

ME 320 – DISTRIBUTION/MEDICAL DEVICE PACKAGING

Type (check one):	Required: _____ Elective: <u> X </u>
2005-2006 Catalog Data:	ME 320. Distribution/Medical Device Packaging. Overview of the physical distribution systems, various distribution hazards imposed to products/packages in transit, rules and regulations governing distribution packaging, common industry guidelines and practices on distribution packaging. Study of the package design process, protective packaging theories and applications, selection and design, other distribution packaging related materials and applications. Introduction to package testing and evaluation methods, standards, and equipment/systems. Introduction to basics of packaging materials, packaging design and development and sterilization methods used in the biomedical industry. (Same as ChE 320) Prerequisite: ChE 113 or ChE 115, and Math 131. <i>One semester; three credits.</i>
Prerequisites:	ChE 113 or ChE 115 Math 131
Co-Requisites:	None
Textbook:	A. H. McKinley, <i>Transport Packaging Institute of Packaging Professional</i> , 1998.
Other Required Materials:	None
Other References:	<i>Medical Device Packaging Handbook</i> , 2 nd Edition, edited by Max Sherman, Marcel Dekkar, 1998. Ronald, Pilchic, <i>Validating Medical Packaging</i> , CRC Press, 2003.
Instructor:	Dr. Asit K. Ray, Professor of Chemical Engineering Y. Zhou, M.S., CPP, FedEx Corporation R. Turner, MEM, Medtronic Sofamor Danek
Course Objectives:	<ol style="list-style-type: none">1. Understand relationship among product, distribution environment and packaging.2. Be aware of rules, regulations governing distribution packaging, and common industry guidelines, practices for distribution packaging.3. Be familiar with theories, processes, and applications of protective packaging, and testing methods, standards, and equipment for transport packaging.4. Be able to properly select, design and develop distribution packaging systems.5. Learn the basics of materials and sterilization methods used in biomedical industry as well as design and development of biomedical packaging.
Prerequisites by Topics:	<ol style="list-style-type: none">1. Differentiation, Integration2. First semester chemistry or one semester survey course in chemistry for students in science and engineering.
Topics:	<ol style="list-style-type: none">1. Introduction2. Hazards in the distribution environment3. Rules and regulations governing transport packaging4. Product fragility, vibration sensitivity, and compression issues

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5. Product sensitivity to temperature, humidity, atmosphere pressure and other environmental conditions
6. Properties of cushioning materials
7. Theories, processes, and applications of protective packaging
8. Corrugated shipping containers
9. Other shipping containers and materials
10. Transport packaging testing methods, standards, and equipment
11. Package design and testing projects
12. Basics of medical packaging design and development
13. Sterilization methods used in industry and the differences
14. Packaging materials used in industry and why they are used
15. Basic thermoforming principles
16. Methodology of shipping temperature sensitive product

Class Schedule: Two 75-minute classes per week

Prepared by: Asit K. Ray, Ph.D. **Date:** September 2005

Professional Component:
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Category (check one)	<input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other
Design (check one)	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Some <input type="checkbox"/> None
Realistic Constraints (check all that apply)	<input checked="" type="checkbox"/> Economic <input checked="" type="checkbox"/> Environmental <input type="checkbox"/> Sustainability <input checked="" type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input type="checkbox"/> Health & Safety <input type="checkbox"/> Social <input type="checkbox"/> Political

Relationship to Program Outcomes:

Check all that apply:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice