Sheridan Shine Brighter

Sheridan Journey
Shaping an Ideal Engineering program based on CDIO approach

Presented to
Regional Council,
North America,
Australia, NZ

June 13, 2013

Sheridan Institute of Technology and Advanced Learning

Sheridan College is one of Canada's leading postsecondary institutions dedicated to the provision of outstanding academic programs and the support of student and graduate success.

Sheridan serves 23,000 full-time students at our campuses in Oakville, Brampton and Mississauga.

POLYTECHNICSCANADA

Polytechnics Canada is a national alliance of Canada's leading research-intensive, publicly-funded colleges and institutes of technology.

Sheridan University

Vision

- To become Sheridan University, celebrated as global leader in **undergraduate professional** education.

Mission

- Sheridan delivers a premier, purposeful educational experience in an environment renowned for **creativity and innovation.**

Values

- Academic Excellence,
- Creativity and Innovation
- Global Citizenship

Shine Brighter
Sheridan

Program Critical Performance:

By the end of this program graduates will have demonstrated the ability to apply engineering principles, methods and techniques to **conceive, design, implement and operate** value added engineering products, processes and systems in enterprise and societal contexts in compliance with professional practice

Sheridan Shine Brighter

School of Engineering

Engineering Education

- Engineering Technology
- Undergraduate degree

Applied Research & Creativity Activities

- Applied Research
- Industrial Projects
- Professional Development

Co-Curricular Activities

- Engineering Outreach
- Engineering Student Clubs
- High School Outreach

Engineering Spaces

- Product Innovation Center
- Center of Advanced Manufacturing and Design Technologies (CAMDT)
- Undergraduate Labs

ENGINEERING SPACE

Newly Constructed Engineering Building

ENGINEERING SPACES

Conceive work spaces

DESIGN WORKSPACES

Design Space

ENGINEERING WORKSHOP

Implement Space, Fabrication Facility

IMPLEMENT WORKSPACE

Additive Manufacturing / 3D printing Lab

PROJECT BASED LEARNING

Implement – Operate work space

ENGINEERING SPACE

Project Based learning

IMPLEMENT WORKSPACES

Automation – Implement – Operate work space

Project Based learning , Implement – Operate work space

PROJECT BASED LEARNING

Fabrication Space

INTRODUCTION COURSE TO ENGINEERING

Exploring Engineering

CO- CURRICULAR ACTIVITIES

Engineering Club - FSAE Competition

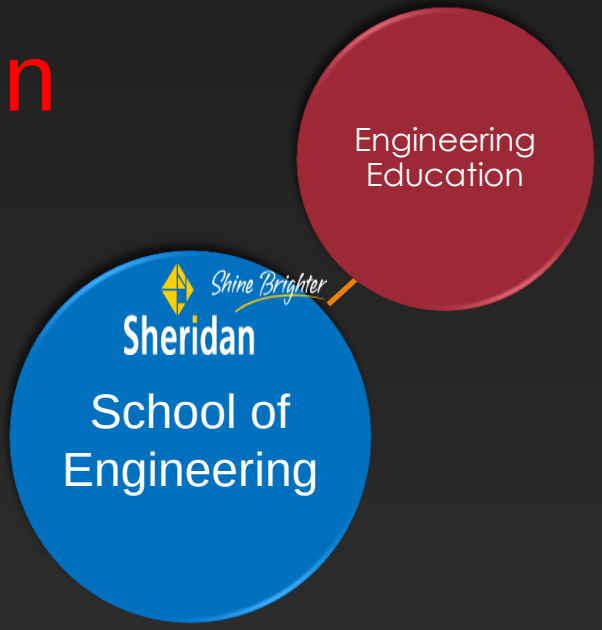
ENGINEERING SPACE

Capstone Projects Space

APPLIED RESEARCH / INDUSTRIAL PROJECT

Conceive- Design –Implement – Operate work space

Engineering Education

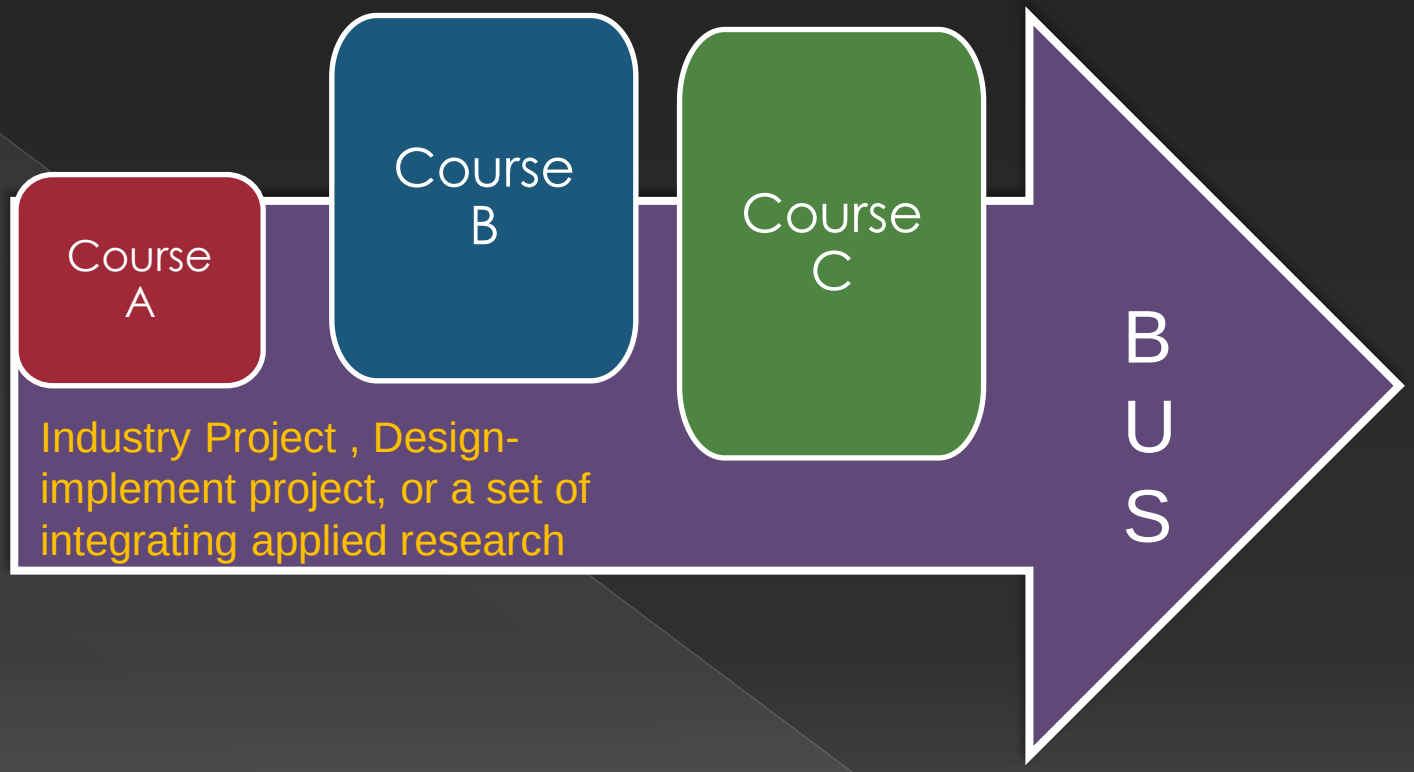


- Creating curricula that inspire innovation and creativity
- Increasing curricular flexibility
- Offering more REAL practice-based engineering experiences,
- Developing students professional skills to a higher standard,

Tradition Curriculum Structure

Curriculum structure is the arrangement of content and associated learning outcomes into instructional units or courses, to facilitate intellectual connections among the courses.

