

14:440:371 (Spring, 2017) Packaging Evaluation Methods
 Packaging Engineering Program, School of Engineering
 Rutgers University – New Brunswick, New Jersey

Instructor: Won-Jong Rhee
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 Office: Engineering Building, A260
 Course Time: Wednesday 1:40-4:40P
 Office Hour: by arrangement
 Phones: 732-236-5445 (cell), 848-445-5234 (office)
 Class Location: SEC 216
 Course Website: <http://sakai.rutgers.edu>

Course Descriptions:

Course Schedule:

| Week | Description | Assignment |
|------|--|------------|
| 1 | Introduction to Packaging Evaluation Methods: General Evaluation of Packages through Conceptual Understanding of Packaging Materials in terms of Physical & Mechanical Properties of Materials. | |
| 2 | Understanding of Cellulosic Fibres & Evaluation of Strength of Paperboards and Paperboard Containers. Factors affecting paperboards and containers. | |
| 3 | Evaluation of Physical & Mechanical Properties of Folding and Corrugated Containers with regard to Packaging Functions. | |
| 4 | Evaluation of Mechanical Properties of Packaging Materials in Packaging Practices in terms of Strength, Deformation & Energy. | |
| 5 | Continued from above Topics. | |
| 6 | Evaluation of Chemical, Physical and mechanical Properties of Plastic Materials in Packaging Practices with regard to: Types of Polymers, Chemistry of Synthesis, Structure, Bonding Forces, Stereoisomerism, Crystallinity & Amorphousness, Polymer Solubility & Solution, Molecular Weight, Transitions in Polymers, Factors Influencing Transitions, Thermodynamics of Melting, Influence of Copolymerization, General Observations about Transition and Melting, Effect of Crosslinking, and Physical Properties in General. | |
| 7 | Continued from above. | |
| 8 | Midterm | |
| 9 | Evaluation of Packaging Materials and Packages in terms of Leakage & Permeation of Packaging Materials & Containers: | |

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| | Closures and Leakage Issues; Gaskets and Application & Removal Torques. Mechanisms of Permeations of Water Vapour Transmission (WVTR) & Oxygen Gas Transmission Rate (O ₂ TR). Factors Affecting WVTR & O ₂ TR. Definition of Shelf-life and Determination of Optimum Shelf-life of Packages. Principles of Operations of Testing Equipment for WVTR & O ₂ TR Testing Determination of Materials Constants in terms of WVTR & O ₂ TR. | |
| 10 | Continued from above | |
| 11 | Properties of Metals and Glasses in Packaging Practices in terms of Functions & Economy. | |
| 12 | Evaluations & Applications of Packaging Materials in terms of Thermal Insulation Properties and ESD (Electrostatic Discharge) Issues of Packaging Materials such as Plastic Films & Foams. Principles of Evaluations of Insulation Materials and ESD Preventive Methods. | |
| 13 | Evaluations for Shock and Vibration Properties of Cushioning Materials in terms of Deformability under Static Stress & Strain. | |
| 14 | Evaluations of Distribution Packaging via Practical Field Analysis of Distribution Packages in terms of Physical / Mechanical Effects using Field Data Logging. | |
| 15 | Reading | |
| 16 | Final Exam (Cumulative) | |

Grading Policy:

Attendance: 10% (each unjustifiable absence=5% reduction)

*** Three unjustifiable absences=fail (unconditional)

*** Each 15 minute late to class=1/3 absence

*** Sign in as entering the class.

Midterm: 40%

Final: 50%

Total: 100%

*** During the semester, there may be some adjustments required in lesson order or assignments.

Those will be announced in class and/or on the course website.

In-class Policy: Permitted no electronic devices at hand during lecture periods.

Homework Policy: All assignments to be handed in before due date/time posted.

Exam & Quiz Policy: **NO** open books/notes/computers. **NO** student discussions/ copying/exchanges.

