

**SCHOOL OF APPLIED TECHNOLOGY**  
**2005-2006**

***It is the student's responsibility to retain course outlines for possible future use in support of applications for transfer credit to other educational institutions.***

PROGRAM: **Bachelor of Applied Technology - Industrial Design**  
COURSE NUMBER: **BIND 301**  
COURSE NAME: **Introduction to Vehicle Design**  
PREREQUISITE(S): BIND 250 Industrial Design Studio 3  
COREQUISITE(S): BIND 302 Computer-Aided Design Studio 3  
BIND 303 Multimedia Application  
BIND 304 Design for Production 2  
PREREQUISITE FOR: BIND 351 Vehicle Design Studio 1  
CREDIT VALUE: 3  
HOURS OF INSTRUCTION: 4  
FACULTY NAME: Ken Cummings



APPROVED:

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Signature

September 2005  
Date

## **I COURSE DESCRIPTION**

BIND 301 Introduction to Vehicle Design is a course in the fundamental principles of design in the development of the automobile. From a background in the origins of transportation modes from the cart to car through the early industrial age to today's complex interlaced structure with limited-access highways, students are engaged in a journey of inquiry and discovery to apply design principles to vehicles in a variety of environments. Body architecture, people packaging, drive line propulsion and suspension layout will be explored with a specific design proposal in mind. Ergonomic principles will be practiced in seating, accommodation, driver sight lines, ingress/egress and vehicle controls with safety and manufacturability as essential considerations.

## **II COURSE LEARNING OUTCOMES**

On completion of the course the student will be able to:

1. Justify, in the context of their time, human-built conveyances prior to the twentieth century.
2. Explain the psychological need for human travel and give examples from different historical periods.

3. Analyze the economic imperative for transportation in the development of society.
4. Compare the automobile as a recreational vehicle to other forms of entertainment through social, economic and technological changes through the twentieth century.
5. Defend a new paradigm of transportation for the twenty-first century.
6. Construct a packaging layout reflecting sound ergonomic principles.
7. Evaluate safety related features and apply them to vehicle platform.
8. Develop sound ergonomic solutions to vehicle controls and displays through interaction and collaboration with others.
9. Select optimum combinations for a specific vehicle type by bringing together factors affecting manufacturing and assembly in a group setting.
10. Select ISO (International Standards Organization) and SAE (Society of Automotive Engineers) conventions and apply them to a design concept.
11. Discuss the interaction between marketing, engineering, management and designer in the transportation industry.
12. Evaluate the effectiveness of current production designs and predict future trends in customer wants.
13. Anticipate future vehicle design parameters such as environmental impact, consumer trends, safety considerations and governmental regulations in a vehicle concept.

### III      **GENERIC SKILLS**

On completion of this course the student will demonstrate competencies in:

- **Reading** through research assignments in which learners identify key elements and salient features of written materials.
- **Writing** through design projects and papers.
- **Personal organization, time management, resource management and responsibility** through class participation and by meeting assignment and test deadlines.
- **Adaptability and learning** through written assignments that adopt different points of view from an interdisciplinary perspective.
- **Problem Solving** through finding relevant sources of information and choosing which of those to highlight in design assignments.
- **Research** using a variety of media including the analysis of materials from the Internet and other sources.
- **Decision-making and critical and creative thinking** by applying interdisciplinary theories to design projects.
- **Helping human beings adjust to life in society and with others**, including the ability to recognize diversity and individual differences, to accept responsibility for one's actions in groups, to lead a group effectively, to evaluate the behaviour of others and provide constructive feedback and demonstrate moderation.
- **Computer applications and communicating** through Web site searches and digital plans. The content may be transmitted by written, electronic and direct communications.

#### IV LEARNING VALUES

The student will develop desired characteristics through:

- Increasing a **sense of historical development** by studying the design industry and its relationship to society.
- Pursuing **independence of thought** in accomplishing individual assignments.
- Adding to the **depth and breadth of understanding** of the complexity of art, design and technology and their place in our conception of civilization.
- Augmenting a **global understanding** of the international and national dimensions of art, design and technology.
- Fostering **ethical development** through adopting morally, legally and socially responsible approaches to industrial design.
- Enhancing **aesthetic development** through the critical examination of assignments.
- Developing competencies in applying appropriate **forms of enquiry** when researching and assessing the essential elements to be included in any design.
- Encouraging **independent thinking** in individual and team assignments, research, and expressing informed opinions; and enhancing **appreciation of learning** new theories, tools, applications and activities, which are part of professional mastery.
- Fostering **creativity** through innovative design.

#### V METHODS OF PRESENTATION

- **Mini-lectures** in the studio draw relationships between lab work and theoretical design concepts
- **Specific readings** will enrich understanding of the alternative concepts that could be applied in each design assignment
- **Labs and projects** apply prior knowledge and learning from other classes, enhance student self-awareness and develop skills in analysis, creativity, critical thinking, application, problem solving and synthesis
- **Essays** enable students to explore ideas and reflect on their own learning
- **Class presentations** and the review of assignments encourage student discussion of design options, theoretical approaches, ideas and values.

