THE UNIVERSITY OF VICTORIA
DEPARTMENT OF MECHANICAL ENGINEERING
Course Outline
MECH 450A – Additive Manufacturing and Machining of Advanced Materials
Summer Term 2016

Lecturers: Martin Jun and Keivan Ahmadi
Room: EOW515 and EOW 539
Tel: 853-3179 and 721-8694
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Lecture Hours:	Monday:	2:30 ~ 5:30
Office Hours:	Thursday:	10:00-11:00 am plus open door policy

TA: Justin Napier

Course Website: **http://coursespaces.uvic.ca**

Course Textbook:

Course Description:
This course covers the importance of additive manufacturing and its role in product prototyping, development, and innovation. Different process technologies for 3D printing and additive manufacturing as well as additive manufacturing devices, systems, capabilities, materials, and applications will be covered. Limitation and capabilities of additive manufacturing will be compared to conventional subtractive manufacturing technologies, and hybrid manufacturing technologies combining additive and subtractive manufacturing technologies will be discussed. Also, the fundamentals of machining advanced composite materials will be introduced. Various traditional and non-traditional machining processes that are commonly used in machining of composite materials will be covered. Applications of additive manufacturing and machining of advanced materials in a wide range of applications including biomedical, aerospace, automotive, consumer products, and creative artistry will be introduced.

Course Learning Outcomes – At the end of MECH 450A, students should be able to:
- Understand different technologies for additive manufacturing
- Understand and identify limitations and capabilities of each additive manufacturing technology
- Construct 3D solid models for additive manufacturing
- Demonstrate printing of 3D parts using a 3D printer
- Assess quality of additively manufactured 3D parts
- Delineate various material removal processes that are used in manufacturing processes of composite materials
- Identify the thermo-mechanical behaviour of various composite materials (polymer, metal and ceramic matrix) during material removal processes
- Describe the various methods of modeling cutting forces and machining-induced damages in composite machining
- Use the mathematical models of Carbon Fiber Reinforced Polymer (CFRP) machining processes to design and perform an optimized machining process.

Course Laboratory Project:

Evaluation Method:

Exam #1	30%
Exam #2	30%
Project/Presentation	40%
Total:	**100%**

Important Notes: In order to pass the course, completion of the project and presentation and two exams are required. Please read and refresh your knowledge about the pertinent rules and regulations of the University Calendar, the Faculty of Engineering (Standards for Professional Behaviour) and the Department of Mechanical Engineering (Course Policy, and Laboratory and Machining Safety Policy).