

Robotics, Mechatronics & Digital Fabrication (RMD) Academy

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RMD Academy



RMD Academy



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Rationale



- The proposal for this STEAM academy (Science, Technology, Engineering, Art, Mathematics) will provide learning opportunities which utilize cutting edge technology, collaboration, problem solving using math, science, and engineering principles.
- We hope to achieve this through a working partnership with Zen Maker Lab which has two locations in the Lower Lonsdale area.

The real problem is that our "educational system continues to push students through career services offices around the country toward the same pathways followed by their parents, rather than encouraging students to map out new pathways that correspond to current realities...."

Yong Zhao. *World Class Learners. Educating Creative and Entrepreneurial Students.*

Robotics Academy Facts



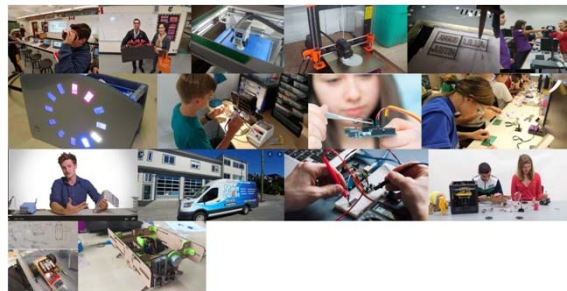
- Open to Grades 10-12, both male and female students regardless of experience
- The Robotics, Mechatronics, Digital Fabrication Academy will be hosted at a North Vancouver Secondary School and/or Zen Maker Lab depending on school facility availability
- Students enrolled in the Robotics academy will earn Technology Education credit
- Students will also have optional opportunities to earn Career Education Work Experience credit through placements related to robotics and mechatronics

Zen Maker Lab



- Zen Maker Lab runs applied science, technology, engineering, arts integration and math after school programs at elementary schools across the North Shore and the Lower Mainland

<https://zenmakerlab.com/>



Robotics Academy Goals



- Create a student cohort of up to 30 students for the 2021/22 academic year
- Identify and improve pathways for students from secondary school to post-secondary and/or employment in the technology/industrial sector in North Vancouver and the Lower Mainland
- Encourage program diversity, including females, Indigenous learners, visible minorities and diverse learners
- Liaise with engineering professionals through partnerships with Zen Maker Lab and its existing partners, including Capilano University, BCIT's Mechatronics program, UBC's engineering programs, SFU's engineering programs, etc.
- Explore collaboration opportunities with the School District's Digital Media Academy

Demonstrating a Need



- Over the past ten years, interest in robotics in BC has grown from a handful of programs to over 140 teams competing throughout the province
- Teams from across the Lower Mainland and Vancouver Island have competed at regional and international levels
- There are few opportunities for students to be involved in robotics in North Vancouver schools
- Demand for spaces in the Carson Graham extracurricular Robotics club, which runs after school, has exceeded capacity

Academy Delivery Model



- Afternoon block (Offered at a NVSD Secondary site and/or Zen Maker Lab)
- Optional Opportunities:
 - Career Education Work Experience (WEX) placements and credit
 - Weekend Competitions and Provincial Finals (Various locations throughout Lower Mainland)
 - World and National Competitions

Ethos of the NVSD Robotics Academy



- A safe and supportive environment in which every student can achieve their best while challenging themselves and supporting others
- An inclusive model in which students of all backgrounds and abilities can be successful and feel as part of a team
- Focus on STEAM using design thinking principles, acquisition of skills, and application of relevant and current technologies
- Curriculum that encourages the use of a range of approaches to support student learning in the manner best suited to diverse abilities
- Integration of Curricular Competencies providing a consistent and continuous focus for both students and teachers on the “doing” aspect of the curriculum, while encouraging student metacognition through reflection and performance

Transferable Career Skills



Coding/Programming

The following programming languages will be taught:

- RobotC
- C++
- Python
- Java
- LabView
- Modkit Block programming
- Visual Basic

Design

Design using the following computer design programs:

- AutoCAD
- FUSION 360
- Eagle
- Blender
- Sketchup

Transferable Career Skills



Fabrication

- 3D Printing and modelling
- Hand tool skills
- Machining
- Welding
- Laser Cutting
- Safe Operation and workshop safety

Leadership

- Effective Communication
- Conflict resolution
- Goal setting
- Teambuilding
- Service

Academic Skills

- Integration of math, science, engineering and technology concepts through project based real-world problem solving applications

Financial Model



• Operating Costs

- The recommended cost per student is \$2,145 per year
 - Sponsorship opportunities will be explored to reduce the cost to as close to zero as possible, so that financial circumstances need not be a barrier to participation
- Fees would cover staffing, equipment, supplies and facility costs.
- (Comparable: West Vancouver School District Megatronics Academy = \$2,500)

Start-up Cost Table



EDR Vex Kits	\$24,200.00
Sensors	\$1,210.00
Nanos	\$1,500.00
Tournament Pieces	\$3,800.00
Subtotal	\$30,710.00
GST and PST	<u>\$3,685.20</u>
Total	\$34,395.20

Initial activities centre around the modification of existing VEX Kits using custom designed and manufactured parts, sensors, and electronics built by students to complete design challenges.