CDIO Based Bus Structure



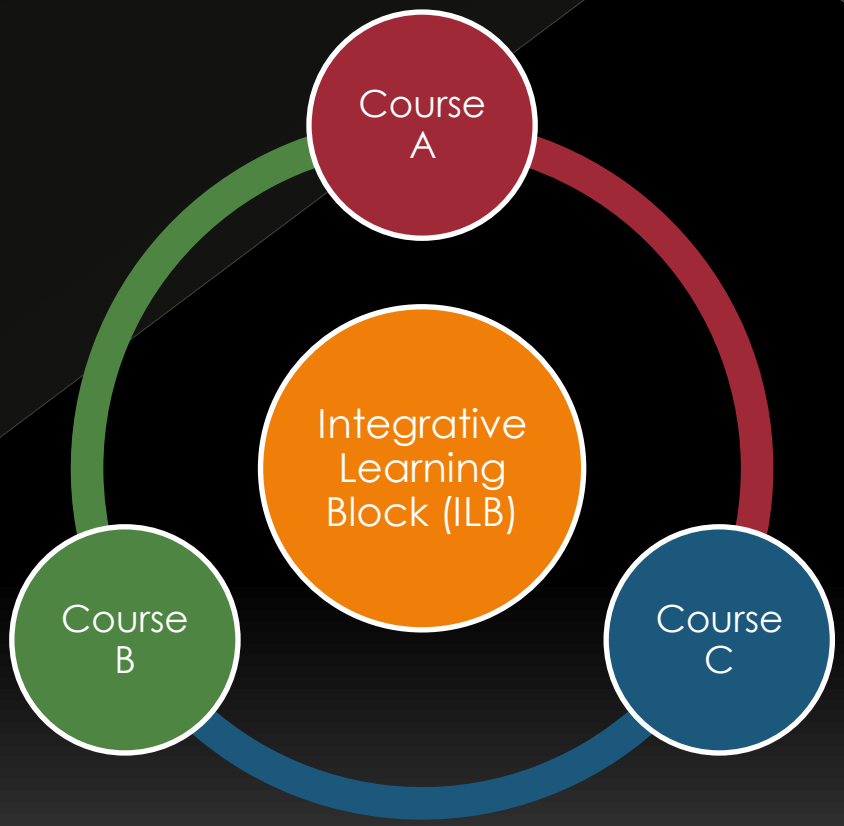
The idea is that some of the allotted time from two or more courses is transferred to a connecting intellectual element that acts as a "BUS" for the courses.

Advantage: Students can take the conventional courses without necessarily participating in the "BUS" experiences.

CDIO Based Integrative Learning Block (ILB)

(Linked or merged structures)

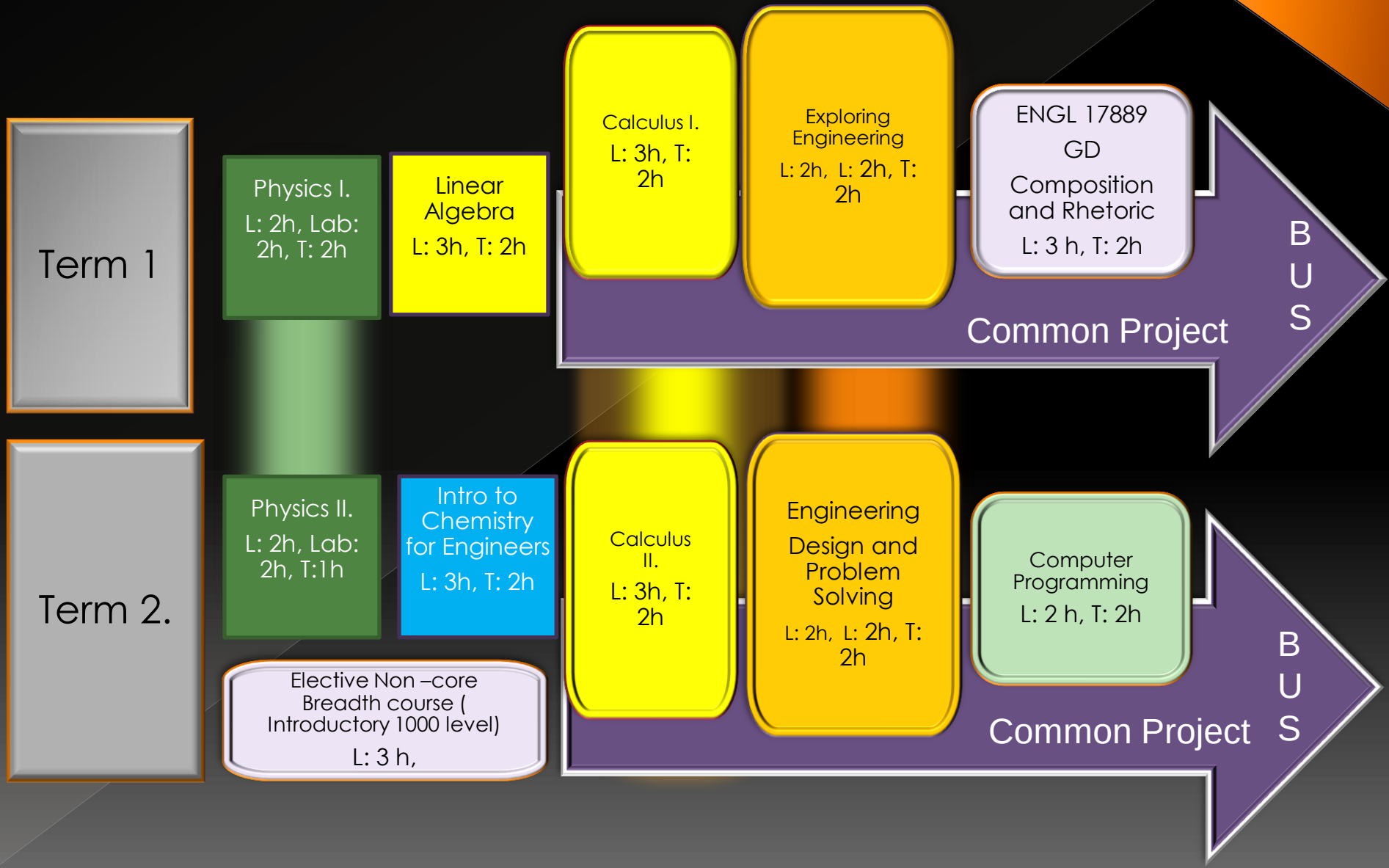
- In ILB structure, two or more faculty members start the term teaching independently, but at some point, the two or more courses flow together and work in common.
- This is most effective when the common work is associated with design project or end-of-term problem that requires the integration of content from two or more courses.