#### VI REQUIRED TEXTS AND SUPPLIES

1. Required Reference:

1. Lewin, Tony. (2003). *How to Design Cars Like a Pro*. St. Paul, MN: MBI Publishing Company. ISBN 0-7603-1641-4.
2. A Coursepack for BIND 301 Introduction to Vehicle Design must be purchased from the Campus Bookstore.
3. Sparke, Penny. (2002). *A Century of Car Design*. Hauppauge, NY: Barron's Educational Series, Inc. ISBN 0-7641-5409-5. (15 copies available on reserve in the College Library)
4. Buchanan, R.A. (1992). *The Power of the Machine – The Impact of Technology*

*From 1700 to the Present*. London: Penguin Books. ISBN 0-14-017063-4.  
(Reprinted with permission as a Coursepack for BIND 153).

2. Recommended Reading (optional)

Auto Editors of Consumer Guide. (2004). *History of the American Auto*. Lincolnwood, Illinois: Publications International, Ltd. ISBN 0-7853-9874-0.

Bastow, Donald, Geoffrey Howard and John P. Whitehead. (1993). *Car Suspension and Handling*. Warrendale, PA: SAE International. ISBN 0-7680-0872-7.

Cowan, Ruth Schwartz. (1997). *A Social History of American Technology*. New York: Oxford University Press. ISBN 0-19-504605-6.

Daniels, Jeff. (2002). *Modern Car Technology*. Sparkford, UK: Haynes Publishing. ISBN 1-85960-811-6.

Dredge, Richard. (2004). *Concept Cars – Designing for the Future*. London: Amber Books Ltd. ISBN 1-904687-24-5.

Dul, Jan and Bernard Weerdmeester. (2001). *Ergonomics for Beginners*. New York: Taylor & Francis, Inc. ISBN 0-7484-0825-8. (Text for BIND 255 Ergonomic Principles)

Durnford, Hugh and Glenn Baechler. (1973). *Cars of Canada*. Toronto: McClelland and Stewart Limited. ISBN 0-7710-2957-8.

Flink, James J. (1975). *The Car Culture*. Cambridge, PA: The MIT Press. ISBN 0-262-06059-0.

Gillespie, Thomas D. (1992). *Fundamentals of Vehicle Dynamics*. Warrendale, PA: Society of Automotive Engineers, Inc. ISBN 1-56091-199-9.

Green, William S. and Patrick W. Jordan. (2001). *Human Factors in Product Design*. Philadelphia, PA: Taylor & Francis, Inc. ISBN 0-7484-0829-0.

Lewis, Tom. (1997). *Divided Highways – Building the Interstate Highways, Transforming American Life*. New York: Penguin Group. ISBN 0-670-86627-X

Lewin, Tony. (2004). *Smart Thinking – The Little Car That Made it Big*. St. Paul, MN: MBI Publishing Company. ISBN 0-7603-1943-X.

McNeil, Ian (Ed.). (2003) *An Encyclopedia of the History of Technology*. London: Routledge. ISBN 0-415-14792-1.

Nader, Ralph. (1965). *Unsafe at Any Speed: The designed-in dangers of the American automobile*. New York: Grossman Publishers, Inc

Rae, John B. (1971). *The Road and the Car in American Life*. Cambridge, MA: The

MIT Press. ISBN 0-262-18049-9.

Tilley, Alvin R. and Henry Dreyfuss Associates. (2001). *The Measure of Man and Woman: Human Factors in Design. Revised Edition*. Toronto: John Wiley & Sons Ltd. ISBN 0471099554. (Text for BIND 255 Ergonomic Principles).

Woodson, Wesley E., Barry Tillman and Peggy Tillman. (1992). *Human Factors Design Handbook*. Toronto: McGraw-Hill, Inc. ISBN 0-07-071768-0.

Websites:

- [www.ccardesignnews.com](http://www.ccardesignnews.com)
- [www.ccardesignonline.com](http://www.ccardesignonline.com)
- [www.conceptcar.co.uk](http://www.conceptcar.co.uk)
- [www.carbodydesign.com](http://www.carbodydesign.com)
- [www.plastics-car.com](http://www.plastics-car.com)
- [www.thecarconnection.com](http://www.thecarconnection.com)
- [www.interiormotivesmagazine.com](http://www.interiormotivesmagazine.com)
- [www.automotivehistory.net](http://www.automotivehistory.net)

**VII EVALUATION**

Essay 1	10 %
Essay 2	10 %
Topic Presentation	30 %
Project Presentation and Final Evaluation	40 %
Contribution to Learning	<u>10 %</u>
	<b>100 %</b>

