Technology Education Program

Rhode Island College
Feinstein School of Education and Human Development
Department of Educational Studies

Spring Semester 2011

Dr. Charles H. McLaughlin, Jr. Office: HB 206/WH 100
Phone: (401) 456-8793 email: cmclaughlin@ric.edu
Office Hours: Tuesday & Thursday 9:00 – 10:00 and by Appointment

I COURSE TITLE: TECH 329 -01 *Transportation Systems* (3 credits)
CLASS HOURS: Tuesday and Thursday 3:00 – 5:00
CLASSROOM LOCATION: WH 101

Communication Devices: Out of courtesy for other students and the instructor, please silence and put out of sight all communication devices (phones and pagers, etc.) during class time so that we may learn and work together without interruption.

II COURSE DESCRIPTION:

Transportation technology , modes, and vehicular and support systems for moving people and cargo in various environments is studied. Effects of transportation on individuals, society, and the environment are examined.

A. Relationship to Feinstein School and Professional Development

This course is designed to introduce transportation systems. The study of transportation will create awareness of the necessary resources and their manipulation that are required to move goods and people. Historical and contemporary processing methods will be investigated to provide a view of innovation and invention. Issues related to transportation impacts and relationships with the individual, society, and the environment will support appropriate problem solving and decision-making opportunities. The directed laboratory experiences emphasize the application of physical laws of science, data acquisition, and data analysis, giving participants appreciation and understanding of the basic mechanisms within energy processing and contemporary transportation systems.

Students will reflect on, analyze, select, and implement new and contemporary methods, activities, and curricula related to technology education. Students will be introduced to technological principles and cross curricular opportunities to solve problems related to transportation systems. Students will be prepared to teach energy and transportation

topics using strategies appropriate for pre-service teachers.

Participants in this course shall benefit from a consistent best practice scenarios and the intentional use of models which explore global attitudes and diverse student populations in the technology education classroom. This technology education course is grounded in FSHED's Conceptual Framework and the PAR Model embrace by Rhode Island College.

III TEXT:

Litowitz and Brown (2007). Energy, Power, and Transportation. Goodheart Willcox Company. Tinley Park, IL. ISBN-13: 978-1-59070-221-5

IV COURSE GOALS:

Upon satisfactorily completing this course, the student will be able to:

1. Use correctly terminology related to transportation systems
2. Categorize modes of transportation within the land, water, air, and space environments.
3. Identify the resources, processes, and applications critical to the operation of transportation systems.
4. Compare and Contrast the various uses for transportation systems.
5. Describe the 5 systems that are used to control, propel, guide, and suspend vehicular systems along with the structures necessary to support these systems.
6. Compare a variety of transportation systems and then identify the benefits or limitations of these systems.
7. Explain the historical evolution of transportation systems.
8. Describe the social, environmental, and economic impacts that transportation systems have on society.
9. Design, Build, and Test several transportation models and prototypes.

STANDARDS ATTAINED:

STANDARDS FOR TECHNOLOGICAL LITERACY:

The Nature of Technology

Standard 1: Students will develop an understanding of the characteristics and scope of technology.

Standard 2: Students will develop an understanding of the core concepts of technology.

Technology and Society

Standard 4: Students will develop an understanding of the cultural, social, economic, and political effects of technology.

Standard 5: Students will develop an understanding of the effects of technology on the environment.

Standard 6: Students will develop an understanding of the role of society in the development and use of technology.

Standard 7: Students will develop an understanding of the influence of technology on history.

Design
Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Abilities for a Technological World
Standard 11: Students will develop abilities to apply the design process.

Standard 12: Students will develop abilities to use and maintain technological products and systems.

Standard 13: Students will develop abilities to assess the impact of products and systems.

The Designed World
Standard 16: Students will develop an understanding of and be able to select and use energy and power technologies.

Standard 18: Students will develop an understanding of and be able to select and use transportation technologies.