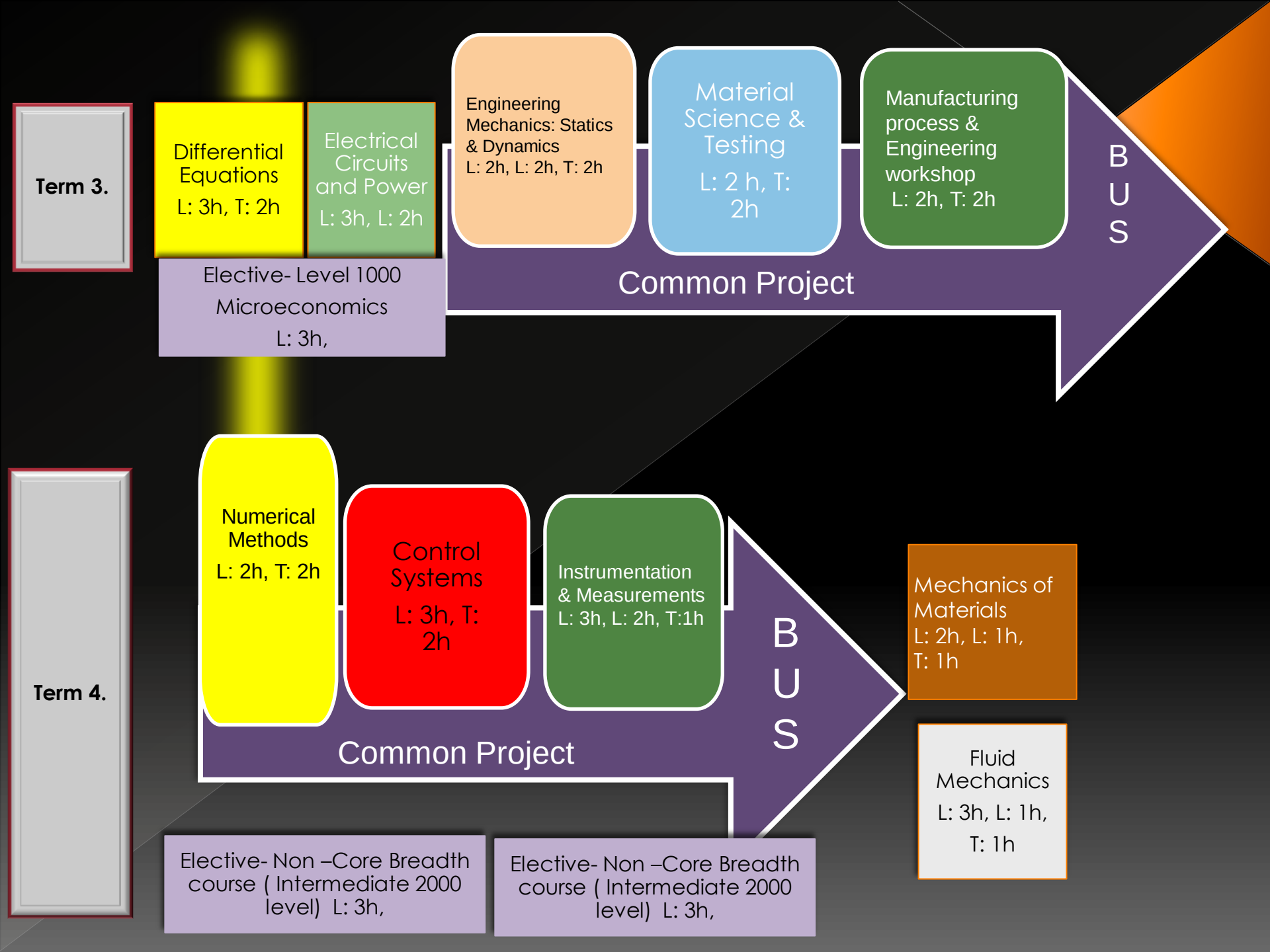


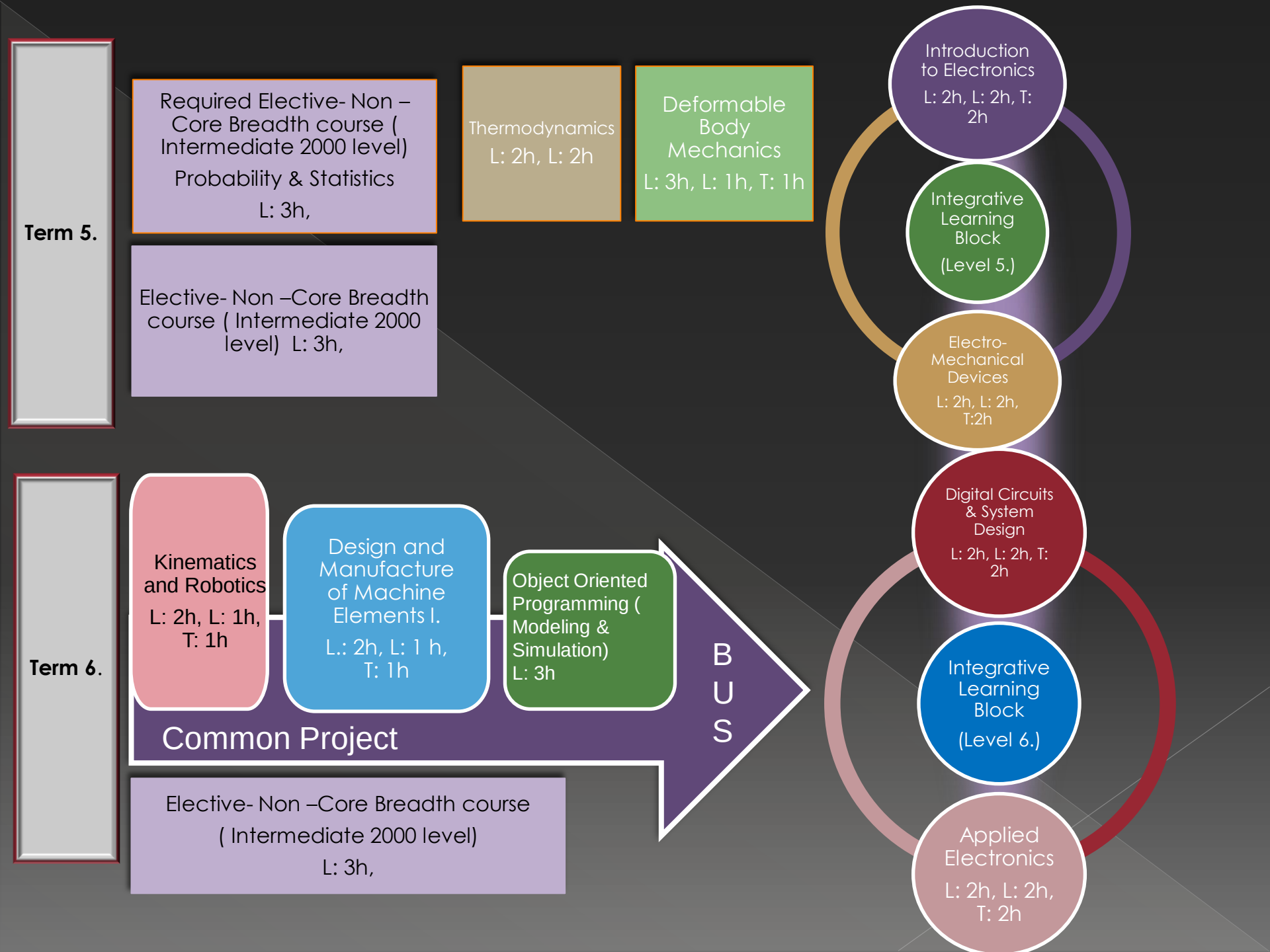
First Year Common Engineering

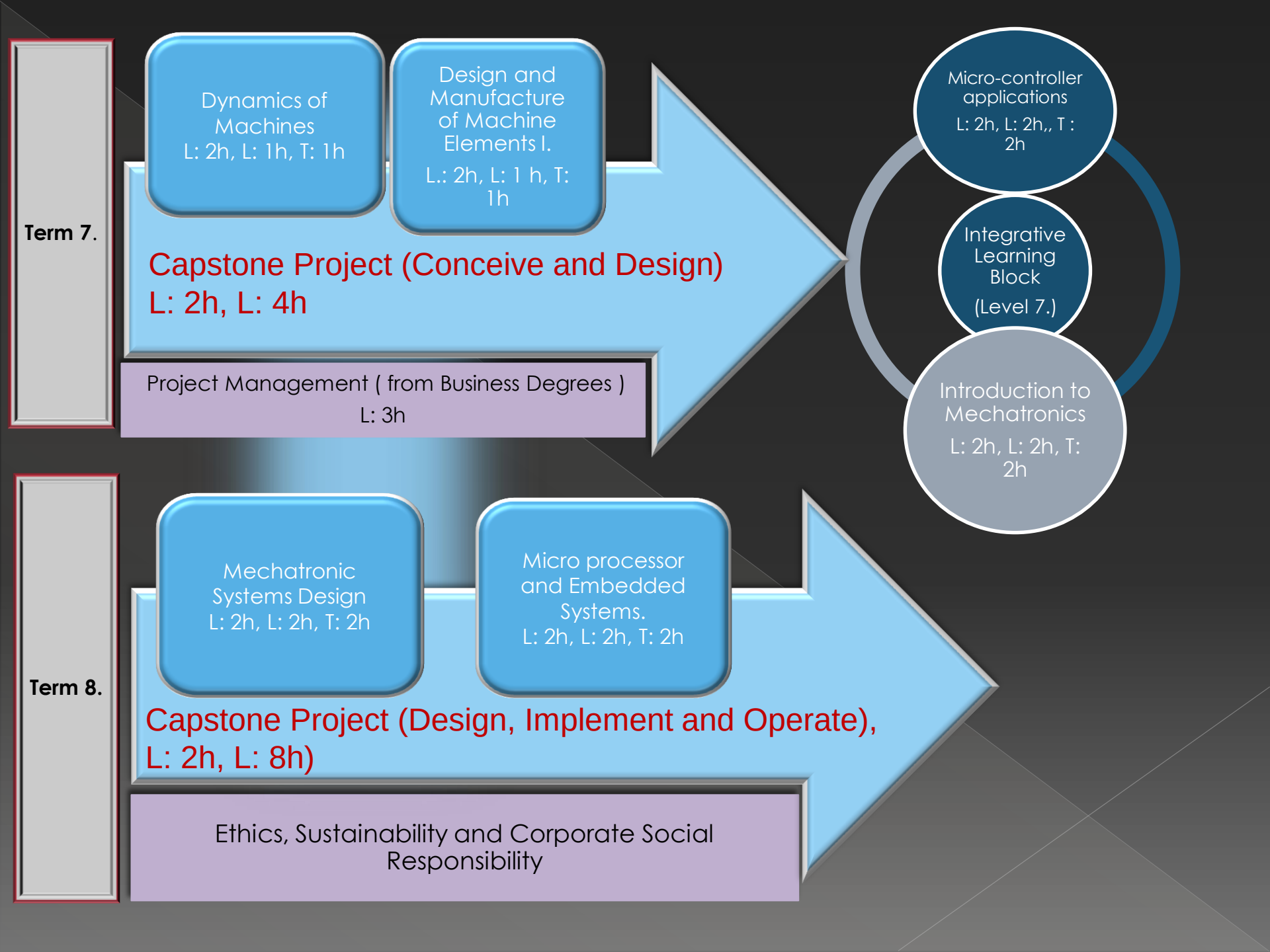
Term 1 (1st Year) Fall	Academic Credit	Lecture	laboratory	tutorial	Weekly hours	AU Credit	Ave. week	AU=Lec+ 0.5 (lab/tut)	Math+ BS	Math	Basic Science	Comp. Studies	Eng'g Science	Eng'g Design	ES+ED
Calculus 1	3.0	3.0	0.0	2.0	5.0	4.0	12.8	51.2	51.2	51.2	0.0	0.0	0.0	0.0	0.0
Fundamental of Physics I.	3.0	2.0	2.0	2.0	6.0	4.0	12.8	51.2	51.2	0.0	51.2	0.0	0.0	0.0	0.0
Exploring Engineering	3.0	2.0	2.0	2.0	6.0	4.0	12.8	51.2	14.8	0.0	14.8	10.0	14.4	12.0	26.4
Linear Algebra	3.0	3.0	0.0	2.0	5.0	4.0	12.8	51.2	51.2	51.2	0.0	0.0	0.0	0.0	0.0
Required Elective Non-Core Breadth Course : ENGL17889GD Composition and Rhetoric	3.0	3.0	0.0	2.0	5.0	4.0	12.8	51.2	0.0	0.0	0.0	51.2	0.0	0.0	0.0
Sub Total:	15.0	13.0	4.0	10.0	27.0	20.0		256.0	168.4	102.4	66.0	61.2	14.4	12.0	26.4