**VIII COURSE SCHEDULE**

WEEK	TOPICS	READINGS / RESOURCES Excerpts From
1,2	<b>Planes, Trains and Automobiles</b> <ul style="list-style-type: none"><li>• History of Personal Transportation</li><li>• The Automobile and Its Impact</li><li>• Travel as Need / Travel as Recreation</li></ul>	<ul style="list-style-type: none"><li>• Buchanan, <u>The Power of the Machine</u></li><li>• Cowan, <u>A Social History of American Technology</u></li><li>• Rae, <u>The Road and the Car in American Life</u></li><li>• Flink, <u>The Car Culture</u></li><li>• Lewis, <u>Divided Highways</u></li><li>• Flink, <u>The Automobile Age</u></li></ul>

		<ul style="list-style-type: none"> <li>• Dwight, <u>Edith Wharton – An Extraordinary Life</u></li> </ul>
3	<b>Great Marques, Great Inventions, Great Expectations....And a Few Disappointments</b>	<ul style="list-style-type: none"> <li>• Sparke, <u>A Century of Car Design</u></li> <li>• Nader, <u>Unsafe at Any Speed</u></li> <li>• Auto Ed. Consumers Guide, <u>History of the American Auto</u></li> <li>• Stamp, <u>QEW – Canada's First Superhighway</u></li> </ul>
4	<b>Contemporary Automotive Packaging – From Access to Excess to Full Size SUV</b>	<ul style="list-style-type: none"> <li>• Dreyfuss, <u>The Measure of Man and Woman</u></li> <li>• Woodson et al, <u>Human Factors Design Handbook</u></li> <li>• Green, Jordan, <u>Human Factors in Product Design</u></li> </ul>
5	<b>Vehicle Packaging cont.</b>	<ul style="list-style-type: none"> <li>• Lewin, <u>How to Design Cars Like a Pro</u></li> <li>• Dul, Weerdmeester, <u>Ergonomics for Beginners</u></li> </ul>
6,7	<b>Vehicle Systems</b> <ul style="list-style-type: none"> <li>• Drive Line</li> <li>• Suspension</li> <li>• Body Structure / Architecture</li> <li>• Safety</li> </ul>	<ul style="list-style-type: none"> <li>• Dredge, <u>Concept Cars – Designing for the Future</u></li> <li>• Gillespie, <u>Fundamentals of Vehicle Dynamics</u></li> <li>• Bastow et al, <u>Car Suspension and Handling</u></li> <li>• Daniels, <u>Modern Car Technology</u></li> </ul>
8	<b>World Automotive Trends</b> <ul style="list-style-type: none"> <li>• Michelin, Peugeot Competitions</li> </ul>	<ul style="list-style-type: none"> <li>• Competition Guidelines</li> </ul>

9,10	<b>Subsystems and Human Factors</b> <ul style="list-style-type: none"> <li>• Interface Design</li> <li>• Alternative Packaging</li> <li>• Advanced Driving Systems</li> <li>• Advanced Safety Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Dreyfuss, <u>The Measure of Man and Woman</u></li> <li>• Daniels, <u>Modern Car Technology</u></li> </ul>
11,12	<b>The Substance of Style</b> <ul style="list-style-type: none"> <li>• Status and Fun</li> <li>• Needs and Wants</li> </ul>	<ul style="list-style-type: none"> <li>• Lewin, <u>How to Design Cars Like a Pro</u></li> </ul>
13	<b>Form, Fitness, Features and Future</b> <ul style="list-style-type: none"> <li>• Hybrid</li> <li>• Fuel Cell</li> </ul>	<ul style="list-style-type: none"> <li>• Daniels, <u>Modern Car Technology</u></li> </ul>
14	<b>Final Presentation</b>	

## IX SUPPLEMENTARY TESTS/EXAMS/PROJECTS

Supplementals are not available in this course, unless extraordinary, documentable circumstances have prevented a student from participating in scheduled course activities. All applications for supplementals are made to the course instructor.

## X ACADEMIC CONCERNS/APPEALS

Any student having an academic concern or questioning an academic decision should first discuss the matter directly with their professor; then with the program coordinator if the issue cannot be resolved; then with the Dean (or designate) if the prior two steps were unsuccessful. Complete details regarding academic appeals are found in the College's Academic Complaint and Appeal Policy.

## XI POLICIES AND PROCEDURES

It is the student's responsibility to be aware of the COLLEGE'S ACADEMIC REGULATIONS and the SCHOOL OF APPLIED TECHNOLOGY POLICIES AND PROCEDURES. (See the School of Applied Technology's Academic Handbook). The College's Academic Regulations can be found at <http://registrar.humberc.on.ca/acregs.html>

## XII PRIOR LEARNING ASSESSMENT AND RECOGNITION (PLAR)

Course credits may be granted in recognition of prior learning. Application for consideration is made through the Office of the Registrar. The method(s) of assessment are:

Challenge Exam	Portfolio	Skills Test	Interview	Other (please specify)	Not Available for PLAR
✓	✓		✓	Transcript and Course Outline review	

## XIII DISCLAIMER

While every effort is made by the professor to cover all content material listed in this outline, the order, content and/or evaluation may change as a result of special circumstances (e.g. time constraints due to inclement weather, College closure, technology/equipment problems and/or changes, etc.) In any such case, every effort will be made to make appropriate adjustments to the course delivery.