RIPTS Standards Achieved:

STANDARD 1: Teachers create learning experience using a broad base of general knowledge that reflects an understanding of the nature of the world in which we live.
(1.1, 1.2, 1.3)

STANDARD 2: Teachers create learning experiences that reflect an understanding of the central concepts, structures, and tools of inquiry of the disciplines they teach. (2.1, 2.2, 2.3, 2.4, 2.5)

STANDARD 3: Teachers create instructional opportunities that reflect an understanding of how children learn and develop. (3.3)

STANDARD 5: Teachers create instructional opportunities to encourage students' development of critical thinking, problem solving, and performance skills. (5.1, 5.5)

STANDARD 6: Teachers create a learning environment that encourages appropriate standards of behavior, positive social interaction, active engagement in learning, and self-motivation (6.3,)

STANDARD 8: Teachers use effective communication as the vehicle through which students explore, conjecture, discuss, and investigate new ideas. (8.1, 8.2, 8.3,)

STANDARD 9: Teachers use a variety of formal and informal assessment strategies to support the continuous development of the learner. (9.3)

STANDARD 10: Teachers reflect on their practice and assume responsibility for their own professional development by actively seeking opportunities to learn and grow as professionals. (10.3, 10.4)

V CLASS ATTENDANCE POLICY:

Students should attend all class meetings and are responsible for all class work and assignments. At the beginning of each semester, instructors will distribute a syllabus, which may include attendance and/or class participation as a component of the course

grade. Students who are absent must take the initiative to determine from the instructor what course work can be made up. Students who are absent on the day of an examination should make every effort to call the instructor (or department office) before the scheduled test.

....All students who incur or anticipate an extended absence (five or more consecutive days or more) should call the Office of Student Life at 456 - 8061, so that notice (not an excuse) may be sent to instructors. (p. 38 RIC Student Handbook)

Attendance Policy Continued:

- The policy of this class is that after the THIRD absence the final grade will be dropped one letter grade.
- Three late arrivals will equate to one absence
- Six unexcused absences from this class will result in a final grade of (F).
- Absences are considered excused **only** when official documentation of the nature of the absence is supplied by the student. (i.e. attending physician's notice, court documents, obituaries, field trip memo)
- All exams and quizzes will be taken at the scheduled time. Make-up exams and quizzes may not be provided unless proper documentation is presented.

VI COURSE CONTENT:

I. A. Transportation
   1. Personal
   2. Mass
   3. Passenger
   4. Freight

   B. Historical Developments

   C. Transportation Environments
   1. Air (Atmospheric)
   2. Land (Terrestrial)
   3. Water
   4. Space

   D. Vehicular Sub-systems
   1. Control Systems
   2. Structure Systems
   3. Suspension Systems
   4. Propulsion Systems
   5. Guidance Systems
   6. Payload Systems
   7. Interdependence of Systems

   E. Support Systems

   F. Regulations

II. Contemporary Transportation Systems
   A. Demographics
   1. Travel Statistics
   2. Cargo Mileage/ Volume
   3. Fuel Comparisons

   B. Vehicles
   1. Personnel
   2. Commercial
   3. Recreational
   4. Military

   C. Common Systems of Transport
   1. Fixed Route
   2. Random Route
   3. Intermodal

   D. Support Systems

III. Land Transportation Systems (Terrestrial)
   1. Vehicle Design
   2. Modes of Transportation
   3. Design and Operation

IV. Water Transportation Systems (Marine and inland water)
   A. Vehicle Design
   B. Modes of Transportation
   1. Oceanic
   2. Inland

   C. Water Systems
   1. Lock

2. Canal
3. River
4. Oceanic
5. Inland/Coastal Waterway

D. Design and Operation

V. Air Transportation Systems (Atmospheric)

A. Vehicle Design
1. Lighter-than-air
2. Heavier-than-air

3. People Carriers
4. Freight/ Cargo Carriers
5. Mass Transit

B. Flight Systems
1. Airports
2. Traffic Control
3. Flight Path

C. Design and Operation

VI. Space Transportation Systems

A. Vehicle Design
1. Manned
2. Unmanned

B. Flight Systems
1. Assembly
2. Launch
3. Control/Guidance
4. Tracking
5. Thrust Systems
6. Re-entry
7. Recovery
8. Landing Field