Term 2 (1st Year) Winter	Academic Credit	Lecture	laboratory	tutorial	Weekly hours	AU Credit	Ave. week	AU=Lec+ 0.5 (lab/tut)	Math+ BS	Math	Basic Science	Comp. Studies	Eng'g Science	Eng'g Design	ES+ED
Calculus 2	3.0	3.0	0.0	2.0	5.0	4.0	12.8	51.2	51.2	51.2	0.0	0.0	0.0	0.0	0.0
Engineering Design and Problem Solving	3.0	2.0	2.0	2.0	6.0	4.0	12.8	51.2	0.0	0.0	0.0	10.0	16.0	25.2	41.2
Fundamental of Physics II.	3.0	2.0	2.0	1.0	5.0	3.5	12.8	44.8	44.8	0.0	44.8	0.0	0.0	0.0	0.0
Computer Programming	3.0	2.0	0.0	2.0	4.0	3.0	12.8	38.4	12.2	12.2	0.0	0.0	26.2	0.0	26.2
Intro to Chemistry for Engineers	3.0	2.0	2.0	0.0	4.0	3.0	12.8	38.4	38.4	0.0	38.4	0.0	0.0	0.0	0.0
Elective Non-Core Breadth Course (Introductory 1000 Level)	3.0	3.0	0.0	0.0	3.0	3.0	12.8	38.4	0.0	0.0	0.0	38.4	0.0	0.0	0.0
Sub Total	18.0	14.0	6.0	7.0	27.0	17.5		224.0	146.6	63.4	83.2	10.0	42.2	25.2	67.4

