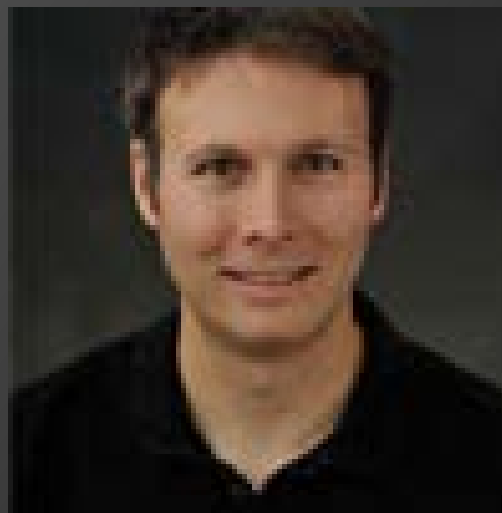


- **Barry Verspagen**
- ME Technologist
- Room 1138

Technical Staff



- **Phil Watson**
- Lab Manager
- Room 1104



- **Mike Speagle**
- Sustainable Energy Technician
- Room 1102