

Technology Education Program

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

Fall Semester 2009

Keith R Doucette Sr., M. Ed
Phone: (401) 524-5919
Office Hours: Tuesday & Thursday 4:00 – 5:00 and by Appointment

Office: WH 100
email: rid27612@ride.ri.net

- I COURSE TITLE: TECH 329 -01 *Transportation Systems* (3 credits)**
CLASS HOURS: Tuesday & Thursday 5:00 - 6:50
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 Laptops, 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 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.

RIBTS 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)

IV TEXT:

Johnson, S. R. & Farrar-Hunter, P. (2000). *Exploring Transportation*. Tinley Park, IL:

Goodheart-Willcox. ISBN: 1-56637-675-0

Johnson, S. R. & Farrar-Hunter, P. (2000). *Exploring Transportation Student Activity manual*. Tinley Park, IL: Goodheart-Willcox. ISBN: 156637-676-9

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:

<u>MID-TERM / QUIZZES</u>	<u>20%</u>
<u>AIR ACTIVITY</u>	<u>10%</u>
<u>(2) TRANSPORTATION REVIEWS</u>	<u>10%</u>
<u>ELEMENTARY/MIDDLE SCHOOL ACTIVITY (GRAND CANYON)</u>	<u>15%</u>
<u>ENGINE ACTIVITY (ENGINE DIESECTION)</u>	<u>10%</u>
<u>MARINE/WATER ACTIVITY (BOAT)</u>	<u>15%</u>
<u>LAND VEHICLE (SCRAMBLER)</u>	<u>10%</u>
<u>SPACE ACTIVITY</u>	<u>10%</u>
	TOT. 100%
TECH Directions Challenge	supplemental 50%

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

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.

ASSIGNMENTS WHICH ARE NOT HANDED IN ON THE DUE DATE WILL RESULT IN ONE GRADE DEDUCTION PER DAY AND 1/2 A GRADE IF HANDED IN AFTER NOON— 1 FULL GRADE AFTER 4:00 PM.

IX Selected Bibliographic Materials

- Bohn, R.C., Fales, J., MacDonald, A.J., & Kuetemeyer, V.F. (1986). *Energy, power, and transportation technology*. Mission Hills, CA: Glencoe
- DeOlds, A.R., Sheets, E. & Alexander, W. (1993). *Transportation: The technology of moving people and products*. Albany: Delmar.
- Flavin, Christopher & Lenssen, Nicholas (1990). *Beyond the petroleum age: Designing a solar economy*. Worldwatch Paper 100. Washington, DC: Worldwatch Institute.
- Flavin, Christopher & Lenssen, Nicholas (1994). *Power surge: Guide to the coming energy revolution*. Worldwatch Environmental Alert Series. Washington, DC: Worldwatch Institute.
- Kozloff, K. L. (1994). Renewable technology energy: A hard sell, an urgent need. *Environment*. 36,(9). pp. 5 - ff 30.
- Mackenzie, F. T. (1998). *Our changing planet: An introduction to earth system science and global environmental change*. 2nd edition. Upper Saddle River, NJ: Prentice Hall.
- Nebel, B. J. & Wright, R. T. (1998). *Environmental science: The way the world works*. 6 th edition. Upper Saddle River, NJ: Prentice Hall.
Chapter 3 pp. 55-77 Energy considerations
Chapter 15 pp. 371-397 Air pollution and its control
- Smith, K. (1993). Fuel combustion, air pollution exposure and health: The situation in developing countries. *Annual Review of Energy and the Environment*. Vol18. pp. 529-566.
- Sperling, D. (1996). The case for electric vehicles. *Scientific American*. 275. pp. 54-59.

Tentative Schedule

Transportation Systems TECH 329

Keith R Doucette Sr. M.Ed
Phone: (401) 524-5919

Office: HB WH 100
email: rid27612@rid.ri.net

Office Hours: Office Hours: By Appointment & Tuesday & Thursday 4:00 - 5:00

Week	Date	Activity/Topic	Readings
September			
1	1 & 3	SYLLABUS/INTRODUCTION GOALS AND RESPONSIBILITIES INTRODUCTION TO TRANSPORTATION	PP. 23 - 36
2	8 & 10	ENERGY MEASUREMENT ENERGY SYSTEMS	PP. 56 - 68 PP. 76 - 91 PP. 98 - 115
3	15 & 17	SOLAR ENRGY INTRO TO POWER Small Engine Assignment <i>Quiz 1</i>	PP.122 - 137 PP.144 - 156 PP.323 - 348
4	22 & 24	SMALL ENGINE LAB	ACTIVITY 14.1
5	28 & 1	TRANSPORTATION SYSTEMS LAND SYSTEMS INTRO TO LAND SYSTEMS LAB	PP. 385 - 408 PP. 413 - 455 PP. 147 - 156
October			
6	6 & 8	LAND SYSTEMS LAB <i>QUIZ 2</i> LAND VEHICLE DUE	
7	No class &15	VEHICULAR SYSTEMS WATER SYSTEMS Exam Review	PP. 461 - 476

8	20 & 22	WATER SYSTEMS CONTINUED WATER SYSTEMS LAB	PP. 479 - 496
		MIDTERM EXAM	
9	27 & 29	WATER SYSTEMS LAB DUE INTERMODAL SYSTEMS MATERIALS HANDLING PIPELINE SYSTEMS	PP. 159 - 164 HANDOUTS
	November		
10	3 & 5	AIR SYSTEMS AIR VEHICULAR SYSTEMS WRIGH BROTHERS VIDEO	PP. 501-514 PP. 520-543
11	10 & 12	AIR ACTIVITY AIR ACTIVITY DUE	
12	17 & 19	SPACE SYSTEMS	
13	24 & Noclass	SPACE SYSTEMS ACTIVITY LAB WORK	HANDOUTS
	December		
14	1 & 3	NASA MATERIALS ELEMEN/MIDDLE SCHOOL LAB	
15	8 & 10	Lab testing Make up and final review	

Additional topics: Intermodal/pipeline/Environment/Future/Communication