B. Eng. Mechanical Engineering

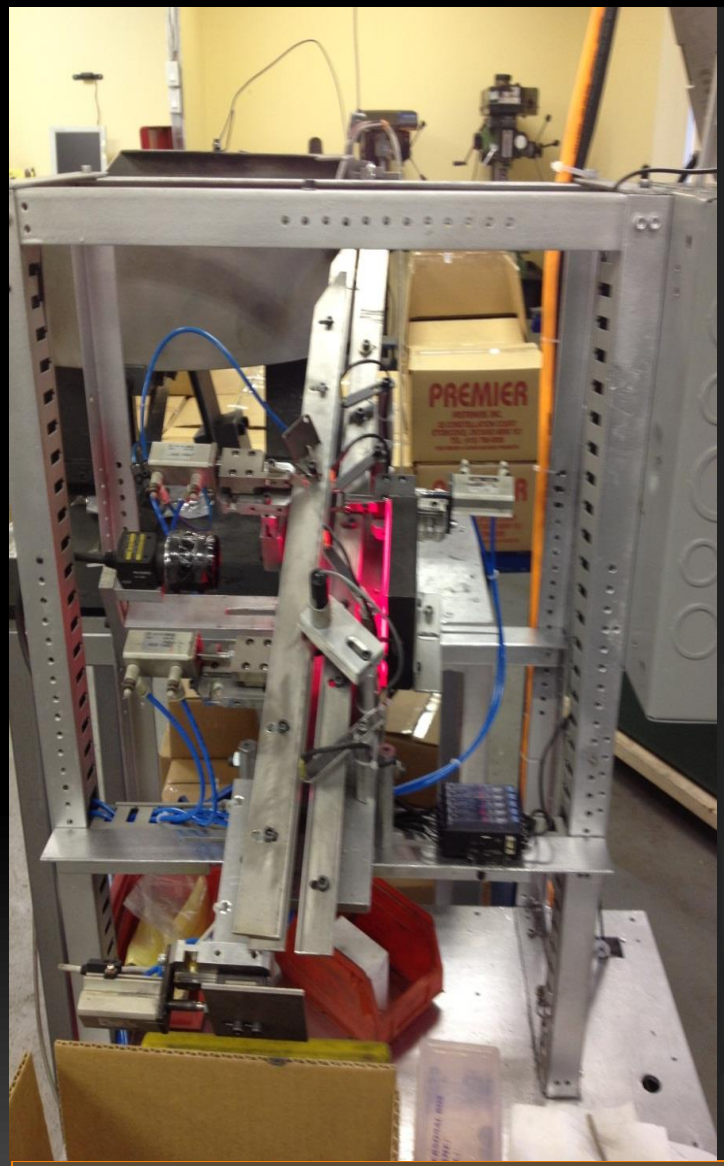


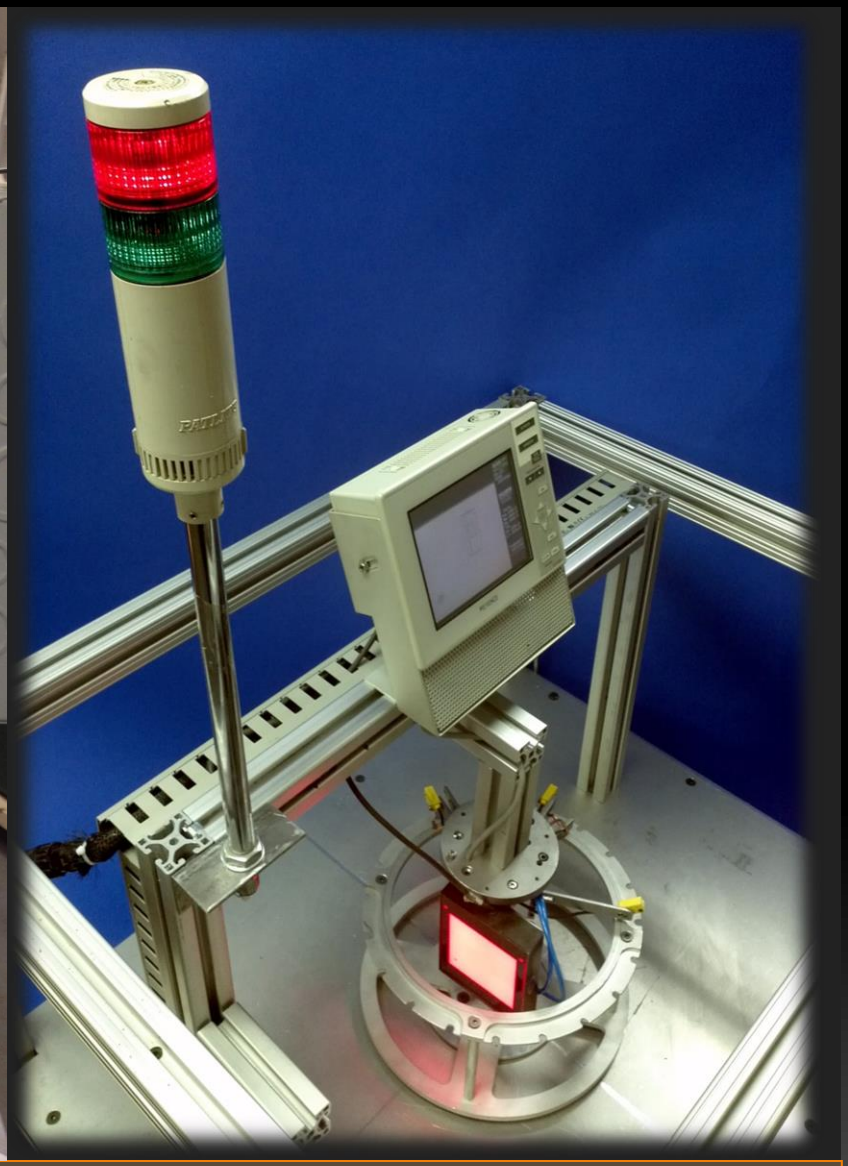

Term 3.
Differential Equations
L: 3h, T: 2h
Electrical Circuits and Power
L: 3h, L: 2h
Engineering Mechanics: Statics & Dynamics
L: 2h, L: 2h, T: 2h
Material Science & Testing
L: 2 h, T: 2h
Manufacturing process & Engineering workshop
L: 2h, T: 2h
BUS
Elective- Level 1000
Microeconomics
L: 3h,
Common Project
Term 4.
Numerical Methods
L: 2h, T: 2h
Control Systems
L: 3h, T: 2h
Instrumentation & Measurements
L: 3h, L: 2h, T:1h
BUS
Mechanics of Materials
L: 2h, L: 1h, T: 1h
Fluid Mechanics
L: 3h, L: 1h, T: 1h
Common Project
Elective- Non –Core Breadth course (Intermediate 2000 level) L: 3h,
Elective- Non –Core Breadth course (Intermediate 2000 level) L: 3h,


Term 5.
Required Elective- Non – Core Breadth course (Intermediate 2000 level)
Probability & Statistics
L: 3h,
Thermodynamics
L: 2h, L: 2h
Deformable Body Mechanics
L: 3h, L: 1h, T: 1h
Elective- Non –Core Breadth course (Intermediate 2000 level) L: 3h,
Introduction to Electronics
L: 2h, L: 2h, T: 2h
Integrative Learning Block
(Level 5.)
Electro-Mechanical Devices
L: 2h, L: 2h, T:2h
Term 6.
Kinematics and Robotics
L: 2h, L: 1h, T: 1h
Design and Manufacture of Machine Elements I.
L.: 2h, L: 1 h, T: 1h
Object Oriented Programming (Modeling & Simulation)
L: 3h
Common Project
B U S
Elective- Non –Core Breadth course
(Intermediate 2000 level)
L: 3h,
Digital Circuits & System Design
L: 2h, L: 2h, T: 2h
Integrative Learning Block
(Level 6.)
Applied Electronics
L: 2h, L: 2h, T: 2h


Term 7.
Dynamics of Machines
L: 2h, L: 1h, T: 1h
Design and Manufacture of Machine Elements I.
L.: 2h, L: 1 h, T: 1h
Capstone Project (Conceive and Design)
L: 2h, L: 4h
Project Management (from Business Degrees)
L: 3h
Micro-controller applications
L: 2h, L: 2h,, T : 2h
Integrative Learning Block
(Level 7.)
Introduction to Mechatronics
L: 2h, L: 2h, T: 2h
Term 8.
Mechatronic Systems Design
L: 2h, L: 2h, T: 2h
Micro processor and Embedded Systems.
L: 2h, L: 2h, T: 2h
Capstone Project (Design, Implement and Operate),
L: 2h, L: 8h)
Ethics, Sustainability and Corporate Social Responsibility