C. Future innovations

D. Design and Operation

VII. Support of Technological Ventures

A. Scientific Exploration

B. Production Systems

C. Weather Monitoring

D. Environment Monitoring

VIII. Environmental Impacts Created by the Development of Transportation Systems

A. Fuel Use

B. Generation of Greenhouse Gases

C. Site Disruption / Aesthetics

D. Air Pollution /Acid Rain

E. Radioactive Materials / Hazardous Wastes

F. Indirect Pollution
1. Point source
2. Non-point source

G. Noise Pollution

IX. Economic and Social Impacts

A. Economic
1. Distribution
2. Commerce/ business
3. Regulations

B. Social
1. Independence to take a trip
2. Migration
3. Recreation
4. Occupational Opportunities

VII METHODS OF INSTRUCTION:

Instructional strategies will include:
- Lecture
- Multimedia
- Individual reports
- Group interaction
- Electronic media
- Discussion / Question and answer

VIII EVALUATION:

QUIZZES	10%
(2) TRANSPORTATION REVIEWS	10%
SPACE ACTIVITY	10%
LEGO ROBOTICS VEHICLE	10%
MARINE/WATER ACTIVITY	20%
LAND VEHICLE	20%
MAG LEV	20%
TOT.	**100%**

Final course grades are assigned on the basis of total points earned from exams, quizzes and projects. All points earned during the semester will be totaled and a percentage will be determined from the points earned. The final grade will be determined from the following percentages.

Grade Scale:

A	100% - 96%	C+	79% - 76%
A-	95% - 90%	C	75% - 73%
B +	89% - 86%	C-	72% - 70%
B	85% - 83%	D	69% - 60%
B-	82% - 80%	F	59% or less

DEADLINES:
AN ATTEMPT HAS BEEN MADE TO ENSURE THAT ALL PROJECTS CAN BE COMPLETED WITHIN THE ALLOTTED TIME. PLEASE DO NOT PROCRASTINATE. BEGIN PROJECTS BEFORE THE DUE DATE .

Tentative Schedule

Transportation Systems
TECH 329

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Week	Date	Activity/Topic	Readings
	JAN.		
1	**25 - 27**	SYLLABUS/INTRODUCTION GOALS AND RESPONSIBILITIES INTRODUCTION TO TRANSPORTATION	 PP. 353 - 368
2	**FEB.**	ENERGY MEASUREMENT POWER	PP. 299 - 320 PP. 144 - 160
	1 - 3	MODES OF TRANSPORTATION TRANSPORTATION ENVIRONMENTS ***QUIZ 1*** **LAND VEHICLE ASSIGNMENT**	HANDOUT HANDOUT ***HANDOUT***
3	**8 - 10**	VEHICULAR SYSTEMS PROPULSION GUIDANCE CONTROL ***ROBOT INFO***	PP. 369 – 377 ***HANDOUT***
4	**15 - 17**	VEHICULAR SYSTEMS SUSPENSION STRUCTURE SUPPORT	PP. 378 - 384
5	**22 - 24**	TRANSPORTATION SYSTEMS LAND SYSTEMS CONCEPTS ***QUIZ 2*** ***LAND VEHICLE DUE***	PP. 385 - 412 PP. 413 - 460
6	**MARCH**		

	1 - 3	WATER TRANSPORTATION ***ROBOT PROGRAM DUE***	PP. 461 - 478
7	**8 - 10**	WATER VEHICLES SYSTEMS ***WET ACTIVITY INFO***	PP. 479 - 499 ***HANDOUT***
8	**VACATION WEEK March 14 - 18**		**VACATION**
9	**22**	AIR SYSTEMS	PP. 501 - 518
10	**29 - 31**	AIR VEHICLES	PP. 519 - 550
	APRIL		
11	**5 – 7**	SPACE ***SPACE SYSTEMS ACTIVITY***	PP. 551 - 570 ***HANDOUTS***
12	**12 -14**	SPACE VEHICULAR SYSTEMS ***WET ACTIVITY DUE • IN CLASS*** ***HBS TE LAB***	PP. 571 - 594
13	**19 - 21**	INTERMODAL TRANSPORTATION ***MAG LEV INTRO***	PP. 597 - 610 ***HANDOUTS***
14	**26 - 28**	TRANSPORTATION AND ENVIRONMENT ***ACTIVITY LAB AND TESTING***	PP. 611 - 624
	May		
15	**3 - 5**	**MAG LEV DESIGN/LAB** **PROTOTYPE DUE**	