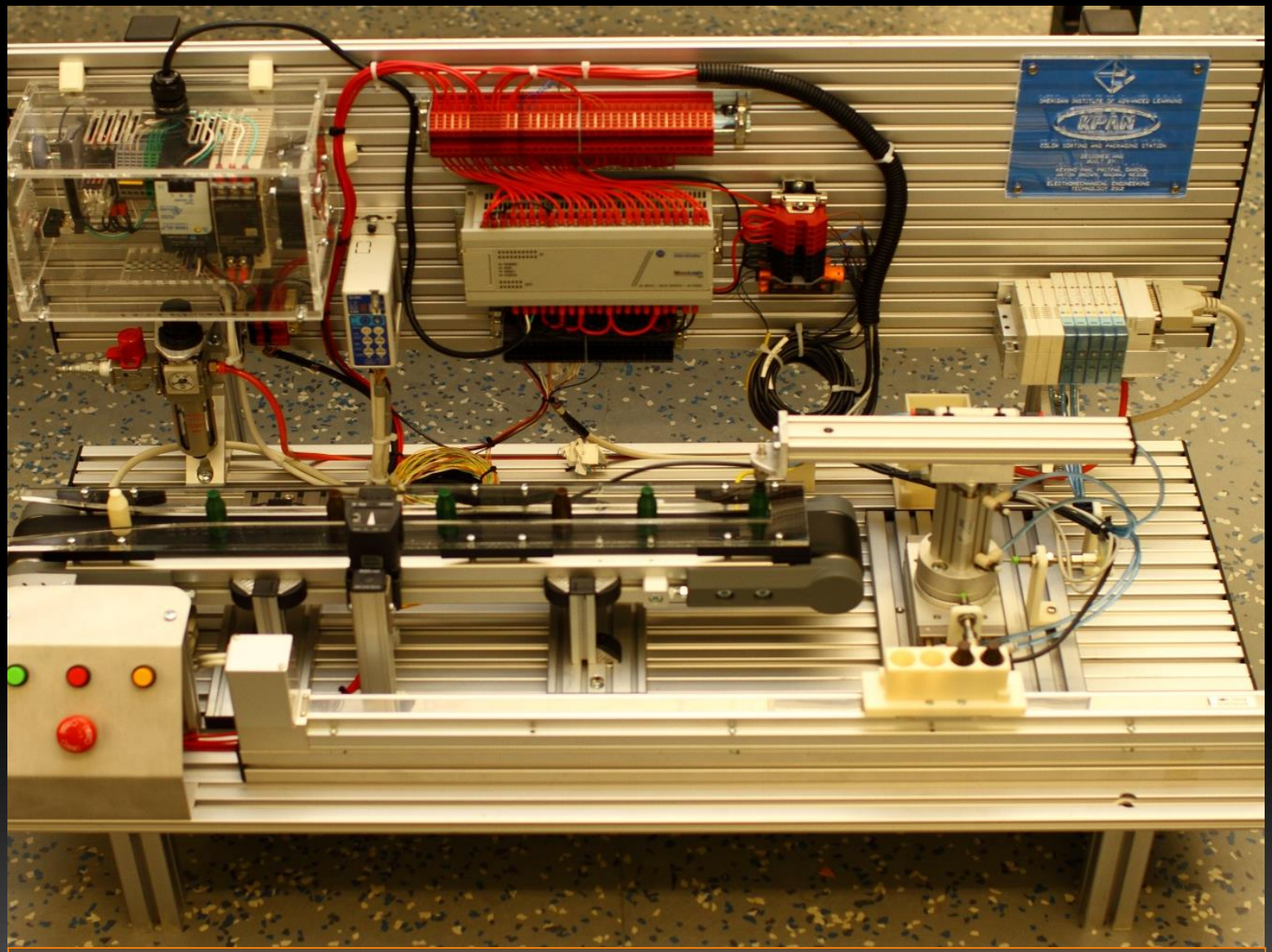
INDUSTRIAL PROJECT





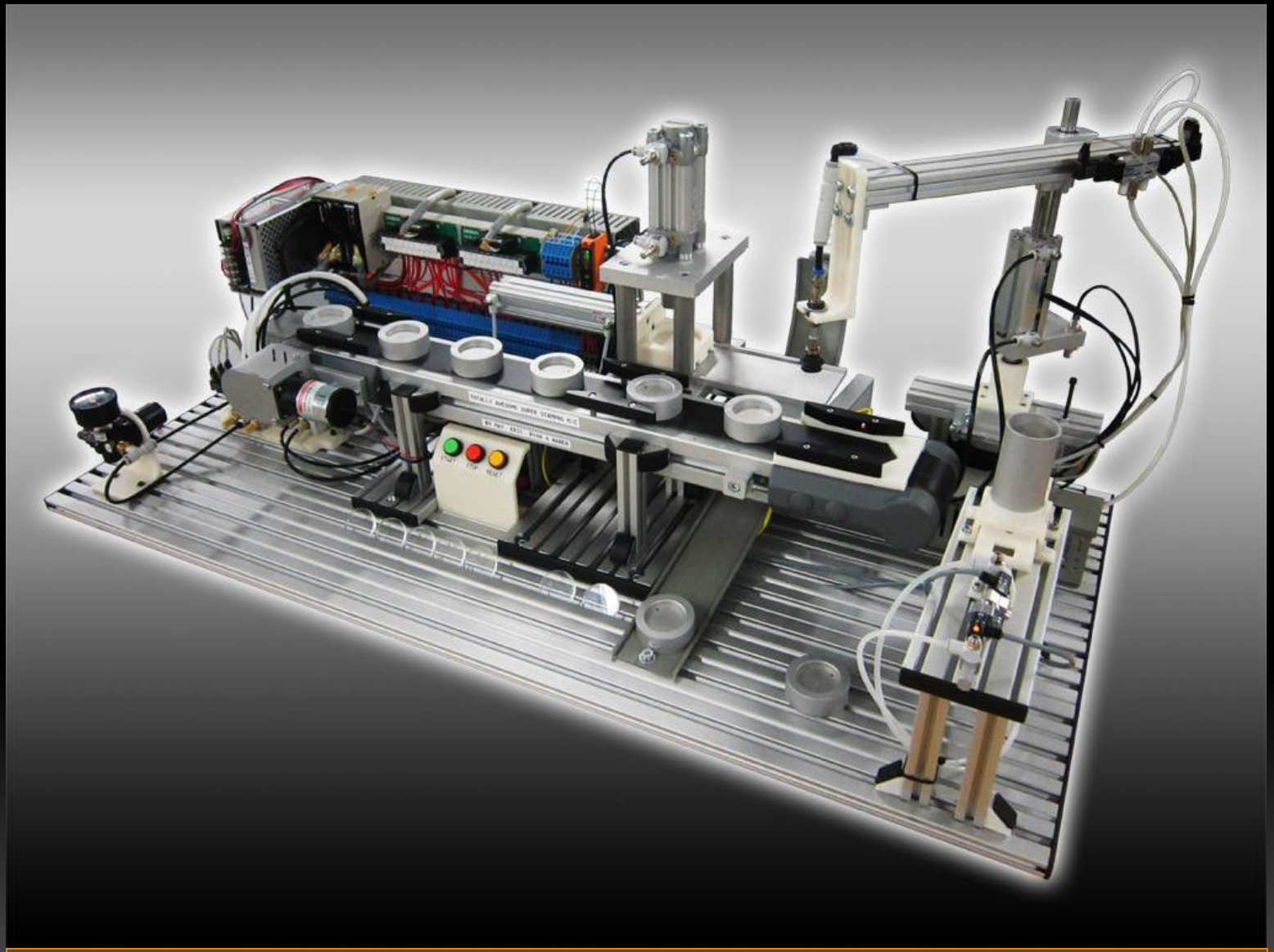
AVP solutions Inc. –Capstone Project

SAMPLE PROJECT



Capstone Project -Bottle sorting prototype

INDUSTRIAL PROJECT



Automated Stamping System

Curriculum Restructuring – Project Integration

PRINCIPLES of Engineering & Principles of DESIGN

(Lab project)

(1st Year)

ENGINEERING BY DESIGN

(In-class project)

(2nd Year)

ENGINEERING PRACTICE

(College / university level project)

(3rd Year)

Industry Project

(Industry / Applied Research project)

(4th Year)

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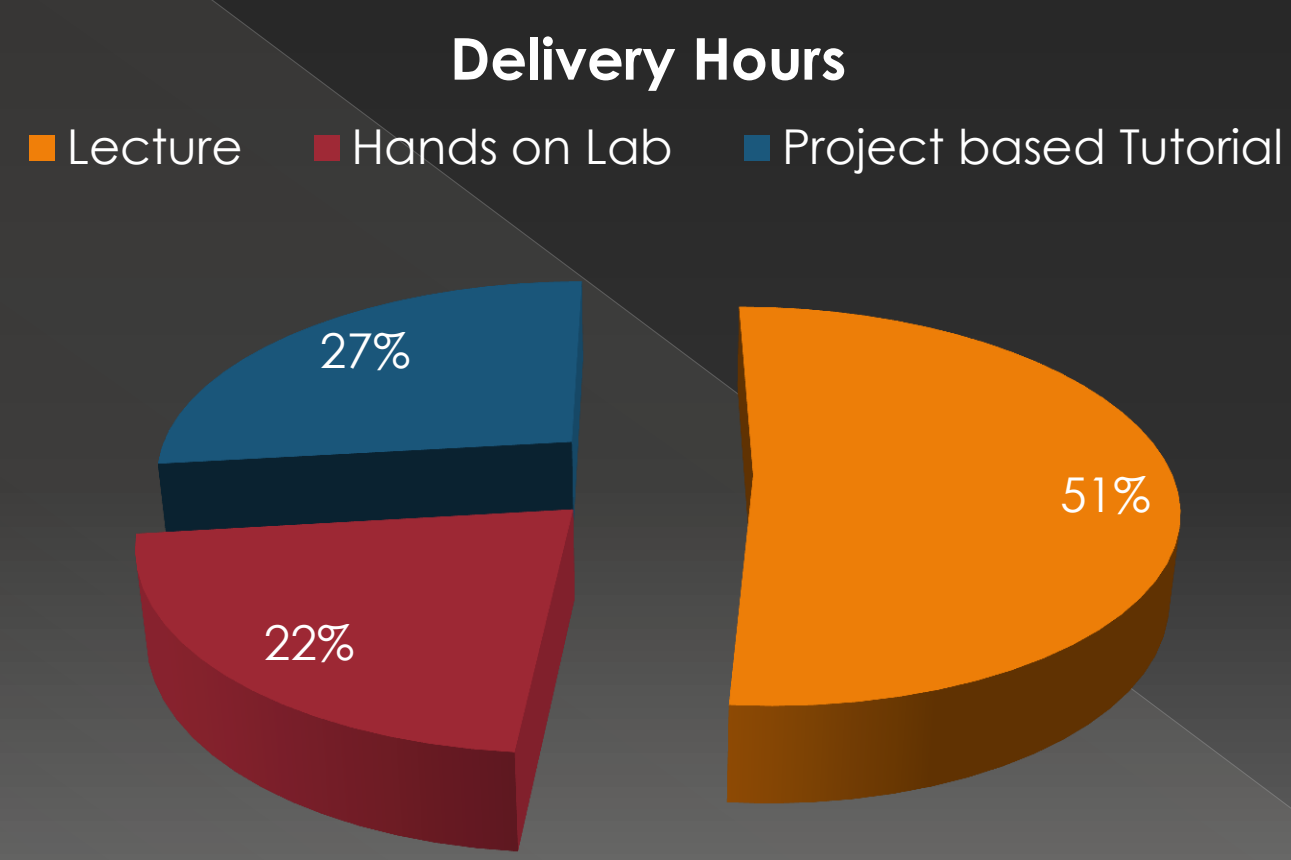
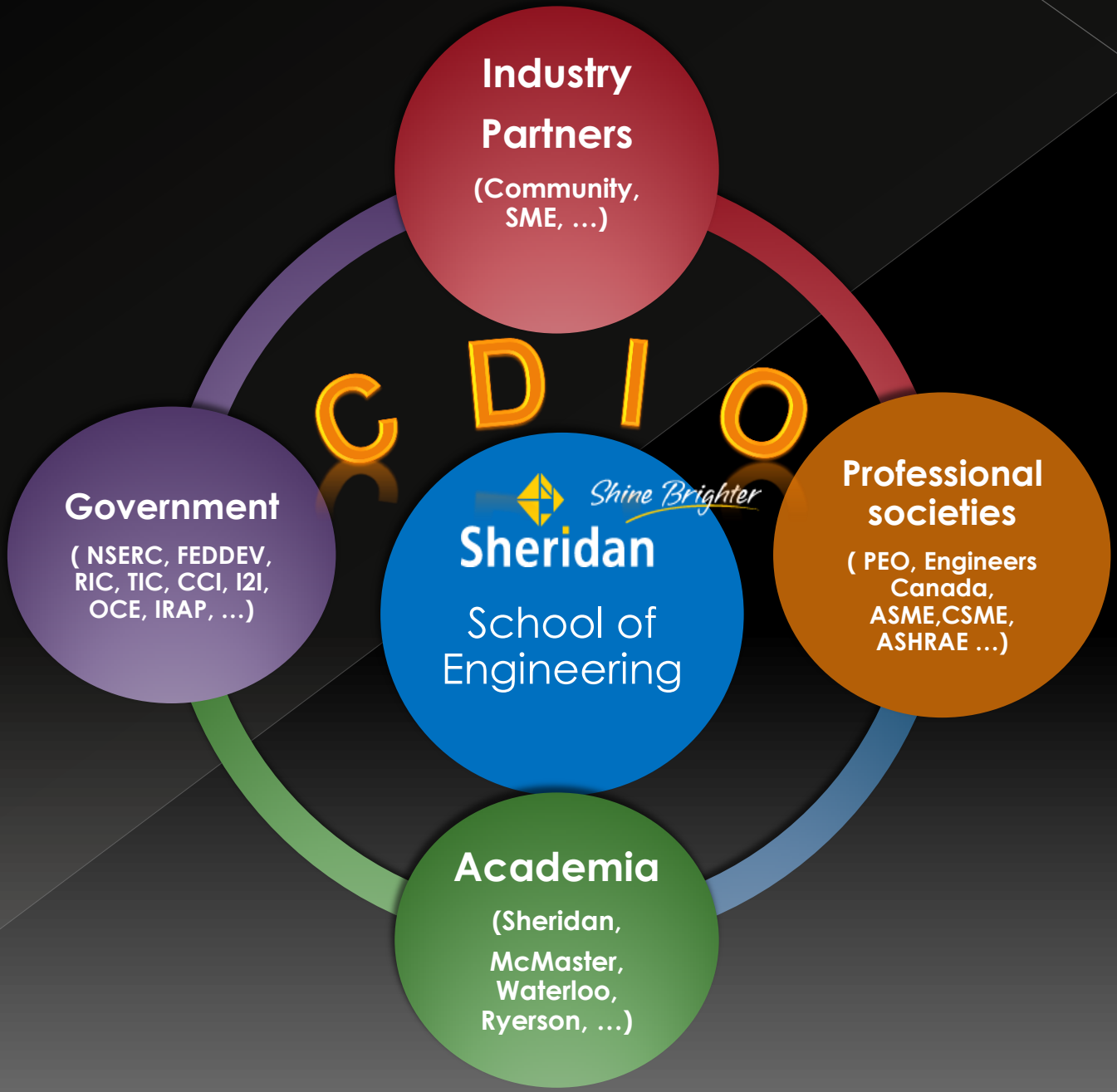
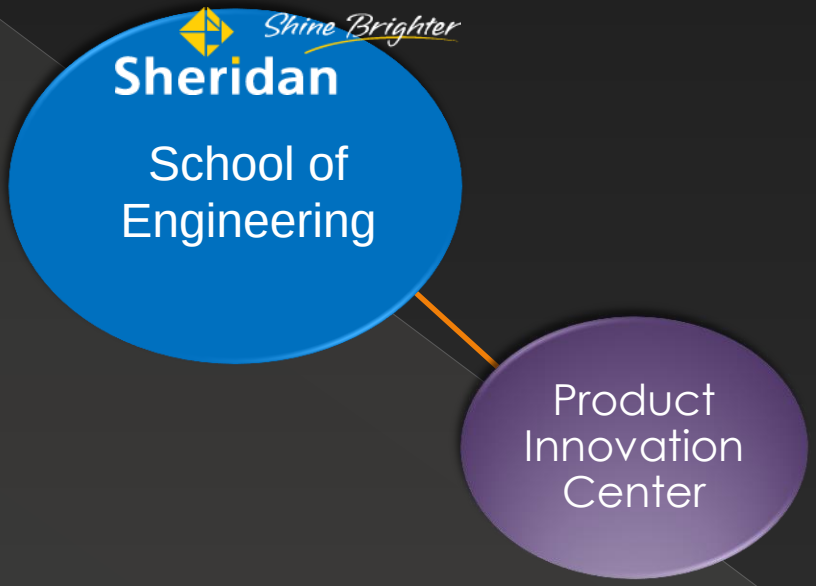
Curriculum Delivery Mode



Developing solutions through the CDIO approach





- Be recognized as a key resource in helping support innovation, resulting in a positive economic impact for Halton and Peel regions;
- Support student success through Engineering Services /Club/Training opportunities
- Build excellent **academic facilities** designed to accomplish student and faculty engagement and **hands-on learning opportunities**.

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Thank You

Discussion and Questions